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Volume 55

January to June, 1920

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UNIV. OF
CALIFORNIA

Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the state matters of any particular state. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or state to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or state affairs appear direct under the names of the city or state involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into thirteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index. As an example, if a reader wished to locate an article on special work he would obviously look in the list under the general subject Track and under this caption, only special work could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair shop equipment" and are not indexed alphabetically, because of the fact that there is a wide choice in most cases of the proper keyword to be used.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND ACCIDENT PREVENTION

Accident claim department
Accidents (including wrecks)
Safety-first

CARS AND OTHER VEHICLES

Car design
Cars
Locomotives
Motor buses
Motor cars, Gasoline

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Controllers and wiring
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Repair shop practice
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UNIV. OF CALIFORNIA

Electric Railway Journal

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More Cars Ordered but Less Track Built than Last Year

WE HAVE made a special effort this year, in our statistical tables, to expand the comparisons with the data for former years. In consequence, several new tables are included which should prove of value. The statistics of rolling stock purchased or built in company shops during 1919 show a considerable increase over the number reported during 1918, particularly in one-man cars, of which more than double the number were purchased in 1919 than during the previous year. In fact, approximately 75 per cent of all motor passenger cars ordered for city service in the United States, exclusive of those for use in subways or on elevated railways, were of the one-man safety type. The number of trailers ordered, while less than in 1918, accounted for approximately 25 per cent of all of the two-man passenger cars. The home-made cars, although less in number than during 1917, were nearly twice those of 1918, indicating easier conditions in the way of securing material and labor.

The car statistics show that the companies are putting forth every effort to carry the traffic presented for transportation and to carry it as economically as possible by a growing number of one-man cars. Similarly, the track statistics afford clear proof that the credit of the companies, or at least their incentive, for making extensions to their existing systems, has practically gone. The record of new track built is the lowest recorded since we commenced the compilation of figures on this subject in 1908. It is only half of that last year, and if the 34½ miles of rapid transit extensions in New York City are excluded, the longest line built was 5.38 miles, and this was by the Seattle municipal line. There were only three other extensions in the country of more than 4 miles. As the tabulation includes turnouts, sidings and connections, these figures mean that extensions have practically stopped.

Evolution Still at Work in Franchise Making

TIME shows the wisdom or the folly of man's plans. As the years go by this is illustrated in the working out of the modern type of franchise for electric railways. Each new settlement between the public and the investors has been arrived at after long periods of thoughtful research and discussion, yet a short experience was generally sufficient to reveal defects not evident before. The very latest attempt at franchise drafting—the one just rejected by the people of Minneapolis—had many features to commend it, but the plan will have no opportunity to show whether it, after all, would not have developed some weakness in spite of the care put upon it.

In our Statistical Issue last year an expert discussion of service-at-cost plans which had been adopted or considered up to that time was presented by L. R. Nash of Stone & Webster. In the present number of the JOURNAL franchise developments of the past year are reviewed, thus bringing up to date the summary of modern franchise experience.

Basis for improvement is still evident in franchise planning after all these years of experimentation. One city will guard against Judge Tayler's error in establishing a too limited schedule of variable fares for Cleveland. Another will avoid a second deficiency of the same grant—namely the fixing of a definite return on investment which may prove inadequate. Still another will place better safeguards around the company's investment at the end of the ordinance term. Taken all in all, however, the perfect franchise has not arrived. Indeed it may be true that if a model franchise were adopted to-day, keeping clear of all known defects of existing grants, it would still fail of its purpose under the unforeseen conditions of the future.

Special attention has been directed lately to provision for maintenance, renewal and depreciation allowances in ordinances of this character. This subject is set for discussion at the coming mid-year meeting. During recent years of financial trial the general practice of meeting such expenses from current revenues, without setting up an adequate fund to insure replacements in the future, has been recognized as economically unsound. While it may be impossible to fix a uniform standard, based on a certain percentage of gross receipts, for these funds, the industry would profit by studying results in such places as Chicago, where this idea has been carried out since 1907.

Too much consideration cannot be given to the question of rate of return. To restore the confidence of capital it is necessary that the experience under certain ordinances be avoided. Better results are promised under such grants as those for Youngstown and Cincinnati. Money has its price the same as labor and materials, and if the electric railways are to continue attracting investors they must offer an inducement comparing favorably with that of competitive bidders. To do this it will be essential at all times to offer a return equal to existing prices for money and to give some incentive to efficiency and economy of operation.

The most recent franchises have provided more sensibly for regulation of rates of fare, the all important feature of any ordinance. A service-at-cost grant is bound to fall short of its purpose if it does not establish a sufficiently elastic schedule of rates. It will also fail to protect the investor if changes in rates cannot be made promptly to meet emergencies. In this instance, the Youngstown ordinance would appear to have an advantage over its predecessors, while the Boston Elevated Act has been found too rigid.

The Youngstown measure presents another important

TO VIMU AMARONLIAO

safeguard in the provision for taking care of investment at the end of the grant. Certain companies whose ordinances have not many years to run are facing serious embarrassment through lack of protection in this particular, and the industry would do well to study how the problems of financial readjustment can be solved when the day of reckoning comes.

Public authorities apparently have failed, except in a few instances, to recognize the injustice of burdening the cost of transportation with such charges as those for paving, cleaning and sprinkling of streets. Until the car rider is assured that the fare which he pays is devoted entirely to expenses connected with his transportation, he will have cause for complaint against increases in rates. Unbiased students of electric railway problems have reported time and again in favor of removing such charges, but the prejudice against such action has yet to be overcome.

Service-at-cost settlements are, in theory at least, essentially fair. They should meet with universal support on the part of the public, the employee and the investor, but this millenium will not be reached until it is recognized that under the franchise in question the car rider pays for what he gets and gets only what he pays for.

Progress of the Zone System During 1919

THE year 1919 was noteworthy in the history of zone fares in the United States. It witnessed the most ambitious experiments thus far undertaken, involving the greater portion of the electric railway lines in two states, Connecticut and New Jersey, and the results secured in the two cases were widely dissimilar. The zone system of the Public Service Railway in New Jersey was introduced on Sept. 14 and abandoned by permission of the Board of Public Utility Commissioners on Dec. 7. The Connecticut Company inaugurated a zone system of fares on Nov. 2, which is still in force.

The zone experiments in New Jersey met with a large measure of public opposition, leading to an active and widespread boycott of the cars on the so-called Southern Division, comprising the lines in and around Camden. In consequence the revenues of the company were much less than had been anticipated by the commission, and they were insufficient to enable the property to earn its fixed charges. The abandonment of the system was requested by the company and acquiesced in by the commission in order to avoid serious financial consequences.

On the other hand, the zone system of The Connecticut Company has been accepted in good part by the public, which has shown a willingness to co-operate in making the new system an operating success. The new system of fares has produced a most gratifying increase in operating revenue, that for November being at an annual rate of $1,500,000, or 17 per cent, over the receipts from a 6-cent fare.

Electric railway operators can study with profit the widely varying experiences of these two companies. There has never been a more impressive demonstration of the importance which the public attitude plays in the success of any movement. In general outline the zone systems of these two companies were practically identical. Both were based upon traffic studies made by Dr. Thomas Conway, Jr., of the University of Pennsylvania. The traffic data collected were substantially the same in both cases, and it is presumed that the methods used in estimating revenues were very similar. In general the operating methods originally employed in New Jersey were adopted with slight modifications in Connecticut. As the zone system in Connecticut is said to be producing almost exactly the revenue which was predicted, it seems clear that the failure of the zone system in New Jersey must be due to certain conditions and causes peculiar to the local situation and that this failure should in no wise deter other companies from seriously considering the zone system, particularly if the lessons to be drawn from the New Jersey experiment are taken to heart. In an article in this issue the New Jersey situation is summarized by a member of the staff of the commission, and the results of an inspection by this same authority of The Connecticut Company system were given in an article in the Dec. 27 issue. In view of the publication of these articles, it will not be necessary to refer to them in detail, particularly as an analysis of the situation in New Jersey was published in an editorial in the Oct. 18, 1919, issue, and one of that in Connecticut in the issues for Oct. 11 and Nov. 1 of this paper.

It would be difficult to find a more conclusive demonstration of the great value of freedom of initiative on the part of the utility in instituting changes in rates than is reported by a study of the comparative results in New Jersey and Connecticut. The wisdom of the provision of the public utilities statute of Connecticut, similar in nature to the provisions of the law in Pennsylvania and Maryland, allowing the company to initiate a new rate upon its own motion without power of suspension by the commission (but adequately safeguarding the rights of the public through the power of subsequent review and determination by the commission), again has been impressively shown.

The future of fares in New Jersey at this time is uncertain. The New Jersey commission is now completing a valuation of the railway property, pending which the 7-cent fare with 1 cent for a transfer has been restored. This rate will probably not yield a fair return upon the value of the property, and the solution which will be worked out eventually to insure a reasonable return, essential to the railway's ability to secure capital to meet the requirements of the people of the State, is one of the unsettled problems carried over into 1920.

While the New Jersey and Connecticut zone plans naturally attracted most of the attention during the past year, the zone systems heretofore existing in Springfield and Holyoke, Mass., on the suburban lines of the Milwaukee Electric Railway & Light Company, on the Rhode Island Company's property, and in Portland, Maine, continued in operation throughout 1919. Certain changes in zone rates were made in the effort to offset rising cost, involving in these cities an increase in the initial rate of fare.

While it is too early to appraise the progress which the zone system has made in America during 1919, yet it seems clear, on the whole, that the year marks a distinct advance in the application of this principle to American electric railways. The economic problems which have turned the minds of electric railway operators to the zone system still remain. Few properties are able to earn a fair return upon their fair value. The problem of an adequate rate remains unsolved on most of the electric railways of the country. The New Jersey and Connecticut experiments have demonstrated the practicability of the zone system in urban communities, although the urgent need for better fare collection apparatus for zone system operation is clearly apparent. There is no doubt that the continued use of the zone system will stimulate manufacturers to produce devices for the more speedy collection and registration of the zone fares.

What Was Accomplished Along Engineering Lines Last Year?

IN REVIEWING the electric railway engineering problems that have been actively discussed during the past year, it is reassuring to find that splendid work is being done to bring about much needed economies. In all of the departments into which we commonly divide such activities, the one outstanding feature is the desire to increase efficiency and so to effect substantial savings. A few examples will be cited to indicate the lines along which progress is being made.

At the Atlantic City convention the power generation committee of the American Electric Railway Engineering Association presented a notable report on the automatic substation and a form of power contract for electric railways, relating respectively to economical use and purchase of power. The extent to which the industry is dependent upon labor has been forcibly brought home in a number of instances and an extension of the use of automatic substations has helped to relieve this condition and at the same time has shown results in reducing costs that are a real encouragement in these times. The trials and troubles experienced with automatic apparatus have not been many and progress in overcoming them has been rapid. Another economy in power generation that has been referred to frequently is the use of special fuels for power plants. In the recent assignment of subjects to the Engineering Association committees this one has been included. If fuels cheaper than coal can be utilized a great boon will be conferred thereby on those responsible for supplying power to electric railways.

The tendency of those actively connected with power distribution has been toward the development of standards for transmission and contact systems. Specifications for overhead line material, wires and cables have been revised and the requirements for crossings of power lines with railroads have received increased attention. The value of a careful study of the losses connected with power distribution has been made apparent by the greater effort toward maximum use of existing equipment. Rapid advances in the cost of labor during the year have also brought labor-saving devices into special prominence. Engineers of way have collected convincing data on the savings which have resulted from the use of various types of tools. All are thoroughly alive to the necessity of utilizing labor-saving devices to the limit in order to keep maintenance costs within reason.

In rolling-stock construction and operation, the light-weight safety car has come into general use. Not only has it proved economical to operate, but increase in riding has been secured on many properties by the use of more frequent headway and quicker service. The limitation of car design for two-man operation to a few standard sizes has equally great possibilities in regard to weight reduction and improvement in construction. In car details the advent of helical gearing for railway motors is an innovation that should reduce car maintenance cost by eliminating those shocks and vibrations which originate in the equipment itself.

Finally, in the repair shops, the necessity for increased facilities to carry on the maintenance of equipment economically has been given increased consideration by equipment engineers. They realize as never before that favorable conditions for inspection and convenient track layouts for the shifting of cars will produce far-reaching results.

Looking at their work as a whole our conviction is that the engineers have contributed no small share to the improvement in operating conditions on electric railways which was manifest during the past year.

Is Maintenance Practice Keeping Up to the Scratch?

DURING the past year much has been said and printed concerning maintenance practice in all departments of electric railways. The subject was especially popular for dissertation and discussion at conventions. This leads one naturally to inquire as to whether maintenance conditions and methods have really shown marked improvement during, say, the past twelve months. Our observation leads us to conclude that they have done so.

To look backward a bit we must remember that even preceding the war net operating revenues had in many cases declined to such an extent that maintenance of equipment, track and lines had fallen behind. During the war, the combination of high prices, lack of money, and scarcity of materials and labor forced all but absolutely essential maintenance in all of the departments to be deferred indefinitely. Since the armistice was signed there has been some decrease in prices, notably in copper, while other commodities have maintained their previous level or, in some cases, prices have further increased. But in many places higher fares have been allowed and this has resulted in larger appropriations for maintenance. Materials have certainly been more plentiful, and as for labor, the higher wages and the release of men from military service have resulted in a change from the condition of trying to find men for the jobs to that of placing those who have returned to their former places of employment.

Thus the natural tendency has been to begin catching up on deferred maintenance, which in many cases had reached a critical point. As a result more necessary maintenance work has been done during the past year than has been performed for several years preceding, although as a rule equipment, track and line have not yet been brought back to a normal standard of maintenance. It is safe to say, however, that on most properties the maintenance program is now on a normal basis or better.

The effect of fare increases upon maintenance has been marked. It is to be hoped that the public realize that maintenance work is being given preference over dividends and interest, and that improved operating conditions have almost invariably followed an increase in revenue. Some properties that are seeking or expecting increases in fares have allotted larger amounts to maintenance in the conviction that business follows service.

In maintenance practice increased stress is being put upon a systematic, intelligent inspection. This is true in all departments, but particularly in the shop. We may revamp the old adage, "a stitch in time saves nine" by saying that a dollar spent for intelligent inspection will save many which would otherwise be spent for service delays, total replacement and accident claims.

The methods by which maintenance work is actually accomplished show a steady improvement. Probably the most important single development has been in the use of gas and electric welding and cutting. This method of reclaiming worn and broken parts or making new ones, both in the track and shop departments, has already come to be recognized as a necessity. The scrap pile has been very largely reduced, and great savings have undoubtedly been made. In some cases enthusiasm has probably gone too far in this work, and parts have been repaired that could have been purchased new at a saving. The point of profitable reclamation must be clearly determined. This accomplished welding will produce marvelous results. The importance of the subject of welding can be realized by considering the fact that a national engineering society is devoting its entire energies to this specialized branch and it seems to find enough to do to keep itself busy. Its activities ought to be helpful to electric railway maintenance men. While the society started under the exigencies of war it can play a useful part in peacetime maintenance.

To sum up the situation as we see it, better maintenance is largely dependent upon sufficient revenue, for costs are not going to be greatly reduced soon. If present fare increases can be maintained and other necessary ones can be secured, the close of 1920 will see maintenance in all departments at a higher standard than ever before.

Retrospect and Prospect— Large Traffic Gains in South

A PROMINENT railway manager, in commenting on the difficulties of the electric railways a year or two ago, said that they were suffering from no trouble which more money could not cure. The truth of this remark has been demonstrated during the past year. Where permission has been obtained by a railway to make reasonable advances in rates to accord with the advances in the costs of materials and labor, the condition seems bright. Where the rate advances have been refused or have been inadequate, the opposite condition prevails.

By and large, the situation as a whole is better than in January, 1919, for several reasons. In the first place there is no doubt a wider popular recognition of the direct relation between rate of fare and cost of service and a greater disposition on the part of the authorities to sanction necessary adjustments in fares. In the second place, patronage, especially on the city properties, is growing, often in spite of increased fares, and although the prices of labor and materials remains high it is easier to obtain both.

The most important event of the past year, from an electric railway standpoint, was the hearings conducted at Washington by the Federal Electric Railways Commission. The report and recommendations of this commission have not yet been made, but considerable benefit from its appointment is already apparent. It has come from the testimony presented which has helped to educate the public to an understanding of the true condition of the industry, to a realization of its essential character and to the injustice of an inflexible selling price for a commodity whose cost of manufacture varies with market conditions.

In some respects conditions in the South are better than those prevailing in other parts of the United States. As is well known, the section of the country south of Mason and Dixon's line is enjoying an unprecedented wave of prosperity. War activities and, more recently, the soaring prices of cotton and tobacco, and the extensive expansion of the oil fields, are responsible, in the main, for this fortunate business condition. Merchandise is moving with a wonderful rate of turnover. Homes are unavailable, hotels are full to overflowing all the time, and railroads are carrying record loads continually. Building projects and all forms of industry are being pushed to meet the great demand.

These conditions are of course directly reflected in the number of passengers carried by the interurbans and street railways, for what one agency is more vitally intermeshed with all local activity and industry than the transportation system? Consequently, aside from isolated cases, the electric railways of the South are in better condition generally than those in other parts of the country. Those companies which have been able to avert receiverships up to the present are now enjoying, almost without exception, such a good increase in traffic over last year that the higher operating expenses are being absorbed without difficulty. While many of them are still operating on a 5-cent fare, practically none is now in danger of insolvency, so long as present conditions continue. A few claim to be getting a return from the 5-cent fare adequate to meet operating expenses and all fixed charges and pay dividends on common stock. It is notable that these few are the companies which have been most alert to new economies and improvements in service, particularly the one-man safety car.

But the great majority of the companies of the South, while having almost more traffic than they can handle, are in need of an increase in the rate of fare. The 5-cent fare under particularly favorable business conditions is serving to keep heads above water, but is not producing a revenue which will provide a reasonable return on the value of the property in addition to proper allowances for maintenance and depreciation, and not sufficient, therefore, to attract new capital into the business.

Many of the Southern companies have been hesitant and perhaps backward about petitioning for increased fares, feeling that it was better not to start a controversy as long as the present rate of fare, coupled with excellent traffic, was providing enough to keep the company solvent, even though not enough to make possible any new financing. In such cases, new equipment has to be paid for out of operating earnings, and quite a little work of this kind is being done, pending the adoption of a permanent settlement of the situation which will permit the issue and sale of securities. Among those railway men who have been in close touch with the people of the South there is a belief that the attitude of the people toward the railways is undergoing a favorable change and that there is more and more evident a disposition to treat fairly their petitions. In the light of this knowledge, it appears that the year 1920 will bring a great many fare increases in Southern cities, and, having these, there will follow splendid progress and a sound financial condition.

Is a Spirit of Optimism Justified at This Time?

ON THE SURFACE, and quite a little way below the surface, operating and financing conditions in the electric field are discouraging. The near-sighted individual who visualizes only 1919 or 1920 is certainly warranted in feeling a trifle blue. But how about the far-sighted man who thinks in decades rather than years, who considers improvement in service more important than immediate gain, whose brain is fertile in expedients for developing new business to take the place of that which is lost to competitors and for cutting down the unit cost of giving this service? Is he justified in looking forward to the future of electric transportation (supplemented by such other means as inventive talent may produce) with zest and hope? We believe he is. It's up to us to say why.

The present condition of the industry is due almost entirely to inability to adjust the price of our product to its cost. This in turn is due to several unfortunate conditions, largely outside of the control of the managers of the electric railways. First, there is the rapidity of the increases in costs of labor and materials.

These costs tend practically always to rise, but under normal conditions it would have been more nearly possible to secure corresponding increases in rates and in operating efficiency. Next is the reluctance of patrons to permit higher prices to be charged when they exercise statutory control over the situation. There are many prices which they cannot readily control and they are apt to hold the controllable prices down, to offset the increases in the others. A third item is the effect of politics; it is obviously in the line of self-interest for the demogog to ingratiate himself with his constituency by playing public utility against public.

Of course we can see now some things that might have been done to offset rising costs. We realize at the same time the handicap of prescribed fares and largely prescribed service.

But enough of this dark side of the picture! The dawn of the day of higher fares and better feeling on the part of the public appears. Fertile brains are devising new means of giving improved service without increased cost, and of selling more transportation to the public by merchandizing methods. The public is beginning to realize its dependance upon the electric railway. It is well to note these hopeful signs and to recognize them as harbingers of that better status for the railway business toward which we are all earnestly striving. The present situation is well summed up in the accompanying "foreword" by Lucius S. Storrs. This the editors asked him to prepare because of his recent experience on the Electric Railway War Board, as chairman of the sub-committee on publicity of the Committee of One Hundred and as president of a company which has just put over a resultful publicity campaign for increased fares. His comment, may, therefore, be considered the conclusion of this article.

Looking Toward 1920—and Beyond

THESE are times when the electric railway industry should put behind it the gloom of the past and look forward with anticipation toward the better times that seem to be at hand.

The period of the war brought many troubles to the electric railways, but the industry is emerging from them, and the future is brighter.

If our recent experiences have impressed any one fact upon our minds more deeply than others, it is the necessity of educating our own employees as to our condition and the need for them to co-operate in bringing about improvement. There is also a need for electric railway companies to put their stories fairly and squarely before the people.

L. S. STORRS

The testimony presented by witnesses who appeared before the Federal Electric Railways Commission has had wide publicity, and all of us must appreciate what a marked effect this publicity has had on the public mind. I believe it has been very helpful in putting the case of the industry fairly before the people.

Too much emphasis can hardly be put upon the suggestion that the work begun by the Committee of One Hundred must be continued. Merely to tell our story is not enough—it must be told over and over again with whatever modifications the future may bring and with due allowance for the varying conditions in different localities.

More important than anything else, it seems to me, is the maintenance of an optimistic state of mind. The industry has gone through a critical period, and that we have stood the test so well is cause for congratulation. Before us is the task of making up the losses of the trying times from which we are emerging and the restoration of the industry on a sound basis. There is nothing about the situation to cause pessimism. Opportunities for earnest, efficient and able service were never so great as they are today, and that there will be an adequate reward to the men in the industry and the public which has invested its money in the electric railways seems certain.

We must all co-operate. We must continually strive for the intelligent co-operation of the employees and, most important of all, we must leave nothing undone to win the good will of the public.

L. S. Storrs

Railroad Electrification In, Before and After 1919

STATISTICS as to new construction and rolling stock for heavy electric traction for 1919 relate largely to the Cascade electrification by the Chicago, Milwaukee & St. Paul Railroad. Although full electric operation has not yet begun on this section, delivery of the new electric locomotives for this division is under way. Five passenger locomotives, which were built by the General Electric Company, will shortly be in operation, as will also ten Westinghouse passenger locomotives for the Rocky Mountain division. The former locomotive was described in the issues of this paper for March 23, 1918, and Oct. 18, 1919; and the latter in the issue for March 23, 1918. The present issue contains another article on the Rocky Mountain passenger locomotive.

It is always interesting to note what the New York Railroad Club talks about on its "annual electrical night" because this is designed, among other things, to epitomize the electric traction progress of the year. At the 1919 meeting E. B. Katté, to whom was delegated this particular task, said that when he began to prepare his paper he thought that there had been very little progress made since the previous meeting, but as he reviewed the situation carefully he found that the year had been far from an "off" one. As evidence of this he directed attention to the new St. Paul, Pennsylvania and New Haven locomotives which show substantial progress.

The Rocky Mountain electrification of the St. Paul very forcibly impressed a commission of thirteen French engineers who came to this country last spring to study heavy traction with a view to finding, if possible, a superior method for general application in their own country. This commission had a definite task before it, because the general electrification of railroads in France is much more imminent than here due to the high price and scarcity of fuel. The commission returned home about the end of July, apparently convinced that the high-voltage direct-current system possessed advantages over others for their purposes. The ultimate results of its observations will undoubtedly be a modification of the tendency on the part of many French engineers to favor alternating current.

On the other hand, in the United States railroad men are not by any means unanimous as to one or another of the systems of electrification now available. On the Norfolk & Western Railway the single-phase three-phase locomotives are doing yeoman service. The work imposed upon them there is terrific, but they are getting away with it. The maintenance cost per locomotive-mile is high, as would be expected under the circumstances, but the cost per ton-mile is reasonable. This fact must be kept in mind when comparing maintenance costs with the remarkable records on the locomotive-mile basis which are being made elsewhere. The Pennsylvania Railroad showed at the Atlantic City convention of the mechanical section of the American Railroad Association the great single-phase three-phase locomotive which it had developed for use on its Allegheny Mountain division. This locomotive has been in freight service in the Philadelphia-Paoli electric zone, where it has given an excellent account of itself. One important reason why this type of locomotive is favored is that it gives a great haulage capacity in a given amount of space. In view of the interest that the Pennsylvania engineers are taking in this type of locomotive, it is certainly still "on the map." And the single-phase system, with series compensated motors, is still being heard from. The New York Connecting Railroad, which operates over Hell Gate Bridge between sections of New York City, has put into commission a number of new locomotives of this type, having a weight of 180 tons and a motor capacity of 2,000 hp. on a one-hour rating.

As the St. Paul situation occupies the limelight for the moment, a few facts regarding it are in order. This road made a notable addition to its electrified track in 1919 by equipping 207 miles of main line and 73 miles in side tracks and yards between Othello, and Seattle and Tacoma, Wash. The passenger motive power of this section will consist of the five G. E. locomotives, which are of the gearless type equipped for regenerative control. These are 76 ft. long and weigh 265 tons. The freight locomotives will be transferred from the Rocky Mountain division, the geared locomotives now used there in passenger service being regeared for the purpose. A few freight locomotives are already in use and the passenger locomotives will be operating in a few weeks. Power for the new electrification will be purchased from the Washington Water Power Company.

The locomotives removed from passenger service on the Rocky Mountain division are to be replaced by the ten new Westinghouse geared machines. These are also provided with regenerative control. The railroad will therefore have available for comparison in performance two types of locomotives, radically different in design and appearance but meeting approximately the same service specifications. The conspicuous differences are in type of motor, method of drive, scheme for excitation of main motors during regeneration, arrangement of control equipment, cab design, etc. Other interesting features of this installation are in the distribution system, which is being equipped with a device for protecting the motor-generators in the substations from the effect of excessive overload, by automatic reduction of voltage. The substations are to be provided also with apparatus for safeguarding the motor-generator sets from the effect of short-circuits, for permitting the power conditions to be closely supervised, etc.

The completion of the electrifications in Montana and Washington leaves a steam-operated section isolated, and undoubtedly this will be electrified in due course for general operating economy, if for no other reason. From what has been said it is obvious that the St. Paul road is entitled to much appreciation from the steam railroad fraternity generally for pioneering on so large a scale. As to the future in heavy electric traction, there is a general feeling that important developments are pending. Several projects are ripe for electrification, but the uncertainty as to the way in which steam railroads are to be organized and administered produces a check on definite planning. The coal situation, however, is so critical that considerations formerly given as favoring electrification are now greatly magnified. The success of the present electrifications is also in favor of further application. In Europe we see the results of natural tendencies in this direction greatly accelerated by the war. The activity in railroad electrification now manifest there must be reflected on this side of the water in due time. And the time would seem to be soon.

Deliveries to Be Important Market Issue During 1920

GENERALLY speaking, electric railway manufacturers are of two classes, those devoted entirely or in large part to the production of electric railway supplies and equipment and those manufacturing a line finding application in more than one field, including the electric railway.

The former class of manufacturers, as a rule, frankly had a rather unprofitable year. Some of these have had to engage in side lines to "keep the wolf from the door" until the electric railways shall again get on their feet. Those in the latter group have not felt our enfeebled condition so keenly because they have been able to concentrate on fields more fruitful in orders.

However, the past is a tale soon to be forgotten. Of real importance just now is the future. Will there be more business? We believe that there will be, particularly in the way of light-weight cars, which have shown such an increase in popularity during the past year, and in those devices which are designed primarily to reduce the cost of operation and are required in maintenance, in distinction from those used in new construction.

In this connection we have a word to say to the man who purchases materials. Prices may go slightly higher during the year, but not very much. Rails and sheets will probably command a premium for early delivery. Wire should be lower before it is higher. We can't tell anything about poles and ties just yet, except to say that there is little likelihood of any drop during 1920. Motors if they change at all will be higher in spite of lower copper costs. The same is true of transformers and substation equipment.

However, the most important factor in the market during the entire year is not going to be prices, but deliveries. Electric railways will feel this very keenly because they have to compete with the steam roads for so much of their material. The President has stated that the steam roads are to be returned to private operation in two months.

Within two months, then, the rail rolling mills of the United States, unless Washington changes its mind, will be booked up for their entire 1920 output and a good part of the 1921 capacity also.

The sheet mills and the girder mills will in all probability be in worse condition for deliveries, owing to the building and industrial demand.

In addition transportation facilities are so short that delays along the road are going to pile up, resulting in further delaying shipments.

The delivery situation during 1920 in the electric railway field, as things look now, will be worse than during 1917 and 1918. This is not said to frighten. These are the plain, cold facts.

If roads have any idea of buying rails, or plates, or wheels, or axles, or motors, or transformers, or line material, we believe therefore that they should order now. If later they do not need the material it will probably be a simple matter to cancel the order. In fact, in most cases, we think that the manufacturer will be highly pleased.

Value of Association Measured by Capacity of Individual

SOME purchasing agents are assuming a skeptical attitude as to the value to them of the organization which the purchasing agents formed at the October convention. They are wondering what good will be derived from such an association and whether they should take membership. According to some of them, it doesn't help to tell each other what prices are secured on various materials, as so much depends upon conditions of competition, quantity, delivery requirements, etc.

This contention is quite true. At the end of the year there will not be any such accomplishment to record to the credit of the Purchasing Agents' and Storekeepers' Association as the lowering of the price of steel, say, 2 cents a pound or of coal 20 cents a ton. The purpose of the association, as we understand it, is not to reduce prices or even primarily to discuss them. Instead, the real value of such an association, as is pointed out in an article by Mr. Stigall in this issue, comes from the interchange of ideas and experiences and the promulgation of new thoughts on making the purchasing department of greater service to other departments, for primarily the purchasing department is a service department. We believe it to be almost impossible for twenty-five live men in the same line of business to get together talking shop without there being expressed ideas of helpfulness to almost all present. Sometimes the value of a suggestion may not be apparent right then, but later it will be recalled that such an opinion was heard and the worth of it will "come home" with its application to the local problem.

This then leads to the conviction that the good to be derived from an association of purchasing agents and storekeepers depends on what the individual puts into it and on his capacity to comprehend and absorb new thoughts. In other words, as one progressive Mid-West P. A. put it, "you can't pour a barrel of water into a pail." The purchasing department representative who can derive no benefit from attendance at such association meetings should place the blame for this upon himself and not upon the association; and if he cannot get back in helpful thoughts several times the value of his expense account for making the trip to the meeting, then he needs to make way for a successor who has vision and initiative enough to move along with the art.

The thing to do is for each purchasing agent and storekeeper of an electric railway property to get behind this constructive effort of the newly organized association, thereby strengthening it by what he gives and by the larger good which he will derive from it.

The Irving National Bank, in a circular issued on Jan. 1, sums up the economic situation as follows: "Out of a year of difficult readjustments to the tasks of peace has come the conviction that national aims must more surely serve all interests alike—that the measure of a country's greatness lies in its contribution to the welfare of its own people and the well-being of the world—and that the important instrument of this contribution is, not governments, but business."

The Federal Commission and Its Work

By Charlton Ogburn
Executive Secretary Federal Electric Railways Commission

An Account of How the Report of the Federal Commission Is Being Drafted for Presentation to the President

Great Public Spirit Displayed by Commissioners and Witnesses—Cases of Railways and Labor Thoroughly Prepared

CHARLTON OGBURN

THE outstanding feature of the work of the Federal Electric Railways Commission, to my mind, is the fine public spirit it has elicited.

Here was a problem—the biggest domestic problem in the realm of finance, save that of the steam railroads, facing this country—and this problem must be solved by the co-operation of the three parties interested, the public, the owners and labor. In that spirit all must come together and give of their experience and their wisdom, pooling their ideas and their interests that there might be worked out a constructive program that will put this essential industry and its relations to the public on a better footing.

The Federal Electric Railways Commission appointed by the President offered the vehicle needed. Thus was the situation visualized by the commissioners themselves and by the public-spirited citizens who by their aid and co-operation made it possible for the commission to perform its task.

First of all, the officials of the electric railways throughout the country spared no pains to supply the commission with the facts it needed. The American Electric Railway Association and its Committee of One Hundred not only performed an enormous amount of work in presenting the case of the railways to the commission, but in doing that work they rose above the selfish interests of individual companies to a full recognition of the social and public nature of their industry. There was no effort to withhold or conceal facts unfavorable to their cause; most of the witnesses testifying on behalf of the railways realized that this was a time when all the cards must be laid on the table.

HOW ALL ASSISTED

This help and co-operation on the part of the railways is shown in no better way than in their answers to the comprehensive questionnaire sent out by the commission. There were asked 174 questions dealing with every phase of the subject. Many of the questions sought information somewhat unfavorable to the cause of the railways. But the answers came back full and unevasive. The preparation of these answers involved an immense amount of work. Records voluminous enough to fill large libraries had to be consulted. Proceedings of public utility commissions and of state and federal courts had to be abstracted and briefed. Financial data for ten years back had to be analyzed and tabulated. Wages, fares, taxes, franchise conditions, traffic figures, details of operation, theories of regulation, history of public relationships—all were asked for with great particularity.

And the answers sent in were so complete that in many instances it would be most unfortunate if they could not be preserved in permanent form.

If the thanks of the commission go to the electric railways for their aid in this work, then to an even greater degree is the commission indebted to the representatives of the public for their invaluable help. This aid was given disinterestedly and purely out of a sense of public service. And the spirit in which it was done is magnificent.

Mayors, chambers of commerce and boards of trade, central labor unions, and state public utility commissions, though lacking the complete records possessed by the railways, put such painstaking labor on their answers to our 174 questions that nothing else is needed to show the deep and widespread interest in this public question and a consciousness of the importance of its consideration by a federal commission. And no better way was afforded the members of the commission of obtaining the views of the country on the manifold phases of this problem than through the answers sent in by these public bodies.

The gratitude of the commission is extended especially to the forty-three busy men who came at their own expense to testify on behalf of the public at the hearings held by the commission. These witnesses traveled great distances, paying their own railroad fare and hotel bills, that the commission might have the public side of this big question as expressed in their testimony.

The witnesses were men whose time was valuable, but they gave of it freely. The list included such men as ex-President Taft, whose experience as joint chairman of the National War Labor Board in fixing wages on electric railways gave him an intimate knowledge of the problem; Secretary of War Baker, who came in close touch with the problem as Mayor of Cleveland, and before that as city attorney under Tom Johnson; Mayor Couzens of Detroit, and Mayor Babcock of Pittsburgh, both students of the traction problem; Commissioner Eastman of the Interstate Commerce Commission, and many leading state utility commissioners, such as Commissioners Ainey of Pennsylvania, Nixon of New York, McLeod of Massachussetts, Higgins of Connecticut, Bliss of Rhode Island, Hall of Nebraska, Corporation Counsel Burr of New York City, City Street Railway Commissioner Sanders of Cleveland and Commissioner Culkins of Cincinnati, State Senator Walsh of Massachusetts, President Ferguson of the United States Chamber of Commerce, and many other men of prominence, including mayors of cities where the problem is acute, all of the leading public utility experts, several specialists on taxation, etc., eminent economists and college professors and private citizens like Messrs. Bauer of Lynn, MacFarland of Boston, Marion Jackson of Atlanta, ex-Governor Foss of Massachusetts, Mr. Ingram of Detroit—to all of whom the commission is especially indebted for their interesting discussions and data, the preparation of which undoubtedly represents years of study and thought.

There were other public officials and private citizens who could not attend in person the hearings before the commission, but who submitted their views, prepared with great care and thought. These papers, too, have been of help to the commission as, for instance, the ones from Thomas L. Sidlo of Cleveland, Thomas A. Edison and Edward N. Hurley.

And labor, too, showed its deep interest and did its part. There was no testimony given before the commission more carefully prepared and presented than that given by the representatives of labor, the Amalgamated Association of Street and Electric Railway Employees of America. The commission recognizes, I am sure, the preponderating importance of the labor phase of the traction problem, and it was indeed glad to have the full statements from the labor representatives.

I may be permitted, I hope, to speak of the patriotic work of the commissioners themselves. They are entitled to the thanks of the country for their self-sacrificing work on this commission, done without a dollar's remuneration and at considerable personal cost. These commissioners sat day after day through long hearings that consumed twenty-eight days, from 10 in the morning until 10 or 11 at night, with brief intervals for lunch and dinner, and listened with the closest concentration to more than 100 witnesses' discussion of every phase of this important subject. And how many more days they have spent in considering the evidence gathered and submitted to them it is impossible to estimate; but it is obvious that the time they have devoted to this work must have been considerable.

The task of gathering and submitting this evidence fell to my lot as the executive secretary. The request of the editor of the ELECTRIC RAILWAY JOURNAL was for an article showing how this work was done. This, I think, has been indicated above rather clearly.

MUCH WORK DONE WITH LITTLE EXPENDITURE

Any recountal of the facts of this investigation ought to make the reader grasp the importance of the two factors that guided every step taken in performing this work; first the enormous scope of the investigation, the magnitude of the industry, the manifold ramifications and phases of the problem; and secondly, that the entire cost of the investigation had to be kept within the small sum of $10,000 allotted for the purpose. If space were permitted in this article I think I could show how this investigation was extended from city to city, from subject to subject, how facts about the industry were gleaned from every source, how the small appropriation was stretched and further stretched until by the practice of the strictest economy it was made to cover the whole scope of the work, until the reader would admit that here at least was one government agency that was not "honeycombed with extravagance."

The record of the hearings, which contained the principal evidence utilized by the commission, comprised 6195 typewritten pages and represents the testimony of 103 witnesses and a number of submitted statements. Seven of these witnesses testified in the presentation of the labor program. The remainder were about equally divided between the public and the railways. W. Jett Lauck acted as counsel for the Amalgamated Association of Street and Electric Railway Employees of America in the case submitted on behalf of labor, and Bentley W. Warren acted as counsel for the railways. The program for the public's side was arranged by me as executive secretary, with valuable suggestions from the chairman.

Since the hearings closed on Oct. 4 I have indexed and briefed all of the evidence—compressing the 6195 pages into 1250 pages; nothing has been omitted, but the testimony has merely been condensed. Copies of all of these abstracts were furnished to each commissioner.

I am now rearranging the entire body of testimony by subject matter into chapters relating under the proper heading the substance of each witness's testimony, utilizing where needed to round out the evidence the data obtained from the answers to the questionnaires.

The gathering of the evidence was greatly furthered by the use of the questionnaire. It saved the work of a corps of field investigators, the employment of which was made impossible by our limited funds. This questionnaire, made very comprehensive at the direction of the commission, was prepared by me with suggestions by the chairman. A second and much shorter questionnaire was sent out on Dec. 1 in order to obtain up-to-date traffic figures from all the electric railways.

SPECIAL STUDIES WERE MADE

I have also obtained special reports on special topics, such as one-man cars, zone-plan fare collections in Great Britain and in America, financial reports of all Canadian electric railways, brief summaries of general financial conditions of electric railways in other countries; a special comparative study of municipal operation of the electric lines of Seattle. We have received the benefit of the investigations and reports made by Stone & Webster and by Day & Zimmerman of the traction systems of New York City, the reports on electric railways by the Merchants' Association of New York, the reports of most of the state utility commissions, the reports of the hearings before the committee on public utilities of the United States Chamber of Commerce, the reports of the special committee on street railways in Massachusetts published on Nov. 15, 1919, and all available valuation reports on electric railways of state commissions and engineering firms.

In addition to the general investigation of all electric railways, there were some cities where I made a special study for the commission of the recent developments in the traction situation, notably New York, Boston, Philadelphia, Chicago, Cincinnati, Toledo, Washington, Denver, New Orleans, Louisville, Pittsburgh, St. Louis and East St. Louis, Cleveland, Detroit, Atlanta, Scranton, Kansas City, Memphis and Buffalo, as well as a number of smaller cities, and several Canadian cities.

The tabulation and analysis of all these data, especially that received in answer to our questionnaires, has been a very engrossing task. To accomplish it within the time required has necessitated a constant and daily violation of the eight-hour rule in our office—often working twice that number of hours—to an extent that would disqualify us for membership in the union, for we got no pay for "overtime."

A feature of the day's work was the acknowledgment of numerous letters of inquiry, requests for copies of our reports and especially the voluntary contribution of "solutions" of the traction problem that came in from all over the country with every mail. I wish that space permitted an account of some of the "brilliant suggestions" we received for saving the electric railway industry from "bankturupter"—as one Californian described it. On the other hand, many of these plans showed the results of thought and study—and I might say of every possible shade of thought—and indicated that from unexpected sources may come evidence of deep public interest in this big public problem and that the "man in the street"—the car rider himself—in whose interest this commission has been so laboriously engaged—may have a few ideas himself on the subject more pertinent and more practical than those of our greatest utility experts.

I was enabled to attend to the vast amount of detail work incident to this investigation only through the help of two extremely competent and faithful assistants, my secretary, Miss Crawley, and my statistician, Miss Stone, and a small force of efficient stenographers, all of whom seemed to have caught the spirit of public service characterizing this task, and worked, not by the clock, but with a certain pride of achievement.

After the hearings, on the authorization of the commission, I engaged Dr. Delos F. Wilcox to aid in analyzing the evidence, and both Dr. Wilcox and Dr. Milo R. Maltbie to advise with the commission, making recommendations, etc. The way in which these men have undertaken this task has clearly shown that they, too, have seen that here was an opportunity to do a constructive work, which if done properly would be of lasting benefit to the whole country.

Just what the commission will finally agree upon in its report to the President remains as this is written to be seen, but from my intimate knowledge of the broad-minded viewpoint of the commissioners themselves I am certain that there will emerge from this investigation a program and a suggested policy which every community can accept as a guide in its consideration of this problem, with only the modifications needed to adapt it to different localities.

The Municipality's Viewpoint in Electric Transportation

By W. C. Culkins

Director Department of Street Railroads, Cincinnati, Ohio

While the Relation of City and Traction System Is Still Nebulous, the War Has Made an Improvement in Conditions

There Is Evidence of Accelerated Progress in the Development of a Logical and an Equitable Type of Franchise

W. C. CULKINS

A NEW municipal viewpoint of street railway transportation is one of the by-products of the world war.

Rapid increases in the cost of materials and demand for higher wages has brought about a condition which is unprecedented and which was unthought of at the time when most of the franchises were adopted. In some places a falling off in traffic during the war period intensified the situation. In others the establishment of war industries caused such increases as to require heavy capital expenditures for extensions and equipment. Failure of companies to earn a fair return on capital already invested made it impossible to secure new capital, and the entire industry was threatened with collapse.

This situation, arriving at a time when the safety of the nation demanded the highest efficiency in production, suddenly focused attention on this vital subject. Startling questions such as these were presented: Under the existing circumstances would it be possible to require the maintenance of adequate service to meet the national emergency? What authority had the cities retained in the franchises to control such service and were the operators in a position to furnish it if they so desired? Indeed, was there not grave danger that the service would be discontinued entirely? Already the government had found it necessary to take over the national transportation facilities because they were unable to meet the economic crisis.

For the first time municipalities generally were awakened to a realization that street railway transportation was so vitally interwoven in the economic and social life of the community that it was not only essential to the existence of all other industries but to the community itself. Just as the early cities were built upon the waterways, so the cities had developed internally along the street railway routes, with neither advancing far beyond the other. The quick, convenient low-priced method of transportation furnished by the street railway had to be maintained or the employees could not be transported to the factories and stores, and the citizens would be broken into groups unable to maintain the interrelation so necessary to their social and commercial requirements.

Impending strikes and the drift of electric railway employees to more remunerative occupations caused the government to see the danger, and the War Labor Board created at Washington was prompt and unstinted in ordering increases that would keep the men on the cars. When asked by the electric railway companies where the money would come from to meet the increased payrolls, the board "passed the buck," saying that it was a matter between the companies and their own city officials. It was much simpler and more popular to raise wages than to raise fares.

However, the board, the Secretary of the Treasury and the President of the United States did recommend that the municipal authorities take up the question of giving relief to the companies, not as a favor to the corporations but in order that each community might carry out efficiently its part of the program of national defense.

These local emergencies and the national insistency were pressing upon municipalities for a prompt solution of this problem. To find this solution presented extreme difficulties because of the necessity of getting a different perspective of a field in which past practice and tradition had largely crystallized into fixed policies.

Although in the earliest days of street railway franchises there appears to have been a recognition that these enterprises were charged with public service, that was afterward lost sight of, until even the reservation of the rights to purchase the properties by municipalities disappeared in new revisions or were specifically abrogated.

UNTIL RECENTLY FRANCHISE PROGRESS HAS BEEN SLOW

The characteristic of private monopoly became more pronounced, fostered by the companies, no doubt, with the same lack of prescience which was shown in their creation of the "nickel fare fetish."

A perusal of the first street railway franchise which was granted by the State of New York in 1831 to the New York & Harlem Railroad city lines, impresses one with the small advance made in the franchises granted since that time in most cities. The cardinal principal was a flat, fixed fare with the greatest possible financial contributions to the city in the way of franchise taxes, street paving, street cleaning or other municipal functions to the relief of the city.

In the flat-fare plan, the lead of civic welfare enthusiasts was followed without investigation on the theory that any other plan would tend to increase congestion of population in the downtown districts.

European cities have the zone system and also have densely populated districts, therefore, they agreed, a zone system produces congestion. In this they overlooked the small detail that the congestion in European cities antedated the street railway, and to-day these enthusiasts still overlook the fact that in flat-fare New York the density of population on the East Side is greater than that of European cities. The population, unmindful and perhaps ignorant of the pretty theories, still neglects the opportunity to seek the green fields and flowers beyond Harlem. The fixed, flat fare made an attractive appeal to the multitude, and in some states the law requires that new franchises shall be granted by competition to the company agreeing to carry passengers for the lowest rate of fare with no other requirement, as though a low fare alone determined the value of street car service.

With an inexcusable ignorance of their own cost accounting, some operators went further and offered as an inducement reduced rates during the rush hour when their own expenses were highest.

The franchise taxes and the assumption of other municipal burdens fitted in nicely with the period when the politicians had as a little fetish of their own the "low tax rate," which was just as illogical as a measure of governmental service as is the low car fare of street car service. Nevertheless, whatever could be exacted from the street car company represented that much more money for municipal expenditures without affecting the tax rate. Meanwhile, the operator had his problem in meeting these requirements out of a fixed fare and of providing satisfactory dividends.

This was made more difficult since the consolidation of many small lines in the cities under unrestricted stock operations had attracted the speculative investor, and the quick supercession of the cable by the electric cars had piled up heavy capital charges. It is not difficult to see where the car rider, unorganized and unrepresented, came out.

The popular provision for a division of profits between the company and the city was a further invitation to exploit the patron. It is not surprising that he felt that there was an unholy alliance against his interests, and he turned readily to the demagogue who capitalized his situation for political advancement. When someone who sincerely desired to improve conditions in the interest of the car rider and the community was elected to office, he usually discovered that with an entire absence of understanding of the public character of the street railway industry the framers of the franchise had reserved no control over the service, or had couched the instrument in vague terms that would require a series of court decisions for interpretation.

A TENDENCY TOWARD COMPLICATION WAS MANIFESTED

Then came clumsy efforts to enforce the rendering of improved service, bringing about long and complex franchises which attempted detailed recitals of specific requirements coupled with stern provisions for the revocation of franchise rights. All of these were ineffectual, as is shown in cases like those of Detroit and Toledo, where the railways have been operating for years without any franchise.

Competition was invoked and laws were passed requiring companies to allow competitors joint use of their tracks to reach city terminals and thereby to break the monopolistic hold of the corporation. The farepayer as the ultimate consumer would have suffered from the increased expense of the two organizations, but the plan did little more than encourage "raids" on existing companies.

Short-term franchises, as an expedient to make companies behave, were vigorously advocated. Many states now have these limitations but not for such short periods as the enthusiasts demanded, which would have rendered financing impossible.

Constitutional, legislative and special charter provisions likewise added to complicate the situation.

The fundamental weakness of all of these efforts for a solution of the problem lay in the fact that they persisted in regarding the utility as something foreign and inimical to the public interest, something to be prodded and fought instead of tamed and broken to the track, then properly sustained to enable it to perform its duties. It was not until the last decade that marked advance was made in franchise policies.

The Kansas City "peace agreement" of 1903 seemed to recognize possible limitations on the earning power of the street railway in that, after imposing most all conceivable burdens from an 8 per cent tax to the lighting of street railway crossings and the furnishing of power for the fire department, it restricted the City

Council on at least one route from requiring schedules whose cost of operation would be greater than the amount of fares or other compensation received through operating them.

The Chicago settlement in 1907 and the Cleveland Tayler-plan franchise in 1910 established distinct advances in franchise making in that they recognized two important principles. These were the right of the public to retain control, and the obligation to allow to the investor a reasonable and moderate return on his investment, to be substantially guaranteed. The Chicago settlement, however, while controlling finances and extensions, is rather vague in the authority of the city to require definite standards of service. Its strong talking point apparently was the large income derived by the city from the division of profits, which, after all was a special tax levied on the car-riding public for the benefit of the tax-paying public.

The Cleveland plan was the development of a long political struggle in which the 3-cent fare had been the slogan and the principal objective. It, therefore, contained the basic principle that there should be no divisible surplus, and that any profits arising beyond the actual cost of service should be applied to the reduction of fares. Franchise taxes and similar charges were eliminated and complete control of service vested in the city. This provided, however, that an item of the cost of service is a 6 per cent return to the stockholders.

The Kansas City agreement of 1914 contained definite provisions for the control of the gross receipts of the company, and a 6 per cent allowance to the stockholders. Control of service was sought in a rather indirect way, by giving to the city the appointment of eleven directors of the company and by placing the supervision in a board of two, consisting of the president of the company and the city member of the Board of Control, appointed by the Mayor. The objection to this "50-50" division of authority should be fairly obvious.

The above illustrates the limited experience in the development in modernized franchise making from which the awakened municipalities had to draw in solving the transportation problem which had suddenly been presented to them in a new light. Public utility commissions and city governments everywhere were deluged with requests for relief for the electric railways that were threatened with receiverships or were actually placed in the hands of the receivers. Temporary fare increases, the zone system, municipal ownership, the elimination of special burdens and many purely local remedies were discussed in all quarters. Operators who, by reason of the fact that their companies had been financed by speculative rather than conservative investors, had not looked with great favor upon the limited return provided in the later ordinances, were now reduced to the "Oh, Lord, anything" class. Where rates of fare had been increased it was suddenly found that public opinion must be reckoned with. The profitable short-haul rider walked and the gross receipts did not reflect the increased percentage in fares.

"SERVICE-AT-COST" EMERGES FROM CHAOS

From this chaos there emerged, among those municipalities which elected to meet the problem in a broad, non-political and enlightened spirit, a tendency toward the service-at-cost plan. Its appeal was particularly strong since the facts were being demonstrated that street railroads could not continue on pre-war conditions and that the duration of high, war prices was indefinite. It appeared to be a device that would meet a present emergency and automatically adapt itself to future readjustments as required. What is more important there came with this a new visualization of the municipal street railway franchise. Where it had been formerly looked upon as a special grant to a private monopoly, it was now regarded as the creation of an agency for the carrying out of a municipal function with which the community itself was definitely charged. If the city did not elect to adopt direct action by municipal ownership and operation, it must offer sufficient security and return to private enterprise to induce it to undertake the obligation for the city. As this obligation is primarily one of public service the community must reserve to itself complete control over its agent in these matters; and the agent must be permitted to exact for the commodity furnished not more than its cost plus such reasonable reward as will assure efficient and economical management and such expansion as the needs of the public may require.

FLEXIBILITY MUST BE A FACTOR IN FRANCHISES

With constantly changing economic conditions and the growth and shifting of population in cities, there must be included such degree of elasticity as will allow the arrangement to function smoothly and properly. While these fundamentals are being generally accepted by forward thinking public officials their expression and application in specific franchise contracts or their equivalents vary widely. Montreal has its three-way division of profits; to the city, to the company and to the car rider. Boston, through its State-appointed board, fixed the schedule of fares to be filed with the Public Service Commission. The Massachusetts theory of governmental subsidy has many strong supporters. Cleveland controls its service through the City Council, which appoints its commissioner, fixes car-mileage allowances, and retains a cumbersome schedule of cash, ticket and transfer charges, all of which has been substantially followed by Akron. Cincinnati has attempted to simplify and render more elastic the service-at-cost system by eliminating the schedules and providing a budget of financial control, and has invested plenary authority in a director appointed by the Mayor, reserving to the Council matters of new franchises and extensions only. The Cincinnati plan provides an incentive to economical management, and allows freedom in matters relating to new securities, subject to the approval of the city and the State.

The Chicago settlement, once the paragon, has failed to meet the conditions now affecting the utility generally. Kansas City, with its city directors, the dividend responsibility of its Board of Control and its fixed fare, is now seeking through its Chamber of Commerce a revision of its contract. In Minneapolis the franchise recently rejected at a referendum closely followed the Cincinnati plan, but adopted the Cleveland method of supervision by the City Council and its appointed agent and provided penalties as well as rewards for the company. Dallas is not entirely happy with its revision downward and sliding-scale-of-return plan. The Pacific coast is trying out municipal ownership, and Eastern cities are struggling to make a fit of the zone system.

With this heterogeneity of theories and processes the composite municipal viewpoint presents a rather hazy picture, confusing rather than helpful to the other cities still wrestling with the problem. While it is true that local conditions and expediency will affect or modify any general plan, the existence of such wide divergence in the application of underlying principles indicates very clearly that the processes of evolution are still at work and that the ideal franchise is yet to be produced. It is not putting it too strongly to say that there is not a street railway franchise in the United States that could not be improved by revision. Furthermore, such revisions if not essential are at least materially important to the communities involved that they may realize upon their opportunities and achieve their proper destinies.

This nation has become a nation of cities. In many growing states the population outside of urban centers is actually decreasing. It follows, therefore, that the nation can only become great and powerful in proportion to the expansion and prosperity of its commercial and industrial centers. These processes are so intimately bound up with the problem of their transportation facilities that the question becomes one of paramount importance.

How Buses Are Run in Baltimore

By L. H. Palmer

Assistant to President United Railways & Electric Company of Baltimore

Facts Are Given About the Charles Street Line, an Auxiliary of the United Railways & Electric Company, Baltimore

The Author Considers There Is a Limited Field for Buses in City Transportation at Fares Higher Than on Cars

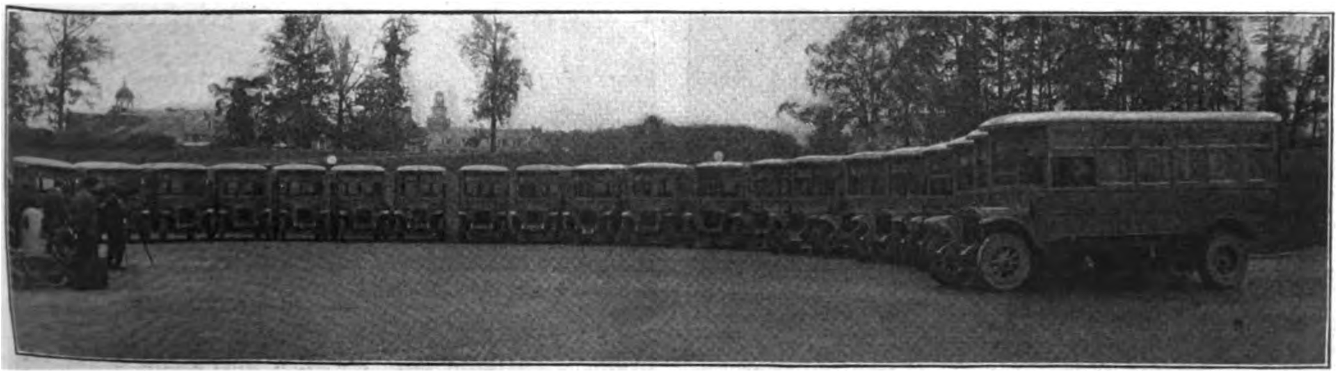
L. H. PALMER

IN COMMON with other cities in the country, Baltimore was infested with the jitney craze in the early part of 1915. From two machines, put in operation in February of that year, the number increased to a maximum of more than 300 licenses, with 105 machines actually operated, at the peak of the business in the beginning of that summer. The resulting loss to the United Railways & Electric Company of Baltimore was appreciable, amounting to more than $500 per day. Of these machines, a few were motor buses seating from twelve to twenty passengers. Most of the service, however, was furnished by a modified express wagon body mounted on a Ford chassis, the driver's seat holding three, including himself, and the two longitudinal seats behind the driver's seat usually holding four persons each, but, in some cases, five or six. This made the average seated load carried by these Ford cars ten. Until overcrowding was prohibited by the Public Service Commission the actual loads carried ran up to twenty or twenty-five during the peak rush hour. In addition, several lines of motor buses were projected which had more ambitious plans and backing. It was shortly before this, also, that the question of competitive motor-bus operation in New York and in one or two other large cities had been taken up, so that there appeared to be serious possibilities of competition with the street railway company.

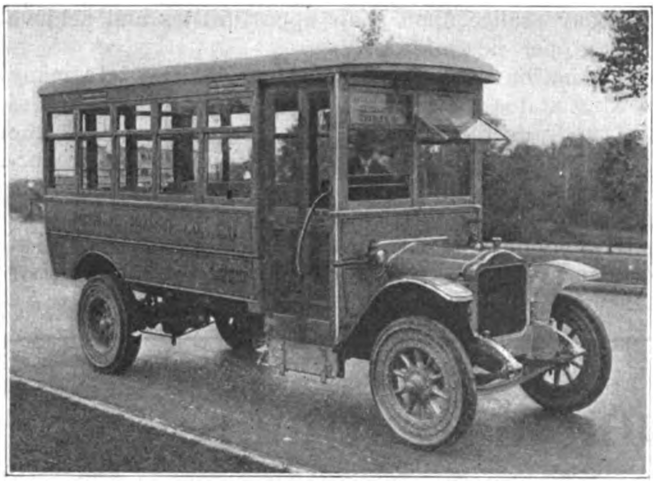
As a result of these developments, foreshadowing new and quantitatively unknown competition, the Baltimore Transit Company and the City Motor Company were organized. The latter operated the Baltimore type of Ford jitney in direct competition with the existing independent jitneys, and the former, a higher-class bus service operating on Charles Street.

The City Motor Company operating Ford jitneys started with twenty-seven of these cars and later purchased five Vim chassis to replace an equal number of Fords which had been retired. These cars were operated from July 25, 1915, until Sept. 28, 1916, and the total net cost of the experiment was upward of $115,000, the deficit from operation being more than $85,000.

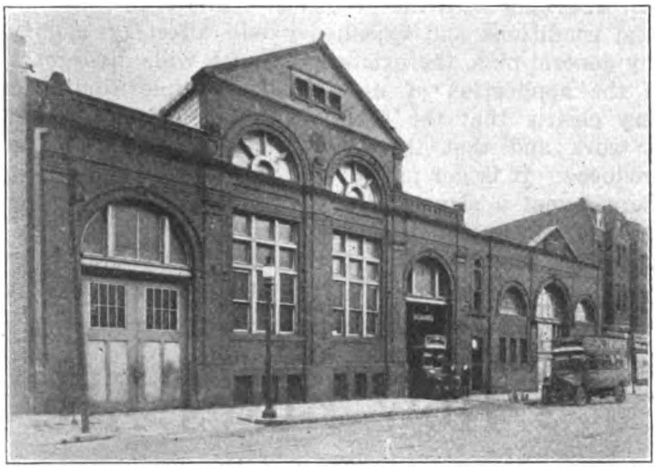
The experience demonstrated conclusively what had been felt was the correct conclusion, viz.: that there was no money in the small-capacity Ford jitney. The constantly changing ownership of the jitneys operated in competition with us was the same as in other sections of the country, and the deduction that the unemploy-



FLEET OF BUSES USED IN AUXILIARY SERVICE IN BALTIMORE



CLOSE-UP VIEW OF BALTIMORE BUS



GARAGE ON NORTH CHARLES STREET

ment factor in the industrial situation was largely responsible for the number of these cars operated seemed to be proved. After the experiment of operating this service for fifteen months, as stated, the City Motor Company abandoned it entirely and disposed of its equipment. In the meantime the number of competitive vehicles had waned, and the independent competition diminished until, at present, there are some thirty-seven licenses and about thirty jitneys still operated. The railway company feels that the accomplishment of some rerouting plans now under consideration and the possible utilization of one-man cars on a frequent headway will mean a still further reduction in the number of these machines.

REAL BUSES ON CHARLES STREET LINE

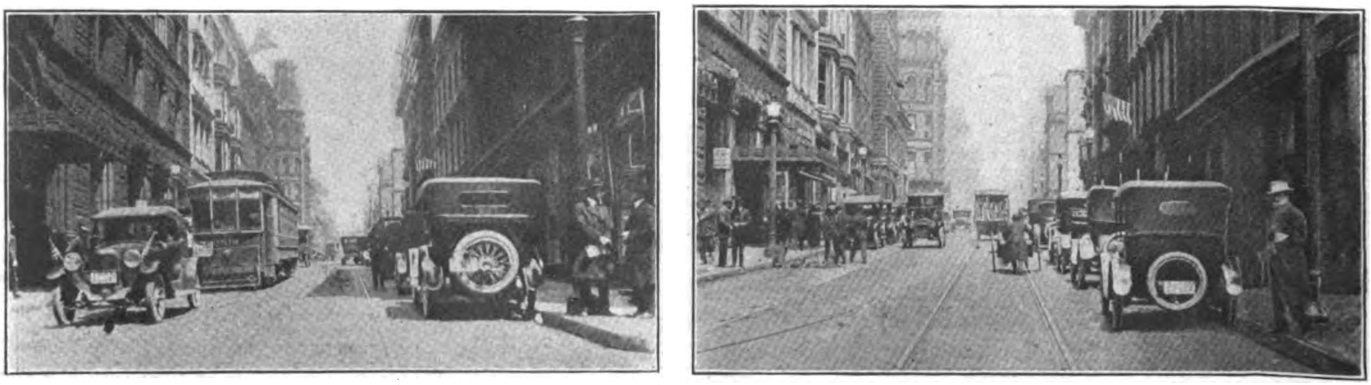
About the same time that the Ford jitneys were put in service by the City Motor Company, a fleet of twenty buses was put in operation on Charles Street by the Baltimore Transit Company. Charles Street is one of the principal high-class business and exclusive residential streets of Baltimore and is a narrow thoroughfare with some rather severe grades, but paved its entire length. The worst grade is about 300 ft. long and the ruling grade is 8 per cent. The two views below, which are taken of Charles Street in the business district, give a good idea of the congested nature of this part of the route. Views of Charles Street farther north are given on page 15. A picture of the garage located about midway of and on the route is shown above. It houses the shop and operating headquarters, and provides housing facilities.

The bus service on Charles Street caters to high-class traffic. The character of the thoroughfare on both its lower business end and the upper residential end is indicated by accompanying illustrations. The buses put in operation were of a larger type, seating twelve persons, with an allowable standing capacity of three.

On this route also there was competition in the form of a regularly operated bus service, which was begun on June 8, 1915, with four Buick chassis, on which were mounted bodies seating fifteen. This number of buses was afterward doubled, and they continued to operate in competition with the bus line of the Baltimore Transit Company until July, 1916, when application to withdraw was made to the Public Service Commission because of losses sustained. Rumor placed the total loss which was incurred by this operation in the neighborhood of $50,000.

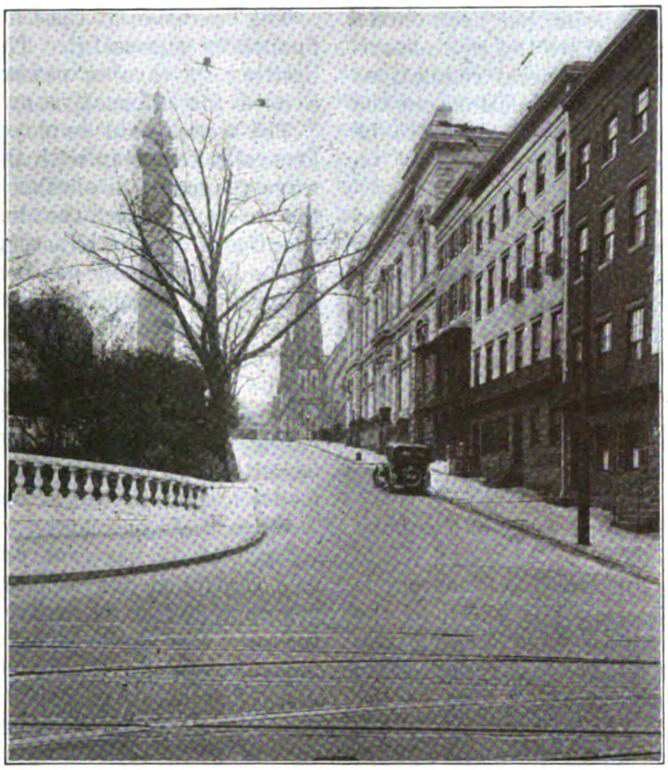
After operating the original buses for twenty-six months, the Baltimore Transit Company sold them and replaced them with twenty higher-priced chassis on which a Brill body seating sixteen persons was mounted, and they have now been in operation for twenty-eight months. These buses are operated by an independent company and do not exchange transfers with the street cars. The rate of fare has kept pace with that of the street car system and at present is 7 cents cash, or two metal tokens for 13 cents. The metal tokens used are the same as those used by the railway company, so they are interchangeable.

The buses are handled by one man and are equipped with a registering fare box. To facilitate making change, the chauffeur, each morning, is provided with $13 in change and metal checks, put up in small envelopes arranged in a convenient-sized tin box. When a passenger presents money other than the exact fare, one of these envelopes is handed to him and he tears



VIEWS ON CHARLES STREET, LOOKING NORTH FROM LEXINGTON STREET, SHOWING THE TRAFFIC CONGESTION. THE BUSES RUN OVER THIS PART OF CHARLES STREET it open and gets out the change to pay his fare. Since the metal 6½-cent tickets have been put in circulation in Baltimore, envelopes containing four tickets for 26 cents are also sold by the chauffeurs. These envelopes are put up by both the day and night dispatchers, and at present 1,500 envelopes containing metal tickets and 1,000 envelopes containing change are used daily.

The Public Service Commission has co-operated with the Baltimore Transit Company in limiting standing passengers, and at present a maximum of only six standees is permitted in the bus at one time. Although this rule is interpreted liberally where it would mean separating the members of a party of two or three persons traveling together, every effort is made to keep the number of standees down to the prescribed maximum.


CHARLES STREET, LOOKING NORTH FROM CENTER. THERE IS AN 8 PER CENT GRADE HERE

The buses operate from 7 o'clock in the morning until after midnight and furnish an alternative service to that provided by street car lines. These surface cars parallel the route within the distance of a block or two and, for part of the distance, operate over the same street. Ten buses furnish the base headway and up to twenty are operated in the evening rush hour as a maximum. The route, from the center of the city up Charles Street to the residential section is 2.9 miles in length, with some of the service, during the rush hour particularly, turned short one-half mile south of the northern terminus. The motor buses, because of their direct route, are able to make somewhat better time than the street cars and are popular with the persons whom they can directly serve. They pass by the Union Station of the Pennsylvania and Western Maryland Railroads which at times is quite a traffic center. To improve the regularity and speed of operation, due to the congested condition of Charles Street which is increased by street cars, consideration is being given to the diversion of this line, for part of its distance, one block to the east. This, if done, will be an excellent illustration of the flexibility of bus service.

The great majority of the jitneys that have competed with this company, and those which still are left, operate between east Baltimore and the shopping district in the center of the city.

Originally, the jitneys were unregulated, but an ordinance was passed in July, 1915, which imposed a license fee of $100 for four passengers and $25 for each additional passenger. This was declared invalid by the court.

On June 9, 1915, the Public Service Commission assumed jurisdiction over jitneys and issued regulations covering their operation.

By an act of the Legislature, jitneys and motor buses are taxed as follows:

Class A—Weighing less than 3000 lb., 1/18 cent per seat-mile.

Class B—Over 3000 lb. and under 7000 lb., 1/15 cent per seat-mile.

Class C—Over 7000 lb., 1/6 cent per seat-mile.

Effective Jan. 1, 1919, the federal government imposed an additional tax, amounting per bus to $20 per year.

Prospective jitney operators must apply to the State Automobile Commissioner for a license, giving the route to be followed, schedule to be maintained, number of buses, seating capacity and the weight, from which is computed the tax levied.

A permit to operate must be obtained from the Public Service Commission and, in addition to the things enumerated above, there are no other special regulations of the commission or the city, except that the operators have to obey the ordinary traffic regulations and are required to file their rate of fare. In recent

THE BOULEVARD SECTION OF CHARLES STREET, LOOKING NORTH FROM 29TH STREET, SHOWING RESIDENCES ON RIGHT AND WYMAN PARK AND JOHNS HOPKINS UNIVERSITY ON LEFT

months, the Public Service Commission has been checking them up to require them to operate the route specified and in other ways to obey the general regulations laid down. It is difficult to enforce regulations on the independent operators. Copies of the schedules to be operated are sent to the commission and are kept on file by that body.

On Oct. 1, 1918, the street railway company raised its fare from 5 cents to 6 cents, and about the same time the jitneys obtained permission from the Public Service Commission to charge 7 cents, and they have been charging that amount since then. According to our observations this has netted them a material increase in their revenue, because apparently they are carrying about as many people as before the increase went into effect.

SERVICE STATISTICS OF TRANSIT COMPANY'S BUSES

The present bus of the Baltimore Transit Company weighs 6970 lb., is mounted on a 1½ to 2-ton White chassis of the regular type—the length of chassis is 220 in., and the wheelbase 158 in. The width of the bus is 72 in., which permits cross seats holding two passengers each on one side of the aisle and seats holding one passenger each on the other side of the aisle. The height of the bus is 122 in. over all. In addition to this, an advertising rack, extending some 18 in. above the top of the roof, is attached all around the sides of the roof and carries outdoor advertising.

Fourteen men are employed in the shop organization, which also takes care of most of the maintenance of the chassis of the automobiles and motor trucks belonging to the United Railways Company. This is divided as follows: One shop foreman, one assistant foreman, nine mechanics, one helper, one washer and one car cleaner. Body repairs and painting are done at the shops of the United Railways & Electric Company, on a cost-plus basis. The transportation supervisory force consists of a superintendent, a day and night dispatcher and one stock clerk. They have a small Ford service car which is used for minor repairs and troubles.

The following general statistics show the results of operation for 1918 and for ten months of 1919, on the Charles Street route, during which time the present buses have been in operation:

	Year 1918	10 months 1919
Revenue from transportation	$100,478	$98,398
Other operating revenue	4,877	7,867
Total operating revenue	$105,355	$106,265
Maintenance of equipment, including depreciation	$34,066	$43,186
Conducting transportation	52,298	52,427
General and miscellaneous	12,216	11,687
Total operating expenses	$98,580	$107,300
Net operating revenue	$6,775	* $1,035
Taxes and licenses	3,751	4,576
Operating income	$3,024	* $5,611
Non-operating income	.....	1,793
Interest and discount	12,929	12,767
Deficit	$9,905	$16,584
Profit and loss adjustments	777	
Total deficit	$10,682	

*Deficit

OPERATING UNITS AND STATISTICS

	Year 1918	10 months 1919
Operating ratio, per cent	93.57	100.97
Revenue bus-miles	365,120	329,841
Operating revenue per bus-mile, cents	28.85	32.22
Operating expenses per bus-mlie, cents	27.00	32.53
Tire repairs and renewals per mile, cents	.50	1.51
Miles per gallon of gasoline	4.58	4.62
Gasoline cost per mile, cents	4.88	5.09
Depreciation allowance per mile, cents	6.32	6.59
Average fare per passenger, cents	5.15	6.07

The operation of the Charles Street line has not been financially successful. The bus is of small capacity, limiting its earning power, but, as stated, it has filled a need for alternative or direct service.

The wages paid employees of the bus company have generally kept step with those paid by the United Railways Company to similar classes of employees and, at the present time, the bus company is able to get chauffeurs of a satisfactory character.

The bus company has been using a special high-grade motor fuel which has given approximately a 35 per cent increase in bus-miles at 25 per cent increase for cost of fuel.

Due to the limited size of the bus and the fact that it is an alternative service, no passes are given for riding free upon the bus. The only persons who are permitted to do this are instructors, inspectors and men engaged in the actual operation of the line.

When these new buses were purchased a depreciation reserve of 25 per cent per annum was set up. This was continued for a short time and then cut to 20 per cent. After an experience of ten months, however, the rate was again raised to 25 per cent, which is the present depreciation figure.

As a result of experience, it is believed that the 25 per cent depreciation, plus the residual value of the vehicle when retired, is sufficient to provide for renewals of the body and chassis. Adequate reserves also should be set up for accidents and tires, and experience shows that it is wise to purchase the higher grade chassis. The service to which these machines are subjected is necessarily very severe, and it is a case of the more expensive being the cheaper in the long run, because of the higher grades of materials and workmanship that go into the better class of trucks.

WHERE THE BUS IS USEFUL

From studies that have been made, it is felt that a properly designed motor bus, of reasonably large seating capacity and comfortable riding qualities, can be used to advantage to supplement city street car facilities, by furnishing a higher-class service in which standing passengers are not allowed, and for which a higher fare is charged; in other words, guaranteeing a seat for an increased fare over that charged by the street railways. Buses of such a type, or even of smaller size, are of value also as feeders for outlying territory, or could be used to maintain crosstown service through sections of the city where it would not pay to construct and operate street cars.

In two recent instances, where the demand for the construction of extensions to the present lines of the United Railways Company was insistent, motor buses were operated from the street car line to the district involved, and proved successful as a substituted service until the time when the street car lines could be extended. It is believed that there is a field for the operation and use of motor buses as feeders for or extensions of existing lines, and that, when properly handled, such vehicles should assist in developing the territory until traffic warrants construction of electric tracks.

In this climate, where the paving is reasonably good and with proper study given to spring suspension, satisfactory results from the standpoint of low cost and good riding qualities can be obtained with solid tire wheels. These are much better also from the standpoint of the passenger, because the vehicle does not have to be delayed for blow-outs or deflated tires of any kind. In the original twenty buses purchased, 35-in. x 5-in. pneumatic tires were used. On the present buses, very good results, indeed, have been obtained from solid tires and Sewell cushion wheels, 36-in. x 4-in. front and 36-in. x 8-in. rear, equipped with giant Firestone tires. An average of 28,000 miles per tire is obtained, both front and rear, and under normal city operation it is believed these should be entirely satisfactory.

An accident reserve is desirable, and an ample reserve accrual should be instituted when the buses are first put in operation.

With a good, reliable type of vehicle and a shop organization properly co-ordinated so that the buses may be maintained efficiently, and where adequate supervision is given to the drivers of the buses, there is no reason, judging from present experience, why satisfactory and dependable service cannot be rendered. In general, it is recommended that a motor bus line should not be started at the same rate of fare as that charged by the street railway; but, if the policy is adopted of permitting no standing passengers and of providing sufficient seats, under normal conditions, to meet the rush-hour load, then a higher fare should and must be charged if the service is going to remain on a solvent basis.

It is believed the motor bus is here to stay, that its use is going to increase largely and that the logical people to handle and develop it are those who have been trained and received their experience in street railway operation. It behooves the progressive street railway manager to study the motor bus situation and be prepared to meet it and to use it as an auxiliary to his other operations, rather than have to fight it as a competitor.

The Investor and the Electric Railway

Capital Which Formerly Flowed Readily Into This Industry Is Now Diverted Into Other Channels on Account of the Radically Changed Conditions Under Which the Traction Business Must Now Be Conducted

By "Financier"*

AN IDEAL street railway system may be described as one where the ordinary citizen can be carried swiftly, safely and reliably from a point very near his residence to his workshop or place of business at stated intervals not far apart, in a clean, comfortable car, not overcrowded. This car must be manned by a thoroughly trained motorman and a courteous conductor, and run upon rails of heavy caliber laid upon ties resting on a roadbed of broken stones or concrete with self-acting switches at all necessary points. It must be equipped with overhead or under-running construction that will convey the current generated in a central station by the most modern and reliable apparatus, and applied by car motors of power sufficient to move the heaviest car, overloaded in rush hours, at 30 or 40 m.p.h. in all kinds of weather. The service must begin at an early hour, at least partially increasing according to the needs of the population, with an extra supply of cars when the traffic is heaviest, and continue at longer intervals all through the night, Sunday and Saturday alike.

The average citizen has come to believe that this is the kind of service to which he is entitled, irrespective of distance or route and extending a long way into the suburbs, all for a 5-cent fare, including any necessary transfers, and that his children should be carried to and from school at reduced rates. He is also persuaded that the railway company should contribute to the revenue of the city an indefinite but substantial sum per annum for the privilege of serving the public in this way, and should be required to pave and maintain the street for several feet on each side of the tracks and keep the roadbed well sprinkled with water in summer and clear of snow in winter. Moreover, it should be required to carry firemen, police and postmen in uniform free.

Apart from the question of the fare, all of this is unquestionably what every enterprising city ought to have, if its own credit is to be maintained, its healthful expansion insured. It is absolutely essential if the city is to attract the best kind of citizens, especially mechanics.

If in any particular this ideal rapid-transit system fails, certain consequences must inevitably follow. They will be made manifest in accidents, delays and loss of time to the patrons, excessive operating costs, congestion in population, tenements, slums and epidemics, and the loss of the best mechanics who will move to where these essentials to their comfort and convenience in traveling to and from their work can be found.

Anyone who visited Toledo, Ohio, during the recent cessation of street railway service could readily see that automobiles, jitneys, cabs, carts and drays can never serve the reasonable requirements of the average city and that an electric system of propulsion with its flexibility and economy is the best so far as known or demonstrated.

TORONTO PRESENTS SOME INTERESTING SITUATIONS

Efforts have been made to attain something approaching the foregoing ideal system in a number of ways and notably through municipal ownership, as in Toronto, Canada. In that city the property was purchased from the original owners when a change from operation by horses was imminent, and it was then leased for thirty years to an operating corporation whose lease will expire in about a year. Then the property will revert to the city upon payment of the value of the physical assets to be ascertained by a reference to valuators, less the value thereof at the inception of the lease, without anything being added for good-will or established business. It is quite safe to predict that the city will find it impossible to lease its railway property again upon any such terms as it did in 1890 and it is probable that municipal operation of the city property will be attempted in the hope that something nearer the ideal service hereinbefore described may be attained. There will undoubtedly be an advantage in securing the property to begin with at a fair valuation and in the ability of the city to borrow the money to pay therefor, together with what further funds may be necessary for extensive enlargements and replacements, on long terms and at a lower rate of interest probably than the ordinary joint stock company would have to pay. A careful computation will undoubtedly be made to ascertain what the rate of fare must be to give the service required and pay the interest upon the debt, and an attempt will be made to continue the 5-cent rate at least for the first year. If it is found insufficient, it will be an easy matter to absorb the deficit by carrying it forward as a liability to be added to the taxes for the following year, and thus take it out of the citizens generally irrespective of whether they have used or not used the services provided and to what extent.

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*The author of this article is the treasurer of an important company closely allied with the electric railway industry. For reasons of policy he prefers not to sign the article.—EDS.

NEW CAPITAL MUST BE OBTAINED

The establishment of municipal ownership, with operation by a corporation chartered for the purpose, under rigid restrictions and provisions as to the character of the service, would immediately bring up the question of what the fare would be and for how long. The city would be saddled with the burden of finding the money to acquire or establish the plant and such further funds as might be necessary to provide for extensions and replacement of worn-out equipment.

However just may have been the fixing of the 5-cent fare when the street railway was originally established or converted to electricity as the motive power, it is quite apparent to all who are now engaged in the industry and to those who have made a thoroughly impartial investigation into the cost of operation that it is no longer adequate. No one could foresee thirty, or even twenty years ago either the immensely improved quality of the service that would be demanded by the public or the tremendous increases in cost of operation through the enhanced cost of all the commodities necessary therefor, and the lessened efficiency and greater remuneration of labor. Such was the lessened cost and improvement in efficiency of the electric motive power when compared with the old horse and mule-driven vehicles that electrification practically cut the operating expenses in two. It was then very easy to attract capital for investment in the electric railway enterprises, but the situation is now entirely changed. Investors find their securities greatly impaired in value, in fact many are almost impossible of sale except at a great sacrifice and new money is unavailable.

Under these circumstances it is necessary to add to the description of the ideal street railway system a provision for a revision from time to time of the fare to be charged, so that it shall always be sufficient to pay not only the operating expenses but a fair return upon the money invested. Otherwise money will not flow in this channel of investment. It appears to be difficult to convince the average citizen or the average municipal council that this is the true and unvarnished state of affairs. Until they are educated and convinced that the situation is unquestionably as it is the loss to existing investors must go on and increase, making this class of security more and more unpopular and inevitably postponing its return to popularity.

Moreover, every day that the enterprise is losing money, the condition of the property which should be operating in the interests of efficiency, economy and safety, is running down and the character of the service is being impaired through lack of timely expenditure on maintenance. Sooner or later this must be made up by the city in some way. When the unfortunate bondholder sees the money of the stockholder sunk in running an unprofitable enterprise he will naturally combine with his fellow bondholders to stop the leak by the appointment of a receiver. He will not take kindly to the issue of receivers' certificates as a prior lien on the property, but will have it brought to sale at the earliest day possible with all the loss and discredit to such securities as this implies. The main point to be emphasized here is that money must be attracted to the enterprise, for nothing can be done without it. To attract money the investment must be safe and remunerative.

The uniform system of accounting in almost universal use can be relied upon to demonstrate what the expenses of running any given road will be, and the fare must be fixed accordingly. Every banker, public and private, every investment banker and security salesman knows how futile it is to attempt to sell securities unless all the basic conditions of safety and the assurance of a reasonable return upon the money are present. The money already invested in electrical securities has come chiefly from the savings of the small investor, the man or the widow living next door or very near you. If the confidence of this class is destroyed it will be difficult to restore, and larger commissions and higher rates of interest will have to be paid to secure it.

Much of the foregoing is elementary and purposely so because it is intended to be addressed through the electric railway operator to the average citizen who makes use of the street cars. Make it clear to him that simply to stand fast and insist upon the ideal service, without proper remuneration for the railway, will soon make life a burden to him and a menace to his health and that of his family, and he will cheerfully consent to an appropriate increase in fare. This has actually been done in several places with the happiest results.

Canadian Association Elects Officers

THE Canadian Electric Railways Association held its annual convention on Dec. 3 and 4 at Hotel Windsor, Montreal, Que. Colonel J. E. Hutcheson, the retiring president, was elected honorary president, and Acton Burrows, managing director *Canadian Railway & Marine World*, was elected honorary vice-president.

The following active officers for the coming year were also elected; President, A. Gaboury, superintendent Montreal Tramways; vice-president, G. Gordon Gale, vice-president and general manager Hull Electric Company; honorary secretary-treasurer, A. Eastman, vice-president and general manager Windsor, Essex & Lake Shore Rapid Railway, Kingsvale, Ont.; members of executive committee, George Kidd, general manager British Columbia Electric Company, Vancouver, B. C.; A. W. McLimont, vice-president and general manager, Winnipeg Electric Railway, Winnipeg, Manitoba; M. W. Kirkwood, general manager Grand River Railway, Galt, Ont.; C. L. Wilson, assistant manager Toronto & York Radial Railway, Toronto, Ont.; F. D. Burpee, superintendent Ottawa Electric Railway, Ottawa, Que.; R. M. Reade, superintendent Quebec Light, Heat & Power Company; C. C. Curtis, manager, Cape Breton Electric Railway, Sydney, N. S.; and Colonel G. C. Royce, general manager, Toronto Suburban Railway.

A Forward Look in Public Relations

By John W. Colton
Executive Assistant The Connecticut Company, New Haven, Conn.

The Author, Who Was Until Recently a Newspaper Man, Gives Some Suggestive Rules for Practicing Publicity

He Summarizes the Plans of the Newly-Formed Committee of Publicity Men, Formed at Atlantic City

JOHN W. COLTON

LET every man in the electric railway industry ask himself this question: "Why have we had such a heck of a time getting by in these times when every other industry has filled its cash box and yelled for the janitor to sweep up the yellow-backs that have overflowed and cluttered up the floor?"

Nine in every ten will answer, "We can't get a square deal from our masters and patrons, the public. We want 'a living wage'—income enough to enable us to pay our bills and return a fair dividend to the stockholders, but darned if we can get it."

And the nine who answer substantially as above go about with long faces, wrinkled brows and drooping nether lip, wishing "the good old days" were here again, and acting like jinxes out of a job.

But the tenth man will look at the situation a little differently.

"Sure, we've got all kinds of troubles," he will say, "but what of that? We're on our way out. We are showing the public that it needs us just as much as we need it. We are showing our employees that we can't pay them good wages if we do not take in enough money to meet our bills, and that they must help us. We are putting the situation up to the people—and the people as a whole are fair and will give us a square deal."

The tenth man gets busy, and when, in a short time, his troubles diminish, the morale of his organization improves and his company's financial condition becomes encouraging, the nine wonder "how he did it."

There is nothing mysterious, about this. Methods of bringing improvement about must differ in different localities, but the principles always are the same.

THE "PEPTIMIST" IS SURELY NEEDED THESE DAYS

Some one recently said that men may be classified as: the pessimist, who says, "It can't be done"; the optimist, who says, "It can be done," and the peptimist, who goes out and does it.

The electric railway industry seems to be in great need of men who combine optimism and peptimism. There has been too much croaking, too much gloom, and not nearly enough stimulating optimism and action.

Perhaps the Almighty knows why so many electric railway executives fear to adopt out-in-the-open, straightforward methods in their dealings with the public, and particularly with the press, but the ordinary citizen does not. There has been an unreasoning fear of publicity, a horror of innovations and a distrust of modern methods that have been successful in many other lines of business. "Conservatism," which too often has been a synonym for unprogressiveness, has brought disaster to many a business that might have prospered if only those at the helm had steered a course that took advantage of favoring winds and currents instead of obstinately bucking the storms and hoping the craft might reach smoother waters before it was battered to pieces.

All this is preliminary to a short discourse on the relations existing between the public and the electric railways, what has been done to bring about improvement in these relations and what may easily be done in the future. Whatever is said herein is not in the spirit of criticism, but with the hope that electric railways which have not yet studied the psychology of their situation may get busy and do something for their own good and incidentally for the good of the industry.

All will agree that the hearings held by the Federal Electric Railways Commission in Washington were of tremendous value in bringing before the people, in an official way, the present-day problems of the industry. One hundred and fourteen witnesses testified to the fact that the industry is essential, and various remedies for its ailments were suggested. These hearings were fine—of course. But—suppose that the public had known nothing about them; suppose that the testimony had not been printed in the newspapers; suppose that there had been no editorial comment—of what value would they have been? If all the important testimony was merely taken down by the stenographer, read by the commissioners and us who are directly interested, well, the hearings in that case might as well have been held in an igloo in northern Greenland, for all the effect they could have had on the public mind. Instead, however, the Committee of One Hundred saw to it that the public was given the facts brought out in the hearings, and it is doubtful if any movement for the improvement of public relations was executed more effectively than this one.

THE TOLEDO AND LAWRENCE INCIDENTS HELPED THE INDUSTRY

Suppose that, when the electric cars were withdrawn from Toledo, no one knew anything about it except the people of that city, how much effect on the public mind as a whole would there have been? But instead the press of the entire country carried items every day describing the course of the dispute, and the editorial columns of the newspapers and magazines reflected very distinctly the great public interest that was taken in the foolishness of a city's action in barring an essential utility and then complaining because its orders were taken seriously.

Suppose that, when the street railway stopped in Lawrence because the jitneys were unregulated and were making it impossible for the railway to operate without loss, only the people of Lawrence knew about it—how widespread and salutary would the effect have been?

Say what one will, most people believe what they read, and therefore it is of the utmost importance that those who write what the people read shall be supplied with the facts.

The industry cannot excuse itself from blame for unjust, unfavorable and antagonistic newspaper criticism if it declines to give information when it is asked. The individual or the corporation whose stereotyped answer to a newspaper, when asked for information, is, "We have nothing to say," is not only leaving an opening for attack, but is cordially hated by the reporters who ask the question; and their dislike is reflected again in the editorial attitude of the newspaper.

Nothing arouses editorial ire more than aristocratic aloofness, for the newspaperman says to himself, "These railways run in the public streets, they are supported by the people, their managers are public servants—why should they seclude themselves and refuse to answer reasonable questions?" Of course he can find many to help him when he starts an attack. Furthermore, he can lay out a campaign against you that cannot be defeated except on the basis of fair, frank, direct statement by the corporation. It follows, automatically, that if the company's policy is fair, frank, direct statement, prejudice is removed in advance, suspicion is disarmed and good-will is created.

FACILITIES FOR MEETING THE REPORTER'S NEEDS MUST BE PROVIDED

Above all things, frankness, square dealing, accessibility, courage and common sense must dominate the policy of an electric railway executive in dealing with the press. A policy of seclusion, contempt for public opinion, side-stepping and berating the public can yield nothing but disaster and demoralization.

But perhaps the executive does not have time or opportunity to get in touch with the press. Perhaps a reporter has been warming his heels outside his office door, waiting for a chance to ask questions which no other officer can answer, and knowing what his city editor is thinking, finally gives up and returns to his office to write some surmise and "dope" when he couldn't get facts. What then? The answer is simple—let the railway engage a man whose duties shall be to provide the newspapers with information and start to build up public good-will.

"It can't be done?"

Of course it can be done. It can't be done in a week, or a month, or a year, perhaps, but it certainly can be done, and is being done, but as a requisite of success the spirit of public service must permeate the organization.

Of all electric railways in the country, serving billions of car riders per annum, only a score or so make any definite attempt to create a spirit of good-will on the part of the public.

Although they are merchandising transportation, the electric railways as a whole ignore the economic and psychologic laws that govern sales. They expect success, yet leave undone the very things which will bring it. If the average business man were as blind to modern methods as some electric railway executives and boards of directors are, the lists of failures in Dun's and Bradstreet's would be appalling.

"PRESS AGENTS" NEED NOT APPLY

When a railway engages a man to handle engineering problems it makes sure it has an engineer who understands the work he is hired to do. The railway should follow the same course in engaging a man to do its public relations work. The man for the place should be interested in the work not merely for the salary, but because of its vital importance to such a tremendous number of people, and preference should be given a man who has shown an inclination to study the situation and ascertain facts, whether these be to the credit of the industry or not. Too often a railway may consider a publicity man a sort of cure-all who will put it in good standing with the public regardless of the quality of service rendered. Such an idea is extremely fallacious. The publicity man should be the medium through which the railway speaks, and the sentiments he expresses can be no nobler than the purpose of the corporation engaging him, for the days of "bunk" are gone forever, and words must be backed up by deeds—by improvements in service, by meeting public criticism when it is of sufficient importance and, in general, by being absolutely on the level.

Least of all does the industry need "press agents." The newspapers want news, not "bunk," and any city editor can instantly discern between news and that which is not news. A "press agent" of the old type may do as much harm as a man of sound principles may do good. And because newspapers are suspicious of propagandists, nothing but news ever should be offered them. The word "publicity" should be avoided, whenever possible, in dealings with the press. "Bureau of information" is more descriptive of the work such a man should do than "publicity department" is. However, opinions may differ as to the title for the job or its incumbent. The work certainly should be done, and done by a properly qualified person.

THE NEW PUBLICITY MEN'S COMMITTEE DESERVES SUPPORT

The men which far-seeing electric railways already have employed to help create better public relations are making an earnest effort to convince all electric railways that they should profit by the experiences of companies that have found their work very successful.

There has been recently created a committee of publicity men, members of the American Electric Railway Association, which is planning a very definite program to interest all companies in taking action to improve relations between the public and the railways. Leake Carraway, of the Virginia Railway & Power Company, is chairman of the committee, and associated with him on it are Luke Grant, Chicago Elevated Railways; W. Dwight Burroughs, United Railways & Electric Company, Baltimore; A. D. B. Van Zandt, Detroit United Railway; W. P. Strandborg, Portland (Ore.) Railway, Light & Power Company; E. R. Kelsey, Toledo Railway & Light Company, and the writer.

The publicity men of the different companies realize that the problem before them is to interest all companies in sensible publicity. Activity toward the cooperation of publicity efforts in the past have not been entirely successful, but it seems now that the great good which has come of the publicity efforts of the Committee of One Hundred should have convinced every electric railway man in the country of the possibilities of properly conducted information services, so that the prospects are brighter than they have been in the past.

The American Electric Railway Association has begun the publication of a series of pamphlets on the publicity accomplishments of some of the companies that have found publicity effective in creating good-will and improving morale. These pamphlets will be mailed to all executives who express the wish to receive them, and they should be well worth reading.

Samples of the leaflets, advertisements, announcements, company publications, in fact all publicity matter put out by all companies, can be obtained from the association. The Committee of Publicity Men has arranged for an exchange of the bulletins and publications the various companies issue from time to time, and surely among these there will be something that every company will find valuable, and which it is hoped every company will take advantage of.

Without doubt the publicity given the hearings of the Federal Electric Railways Commission was most helpful to the industry, and the Committee of One Hundred is to be congratulated on the widespread use which was made in the press of the matter the committee sent out. Every newspaper which has affiliations with the great press associations printed more or less of the testimony heard by the commission, and nothing could so impress upon the public mind the essential nature of the industry and its serious predicament as the testimony of men from so many walks of life.

Supporting the newspaper publicity was the publication of the daily bulletin during the progress of the hearings, giving the testimony in more or less detail. Many companies distributed hundreds of these daily bulletins through the mails to lists of citizens, and that these bulletins were very effective there can be no question. The Committee of One Hundred also published a booklet containing excerpts from testimony of the different witnesses and copies were in great demand.

At the same time thousands of leaflets for public distribution and posters to be placed in cars were distributed to electric railways, each containing terse statements of fact, and many railways used this service to their own marked advantage. Every man in the industry has been benefited by the work of the Committee of One Hundred, and there has been a very noticeable improvement in public relations in territory where this material was used.

This work makes a fine start for the industry, but now that a start has been made it is of the utmost importance that the work should be continued. It is now up to the railways which have been helped to do something to help themselves. If the work is to be successful there must be continual reiteration of the facts which the railways must impress upon the public. To tell the story once is hardly sufficient—it must be told over and over until practically everybody understands the facts. To carry on such work need not be expensive. Small companies can do it as effectively as large ones. If there is any company in the country that does not know how to plan a program of publicity, the American Electric Railway Association will be very glad to tell it what has been done by other companies and obtain the assistance of other companies for those who wish to make a start in publicity.

It must be borne in mind that the publicity problem of one company may be very different from that of another. What has been satisfactory in Connecticut might not do at all in another state, and what might do in the Middle West or in the South might not be effective in New England. But human nature is the same in all parts of the country and the principles of publicity can be applied generally, although the methods may have to vary and the appeal be put forth in varying forms.

All advertising has value, but some forms are more valuable than others. Where there is a distinctly antagonistic press it may be necessary to use billboards, to carry posters in cars, to use every available avenue of approach to the public mind. Many companies are now publishing weekly or monthly bulletins for free distribution among the car riders, and undoubtedly they have proved successful or the companies would not continue to use them. On the other hand, there are many companies which as yet have not considered it necessary to distribute bulletins to the public. Other companies get out monthly publications for circulation among their employees, and so long as these are kept interesting they will be effective. A great many companies do not find them necessary, but they may be very necessary for other companies.

The proper education of a company's employees is very important. Too many companies have neglected to inform their employees of the difficulties that beset them. The platform men are primarily interested in how much pay they are going to get. Among them there may be some who are indifferent, who may be careless in their handling of company property and who may be unnecessarily curt or gruff in their conversation with passengers. The platform men come in direct contact with the public, and public opinion of the service may be formed by the impressions the employees make upon the car riders' minds.

Because these are facts it is very important that every company should inform its employees that unless the company obtains sufficient income it cannot continue to pay them good wages; that the electric railway has nothing to sell except the service it offers the public; that the quality of this service determines the amount of income the company shall receive; that the company cannot be successful without the good-will of

Six Pertinent Points on Publicity

Point 1—Tell your own employees your story, and win their co-operation by getting them to give the best service of which they are capable.

Point 2—Be absolutely frank with the public.

Point 3—Answer every question asked by the public.

Point 4—Never side-step a problem.

Point 5—Use every medium of publicity that local conditions may warrant.

Point 6—Keep everlastingly at it.

J. W. COLTON.

the public; that the communities cannot expect good service and continual improvement unless the people co-operate; that the electric railway problem to-day is a problem for every community to take an interest in, and that the men on the cars have it in their power to make their companies more prosperous and thereby help to insure continued employment to themselves. Some companies have found campaigns along these lines very successful. Some conduct them through the monthly and weekly publications which have been mentioned, and others send bulletins to the homes of the employees, where not only the employees but their families also have an opportunity to see the employer's side of the problem.

ONE CASE WHERE NEWSPAPER ADVERTISING PAID

Paid newspaper advertising should be used whenever necessary. Opinions may differ as to whether such advertising should be continuous or sporadic. When radical changes in service are made, such as the introduction of safety cars, the introduction of a new system of fare collection, material changes in schedules, etc., newspaper advertising space most certainly should be used, because the majority of people depend on the newspapers for information on current affairs. All newspapers consider anything that has to do with the electric railways as legitimate news, and are usually glad to print any news statements given out by them, but these news statements should be backed up with paid advertising.

The Connecticut Company found paid advertising valuable in connection with the establishment of the zone system on its property. It used large space to instruct the public about the revolutionary changes in the car riders' customs which the new system made necessary. This advertising, together with news articles and the posters which it used in the cars and in factories, contributed greatly toward making it possible for the company to announce that the zone system was an "unqualified success" within ten days after it had been established.

The character of the population served also has an influence on the kind of publicity to be used. Sometimes there is a large foreign element using the cars whose knowledge of English is so scanty that ordinary publicity is not effective. In such instances it is necessary to put before the car riders, in their own language, the facts which the company wishes to set forth. In connection with its zone system the Connecticut Company was obliged to put its announcements in Swedish, Italian, Polish, Hungarian and Russian as well as in English, and to use the foreign-language press.

There is nothing mysterious about publicity and advertising in connection with electric railways. They are merely the application of a well-known business principle, that if a concern is to be successful it must tell the people what it has to sell and exploit the advantages of its goods. If competition becomes keen it must be met. If competition is unfair the electric railway must tell the public that burdensome conditions cannot continue indefinitely and that in time the public will face serious curtailment of service unless the unfair competition is removed. The crisis brought about in Massachusetts through unfair jitney competition is an illustration of the point. There the people were told by the railway that there was not room in the streets for the electric railway and the jitney, and when the city authorities of Lawrence realized that the company meant what it said when it declared that service would stop if the City Council did not take action to curb the jitneys, prompt action was taken to preserve electric railway service to the people. There the company let the public know just what its predicament was, and its appeal to the common sense of the citizens was effective.

Where newspaper advertising may not be considered advantageous the electric railway usually has the opportunity of presenting its case to the people through meetings of Chambers of Commerce, Rotary Clubs, community forums and similar organizations, and whenever this is done the newspapers should be provided with abstracts or manuscript containing the facts presented by the company.

There is no branch of advertising that is not of some value to electric railway. How these branches shall be used depends entirely on the problems confronted by each railway. But if the companies are to win the public's good-will they must use some of these forms, and if they are to be effective they must be used intelligently. To use them intelligently makes necessary the employment of some one who knows how to use them. It is very easy to waste much money in publicity, and it is just as easy to make money through the creation of a favorable public spirit by the use of publicity. It all depends on the policy of the company and the manner in which the policy is carried out. In this phase of publicity as well as the others certain rules are practically inviolable if success is to be secured. These rules, set down in tabular form, appear on page 21.

SOME LESSONS FROM THE SUCCESSFUL MERCHANT

The electric railway industry might well bear in mind the salesmanship idea in planning its compaigns to win good-will. First of all, what have we to sell? In what kind of packages do we offer it to the public? How convenient are our schedules? How much effort do we make to meet the wishes of our patrons? What consideration do we give to their complaints? What competition must we meet? How have we been affected by the increased costs of labor, equipment and supplies? What must we have to give good service in the future? What are we doing, anyway?

The merchant, when he builds an addition to his store, advertises the fact. When we add new cars, increase our power capacity or otherwise improve our facilities, we should tell the public about it. When we put on better schedules, or adopt economies to improve service, we should by all means tell about the changes. The public is not unappreciative, if we meet it half way.

When demagogues tear the air, is it good policy to keep still? Does any individual or any corporation retain respect by submitting indefinitely to unjust attack? Many think not. When a defendant in a court action refuses to take the stand in his own behalf, usually there is a feeling that his cause is not a good one. Can the electric railway industry afford to encourage any such feeling toward itself?

"Learn the Truth" is a good slogan, and the electric railways owe it to themselves to see that the truth is spread broadcast.

One of the most unjust and most serious forms of attack is the comparison of conditions in one city to those in another, where franchise and other conditions are entirely different. Cleveland is pointed to by newspapers in all parts of the country as the city where low fares are producing profits, but it is seldom that railways explain the features of the Tayler grant that make low fares possible. Philadelphia lately has been pointed to by many newspapers that have not been told about the 3-cent exchanges that prevail in the Quaker City. These and similar matters are proper for discussion at meetings of Boards of Trade and similar organizations, and the railways should see to it that the truth about them is reiterated. "You can't blame a fellow for what he doesn't know if he has had no opportunity to get an education."

But, above all things, let's stop weeping. Everybody hates a cry-baby; sooner or later he wants to wring its neck to stop its noise. Fight, if we must, for all we are worth, but let's grin while we fight. We should and must be happy warriors, fighting only for our just due, and determined to win by fair, hard, vigorous, sensible, invincible campaigns of truth. We can find no weapon more effective than printers' ink.

Franchise Developments in 1919

Considerable Progress Was Made During the Past Year in Service-at-Cost Franchises, Although Two Plans of This Kind, at Denver and Minneapolis, Were Rejected at the Polls

THE serious financial crisis faced by electric railways during the past year brought the service-at-cost type of franchise to the fore as one means of escaping impending disaster. While it is true the results of operation under grants of this character were not entirely satisfactory, the fundamental justice of providing a basis for meeting unusual expenses appealed to students of the railway problems, and the utility management and public authorities in many cities gave thoughtful consideration to the merits of those ordinances which had been subjected to actual test.

Reporting at the mid-year meeting of the American Electric Railway Association, the committee on readjustment declared there were only two possible ways out of the present financial embarrassments for electric railways—one of these being some sort of service-at-cost plan and the other the adoption of municipal or government ownership. In line with the recommendations of that committee, papers were read at the Atlantic City convention of the Association showing the results of operation under service-at-cost in three cities.

Other developments in franchises during the year were the following:

New form of service-at-cost plan became effective in Youngstown, Ohio, Jan. 16, 1919.

Amendment to Cleveland Railway franchise passed April 7, 1919, extending the grant for an additional period of ten years.

Adoption of other settlements of this character under consideration in Detroit, Toledo and St. Paul, while two other types of grant were rejected by the voters of Denver and of Minneapolis.

The franchise situation is still unsettled in Chicago, Philadelphia and St. Louis. The Dallas, Texas, company has not had an entirely happy experience with its service-at-cost arrangement, a recent report having shown that the utility corporation failed to earn the 7 per cent return allowed under the ordinance. The Des Moines and Kansas City properties also have been beset with difficulties, although operating under modern types of ordinances. In Chicago, no progress has been made since a service-at-cost plan was rejected by the voters in 1918. The mayor of that city has offered a substitute plan, which he calls "people's ownership," based on a 5-cent fare, the details of which are now being worked out for submission to the city council, the state legislature and the public. Since the failure of the Pennsylvania commission to approve the Philadelphia settlement plan no definite progress has been reported from that city. Another form of service-at-cost was put into effect during the year in Massachusetts, where the Bay State company, having been reorganized under the name of the Eastern Massachusetts Street Railway company, was placed under control of public trustees.

In the annual Statistical Number of the ELECTRIC RAILWAY JOURNAL for 1919 a scholarly analysis of developments under service-at-cost franchises up to that time was presented by L. R. Nash of Stone & Webster. A statement of advantages under service-at-cost was also set forth in a paper by H. C. Clark, abstracted in the issue of June 21, page 1219. The three papers presented at the Atlantic City Convention, telling of results under such franchises in Cincinnati, Youngstown and Montreal, were abstracted in the Report Number of Oct. 11, page 18.

TERMS OF THE YOUNGSTOWN FRANCHISE

To bring the situation up to date, it should be of interest to consider developments in Youngstown, Ohio, where the company has been operating since last January under a franchise modeled largely after the so-called Tayler grant. The valuation of the property, for purposes of the ordinance, was fixed at $4,000,000, on which the company was allowed a 7 per cent return, to be paid from the stabilizing fund. New capital expenditures are permitted a return based on the actual cost of obtaining the money. Had such provision been made in the Tayler plan there would have been no need for requesting a higher guaranteed rate in Cleveland, where the matter has been the subject of arbitration during recent months.

Under the Youngstown plan a street railroad commissioner has supervision over service, accounting, additions and betterments. A stabilizing fund was created by setting aside $100,000 from the agreed capital, credited monthly with interest earnings and the net receipts of the company. The ordinance allows for operating costs 22 cents per car mile, with 60 per cent of this amount for trailer cars; and for maintenance, repair and renewal costs 8 cents per car mile, with a 40 per cent reduction for trailers. Either allowance may be increased or decreased by agreement or arbitration.

A sliding scale of fares was provided for, nine rates in all, with more possible, and a 1 cent charge for transfers under each rate. The initial rate was 5 cents cash and 1 cent for a transfer. The barometer established through the stabilizing fund soon showed the necessity for higher revenues, and by the several stages the rate has now reached 7 cents plus a 1 cent transfer charge. As pointed out by the president of the company recently, another rate provision of importance is that the city and the company may at any time agree on any fare, regardless of the prescribed order in the schedule, thus permitting of the prompt meeting of an extraordinary situation.

Under another section of this ordinance either the company or the city may propose extensions or betterments, but the city loses this right when the unexpired term of the franchise is less than fifteen years. In that event also the company has the right to set up an amortization fund during the balance of the life of the grant for the entire value of the property. The importance of this as a safeguard may be appreciated by comparison with other types of franchises where, upon the expiration of the grant, the company's investment is left unprotected.

The city's right to purchase may be exercised at any time during the life of the franchise upon six months' written notice, or at the termination of the grant. In the former event a 10 per cent premium is to be paid.

CHANGES IN THE CLEVELAND FRANCHISE

Renewal of the Cleveland franchise last April was necessitated by the terms of the contract, which provided that whenever the grant or any extension thereof had less than fifteen years to run the company would have the right to collect the maximum rate of fare mentioned in Section 22 and to operate under its own policies for the remainder of the term. After the long negotiation, therefore, the revision was completed and the term has been extended to May 1, 1944. Among the important amendments were the following: Car mile allowance for interest fund was increased from 11½ to 19½ cents. Car mile allowance for maintenance fund was increased 1 cent per car mile. New schedule for sliding rates of fare was incorporated, raising the maximum to 6 cents cash, 9 tickets for 50 cents, 1 cent for transfer and no rebate. The rate in force at the time this article is being written is 5 cents cash, 11 tickets for 50 cents, 1 cent for transfer and no rebate.

TERMS OF THE REJECTED MINNEAPOLIS FRANCHISE

For completeness a reference will be made here to the Minneapolis service-at-cost ordinance, although it was rejected by the voters at a referendum taken on Dec. 9. The franchise permitted the Minneapolis Street Railway company to operate under a service-at-cost plan for a period of twenty-five years after Jan. 1, 1920. The agreed valuation of the property was fixed at $24,000,000, upon which the company was to be allowed to earn a maximum of 7 per cent, if it could, after paying all expenses and public charges. New money was to receive a rate of interest to be fixed by the city council, but inasmuch as the company was to have increased responsibilities and the greatly increased hazard of the original investment, the plan provided that the company would receive 1 per cent upon the total of the new securities as compensation. Neither the 1 per cent nor the 7 per cent was guaranteed, and therein lay, it was thought, an incentive to efficiency and economy of management.

Under the franchise the city council would have retained control over the business, and the office of street railway supervisor was provided for. The company was not relieved of any of the usual public charges, such as paving, etc. The city was authorized to take over the property upon giving one year's notice or it might have designated a purchaser.

An unusual feature of the ordinance was that providing for collective bargaining, the best possible working conditions and a limitation upon the amount of time which employees could be required to work, and also providing for the submission of disputed questions to arbitration. Automatic adjustment of fares was assured. The initial rate for the first three months was to have been 5 cents. Any deficit was to have been drawn from the stabilizing fund of $250,000 and successive increases or decreases at the rate of 1 cent were to have been determined every three months. If fares went above 5 cents, tickets or tokens were to have been sold at a discount of 10 per cent.

THE SITUATION AT DENVER

In Denver the car riders have had a series of up and down experiences with changing rates of fare. Hope of stabilizing conditions through a new fare settlement plan was frustrated by the vote of the people, who on Oct. 22 defeated a service-at-cost grant and a so-called elastic 6-cent fare measure. The service-at-cost plan would have created a board of tramway control, two members appointed by the city and one by the company, with wide powers over expenditures and service. This plan would have eliminated some expenditures which do not benefit the car riders. The proposed ordinance also provided for a "fare control fund" of $300,000; a limit of returns on the fair value of the property ranging from 5½ to 7 per cent; depreciation and renewal funds. The initial rate of fare would have been 6 cents and by putting into effect a lower rate the company would have been allowed an additional earning of from ½ to 1 per cent.

The "elastic 6-cent fare plan" also offered an initial rate of 6 cents with free transfers. This rate was conditioned on the existing 48-cent maximum wage scale for trainmen, and fares would go up or down as the wage schedule varied. A board of control would have had charge of this arrangement, and the wage scale was to have been no greater than the average for St. Louis, Omaha, Kansas City, Minneapolis and St. Paul.

THE MAYOR'S PLAN FOR CHICAGO

A "cure for all traction difficulties" has been offered to the people of Chicago by Mayor Thompson, who insists that he can provide service at a rate of fare not exceeding 5 cents. He has been provided with a fund of $250,000 by the city council to make a study of conditions and offer a completed plan within nine months. The mayor's plan would create with the help of State legislation, a district to be known as "The Transportation District of Chicago," whose bonds could be issued to take over the existing traction lines. Service would be regulated by five trustees who, according to the plan, will be elected by the people.

Franchise developments in Detroit, Toledo and St. Paul are so recent as to need no further discussion here. Politics seems to have been the stumbling block in the path of settlement in each of these cities, but negotiations are proceeding in spite of all opposition.

Are Street Railways a Real Public Utility?*

By General Guy E. Tripp

Chairman Board of Directors, Westinghouse Electric & Manufacturing Company

The Efforts of the Committee of One Hundred to Present the Railways' Case at Washington Are Described and Several Local Situations Are Mentioned

THE subject upon which you have asked me to address you is, without doubt, a depressing one to a gathering of men with financial responsibilities, because such men can have no pleasure in contemplating the depreciation of property. That the values of electric railway securities have depreciated, and depreciated to a greater extent than any other public utility, is a matter of common knowledge. American life insurance companies have invested millions of their policyholders' money in these enterprises, and they undoubtedly find added to their natural regret for money losses a sense of their responsibilities as trustees.

Gen. Guy E. Tripp

A trustee's first thought, upon being confronted with such a situation, has to do with the degree of judgment exercised when the investment was made, both as to the soundness of it and the amount of it relative to his total capital.

In this case the amount is considerable. Twenty-six American life insurance companies with assets of $5,262,818,894, equal to over 78 per cent of the assets of all American life insurance companies, have invested in public service securities $237,346,223, of which $116,592,670 represents street and interurban railroad investments. If it is assumed that the remaining 22 per cent of the assets of the companies carries the same proportion of investment, then the amount of policyholders' money invested in street and interurban railroad securities is $160,000,000.

With respect to the judgment used in making this investment the facts are all favorable. From the beginning to the present time street railroads have had all the fundamentals of a sound investment. They furnish now and always have furnished an indispensable service to our urban population.

The very existence of modern community life depends upon this form of transportation and, after water and sewerage, it is the most important public utility. Without means of transportation there could be no great department stores, no great institutions of any character which require a daily concentration of a large number of employees and customers.

In short, if our urban communities have made for the wealth, comfort and culture of this country, then an investment in street railway transportation is in one of the cornerstones of the structure, and if the investment is in danger, it is not because of poor financial judgment.

The Interest of Life Insurance Companies Is Shown by the Fact That Twenty-Six Have Invested More Than $116,592,000 in Electric Railway Properties

When I say that the electric railways are indispensable, I have intimated that, such being the case, the investment in them should be regarded as one entitled to all the protection which the law gives to all property; but the question is nevertheless still open for the discussion of its relations to the public in all its phases, which furnishes a field for the exploitation of fanciful social theories and tainted politics, all of which cannot fail to react upon values.

But this is not all nor perhaps the most important feature of the processes of readjustment which are now going on in the affairs of these transportation utilities. The capacity of the people of the United States to deal with the complex problems presented by our modern economic structure is being put to the test, and upon the way in which this particular question of electric railways is decided will depend, in a large measure, the treatment that will be accorded to all industry and to all business.

I am the chairman of a committee of one hundred representatives of electric railways, bankers, manufacturers and others interested in electric railways, appointed by the American Electric Railway Association to act as the spokesman of the industry in the investigation conducted by the Federal Electric Railways Commission.

This commission was appointed by the President to study the electric railway situation and to present to him its recommendations for the cure of a situation which he, on the advice of his Secretaries of Commerce and Labor, considers to be of national concern.

The Situation Analyzed

To qualify itself to act for the industry, it became necessary for this committee to determine for itself the basic facts of the situation and to determine at the same time the principles which should govern in the correction of a condition that threatened disaster all round. We felt that we must first establish the essentiality of the industry—whether or not it had survived its usefulness, whether it was to be superseded by some other means of transportation, more efficient, cheaper and convenient. We decided on this point that the industry is essential—that there is not now nor can there be expected in the calculable future any form of local transportation which can furnish a complete system of transportation to urban communities that is not predicated upon the use of tracks in the public streets, on elevated structures or in subways. This belief has subsequently been borne out by the 114 different witnesses of all shades of opinion who testified before the Federal Commission, not one of whom (although they differed widely on other points) suggested that transportation on rails could be supplanted profitably.

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*Abstract of an address delivered at the thirteenth annual meeting of the Association of Life Insurance Presidents, New York, Dec. 5, 1919.

It was our next business to determine—because we were in the case as representatives of private enterprise—whether or not private enterprise should be withdrawn from the business, and, in the interest of both efficiency and economy, the function of providing transportation be performed directly by the community. Our determination upon this point was, that however good or however bad the theory of public ownership might be, a consideration of it in connection with the present situation must be entirely academic, because in the vast majority of cases it is impossible, both because of legal and financial obstacles in the way of its application, and because the public mind has not yet been made up upon its merits and it is unlikely to be made up within any reasonable time.

It was, then, evident to our committee that to save it from collapse in which the public interest would also suffer, the use of private capital and private enterprise in this public utility industry must be continued. Our further duty then, was to determine upon what terms private capital and private enterprise could be attracted at the least cost to the public. I say "attracted" advisedly, because a continuous flow of new capital into public utilities is essential, if they are to perform their functions properly, provide service and care for the expansion, progress and growth of communities.

At the present time the credit of the electric railways is nonexistent. The reason is apparent. More than a sixth of the total electric railway mileage of the country is in the hands of receivers. A very large additional number of companies are on the verge of bankruptcy, some of them kept from this fate only by the financial strength of the much criticised "holding" companies. The prosperous electric railways of the United States, if there be such, are so few as to be negligible. Alone of the important industries of the nation, the electric railway industry nearly suffered annihilation through conditions caused by the war, and back of all these facts is the further and by all means the most important fact that the industry, by reason of restrictions in statute law, in ordinances and in franchises, is unable to take measures to save itself from the fate which events show to be imminent.

The restoration of credit is fundamental to the continuance of private capital and private enterprise in the public service, and the main task that confronts the country, in so far as electric railways are concerned, is the restoration and the future preservation of that credit.

DEVELOPMENT CAME FROM INDIVIDUAL INITIATIVE

Certainly it cannot be done upon any such basis of relationship between the public and utilities as has existed in the past. Under present conditions such a basis is no longer desirable or possible. That it ever existed is the fault of no one, and, in so far as it permitted that wide range of individual initiative, or individual enterprise and of individual genius, it is not to be deplored, since it gave to this country a system of local transportation, which in extent, in character, in the convenience afforded, and in the opportunity for community expansion and community progress presented, is equalled nowhere in the world. And in this connection it should not be forgotten that it is not to the exercise of governmental foresight or governmental enterprise that we owe the present highly developed transportation system of this country. Much of the development has come in spite of public opposition; very little of it has come with governmental co-operation. It has sprung into existence because the individual has been given wide latitude in the exercise of those qualities in which the business men of America excel, and because the hope of substantial reward was possible under a system which provided that if the individual took the risk, he should also be permitted the profit.

That original conception has not, however, prevailed for a number of years. Through the operation of the theory of regulation as applied to public utilities, it has so changed that while the individual still took the risk, he was denied his profit, and it is this thing that has destroyed the credit of the railways.

HOW NEW CAPITAL CAN BE ATTRACTED

Now the question of whether new capital can be attracted to local transportation utilities is not to be solved by enactments of legislatures or the ordinances of city councils, or the pronouncements of commissions or committees. Its solution is in the hands of the man who has the capital to invest, and the risk that investors will take is in direct ratio to the profits which they hope to reap.

Consequently, the business of the public, seeking new capital at low cost, is to eliminate from the enterprise as many elements of risk as is possible. Now, we believe that the successful conduct of a public utility requires not only capital in continuing supply, but that it also requires the vigilance, foresight and initiative that accompany the investment of capital in strictly private enterprise; in other words, that the mere loaning of money to the communities for public utility purposes is not sufficient; that with the money must go the same business and executive and administrative attributes that bring success to private business. These are rare qualities, rarer than the average man realizes, and they are entitled to reward. The problem, therefore, is to attract into the public service not only private capital, but private enterprise, at the least cost and with the best results to the public.

We believe that there are certain well-defined principles that must underlie any detailed plan for accomplishing this purpose. The first of these is that integrity of investment must be protected; that the investor has the right to demand and will expect that the integrity of his investment shall be protected, by which we mean that at the expiration of the period of its use by the public, it shall be given back to him undiminished. This means that the legal authority under which the public utility shall operate shall so provide, and at once we reach the question of the franchise, permit, agreement, or statute law under which the operation of the utility is undertaken.

If such legal authority be for a fixed period, it is evident that the integrity of the property can be assured only if there be provision for the amortization during the life of the authority of the difference between the actual investment and the estimated scrap value of the property at the end of the term. For anything but a very long term authority, this means a rate of fare so high as to discourage riding, and by so doing operate against the interest of both the car rider and the company itself—in other words, more than the traffic will bear.

The other alternative is the so-called "indeterminate" permit, which provides authority to conduct business until such time as the community may decide to take over the property of the company at any agreed upon value, or grant to another company or to another individual the right so to take over the property. This fully protects the integrity of the investment and at the same time protects the interest of the community, since it makes provision for ousting a derelict performer in the only two ways which insure a continuance of the service.

The second of the principles is that there should be an assurance of return upon the investment. The basis of such assurance must be provision by which the price of the commodity furnished, *i.e.*, transportation, can be quickly and automatically adjusted to its cost, or the direct guarantee of the communities that the return will be forthcoming.

Upon the degree to which both the assurance of integrity and the assurance of return are provided in the relations between electric railway companies and the communities, will depend the cost of the capital required.

Moreover, there should be provided in the return, and regulated by the degree of efficiency and managerial ability shown, a reward for these qualities, in order that there may be present in the private conduct of a public enterprise, the initiative and economy which will always depend upon the hope of reward.

These we believe to be the basic principles involved in the restoration of credit. From them, we are convinced, may be built a practicable. workable plan for the government of relations between the utilities and the communities, which will inspire the best effort of the operators and enlist the co-operation of the communities in assisting in the work of providing good and adequate service.

The same principles we believe should govern the treatment of capital already invested in the public service. To bring it into step with the future capital investment it is necessary to ascertain, if that be possible, the money which private individuals have furnished for the enterprise; or if that, by reason of imperfect records, is impossible, to have fixed by courts, or commissions, or by agreement, the value of the property. When the investment or the value is so fixed, then the capital already invested should not be differentiated from that which it is expected to secure in the future.

NO NEW PRINCIPLES ARE INVOLVED

There is nothing new in the principles which I have here enunciated. They are merely those which underlie commerce and business in general, and the fact that it is necessary to impress their application to the electric railway industry upon the public, the operators and the regulating authorities, is an indication of the distance we have strayed from well known economic laws in the conduct of our public utilities. It is surprising the extent to which economic law has been disregarded and overlooked in the attempt to control and regulate public utilities. It is surprising that intelligent men should have been willing to enter into long term contracts to furnish a commodity at a fixed price, in disregard of future conditions as to cost and in disregard of future conditions as to the character of the commodity. It is surprising that lawmakers should have considered that it was possible to pass inflexible regulations governing the price of a commodity when the price plainly depended upon the cost to produce it, or that they should have conceived it to be possible to regulate its cost or its price. And yet that was precisely what was done in the case of franchise agreements and grants, in the case of much street railway legislation, and in the laws creating many public service commissions.

It was primarily due to the belief on the part of railway men and the public alike that the local transportation business was a very profitable business and to the lack of exact knowledge as to the real cost of furnishing the commodity. From these two misconceptions have grown most of the troubles of the industry. They have led to the system of bargaining which has saddled the companies with burdens in the way of restrictions, taxes and imposts which they are today unable to bear, to the willingness of companies to accept franchises imposing fare limitations, to the power given to the commissions to compel the making of extensions and the expansion of service, and last but most important, to the public attitude of distrust towards the companies.

The industry is now finding itself. It knows now, as it has never known before, the limitation of its resources. It is realizing that its ability to furnish service is limited by its ability to collect revenue therefor, and it is learning how to ascertain the true cost of the service when the cost of maintaining the integrity of the investment is included.

It is this relation of price to cost that is the most important consideration in the solution of the problem. It is a relation that must be understood by the public as well as the companies, and until it is understood, there can be no satisfactory settlement, no matter what laws may be passed or agreements entered into.

And so, having established the fundamentals upon which a settlement must be based, it is necessary that there should be agreement between the two parties at issue, as to the object towards which this partnership for common good should strive. I believe that it has been well stated in the so-called Tayler grant under which the Cleveland Railway is being operated. There it says that the object of the grant is to "secure the best possible service at the lowest possible cost."

If this be true, then having provided terms under which the necessary continuing supply of private capital may be attracted into the business and the private initiative and enterprise secured, the attention of every one concerned can be devoted without reserve to the agreed upon object. Immediately there arises the question affecting the basis upon which fares shall be charged, whether a flat rate shall be installed, or a zone or distance tariff system put into effect; the removal of the taxes and imposts which are a charge against the car rider and not against the private owners; the question of subsidizing the service in order to maintain low rates of fare; the employment of operating economies now so frequently prevented by the hostile attitude of communities; the restriction of the unfair competition of jitneys, which without the power to supply the entire service furnished by electric railways, exist on the cream of the business; the co-operation of public authorities in providing traffic regulations so that the progress of the cars through the streets shall be unimpeded; the use of new capital for the installation of improved apparatus and equipment which cut down cost, and many other methods of improving and cheapening the service and more equitably distributing its cost.

Many of these are not now possible, first, because the credit of the companies being gone, it is impossible to secure the capital necessary to put them into effect; and second, because the spirit of antagonism against the companies is such that every move towards decreasing the cost of service is bitterly opposed.

INSTANCES OF SERVICE AT COST

I have given you in a very general way the principles which I believe should govern the readjustment of the relations between electric railways and communities. I shall not attempt to translate them into detailed plans of settlement. I believe that the intelligence and good sense of the owners of these properties and of the public authorities with whom they must negotiate is sufficient to enable them to get together in agreement upon a plan. The way has already been blazed. The street railway systems of Cleveland, of Cincinnati, of Youngstown, of Boston, of eastern Massachusetts in this country, and of Montreal in Canada, are now being operated under agreements which embody in general the principles to which we subscribe. None of these agreements is entirely perfect. None of them has been in effect for any considerable length of time. All of them have developed defects and it is interesting to note that these defects have come when there has been a departure from the principles noted. And in spite of the defects, the companies in the cities in which cost-of-service agreements obtain, are today being conducted with greater satisfaction to both the public and the investors than those in other cities. This is notably true in Cleveland, which because of its flexible fare was enabled to weather the storm caused by the war with less ill effect upon company and the riding public than almost any city in the United States.

Secretary of War Baker, who, as city attorney of Cleveland, and later as its Mayor, has a very thorough knowledge of traction conditions and a very complete understanding of the principles of service at cost, was one of the most interesting witnesses before the Federal Commission, and I was particularly struck with what he had to say as to the possibility of reconciling the apparently conflicting claims of the companies and of the car rider. Asked as to the method to be pursued in arriving at an agreement, he said:

> Get the council and the board of directors in the same room with all the facts and all the figures, and let everybody in the community understand what they are. I believe that any community in America will pay cheerfully and willingly whatever rate of fare is necessary to maintain good service in their communities, if they are sure they are only paying proper operating expenses, proper maintenance and a proper return on capital.

QUESTION CONCERNS THE COMMUNITY

I agree with Mr. Baker, but I see difficulty in the way of letting "everybody in the community understand," unless the industry is able to secure the active participation of the better informed and more intelligent part of the community. I do not, for a moment, believe that the attempt now being made in this city of New York to wreck the system of local transportation appeals to any person of knowledge and intelligence. I will go further than that and say that I do not believe that it appeals to any but the very ignorant. I do not believe that an electorate that votes as the electorate of Toledo voted, to oust a street railway system from the streets, is an "informed" electorate. I believe that situations such as those in New York and Toledo, as well as in certain other places, are a reflection upon the better part of the community which pays so little attention to civic affairs that it stands idly by while a service absolutely essential to the community is destroyed, because some men think more of votes than they do of the real interests of the people.

This street railway problem has passed the stage where it is simply a concern of the owners and operators of the properties. They have lost and are losing a great many millions of dollars, and for them the situation is deplorable enough; but the communities, and through the communities you men of business, the workmen, the ordinary every-day citizen, are today threatened with the loss or demoralization of a service that is absolutely necessary if business is to continue in our large urban centers, if the health and morals and comfort and convenience of our citizens are to be preserved.

We, of the Committee of One Hundred of the American Electric Railway Association and of the industry generally, believe that we have correctly stated the principles which should govern the relations of these companies with the public, but we are still willing to be convinced. From our side, we have made such a close and intimate study of the question as is possible. But it is the public's question as well as ours, and unless the public through its representatives gives it as close attention, devotes as much energy to its solution, and ultimately reaches conclusions upon which it is willing to attempt readjustment, we shall arrive nowhere.

THE SITUATION IN NEW YORK STATE

I desire particularly to call attention to this aspect of the matter because of conditions here in the State of New York. As early as June, 1917, the trend of events was apparent to the electric railway men of this state, who were thoroughly alarmed over what they saw was coming upon the industry. A committee was formed, consisting of five gentlemen representing companies located in New York City, and five gentlemen representing companies located in other cities in the State.

In behalf of some thirty-nine companies, this committee made application for a hearing before the two Public Service Commissions and upon the application being granted applied for relief in the shape of increased rates. A very exhaustive presentation of the situation was made to both commissions, in which attention was drawn to the vast increase in expenses and the precarious situation of most of the companies.

The First District Commission did nothing. The up-State Commission, deciding that it had power to exceed rates named in franchises, proceeded to hear individual cases and gave relief in several. They were halted, however, by a decision of the State Court of Appeals to the effect that they were without jurisdiction in the case of companies operating under franchises containing fare limitations. Now, we have it on the authority of Judge Hughes, who as Governor of the State was instrumental in securing the passage of the public service commission laws, that it was the intention of the framers to bestow complete jurisdiction upon the commission, and that the failure so to provide was an inadvertence. The obvious remedy was an amendment to the law which would give to the commissions the power which they were originally intended to have.

Two legislatures in succession have failed to make such amendments.

This would be entirely understandable if the legislatures had provided other means for relieving the situation; had subscribed to another policy in the regulation of public utilities, or had even investigated the possibility of some other policy. None of these things has been done. On the contrary, by amending the law as it applies to the First Public Service Commission District, there have been left all of the provisions for the exercise of complete and rigid control over service, but nothing has been done which permits the commission to allow adequate revenue to be provided in order to comply with such service requirements.

An appeal to the Governor of the State, that he appoint a commission to investigate and report upon the situation and to make recommendations for constructive legislation for the correction of the present intolerable conditions has been equally futile. The State of New York today is without any constructive policy as to the regulation of its electric railways, and nowhere is there evidence of concern on the part of any state officials to inaugurate such a policy, although there seems to be no lack of activity upon the part of those who are attempting to make a bad situation much worse.

The result of this failure on the part of the public officers to comprehend and to act upon the conditions confronting them is reflected in New York City in the breaking up into its component units of the New York Railways, and the Brooklyn Rapid Transit System, with its consequent very large increase in fare to many riders; in the abandonment of lines wherever possible, and throughout the State in the deterioration of service.

There is evidence that the people themselves are taking an interest in the situation. Numerous investigations are being conducted throughout the country by civic and business organizations. Very many constructive suggestions are being made. The day is dawning when the unscrupulous politician can no longer expect to ride into office on the back of a calamity which he himself has assisted in creating.

I have said to you that I believe that the treatment of this electric railway problem affords a test of the ability of the American people properly to serve the problems which are more and more common as our national life becomes more complicated and involved. Let me add that this test is as much a test of the better educated and more intelligent part of the public as it is of the more ignorant, because the duty devolves upon the former to lead the way in the solution of questions of this kind and to devote their higher intelligence to the information of the others.

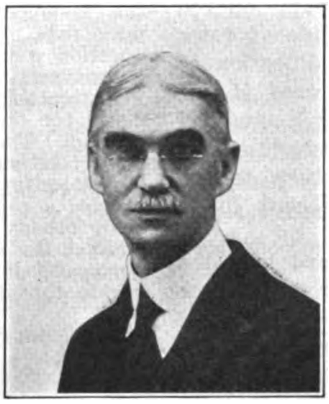
I am optimistic as to the future. I believe that a way out of the difficulties can be found. I have hopes that the recommendations made to the President by the Federal Electric Railways Commission will be of such a nature as to afford a common meeting place for both the public and the utilities, and that with these recommendations as a guide, the business men of the nation will make this problem their own and that they will force a readjustment that will be entirely equitable to every one concerned.

The Zone Plan in New Jersey

By H. C. Eddy
Electric Railway Engineer, Board of Public Utility Commissioners of New Jersey, Newark, N. J.

Under Existing Conditions the Zone Plan Will Not Produce the Revenue Which Public Service Railway Must Have

Board of Public Utility Commissioners Regretfully Permitted the Company to Return to the Flat-Fare System


H. C. EDDY

THE Public Service Railway of New Jersey, having about 860 miles of track, operates through 146 municipalities in the State and ranks among the largest street railway systems in the country. By permission of the Board of Public Utility Commissioners, State of New Jersey, this company on Sept. 14, 1919, inaugurated a zone system of fare collection, following the general lines of a zone plan submitted to the board by its direction. The proposed rate under the original plan submitted was 5 cents for the first zone or fraction thereof, and 1 cent for each zone or fraction thereof thereafter, with 1 cent for a transfer. The standard length of zones was 1 mile, variations from this distance being made in certain cases to meet traffic and other conditions where it was found advisable to do so.

This was the first attempt to establish a trolley fare on practically a mileage basis on any large scale, and, while the early history of the experiment is doubtless generally known to the industry, it is thought that a review of the matter will be of interest. It is the main purpose of this article, however, to give an account of the results of the operation of the system and the causes which led up to its final abandonment by the company.

Following the filing by the Public Service Railway on March 5, 1918, of a petition, amended March 19, 1918, for increased rates from 5 cents to 7 cents, with 2 cents for the initial transfer and 1 cent for a transfer on a transfer, the board, after hearing, by a report and order dated July 10, 1918, dismissed the petition but allowed a charge of 1 cent for each initial transfer, effective Aug. 1, 1918. Certain conditions were included in this order, among which was the following:

> 4. The company shall file or submit to the board before Jan. 1, 1919, a plan whereby the method of charging at present in force may be revised by an equitable zoning system over its entire territory, proper consideration being given to all of the elements to more properly relate the cost of service with the length of haul and value of service.

Subsequently, owing to additional wage awards by the National War Labor Board, under date of Sept. 25, 1918, the board granted the company, at the latter's request, an increase to a rate of 7 cents, with 1 cent for a transfer, effective Oct. 15, 1918, and to continue until April 1, 1919, when the rate was to be 6 cents, the 1-cent transfer charge to be retained. However, by permission of the board the 7-cent fare was again restored on May 2, 1919, following a petition to that effect submitted by the company on March 11, 1919.

In the meantime, under date of March 11, 1919, the company submitted a comprehensive report providing for a zone plan of fare collection, an extension of the original time for submission of the report, Jan. 1, 1919, having been requested by the company and granted by the board. Hearings in regard to this matter, including also the valuation of the entire property, were begun on March 26, 1919, and continued through the spring, summer and fall, and in fact are in progress at the time of this writing, December, 1919, so far as the valuation of the property is concerned.

THREE PLANS SUBMITTED BY THE RAILWAY COMPANY

Subsequently, the company submitted for the consideration of the board three alternative schedules of rates as follows:

1. A charge of 9 cents where 7 cents is now being charged, together with 1 cent for each initial transfer.
2. A system of charges based upon the zone plan as submitted modifying the charges therein proposed as follows: 5 cents for the first 2 zone-miles and 2 cents per zone-mile thereafter, together with 1 cent for each transfer.
3. A system of charges based upon the zone plan as submitted modifying the charges therein proposed as follows: 3 cents for the first zone-mile and 2 cents for each zone-mile thereafter without transfers.

After due consideration, under date of July 30, 1919, the board issued a report permitting a schedule of rates to take effect Sept. 14, 1919, based on a zone system of fares as provided for in the third scheme proposed by the company, as indicated above, and following in general the plan as submitted under the board's order of July 10, 1918.

Under date of Oct. 21, 1919, the company offered to the board for its consideration a schedule of rates to be charged under the zone plan in modification of the former rates and in substitution thereof if the board should continue the zone plan with a modified schedule of rates. If this alternative schedule was unacceptable the company proposed a return to the pre-existing flat fare of 7 cents, with 1 cent for a transfer.

After a hearing on this matter the board issued a report, on Oct. 23, 1919, recommending that the zone system be continued with a modification of the schedule of fares, providing for a charge of 5 cents for the first two zones and 1 cent a zone thereafter, with 1 cent for a transfer.

A few days later the company submitted a statement refusing to accept the board's recommendation and renewed its application for permission to return to the 7-cent flat fare with 1 cent for a transfer. This was refused by the board on Oct. 30, 1919, and the company finally agreed to accept the board's recommendation, the new rate of 5 cents for the first two zones or fraction thereof, 1 cent for each zone or fraction thereof thereafter and 1 cent for a transfer being put into effect on Nov. 16, 1919.

Again, under date of Nov. 24, 1919, the company made a further request for a return to the former flat-fare rate of 7 cents, with 1 cent for a transfer. This was granted by the board after hearing, and on Dec. 7, 1919, the zone system was abrogated. This last decision is not to be interpreted as the permanent rate to be allowed by the board. Such rate will not be determined until the valuation of the property now under investigation is determined by that body.

REASONS FOR SUCCESSIVE FARE CHANGES

The numerous petitions submitted by the company during the past twenty-one months appear to have been necessitated by the rapidly changing conditions which developed. It was claimed at first that the company required greater revenue than it was receiving under the 5-cent flat fare to enable it to function properly. There followed, in rapid succession, two awards of the War Labor Board, each greatly increasing the company's annual wage expenditure. The introduction of the zone system under what was known as the "3-and-2" plan failed to bring in sufficient revenue. Resort was then made to the "5-and-1" zone rate in the hope that this would produce satisfactory results, but the returns under this rate were also not immediately sufficient, and the 7-cent flat fare with 1 cent for a transfer was again adopted. Whether this latter rate will prove satisfactory remains at this writing to be demonstrated.

The board, in an effort to meet the conditions as they developed, and in order to provide a revenue which would maintain the solvency of the company, coupled with a desire thoroughly to demonstrate the feasibility of carrying out the zone principle, made a most thorough investigation of each case presented and issued its various reports, recommendations and orders accordingly.

The following quotation from the board's report of July 10, 1918, appears to indicate its attitude in regard to the flat-rate charge:

> Numerous witnesses produced by the petitioner clearly indicated as their opinion that the flat-rate fare system was an inheritance from horse-car days and was in no sense a scientific or proper charge for the service rendered. While the board's power to increase railway fares despite the existence of a municipal ordinance specifying the maximum fare to be charged has been sustained, an important question would arise as to whether we would countenance a horizontal raise of the uniform 5-cent rate without an investigation of the nature and extent of the service rendered for the fare charged and all the elements involved therein. The charge for the service does not bear any fixed relation to the service. Under the present existing 5-cent uniform rate, some passengers are permitted to be carried a considerably greater distance for the same rate than other passengers. This may unduly discriminate against the short-haul passenger or short rider, and any horizontal increase in the flat rate would further exaggerate this discrimination.

LACK OF CO-OPERATION WAS DIFFICULT TO SUPPLY

From the very day the zone system was placed in operation there appears to have been a general lack of co-operation on the part of the public to make it a success, which obviously indicated unpopularity of the system. This was undoubtedly due to several causes, among which were the following:

1. The original rate adopted, particularly as applied to long-distance riders, was undoubtedly excessive.
2. The locations of several of the original zone points were not suitable. These, however, were capable of readjustment, as provided by the board's order permitting the zone system to be inaugurated.
3. The period in which the trial of the system was made was one of industrial unrest which resulted in unlawful tactics on the part of certain classes of patrons in certain localities.

4. Delays were occasioned by the method of fare collection adopted.

5. The system was inaugurated in the midst of a hotly contested political campaign in the State and was used as political capital by both parties.

The first of the objections could have been, and in fact was removed by the change in rate of fare which ultimately could have been further adjusted to meet the requirements of the company.

The second could have been entirely removed, and was in a large measure rectified by readjustment of certain zone points. In this connection it should be stated that, although the zone points were located with very great care and after much study, yet it was inevitable that actual operating conditions would develop the desirability of certain changes.

The third was difficult to meet but this was accomplished in considerable measure in most instances.

The fourth was gradually being minimized as the public and the employees of the company became more familiar with the system. This doubtless could have been reduced to an almost negligible quantity had there been full co-operation on the part of the public and the employees of the company, together with some modifications of the plan, particularly in connection with the method of the issuance of zone checks by the motorman.

Concerning the fifth objection, it was unfortunate that the system should have been inaugurated under these conditions.

CAMDEN WAS THE CENTER OF ANTI-ZONING DISTURBANCE

The lack of co-operation on the part of the employees of the company, at least after the first few weeks that the system was placed in operation, undoubtedly had much to do with its unsuccessful operation during the trial period. That the system was most unpopular with the platform men was demonstrated at a hearing granted the men by the board, at their request, relative to this matter. It is not to be expected that the men would use every effort tending to the success of a system toward which they themselves were very antagonistic. This feeling on the part of the men may have been produced partly by the fact that the plan was not "sold" to them by the company and the men in turn did not "sell" the plan to the public. This combination of circumstances could not be expected to be conducive to the success of any such undertaking.

Immediately following the inauguration of the system a unique situation developed in the City of Camden, where an organized boycott on the company was established and successfully maintained for a long period. This boycott was made possible largely for the reason that the lines of the Public Service Railway in the vicinity of Camden are for the most part paralleled by steam railroad lines, the latter furnishing good service. This, on the inauguration of the zone plan on the Public Service Railway lines, was considerably augmented. The commutation rates of fare on these lines to Camden and Philadelphia, the traffic on which constitutes a considerable proportion of the Public Service Railway's patronage in the general vicinity, was considerably lower in most cases than the rates charged by the Public Service Railway under the zone system.

Much opposition to the system was manifested also by the shipyard workers, particularly in the vicinity of Camden, culminating in rioting which resulted in not a little personal injury and much damage to property, chiefly rolling stock of the company. The extra service previously maintained for the shipyard workers was discontinued by the company for a considerable period as a result of this lawlessness.

Some objection to the system was also made in other localities. The following quotation from the board's report of Oct. 23, 1919, in regard to this matter is of interest:

> With few exceptions, the company's proposal to abrogate the zone plan and return to a flat fare of 7 cents, with 1 cent for a transfer, was unfavorably received. It was urged by some that the zone plan should be abrogated and the company be required to restore the flat fare of 5 cents in effect before the approval of the board of a higher charge. Many of those who urged this contended, and with evident sincerity, that, if this were done, riding would increase to such an extent that the company's revenues would be equal to those which would accrue under a 7-cent fare.

Other elements than the opposition of the platform men and a certain degree of unpopularity of the system among the traveling public were conducive to the conditions which resulted in its abandonment. Among these were the following:

1. The complete equipment for operating the zone system was never used by the company, doubtless because of the great investment involved and inability to secure the apparatus in the limited time allowed between the authorization and specified date of inauguration of the plan. Possibly a trial of the plan on a few lines of the property with the complete equipment would have been a fairer test of its feasibility.

2. The plan as devised by the company was not adapted for application in every detail to every part of so large a property having so many varying characteristics. Modifications in the plan to meet different conditions on different parts of the property would undoubtedly have brought about more satisfactory results.

3. Insufficient publicity was given the plan previous to its inauguration and during at least the early period of its operation.

4. Various detail obstacles were incidental to the method of introducing the system and in its operation, many of which probably could have not have been readily foreseen.

From the foregoing it will be noted that the practicability of the zone plan as applied to the system of the Public Service Railway did not have a fair trial during the recent experiment.

THE BOARD'S PRESENT ATTITUDE IN THE MATTER

The following quotation from the board's latest report on the matter appears to indicate its attitude relative to the flat-fare charge and its view of the experiment with the zone system:

> To raise the additional revenue required, in localities where the flat-rate method of charging existed, the railways generally resorted to the plan most available of increasing the charge to the extent necessary to meet the requirements. This generally was resented by the patrons, particularly the most lucrative class thereof, viz., the short-haul riders. * * * In many instances companies have sought successive increases in excess of the previously existing 5-cent rate, in some cases reaching the limit of 10 cents. The history of the experiences of the various street railways employing this method to meet the difficulty indicate clearly that it threatens catastrophe to street railway transportation. * * * What such a catastrophe means to the public has not yet been appreciated by it. To avoid the possibility of it we have devoted our best thought and endeavors. To solve the problem required, however, co-operation not only of the company and its employees, but of all others interested in the public welfare and the welfare of the State and its industries. We believe that with co-operation the plan proposed would at least have had a

fair trial. It does not follow that the plan proposed would be adaptable in all its details or solve fully the problem satisfactorily either to the public or to the company. With a fair trial of the plan proposed, however, adjustments could be made, and the experience which could be obtained would furnish data which could be submitted to and studied by the experts engaged by the public and the company. Some plan acceptable to the public and the company might thus have been evolved. That the plan has not had a fair trial, however, must be conceded. * * * The board does not have sufficient evidence to justify it in determining that the existing rate is one which can be ordered continued without regard to the imminent insolvency of the company. In view of all the facts and circumstances involved, the board regrets that for the time being at least the zone plan, the principle of which has commended itself to our judgment, must be discontinued and the rates of fare in effect before its adoption again charged.

The industry throughout the country had been watching with great interest the preparation, inauguration and, finally, the operation of the plan of the Public Service Railway in the hope that the solution of the trolley rate problem would be found thereby, and it is unfortunate that circumstances developed which prevented a thorough demonstration of the practical operation of the plan.

Advocates of the zone plan need not be discouraged, however, on account of the result of this experiment. On the contrary, they should be encouraged to apply the system with such modifications as have been shown to be necessary, bearing in mind, however, that the peculiar conditions existing on any and every property must receive due and very careful consideration in the adoption of a zone plan which will be satisfactory from an operating standpoint as well as a source of sufficient revenue.

Fare Increases in New York*

Statistics Are Given of Recent Electric Railway Fare Increases, Receiverships and Abandonments in New York State, as Well as the Effect of These Increases on the Traffic of the Individual Companies

By Harlow C. Clark

Editor of Aera

I HAVE prepared two statements in connection with the subject that has been assigned to me. One gives the rate of fare at present in effect, or authorized, in each incorporated city or village having a population of more than 8,800. The other gives the fare situation on each of the eighty-four operating railway systems in the State. Both statements are so long and complicated, that I shall not attempt to read them, contenting myself with a summary of their contents. I have had copies prepared for the use of Association members who may desire the information as a matter of record.

There are fifty-six incorporated cities and villages in New York State, having a population of more than 8800. Leaving out New York City, which is served by a number of companies, in thirty-one of these communities, the railway companies are either collecting or have been authorized to collect increased unit fares. In one, a 3-cent charge for transfer to lines outside the city limits is in force. In six, relief has been afforded the companies by creating new zones outside of city limits. In three, reduced rate tickets have been abolished, and in the remaining fourteen, no change in fares has been made.

In the city of New York, the Hudson & Manhattan Railroad began in 1911 the collection of an extra 2-cent charge for rides between up-town New York and points in New Jersey. In July of this year, the New York Railway Company and the Brooklyn Rapid Transit System began, with the permission of Public Service Commissioner Nixon, the collection of a 2-cent charge for transfers at certain transfer points where transfer charges were not forbidden by their franchises. In August of this year, the New York & North Shore Traction Company was permitted by Commissioner Nixon to extend its zone system, previously authorized as to the part of its road outside of New York City by the Second District Commission, to its line within the city limits, bringing about an increase in the unit fare from 5 to 6 cents, and the creation of certain new zones. Aside from these, no increase in fares has been permitted railways operating in New York City.

Of the fourteen cities outside of New York in which no increase has been made in fares, nine have prevented such increase by refusing to waive franchise restrictions. In three, no application for increase has been made; in one, there is no local service, and in one, local service has been abandoned. In New York City, all companies have applied to the city for relief, asking that franchise provisions be waived, but in no case has the city given its assent.

An analysis of the statement shows the following situation:

Seven-cent fares—New York (on the Hudson & Manhattan Railroad for rides between up-town New York and points in New Jersey), Oswego (authorized, but not yet in effect), Olean and Port Jervis.

Seven-cent cash, six tickets for 35 cents—Ogdensburg.

Seven-cent cash, eight tickets for 50 cents—Buffalo (authorized but not yet in effect), Ithaca and Ossining.

Seven-cent cash, 10 tickets for 50 cents—Jamestown.

Six-cent initial zone, one-cent extra for each additional zone—New York (New York & North Shore Traction Co.).

Six-cent cash, no tickets—Syracuse, Albany, Schenectady, Utica, Troy, Amsterdam, Auburn, Newburgh, Kingston, Cohoes, Gloversville, Lockport, Peekskill, Glens Falls, Watervliet, Hornell, Geneva, Saratoga Springs, Hudson, Beacon, Rensselaer, Johnstown.

Six-cent cash, 35 tickets for $2—Poughkeepsie.

Three-cent transfer charge for rides beyond city limits, and readjustment of outside zones—Port Chester.

Two-cent transfer charge—New York (at certain transfer points on New York Railways and Brooklyn Rapid Transit System).

Additional fare for rides beyond city limits—Yonkers, New Rochelle, Elmira, Mt. Vernon, White Plains, Middletown.

Reduced Rate Tickets abolished—Watertown, Cortland and Plattsburg.

No relief granted—New York (except as noted), Rochester, Binghamton, Niagara Falls, Rome, Dunkirk, Lackawanna, Corning, North Tonawanda, Little Falls, Batavia, Fulton, Oneonta, Oneida and Tonawanda.

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*Abstract of paper presented at quarterly meeting of New York Electric Railway Association, New York, Dec. 10, 1919.

The cities which have refused to waive franchise provisions in order to grant relief to their traction systems are New York, Buffalo, Rochester, Binghamton, Niagara Falls, Elmira, Amsterdam, Rome, Dunkirk, Lackawanna, North Tonawanda, Plattsburgh, Oneida and Tonawanda.

The cities which have actually waived franchise provisions in order to afford relief are Syracuse, Schenectady, Utica, Troy, Auburn, Cohoes, Oswego, White Plains, Peekskill, Port Chester, Watervliet, Rensselaer, Port Jervis.

The second statement to which I have referred covers the eighty-four operating railway systems of the State. Of these forty-five furnish city and suburban service, seventeen furnish exclusive interurban service, twenty-one furnish both interurban, city and suburban service, and one does freight switching only. The following summary shows the relief that has been granted to these roads:

City and suburban fares increased.....	21 companies
Interurban fares increased............	14 companies
City and interurban fares increased....	14 companies
Partial relief granted................	3 companies
Service completely abandoned.........	3 companies
No increase asked....................	10 companies
Increase blocked by franchises........	16 companies
Increase granted but nullified.........	1 company
Switching road	1 company

Of the eighty-four roads included in the list eleven are in the hands of receivers, as follows:

Buffalo Southern Railway Co...........	23.35 miles
Buffalo & Lake Erie Traction Co.........	168.00 miles
Buffalo & Depew Railway Co............	14.00 miles
Buffalo & Lackawanna Traction Co......	8.80 miles
Binghamton Railway Co.................	49.74 miles
Brooklyn Rapid Transit Co.............	690.89 miles
Hornell Traction Co....................	10.90 miles
Manhattan & Queens Traction Corporation	22.00 miles
New York Railways Co..................	153.60 miles
Penn Yan & Lake Shore Railway.........	10.00 miles
Second Avenue Railway Co..............	23.90 miles
Total	1174.28 miles

This 1174.28 miles of track in the hands of receivers, constitutes almost 24 per cent, or nearly one-quarter of the total of 4893.49 miles of track within the State.

Since Jan. 1, 1918, there has been a notable abandonment of track and service by New York State companies. The following roads have completely abandoned service:

Huntington Railroad Co.*..............	19.97 miles
Suffolk Traction Co....................	28.97 miles

In addition the following partial abandonments of service have occurred:

Buffalo & Lake Erie Traction Co. (Dunkirk city lines).......................	9.1 miles
Third Avenue Railway Co...............	30.8 miles
New York Railways Co..................	8.71 miles
Yonkers Railroad Co....................	8.5 miles

This makes a total of 106.04 miles of track abandoned within a year, and indications point to further abandonment within a short time unless relief is afforded. Thus, preparations are now being made to abandon service on **the 25.84 miles of track operated by the Long Island Electric Railway, within the limits** of New York City.

EFFECT OF INCREASED FARES DESCRIBED

I have attempted to secure from as large a number of electric railway operators as possible opinions as to the effect of increased fares both upon the revenues of the companies and the riding habits of their patrons. The impossibility of securing direct comparisons is apparent. Conditions vary so greatly between communities in the first instance and between those prevailing at various times in the same community that the mere setting forth of figures is of no assistance in arriving at a conclusion. In a questionnaire sent to the executives of all operating systems, to which replies were received from thirty-two railways, the following request was made:

> It is desired to secure information as to the effect of increased fares both upon riding habit and revenue. Owing, however, to varying conditions caused by time and locality, it is not possible to provide a standard form of reply. Will you not, therefore give ...... what you consider to be the fairest possible estimate of the effect of such increase or increases as you have received and, in addition, give your opinion as to the extent that riders lost through such increase or increases have been recovered, after the public became reconciled to the change?

Of the replies received, nineteen dealt with the effect of increased fares in city service. Two of these nineteen dealt with 7-cent fares, one with a 7 and 6-cent fare, nine with a 6-cent fare, one with a 2-cent transfer charge, five with increased rates outside the city limits, and one with the abolition of reduced rate tickets.

In relation to 7-cent fares, Charles C. Wagner, manager Port Jervis Traction Company, reports that the increase which has been in effect since Jan. 1 of this year has not caused a falling off in riding "to any extent." Paul S. Murphy, treasurer Ogdensburg Street Railway, which has been collecting a 7-cent fare, six tickets for 35 cents, since June 1, 1918, presents some interesting figures, which show that for the six months ending May 31, 1919, as compared with the six months ending May 31, 1918, there was a loss in passengers carried of 3.41 per cent and an increase in passenger revenue of 33.84 per cent; that the same six months in 1919 as compared with 1917, before the change was effective, showed a loss in passengers carried of 14.14 per cent and an increase in passenger revenue of 17.47 per cent. However, the first six months of 1918 as compared to the first six months of 1917, in neither of which periods was the increase effective, showed a decrease in passengers carried of 11.10 per cent and a decrease in passenger revenue of 12.23 per cent. The six months immediately following the increase showed, as compared to the corresponding six months of the year before, a loss in passengers carried of 27.60 per cent and an increase in revenue of 0.23 per cent. It may be assumed from these figures, first that while the loss in passengers carried was accelerated by the increase, it was not entirely caused by it, and that this loss is gradually being made up as the higher range of prices and of salaries and wages to meet them becomes recognized.

In Peekskill a 7-cent fare was put in effect by order of the Public Service Commission on Jan. 1, 1918. On the first of May it was taken out because of the Quimby decision. In December, 1918, the city consented to a 6-cent rate which has since been effective. H. D. Swain, assistant treasurer Peekskill Lighting & Railroad Company, says that the 7-cent fare caused "some loss of traffic," but that under a 6-cent fare "we carry as many passengers as if it were a 5-cent fare."

The largest city in the State in which a 6-cent fare is effective is Syracuse. Discussing the situation in that city and in Utica, where a 6-cent fare is also effective, C. R. Gowen, general passenger agent New York State Railways, says: "From Jan. 1 to Nov. 30, 1919, the earnings of the Syracuse lines have increased 23.92 per cent, and for the Utica City lines up to Oct. 31, 12.76 per cent. We do not believe that the increased fare has affected the riding habit because in Syracuse the figures speak for themselves and in Utica, with the signing of the armistice, several large munitions plants practically closed down, which has materially affected the riding."

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*In December, 1919, efforts were being made to renew operation on this line.—[Eds.]

In Schenectady, where a 6-cent fare has been in effect since May 26, 1919, there was, for the three months ending Sept. 30, a decrease in number of passengers carried of 4.03 per cent, while the revenues for the same period increased 14.88 per cent. J. P. Barnes, general manager Schenectady Railway, says of this showing: "In our opinion, increases in rates on our lines have had little effect, if any, on riding habit. The decreases in passengers carried, as shown on the statement, are attributable to unfavorable changes in industrial conditions in this vicinity."

In Poughkeepsie, where a 6-cent fare has been in effect since Jan. 16, 1918, J. A. Nilan, auditor Poughkeepsie City & Wappinger's Falls Railway, says that there was a falling off in the number of passengers carried for three months after the fare became effective. After that, the traffic showed an increase.

The traffic of the Albany Southern Railroad in the city of Hudson showed an actual increase after the 6-cent fare became effective on Sept. 1, 1918. C. E. Holmes, the company's general freight and passenger agent, says: "The Hudson City line shows for the first year of operation after the 6-cent fare was in effect, 30 per cent increase in revenue and no decrease in the number of passengers. In fact, there was a small increase although there was no change in the service."

W. J. Harvie, general manager Auburn & Syracuse Electric Railroad, says that for about two months after the 6-cent fare became effective in the city of Auburn, there was a reduction in travel. After that it gradually increased and finally showed an increase of about 15 per cent over the previous year.

In the city of Lockport, where a 6-cent fare became effective March 1, 1919, returns for the month of September, 1919, as compared to September, 1918, furnished by E. J. Dickson, vice-president International Railway, show a decrease in revenue passengers of 9.99 per cent and an increase in revenue of 8.02 per cent.

In Kingston, according to G. B. teBow, superintendent Kingston Consolidated Railroad, the public has shown no resentment against the 6-cent fare which became effective April 15, 1919, passenger revenue has shown an increase of 25 per cent, as against a theoretical 20 per cent.

B. Bryant Odell, secretary Orange County Traction Company, reparts that a 6-cent fare in the city of Newburgh, effective since Nov. 29, 1917, has resulted in no "apparent loss of riders."

In the cities of Amsterdam, Johnstown and Gloversville, a continuing loss of riders is reported by W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad. "On the company's three city lines," says Mr. Collins, "under the 6-cent fare, eleven months operation to Oct. 31, 1919, with fares aggregating $173,788.39, an increase of $7,374.78, or 4½ per cent, there is a continued falling off in number of passengers carried, varying in different months, but to date, rides lost through increase in fares have not been recovered."

It is impossible at this time to secure any figures of value as to the effect upon riding of the 2-cent transfer charge which was made effective in New York City on Aug. 1 last. Frank Samuelson, auditor for the receiver New York Railways, says: "Owing to the brief experience under the 2-cent transfer arrangement we are not in a position at this time to furnish information that would be of value as to the extent of the loss, if any, in 5-cent fares by reason of the 2-cent charge for transfers. It is estimated that the additional gross receipts as the result of this 2-cent transfer charge will be around $600,000 per annum."

In Yonkers, Elmira, Middletown, New Rochelle, Port Chester, Mount Vernon, White Plains and a number of other villages in Westchester County, relief has been given to companies by an increase in fares outside of city limits. E. A. Maher, Jr., for the Yonkers Railroad Company, F. H. Richtmeyer, general passenger agent for the Westchester Street Railroad and the New York & Stamford Street Railway, and Miss May L. Robinson, auditor Wallkill Transit Company, report that the additional fares have made no perceptible impression on the traffic. In the case of Elmira, Vice-President F. H. Hill of the Elmira Water, Light & Railroad Company, says: "The increase in fares on our city lines affected long-haul passengers only. There was, therefore, no appreciable effect on riding habit."

On March 7, 1919, the Black River Traction Company, of Watertown, stopped the sale of twenty-five tickets for one dollar; on Sept. 15 of the same year it stopped the sale of round-trip tickets at a reduced rate to surrounding territory. L. Schwerzman, the general manager of the company, says that at first the revenue of the company was increased about 60 per cent of the estimate, but at the present time the full 100 per cent is being received.

EFFECT OF INCREASES ON INTERURBANS

Of the interurban roads, whose executives replied to the questionnaire, one is collecting 4 cents a mile, three are collecting 3 cents a mile, one is collecting 2.77 cents a mile, three are collecting 2¾ cents a mile, one is collecting 3 cents on one line and 2½ cents on others, and two are collecting 6, instead of 5 cents per zone.

H. R. Skirving, auditor and treasurer Southern New York Power & Railway Corporation, the rates of which were raised from 3 to 4 cents a mile on Jan. 26, 1919, reports a 12 per cent increase in passenger revenue and a 10 per cent decrease in passengers carried for the first ten months of 1919. C. Loomis Allen, vice-president Syracuse & Suburban Railroad, reports that an increase in the cash fare of from 2 cents to 3 cents a mile made Oct. 11, 1918, has increased gross revenue 22 per cent, with no loss in passengers carried. Fares on the Rochester & Syracuse Railroad have been raised three times since May 5, 1918, from a charge of 1.77 cents per mile, to 3 cents a mile. W. D. Zinsmeister, treasurer of the company, says of the result: "On three increases in fares amounting to approximately 65 per cent, we are receiving 24 per cent increase in revenue. The number of passengers carried has decreased 16 per cent, but it is apparent that the passengers are becoming reconciled to the new rates, as the number of passengers carried has shown a small increase for the past two months."

An increase from a system of 5-cent zones to a flat rate of 3 cents a mile, made by the Fonda, Johnstown & Gloversville Railroad, Aug. 1, 1918, has resulted in a final increase in the number of passengers carried. General Manager W. H. Collins of the company says: "On the company's three interurban lines, fifteen months' operation to Oct. 31, 1919, with fares aggregating $682,095.54, an increase of $74,537.60, or 12 per cent, show a falling off in the first ten months in passengers carried, but an increase of 52,382 passengers for the five months ending Oct. 31, 1919."

The Empire State Railroad Corporation has increased its fares twice since Jan. 6, 1918, when the fare was 2 cents cash, 2 cents one-way ticket, and 1.8 cents round trip ticket, per mile. It is now 2.77 cents, cash and ticket. Vice-president J. C. Nelson says, "From a statistical analysis of our interurban situation, we do not believe that increase in fares has decreased traffic to any appreciable extent."

On April 27, 1918, the Rochester, Lockport & Buffalo Railroad raised fares from 2 cents, cash and ticket, to 2½ cents cash, 2¼ cents ticket, per mile. On Aug. 2, 1918, it made a further increase to 3 cents cash and 2½ cents ticket. On July 10, 1919, it put in a flat rate of 2¾ cents cash and tickets. Passengers carried began to decline before fares were increased. There was a decrease of 44,149 as between 1916 and 1917, although passenger revenue increased $23,484.75. Between 1917 and 1918 passengers carried decreased 374,180, and passenger revenue increased $14,601.81. The first ten months of 1919 show practically no decrease in passengers carried and substantial increase in revenue as compared to 1918.

Fares on the Albany Southern Railroad were increased from 2.2 cents a mile to 2.75 cents, on Dec. 1, 1918. For the first eleven months under the new tariff, passenger revenues increased about 26 per cent and passengers carried about 3 per cent. "There was no decrease in number of passengers carried from the start," says C. E. Holmes, general freight and passenger agent, "although the public contested the increase before the Public Service Commission."

On May 28, 1917, fares on the interurban division of the Auburn & Syracuse Electric Railroad were changed from 5 cents a zone to 2 cents a mile. On Aug. 1, 1918, they were changed to 2½ cents a mile, cash and ticket and on Dec. 23, 1918, to 3 cents cash, 2¾ cents ticket. General Manager W. J. Harvie says: "Following the increase we had a falling off in travel. This we believe was largely on account of the closing of a munition plant located on our line. We are unable to state what effect the increase had on our interurban travel."

The September revenues of the interurban lines of the International Railway Company, 1919, as compared with 1918, showed an increase of 23.66 per cent, although the number of passengers carried fell off 3.07 per cent. Fares were increased on these interurban lines on May 1, 1919, from 2½ cents to 3 cents on the Olcott line and from 2 cents to 2½ cents on all others. E. J. Dickson, vice-president of the company, says of the result, "It is almost impossible to give any reliable information relative to our interurban lines, owing to the new high-speed line. There appears, however, to be a slight increase in revenue passengers."

The Penn Yan & Lake Shore Railway increased its zone fares from 5 cents to 6 cents in 1917, from 6 cents to 7 cents in October, 1918, and reduced them to 6 cents in April, 1919. William F. Tyler, receiver for the company, says: "The increase from 5 cents to 6 cents and later to 7 cents showed a continued decrease in business, but dropping back to 6 cent gave better results, showing increased business. The increase from 5 to 6 cents on up to 7 cents, then back again to 6, seems to give better results than a raise from 5 to 6 cents."

The zone fares on the Troy and Ballston divisions of the Schenectady Railway were increased from 5 to 6 cents, and the minimum from 5 to 7 cents on May 26, 1919. The fares on the Albany division were unchanged. Yet for the three months ending Sept. 30, 1919, passengers carried increased 7.46 per cent on the Ballston division, while they decreased 1.36 per cent on the Albany and 6.23 per cent on the Troy division. Passenger revenue increased for the same period 17.96 on the Ballston, 15.82 on the Troy and 2.78 on the Albany divisions. General Manager Barnes' comment has already been given in connection with city fares.

Increases amounting to practically 1 cent a mile from the former fare of 2 cents a mile were put into effect on the interurban lines of the Elmira Water, Light & Railroad Company, on July 20, 1919. Vice-President Hill says of the result: "The combined effect of this and previous fare increases has been a 25 per cent decrease in passengers. Our gross revenues, however, on the interurban lines, has been increased about 10 per cent."

Dates of Increases

Increases in fares on New York State railroads, have, in point of date effective, been as follows:

Before 1917—On city lines, 1; on interurbans, none.
During 1917—City lines, 6; interurban lines, 1.
During 1918—City lines, 17; interurban lines, 21.
During 1919—City lines, 15; interurban lines, 9.

Attention is called to this matter of the date of increases, because it was in June, 1917, almost two and one-half years ago, that the Committee of Ten, representing your association, appeared before the Public Service Commissions of both districts and submitted proof of the desperate conditions of these utilities and the disaster that was bound to overtake them unless measures were taken for their relief. The fact that relief was so long in coming, when it did come, and that so many companies have not yet received relief, is an indication of the failure of the particular form of regulation which we have in New York State, and is justification for a change in the method of controlling these utilities.

It should be said, in justice to the Second District Commission, and to the present regulatory commissioner of the First District, Lewis Nixon, that they have, where it has been possible, authorized increases of rates to meet the crisis that has come upon the companies as a result of the high prices forced by the war, but there is a constantly growing feeling that is being manifested even among the commissions themselves, that the present method of rate adjustment is too slow and too cumbersome to be effective.

[In conclusion, the author described how a form of such automatic rate adjustment is secured under commission regulation through the act passed at the last session of the Wisconsin legislature and described on pages 891-895 of Vol. 54, No. 20 of this paper.]

New Passenger Locomotives for St. Paul's Rocky Mountain Division

Some Details Are Given of the Ten Engines Now Being Delivered to Replace the Original Ones on This Division Now Being Regeared for Freight Service

ABOUT four years ago public interest centered on the initial 440-mile electrification of the Chicago, Milwaukee & St. Paul Railroad over the Rocky Mountains. This epoch-making installation included as motive power ten passenger and thirty-two heavy freight locomotives. When later the extension over the Cascade Mountains was decided upon, five new passenger locomotives were ordered from the General Electric Company for this division and ten new passenger locomotives were ordered from the Westinghouse Electric & Manufacturing Company to replace the passenger locomotives on the division farther east, which were to be regeared for freight service.

The passenger locomotives for both divisions are now being delivered by the manufacturers. Up-to-date information regarding those for the Cascade Division was given in the ELECTRIC RAILWAY JOURNAL for Nov. 1, 1919, page 827. In a paper delivered before the New York Railroad Club, and abstracted in the issue of this paper for March 23, 1918, page 559, F. H. Shepard, director of heavy traction Westinghouse Electric & Manufacturing Company, gave a preliminary account of the passenger locomotive for the Rocky Mountain Division. It is now possible to reproduce an actual picture of the locomotive and to give a few of the design considerations. A later article will go into the more technical features of the locomotive.

The Rocky Mountain passenger locomotive has a capacity to develop 4200 hp. for one hour without exceeding normal temperature of the motors, and the normal starting drawbar pull is 100,000 lb. The drawbar pull can, however, be increased without injury to the electrical apparatus up to the point of wheel slippage.

The locomotive consists of two duplicate running gears of the Pacific type placed back to back, supporting a single cab. The wheel arrangement of the locomotive is 4-6-2-2-6-4, the drivers are 68 in. in diameter, the rigid wheelbase is 16 ft. 9 in. and the total wheelbase is 79 ft. 10 in. Rigid and floating center pins have been provided to relieve the cab structure of any pulling or bumping strains, all such forces being transmitted directly through the running gear.

This locomotive has been designed to include the features which have proved to be of distinct advantage in steam locomotive design. Other features kept in mind by the designers were to limit the amount of high voltage auxiliary apparatus, to provide facility for inspection of the main motors, to furnish a wide range of operating speed, and to provide the best possible disposition of the apparatus as to grouping and mounting.

Particular attention was directed to the articulation of the several trucks. In their design it was the endeavor to have each truck laid down to take care of itself and not have to be led along by any of its companion trucks. During the tests at East Pittsburgh this feature of the mechanical operation of the locomotive was said to be most pronounced, and to quote one authority, "the engine has the riding qualities of a Pullman car."

An effective study was also made of weight distribution and its equalization among trucks. With this latter end in view, comparatively long spring hangers were used so that any slight increase or decrease in their lengths, for the purpose of shifting the load, would not have any noticeable effect on the position of the locomotive springs.

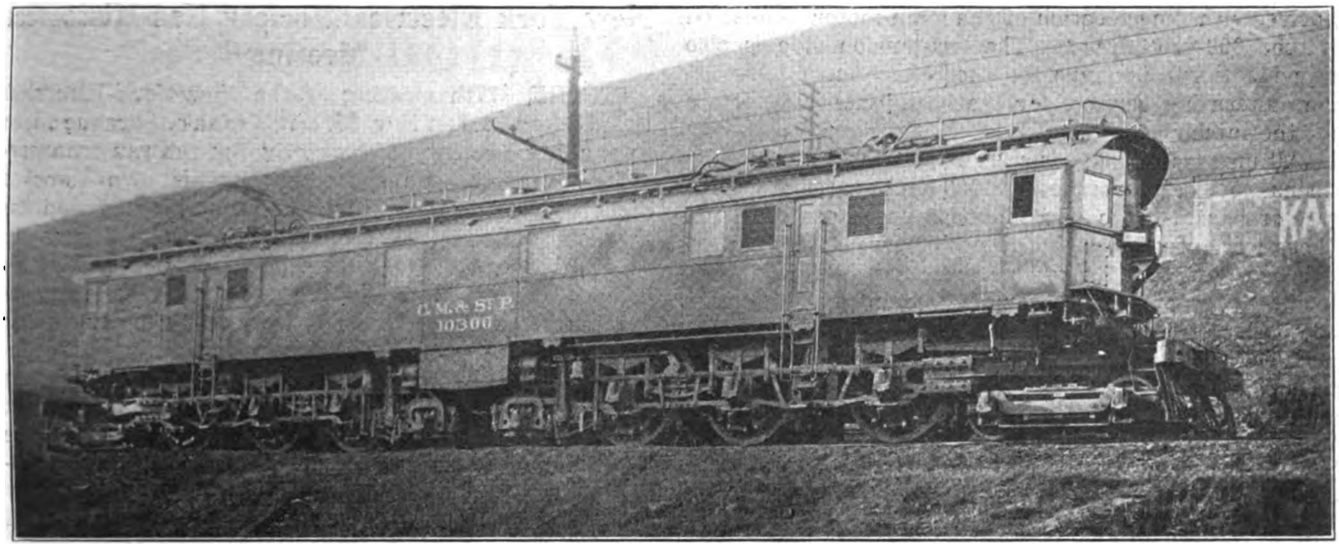
Power is supplied for the locomotive from six motors of the twin-armature type, mounted on the locomotive running gear. The two armatures of each motor are permanently connected in series and the control is so arranged that at least two motors are always in series. The result is that with the locomotive voltage of 3000 on the overhead contact wire, that across any one armature never exceeds 750 volts during motor operation. The control is further arranged so that all main motor fields are connected on the ground side of the circuit, thus maintaining most of the voltage stresses on the motors practically in line with commercial usage for the past fifteen or twenty years.

The motors are mounted, one over each driving axle, on the frame of the locomotive, transmitting their power by means of an 89 to 24 gear-and-pinion reduction to the locomotive drivers. The gears and pinions are kept in mesh by a quill shaft supported on the locomotive frame and surrounding the locomotive axle with a liberal clearance. The connection between the driving wheels and this quill shaft is made by means of springs, one end of each of which is connected to the quill shaft, while the other engages a bracket on the spokes of the drivers. This arrangement permits the drive wheels to follow the unevenness of the roadbed without affecting the gear mesh, and it also provides a cushioning effect for the torque of the motors.

In the design of this type of quill shaft, the details have been governed by the experience of the manufacturers obtained from the successful application of a similar class of drive on the New York, New Haven & Hartford locomotive. Due allowance, however, has had to be made for the increase in tractive effort.

The cab structure of the locomotive, which also partially incloses and protects the main motors, contains the auxiliary apparatus necessary for the proper functioning of the motors. Enginemen's operating compartments are located at the ends, connected by aisles extending along the side of the cab. All high-voltage apparatus is inclosed in compartments, so as to protect the engine crew while the locomotive is in operation. When the locomotive is "dead," however, easy access is afforded for the inspection and adjustment of all apparatus by removing the compartment sides and by passage through center aisles opening through expanded metal doors onto the cross aisles.

Regeneration of power on down grades and in braking on these locomotives is accomplished in the following



PASSENGER LOCOMOTIVE FOR USE ON THE ROCKY MOUNTAIN DIVISION OF THE CHICAGO, MILWAUKEE & ST. PAUL RAILROAD

manner: Control of the excitation of the main motors for regeneration is initiated manually by the operator from the master controller, the exciting current coming from two small generators geared to idle axles. The excitation of the exciters is secured from an independent source, a motor-generator set operating in parallel with a small storage battery. It is obviously necessary to have a separate source of excitation for the motors during regeneration because these must furnish characteristics similar to those of a shunt or separately-excited generator for this purpose. All of the main motors are used during regeneration. The exciters are automatically connected to the low-voltage auxiliary circuits during motoring, thus reducing the necessary size of the motor-generator set which is used in regenerating operation to supply these circuits. During motoring the motor-generator is called upon to furnish current for lighting the train, charging the train batteries, excitation to the axle generator fields, the control circuits and for charging the storage battery. One of the axle generators is mounted on the inside axle of each bogie truck. They are built like ordinary interurban railway motors, but are separately excited and are wound for 90 volts.

The control of the locomotive provides three motor combinations, giving full series and two series-parallel connections. In the latter two connections there are two parallel circuits of three motors in series and three parallel circuits of two motors in series. In each of these motor combinations three running matches are provided, namely, full field, short shunt and long shunt. This gives a total of nine efficient speeds at the disposal of the engineman during motor running. While decending a grade, the excitation of the motor field is entirely under the control of the engineman, and may be increased or decreased as desired, causing corresponding increments and decrements in the regenerative effort of the locomotive. The speed of the train can thus be varied through any desired range. The full motor capacity of the locomotive is available for regeneration. The locomotive with a given current will develop 15 to 20 per cent more retarding effort during regeneration than tractive effort in motoring. On a 2 per cent grade it can hold about 60 per cent more load in descending than it can haul up the grade. On a 1 per cent grade it can hold more than double the load it can haul up.

Power for energizing the control circuit and the operation of the auxiliary apparatus, such as blower motors, the motor-driven air compressor, etc., when these are not being driven by the axle generators, is obtained from a small motor-generator set operated in parallel with a storage battery. The high-tension winding of this set is the only piece of revolving apparatus on the loco-

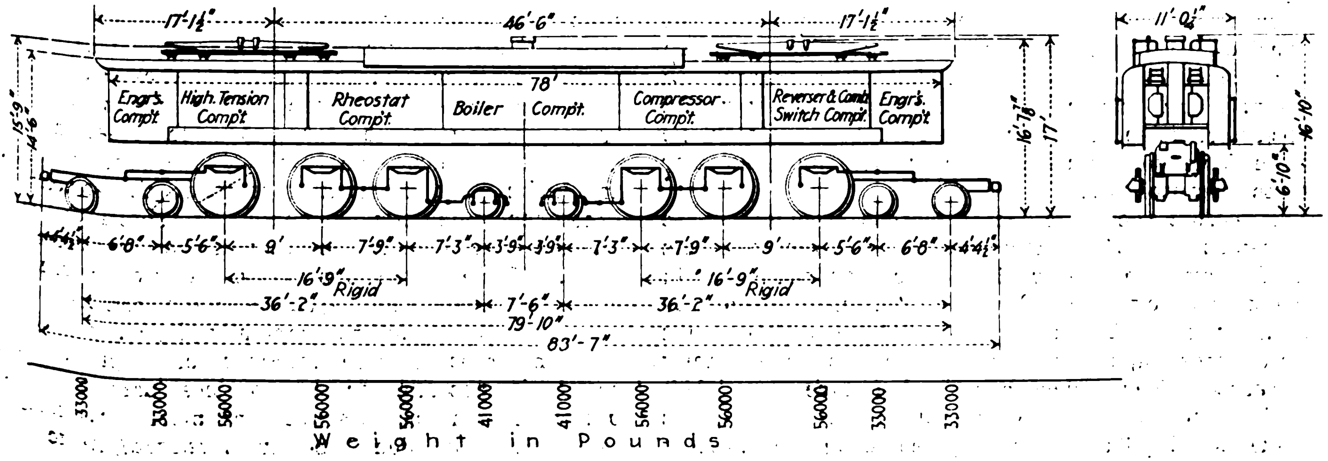


DIAGRAM SHOWING GENERAL ARRANGEMENT OF EQUIPMENT, DIMENSIONS, ETC., OF THE NEW PASSENGER LOCOMOTIVE FOR THE ST. PAUL ROCKY MOUNTAIN ELECTRIFICATION motive, with the exception of the main motor, connected to the 3000-volt circuit. The low-tension side is also provided with slip rings for the collection of low-voltage alternating current for the headlights and certain of the interior cab lights.

All main motor and resistance circuits are opened by means of electropneumatic, 3000-volt switches, which are standard for the Westinghouse unit-switch control. These are provided with powerful blowout coils to extinguish the arc. Transfer of circuits where no high voltage current is to be broken is accomplished by means of cam-type contactor groups, adopted for the purpose of reducing space and weight by the elimination of the otherwise necessary unit switches. The control circuits of all unit switches and cam contactor groups are interlocked electrically to prevent false functioning of the apparatus. All unit switches, cam contactor groups, grid resistors, protective relays, etc., are mounted in the compartments as previously described.

The center compartment of the locomotive is given up entirely to an oil-fired steam boiler, its supply tanks and auxiliaries. This boiler, which is for the purpose of heating the passenger trains, is capable of evaporating 4000 lb. of water per hour. Two storage tanks for water are provided, having a combined capacity of 25,500 lb. There is also a tank for fuel oil with a capacity of 750 gal. This steam boiler also feeds radiators in the operating cab.

The data for the locomotive are summarized in the accompanying table.

DATA FOR ST. PAUL PASSENGER LOCOMOTIVE FOR ROCKY MOUNTAIN DIVISION

Normal trolley voltage	3,000
Total weight	275 tons
Weight on drivers	336,000 lb.
Weight on leading trucks	66,000 lb.
Weight on trailing trucks	41,000 lb.
Total wheelbase	79 ft. 10 in.
Driving wheelbase	16 ft. 9 in.
Maximum rigid wheelbase	16 ft. 9 in.
Diameter of drivers	68 in.
Diameter of leading truck wheels	36 in.
Diameter of trailing truck wheels	36 in.
Locomotive capacity at 23.8 m.h.p. (one hour rating)	4,200 hp.
Locomotive capacity (continuous) at 80 per cent of above	3,360 hp.
Normal starting tractive effort	100,000 lb.
Normal speed on level track	55 m.p.h.
Capacity of steam boiler, per hour	4,000 lb.
Capacity of water tanks	25,500 lb.
Capacity of oil storage tank	750 gal.
Cab length	78 ft. 0 in.
Total over-all length	88 ft. 7 in.

Fare Situation in Toronto

THE *National Municipal Review*, which is publishing a series of articles on the fare situtation in different cities, covers in its issue for November, 1919, the situation at Toronto and San Francisco. The article on San Francisco is written by M. M. O'Shaughnessy, city engineer, and relates particularly to the history and present condition of the municipal railway. The article on the Toronto system is written by the municipal editor of the Toronto *Star*.

In Toronto the fares are still those provided in the agreement of 1891, namely: cash fare, 5 cents; tickets good at any time, six for 25 cents or twenty-five for $1; tickets good between 5:30 and 8:30 a. m. or 5 and 6:30 p. m., eight for 25 cents. Since 1891, when these rates were agreed upon, all costs of operation have greatly increased. Wages alone have doubled since June, 1916.

The company stock, which sold at 148 in 1913, has fallen to 42. The city has agreed to buy the property when the franchise expires in 1921, the price to be the valuation of its physical assets.

New York Electrical Society Has Historical Meeting

AT THE 377th meeting of the New York Electrical Society held on Nov. 25, last, Frank J. Sprague spoke on the development of electricity for railway transportation purposes. He spoke also of his own work at Richmond and on the Chicago South Side "L" and the New York Central electrification projects.

In speaking of the future of railway electrification he called attention to the attitude of the French commission recently in this country to study heavy electric traction. The commission after inspecting the Chicago, Milwaukee & St. Paul and other electrifications was enthusiastic over the use of high-voltage direct current and believed that this system was the only one for future electrification. Mr. Sprague himself believes that the economic performances developed by these locomotives will be even better than anticipated and predicts the use in the near future of a third-rail carrying 1500 to 1800 volts direct current, the use of regenerative control for braking purposes and the supply of power to the line when going down grade, the use of gearless motors and the interchange of passenger and freight locomotives.

In speaking of the urban electric railways, he pointed out that the government had, by price-fixing methods, doubled the railways' coal bills, raised the wages of their trainmen through a special war labor board, and their equipment cost more than in pre-war days; and yet this is the only industry, said Mr. Sprague, that does not have direct control over the selling price of its one product—service.

Referring to the New York situation, he said that while the subway system there is the most extensive in the world, it is now impossible to maintain the equipment in the safe operating condition demanded for the carriage of the ever-increasing hordes of people, and at the same time to carry them increasingly greater distances for the single fare adopted at the time the subway was opened.

The Public Service Commission, he stated, was playing a lone hand, but nevertheless was using commendable independent judgment against the city officials' dictum that, irrespective of existing conditions, no increase in fares shall be allowed because such would not be acceptable to the people. The average man, said Mr. Sprague, is disposed to deal fairly, and where differences concerning public welfare arise between a transportation company and a city, it is incumbent upon each to approach the situation in an open-minded manner and with absolute frankness, so that the public can see fairly and understand the merits of the case. It was useless, so far as the attitude of the public is concerned, for the railway or the Mayor to issue independent reports on conditions. What was needed was for the Mayor, the Public Service Commission and the company to agree upon some body, composed of technical and financial men, who will lay the facts of the case before the public. If the contentions of the railway are true, the public will accept this impartial body's solution.

Mr. Sprague said that personally he had no patience with the threat of receivership or municipal operation, for it is impossible for any political party to get the quality of men necessary at the price a municipality would pay. The men who run a railroad, he declared, must have an incentive for which to work and must take pride in their accomplishments.

Some Thoughts From a Utility Leader of the South

THOS. S. WHEELWRIGHT HAS STOPPED FROM HIS WORK A MOMENT TO TALK TO THE READERS OF THE ELECTRIC RAILWAY JOURNAL

An Interview with the President of the Virginia Railway & Power Company in Which He Discusses Franchise Relations, Labor Principles and One-Man Safety Cars

By Harry L. Brown

"A MUNICIPALITY and a corporation bound together by a contract makes a most absurd partnership, doesn't it? Just like two cats tied together by their tails and thrown over a clothesline. They are partners all right, but their principal mutual concern is to get apart."

In this characteristically epigrammatic manner, Thos. S. Wheelwright plunged into the task immediately before him of answering my question about the relations of local governments with their utilities. His happy expression—"right away, please, sir"—used so frequently and yet so without irritation, in addressing his assistants, was now being applied to himself. His twinkling blue eyes and the smile-wrinkles around them, bespoke the generous sense of humor with which he is endowed and which has played a timely and important part in some of the tense, perplexing situations only recently confronting him.

"You know as well as I," he continued, "that a contract which places all the responsibility on one party is a very poor working arrangement. That is about the way the electric railways have been hooked up. They were born wrong, I reckon, and as was said to Nicodemus, the only way they can be fixed up is to be born over again. It has almost been just fool nigger luck that they have gotten on at all. I am not surprised that the industry is in the present predicament; it's a marvel that it isn't worse off. This is the most respectable business on earth, and the most useful to the general public, yet it has been penalized on every hand all along the line. All the splendid economies that have been introduced were the outgrowth primarily of necessity—a question of life—and I reckon it will always be that way until the street railways can be extricated from the political atmosphere and history which has always enveloped them. That can only be hoped for when the people shall come to understand that their municipal government must be run as a business institution and not as a political plaything, and when such awakened government shall recognize its responsibility to the people and will co-operate with the utilities to work out what is best, realizing their inseparable and common interests. The present municipal government, with all its ramifications of councils and boards of aldermen, the numerous committees of each, and a politician for the business head instead of a business man, is just like a series of hurdles. You get over one and then there is another and another and another, and you never get anything done. Sometimes it is better likened to a series of toll gates."

This last reference reminds me of something Mr. Wheelwright told me as we chatted over a lunch at his club, a lunch about which I remember in particular the corn cakes and syrup. They were delicious. Their like never grew in the North. He was telling me how he happened to become the president of the Virginia Railway & Power Company, which supplies the electrical energy and transportation to practically the whole of his native state.

He had been serving Frank Jay Gould for some years as general manager and then president of the Old Dominion Iron & Steel Company, also located in Richmond and of which he is still the active head. Mr. Gould is also largely interested in the Virginia Railway & Power Company, and when William Northrop, the former president of this company, was killed in an automobile accident in 1912, Mr. Gould wrote from Europe offering Mr. Wheelwright the place. He replied in a very appreciative manner but declined to take the offer seriously, saying that a politician was perhaps best suited for that position. But when Mr. Gould returned to the States, he called Mr. Wheelwright to New York and they reached an understanding whereby the latter assumed the task of directing the affairs of the utility as well as the iron and steel company. A part of this understanding had to do, in plain language, with the use of any graft or hush money—a thing which is absolutely foreign to and irreconcilable with Mr. Wheelwright's philosophy of life, as well as that of his predecessor, Mr. Northrop.

"Since 1912," he said, "I have several times been informed—but that knowledge has not been sought—what the price was at the various toll gates, and I was glad I had had so clear an understanding as to the fixed policy of this company. But it's easy," he hastened to add with a broad smile, "to ignore a little thing like that when the man having the largest stake in the game had decided positively the only policy—honesty."

Perhaps the above has some bearing on his ability to leave all his cares at the office whenever he leaves it, for the utility business, strenuous as it is, causes him no worry. His work is his play, and about the only play he indulges in. It is his hobby. When he gets tired at the utility office, he goes over to the steel plant and that rests him, he says.

LABOR PRINCIPLES PRACTICED BY MR. WHEELWRIGHT

Just a few weeks ago, Mr. Wheelwright entered into a new agreement with his employees. This was the outcome of an extended series of long-drawn-out conferences, the president having determined to hear the men to the last word. Two clauses of this agreement attracted my attention particularly, the first and seventeenth, as follows:

> 1. That the established policy of the company to maintain an open shop will be strictly adhered to. By the "open shop" is meant that each individual employee is left free to exercise his own discretion as to whether he will join a union or not; that those preferring to act as individuals may do so, and those who wish to affiliate with an organization have the same right; that the company will hear, in like manner and on the same basis, any grievances of any employee who presents his case alone, as well as of any group of employees who come together as employees to present their case. The parties of the second part (Amalgamated Association) agree that they will at all times render proper and due assistance in breaking in new men in any branch of the service, whether they have signified their intention to join a union or not.
>
> 17. All matters on which we cannot agree, except the matter of wages, hours and other questions affecting operating costs, are to be submitted to arbitration. . . .

I was greatly interested to know some of the background for these clauses and Mr. Wheelwright answered my questions as follows a few lines below. His entire attitude toward employees is liberal and considerate. He has held himself in readiness to hear any employee or group of employees at any time by appointment, and he says:

"Anyone who will not meet with his employees must have something to be afraid of."

In reference to the agreement, he said:

"There are three reasons for holding fast to the principles of this agreement. First, we cannot negotiate with any group except they be employees of the company. Second, so long as they are our employees, we do not care what they call themselves, whether it be Odd Fellows, Knights of Columbus, Amalgamated Association, or what not. Third, we cannot possibly agree to the arbitration of matters involving expenditures unless the same arbitration board has the power to fix both the revenue out of which the wages are to be paid, and the wages."

"Suppose you were up against the situation where the employees were strongly organized, where they were more influenced by radicals, perhaps, than they are here, and insisted on a closed shop?" I asked.

"Well, there is nothing to do but quit."

"But you can't quit for long and remain solvent," I persisted.

"In that case, we would just have to ask for the protection of the state and municipal authorities and ask for volunteers to run the service under that protection."

"In other words, you think there is no justification for anyone submitting to a closed shop?"

"I cannot see any reason for so doing. To do so would be not only surrendering your own independence, but would be encouraging employees with other companies to do the same thing. I think you will agree with me that the test of a proposition is whether it is right or wrong. Personally, I have not had a great deal of trouble in deciding what was right. My difficulty has been when I did something wrong to make myself believe it was right. That's where the problem comes in."

"I am still thinking of the man," I persisted, "who is up against a deadlock on the closed shop principle. That has happened, has it not?"

"Yes, that does happen. But in the first instance, we are working on a principle that is admittedly right. If somebody locks us out, we can very properly ask for the protection of our government. If our government falls down in protecting us in doing what is right, we have not a government that is worth a damn."

It was my understanding that the wage increase granted as part of the recent settlement had been made on the basis of a division of the surplus for three months, and assuming that the rate of surplus would be earned during the succeeding months of the agreement, I asked if that was true. Mr. Wheelwright said:

"Yes, but we did not make the profit-sharing plan a part of the agreement, because our company had not yet decided on that policy."

"Have you formulated any ideas on how a profit-sharing plan could be worked out in the electric railway industry?" I asked.

"Well, that is pretty well covered in Mr. Ashburner's plan," he replied. "There is no difficulty about it. You can make a showdown, say at the end of every six months, and then work the profit-sharing plan on a percentage basis. One, of course, has to start somewhere, and, having just given a raise of 5 per cent, that is my starting point. Now, when we make up our books on July

1, if we find we have made an amount over and above all charges for capital and depreciation that would give a distribution of 5 per cent, instead of making the distribution in a lump sum, we would increase the pay of each man 5 per cent for the next six months. If in the next six months we do not have an increase, why we would chop it off. Of course, my company has not yet given its approval to such a plan, but I think that is working in the right direction."

The plan of Charles E. Ashburner referred to above is one which he, as City Manager of Norfolk, Va., recently presented to the City Council. It provides that any excess revenue after depreciation and dividends on preferred and common stocks, shall be divided equally between the city, the common stockholders of the company, and the employees below and including the position of superintendent. The details of the application of this plan have not been worked out as yet, but the company is in accord with the general provisions.

Service-at-Cost and Other Features

Discussion of this ordinance led to mention of the service-at-cost franchise and on that form of grant Mr. Wheelwright had this to say:

"There is no more reason why the principle of service-at-cost should be applied to street railways than to beefsteak, as the capital obligation of the company is probably represented by the bonds and stocks in the hands of the public. The only reason it is being done is because the railways were born in a political atmosphere. But I believe the public is going to look at this matter differently in time, especially with the coming of the commission form of municipal government."

"Do you believe the people would ever be willing to have a public utility earn more than what is considered a reasonable return on the investment?" I interposed.

"I believe that when a more compact city government, a real business administration, becomes thoroughly acquainted with its responsibilities it will realize that a reasonable return on such a hazardous business as we have should be more than that on a 6 per cent real estate mortgage. The hazardous nature of our business is generally overlooked. For example, what other business finds it necessary to set aside 5 per cent of its gross earnings for accidents and damages. What is reasonable is what will induce capital to invest in the business."

"Your situation here locally is probably better than that existing with a majority of companies, is it not?"

"Well, I don't know about that. In fact, I do not have much chance to see what the other fellow is doing and how he is fixed. My job keeps me so busy that I am like the rat about to drown in the milk can trying to keep his nose above the milk by churning enough butter to hold him up. He hasn't time to see what the other rat is doing."

"The only way in which to get the industry on a basis where it will earn a reasonable return on the capital invested is through a revamping of public opinion. People realize we must have a more efficient government. The present form of boards of aldermen and councilmen is archaic.

The nickel fare is still the rate in Richmond, so it is not surprising that the Virginia Railway & Power Company has been giving very broad attention to a system which has such marked effect upon operating costs and earnings as does the one-man safety car. Thinking of costs has been a habit with Mr. Wheelwright. Speaking of this trait of his, he said:

"There never has been a time when I did not know the cost of a barrel of flour. I was born here in Virginia just after the war when everything was high. Materials were very scarce, I reckon. Only weighed three pounds, myself."

The original installation of safety cars made by Mr. Wheelwright was in Norfolk where the natural course of events was complicated by the overwhelming growth of the community due to war activities and by the addition of another party, the United States Housing Corporation, to the city-public-labor trio which must ordinarily be dealt with in such an installation. The trial installation brought a host of troubles and the cars were taken off, though the reasons for the removal have been obscured. I sought light on the cause of this apparent failure and Mr. Wheelwright explained the circumstances, making clear that the failure was no fault of the cars. He began with the history of the case.

"Early in the fall of 1918, before the armistice was signed, we were up against it for equipment to furnish the necessary service for the government activities in Norfolk and Portsmouth. The authorities insisted that more equipment was necessary and we, of course, knew it. To help out in the situation, the government offered to advance us the money to purchase fifty one-man cars for Norfolk and Portsmouth. We agreed to accept the loan of the money—approximately $300,000—which was to be paid back in installments, the first payment to be made one year after declaration of peace, which has not yet occurred. We stipulated in that contract, however, that we would agree to the arrangement provided the city authorities of Norfolk and Portsmouth would permit the use of this class of equipment, because we knew that our franchises required the employment of a motorman and a conductor on each car.

"Before the cars were delivered, the armistice was signed and the Housing Corporation undertook to get the city authorities to permit the use of these cars. The city then asked that the cars be given a trial. This raised a great issue in both communities, and there was some opposition because the city authorities did not feel like taking the initiative in putting on a car that they did not know for sure would be acceptable to the public —a rather reasonable position, it seemed to me. The Housing Corporation, on the other hand, said it could not put the cars out on trial, as this would make them second-hand.

"We then proposed to the Housing Corporation that if it would let us use the cars anywhere on our system, we would accept them. This it did. However, the question got to be such a hot issue, and sundry viewpoints were so vehemently expressed by representatives of labor, the public and others, that the Councils of both Norfolk and Portsmouth turned the cars down. We then brought them to Richmond and Petersburgh where the people took to them and so far they have been very satisfactory and are highly indorsed, and we have purchased for early delivery thirty additional safety cars for Richmond."

"Was the consideration of the negro involved?"

"Yes, the car was said not to be a very satisfactory form of equipment for handling negroes, but to ease that point as much as possible we put the cars on the lines where we had a minimum of negro traffic."

"How did the people of Norfolk and Portsmouth express themselves about the cars?" I asked.

"The people liked the cars and expressed themselves freely as being greatly pleased with them and with the service they afforded. They even circulated a petition in Portsmouth and secured 1200 signatures requesting the Council to continue the safety cars in service."

"Then the Councils took the action of removing them, you might say, in contradiction of the people's wishes?"

"Well, I would not like to say it as strong as that," Mr. Wheelwright answered, "for the Councils were seriously attacked by the labor organizations, and both cities have a recall system effective upon the petition of a surprisingly few people, and this action was openly threatened. By the labor opposition mentioned, I do not mean our own employees. They liked the cars."

"There has been lots of talk, but I do not really think the safety car has had any 'bump' because it was not adopted in those two cities. There were very difficult conditions at the time. I do not feel the least bit discouraged as to the future of the safety car. I believe it is the ultimate unit for handling passengers by trolley inside of cities. And I am not so sure that it would not be just as well on the outside."

"On interurban lines?" I queried.

"Yes. On our interurban we have our money in very good equipment, and, while we might save money by the operation of the safety cars, they cost as much now as the standard cars did a few years back."

"But they would soon pay for themselves from the saving."

"That is true, but we have got to get the money from somewhere with which to buy them."

SOME OTHER THINGS MR. WHEELWRIGHT HAS DONE

While Mr. Wheelwright is one of the younger officials (in years of service) with the Virginia Railway & Power Company, he jokingly claims to be the oldest in experience among them. In this connection, I remarked:

"You were associated with Frank J. Sprague when he built his first commercial electric line here in Richmond, were you not?"

His answer was typical:

"Oh, I was only a livery horse for Mr. Sprague—a tin can that you fill up and empty out again. But, of course, I could not help but absorb some of the fundamentals."

He had served as a stenographer during those trying development days of the electric railway, and he expressed great admiration for the work done by Mr. Sprague. He said that the venture cost Mr. Sprague a fortune, but his nerve to see the thing through put the industry ahead ten years. Mr. Wheelwright has great admiration for that attribute of some men which can only be described by the homely expression of having the "guts" to go ahead and do a thing, no matter how many unsuccessful attempts are made. He once spent ten years in Chicago with the Gray Telautograph Company trying to develop a commercial telautograph, meeting with one failure after another, but finally achieved his goal in the product now made by the American Telautograph Company.

His experience in Chicago was finally successful, but he could not remain longer away from his native soil and so determined to return to Virginia and "put a pin in the ground and vibrate around that." So he bought a small farm 12 miles out of the city which now bears the name of "Buckhead Springs," and settled down there with no job in sight. He has lived there ever since.

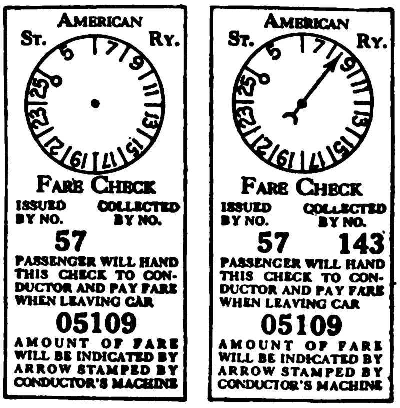
The interurban line to Petersburg runs past his farm and he always rides the cars back and forth. This is his contact with the actual operation of the cars, and he considers it invaluable to him.

Mr. Wheelwright began his career by spending five years at Randolph-Macon College at Ashland, Va., in learning stenography and French and German, preparing himself, as he thought, to take an active part in the export business and making Norfolk one of the great world seaports. This, it seemed to him, was the future of that city.

"Thus prepared," he said, "I went to Norfolk and, after long search, found that there was not a place in town for a man of my training, and I was finally forced to take a job as a bookkeeper at $50 a month, something about which I knew nothing. But the joke was on Norfolk, not on me. My geography was all right but the town had not realized its opportunities, but what I foresaw for the city then is now actually coming true."

True Mileage Fare Collection

APPLICATION has been made by Albert S. Richey, of Worcester, Mass., for a patent covering a new form of ticket stamping machine that can be used in collecting zone fares based on distance traveled. The plan in general provides that two synchronously operated machines be used.


AMERICAN ST. RY.
FARE CHECK
ISSUED BY NO. COLLECTED BY NO.
57
PASSENGER WILL HAND THIS CHECK TO CONDUCTOR AND PAY FARE WHEN LEAVING CAR
05109
AMOUNT OF FARE WILL BE INDICATED BY ARROW STAMPED BY CONDUCTOR'S MACHINE

AMERICAN ST. RY.
FARE CHECK
ISSUED BY NO. COLLECTED BY NO.
57 143
PASSENGER WILL HAND THIS CHECK TO CONDUCTOR AND PAY FARE WHEN LEAVING CAR
05109
AMOUNT OF FARE WILL BE INDICATED BY ARROW STAMPED BY CONDUCTOR'S MACHINE

AT LEFT, TICKET AS ISSUED FROM MACHINE. AT RIGHT, TICKET AS STAMPED BY MACHINE IN CHARGE OF FARE COLLECTOR AT ALIGHTING POINT

The first or issuing machine may be under the control of either the motorman or of the conductor and has a revolving dial which prints on the ticket as issued relatively the point at which the passenger boards the car. At the same time the machine stamps a serial number on the ticket as well as the motorman's number in the position shown. The second machine is in charge of the fare collector and has a rotating indicator arrow which revolves in synchronism with the rotating dial on the issuing machine. The ticket held by the passenger when inserted in this second machine is stamped with an arrow which shows either miles traveled by the car since the ticket was issued or how much fare is due to the conductor for the ride taken. The collector's number is also stamped on the ticket at the same time.

The illustration shows at the left the ticket as issued and, at the right, the appearance of the ticket if the passenger left the car after he had taken a ride worth 9 cents. In the case shown, the disk indicates the fare to be paid and not the distance traveled.

As will be seen, the design of the machine is such that fares may be in even amounts per mile or per fraction of a mile, or an initial charge may be made greater than the unit of subsequent increments. Changes in rates may be made by changing only the disk which prints the dial on the ticket when issued. The tickets as collected can readily be audited.

In contrast with systems having fixed zone points, this plan allows each passenger his full initial fare ride irrespective of his boarding point.

Unlimited-Ride, Transferable Weekly Pass at Racine

An Experiment in the Sale of Street Railway Transportation to Promote Frequent and Frictionless Riding —Why a Pass Is Being Tried in Preference to Other Special Rate Plans — How It Is Advertised and Used to Further Better Public Relations

Is it possible to restore the old-time zest and flavor? Other competitive businesses have done so. The old-fashioned drugstore, when the population became too disgustingly healthy to require patent medicines and a few prescriptions, blossomed forth with soda, candies, cigars and minor household furnishings. The Yankee notion corner was transformed into a 5 and 10-cent store; and the barber shop, threatened with rapid extinction by the safety razor, transformed itself into a beauty parlor and raised its prices besides. Is the industry lacking in constructive imagination, or is the trolley ride as prosaic as a postage stamp which it does not pay to flavor to induce use? The low number of rides per capita—less than one ride per day—indicates a minimum of patronage and absence of convenience or pleasure riding and a dearth of salesmanship. We call it "the riding habit"—a proper designation. Riding is habitual or forced rather than attracted. . . . There is some solution awaiting the genius of salesmanship.

THE foregoing quotation from the paper: "Can Service Costs Be Collected From the Traveling Public?" presented by J. D. Mortimer, president North American Company, before the 1919 convention of the American Electric Railway Association sounds the keynote of this article. This quotation is all the more appropriate as the Milwaukee Electric Railway & Light Company, of which Mr. Mortimer is also president, has pioneered in two important ways of selling transportation. It was Milwaukee which inaugurated a zone-fare system as early as January, 1914, and it is in successful use to-day as described in the ELECTRIC RAILWAY JOURNAL for Sept. 27, 1919. So, too, it is the Racine division of the Milwaukee company which is the first in this country to try the unlimited-ride pass hereinafter described, zone fares not being practicable at Racine because of the shortness of the routes and the character of the present headways.

VARIOUS FARE SCHEMES WERE CONSIDERED

Before the pass idea was adopted in Racine consideration was given to the experience of foreign roads in successfully building up short rides and in improving their load factor. Due thought was also given to the several expedients that have been tried or suggested in the United States, such as wholesaling tickets, off-peak hour tickets, club membership tickets, limited-ride tickets, etc. The plan of a weekly pass finally approved for trial is a modification of the British season or contract ticket, and was suggested by Walter Jackson, who had been engaged by the company to devise a plan tc increase the riding on the property. It is interesting to add that Bruce Cameron, former general superintendent United Railways of St. Louis, independently reached the same conclusion in working out a plan for the county lines of St. Louis.

In addition to the comparisons of fare schemes which follow, it should be stated that Racine is a city of about 50,000 population, of whom some 18,000 are in factory, office or store employment, and that a large proportion of this labor is well paid, as proved by the fact that Racine has 8000 telephone subscribers, of which number about 7000 are residence subscribers. There are few large stores, owing, probably, to the nearness of Milwaukee and Chicago, but there are several excellent theatres to induce night travel. The shopping and pleasure district is roughly 2 miles from the outskirts. Hence a good deal of walking is to be expected unless the fare and service are held by the public to be satisfactory. At the present time, with two men per car, the shortest headway exclusive of rush-hour trippers is nine minutes. Other headways are ten, twelve, fifteen and twenty minutes. These headways should be borne in mind in the consideration of any scheme for inducing traffic. The shorter the headway the greater the proportion of population to which the railway can be of every-day utility. To-day, obviously, persons within one mile from the shopping and pleasure center, and that means more than half the population, are not good prospects for the street railway.

At the time the pass was installed the single-trip fare in Racine cost 6 cents cash, and a 6-cent metal ticket was sold at full price. There was also a workman's metal ticket sold at ten for 55 cents, or 5½ cents each, good between 6 and 8 a.m. and 5 and 7 p.m. Children between the ages of three and ten years rode at half price. Transfers were free. By a ruling of the Railroad Commission in the latter part of November, 1919, the company was authorized to increase its cash fare to 7 cents and to sell six tickets for 35 cents and to discontinue the sale of workmen's tickets. Up to that time, during 1919, about 5 per cent of the passengers rode on workmen's tickets and between 4 and 5 per cent presented metal tickets sold at full price. These facts were considered in the adoption of the final plan, in which one of the principles sought was to simplify rather than further to increase the work of the conductor. The principal schemes considered were as follows:

Wholesaling Tickets: An intensive selling campaign, including house-to-house canvassing, it was recognized, might have greatly increased the sale of metal tickets if some cut rate had been offered. This would have tended to encourage riding, since a ticket in the pocket is money already spent and would have relieved the conductor in making change. The objections to this plan, however, were considered to be as follows: First, since the principal buyers of tickets would be people with a fixed riding habit, the advantage of a reduced rate would be enjoyed chiefly by those who as long-ride, rush-hour, compulsory riders were already getting their money's worth and more; second, the company was already selling a 5½-cent ticket good during the chief peak hours; third, a variety of fares tends to confuse the conductor and his accounts.

Cheaper Off-Hour Tickets: Another way that was considered and has been tried to a lesser extent is that of selling so-called shopper's tickets good only between the hours of say 10 a.m. to 4 p.m. The objections to this were: First, a further complication of tickets for conductor and auditor; second, any ticket with a time-limit feature would, like a transfer, be another source of friction between the rider and the conductor—as when a woman wanted to argue as to why she could not board at 9.55 a.m. or 4.10 p.m.; third, should safety car operation be introduced, it would be most undesirable to slow up the car through having a variety of fares.

Street Railway Club Scheme: Mr. Schaddelee of Grand Rapids, Mich., it will be recalled (ELECTRIC RAILWAY JOURNAL, April 5, 12 and 19, 1919), has suggested what might be termed a membership plan. Those who pay a fixed sum per annum or per month would be entitled on presentation of a pass to pay a cash fare of, say, 5 cents, while all others would pay, say, 10 cents. This plan was also considered, but it was rejected because it was thought to discriminate against the casual rider who may or may not be a frequent rider. As in the case of wholesaling tickets, it was believed that the person who must ride twice a day will be the one most likely to go to the trouble of signing up monthly or annually. On the other hand, a woman who may be taking more trips (and shorter ones) during the week than rush-hour riders, but at irregular intervals, might be unwilling to go to this trouble. At the same time, she would resent paying a higher fare per trip and therefore would ride less and telephone more.

THE ONLY WAY

To Reduce the Cost of Living Now

Some day the government may find a simple method of reducing the cost of living. It hasn't yet, however. The only way open to the average family is to buy economically. To buy economically, you must visit the store in person. In the past, that has meant added expense for street car fare. But since the establishment of the Weekly $ Pass you

Needn't Pay 6c Car Fare

Has it been explained to you? Every conductor and many merchants now have on sale the Weekly $ Pass. It is an unlimited ride ticket, good from Monday morning until the next Sunday midnight on any street car. Any person can use your pass, one pass does for the whole family, provided they all don't want to ride at the same time. The pass costs $1, and you can ride 100 times—or 1,000 times for that matter—on it if you do it during the seven days for which the Weekly $ Pass is issued.

1,100 Used In Racine

More than a thousand Racine people buy these passes each week. The men go to work on them. They come home to lunch. The rest of the family use them in shopping hours, in the evening and on Sunday. Groups of clerks downtown have bought them for their joint use. They take turns riding.

Good Street Car Service

The use of these passes is making for better street car service. The owner of one doesn't have to pay carfare, he doesn't need a transfer, he doesn't delay the people following him while he makes change at the car door. The result is that service is being speeded up. There is less delay at junction points. People use the cars to ride a block or two. When it is raining—oh, what a boon that Weekly $ Pass is then!

Free Rides to the Movies

Your family will get more than the $1 cost out of riding in the daytime. As a result, your evening rides and your Sunday trips are really free. This means a lot to people who have had to forego the pleasure of the movies, because car fare added too much to the cost of the entertainment.

Go Home For Lunch

No need to stay downtown at noon. With the Weekly $ Pass in your possession it is cheaper to go home than to stay downtown. Hundreds of Racine people have learned the value of this pass. It has enabled school children to abandon the noon hour cold lunch, and go home instead.

Try a Weekly $ Pass Today

Try this Weekly $ Pass now. Ask the conductor about it. No one who has bought one has failed to do so again. It looks now as though it is to solve the problem of cheap transportation by increasing traffic and efficiency.

THE WEEKLY $ PASS FOR NEXT WEEK IS NOW ON SALE

T. M. E. R. & L. CO.

THIS IS AN ENTICING ADVERTISEMENT OF THE PASS

Theoretically, in the opinion of those who worked out the Racine plan, the casual rider costs the railway more than the regular rider; actually, he does not so long as the casual riders do not fill all the seats offered during the hours when a base schedule must be given in any case. There is also, in their opinion, a further disadvantage in charging the casual rider a higher rate, namely, in arousing the antagonism of the business and amusement interests of the community. Many casual riders are on shopping or pleasure bent. Even the woman who comes into the city but once a week to buy a bill of goods is so welcome to the merchant that he would rather pay her fare himself than have her sour on the town because of a discriminatory fare. It does not seem good public policy,therefore, to make the discrimination against the casual rider too glaring.

The club plan, it was thought, is also but slight relief to the regular rider in so far as his fare transactions are concerned. He may have less trouble about getting change, but he must still go through a cash transaction every time he boards the car, ask and perhaps pay for a transfer (unless he has a special pass) if needed and also have the bother of signing up or remitting monthly dues. Nothing is gained from the viewpoint of the conductor because he still has a transaction with each passenger and still has a variety of fares. From the financial viewpoint, there is the further difficulty to the company of distinguishing between the passenger who pays a reduced rate and one who pays the full rate. For these reasons, the club plan was not tried.

THE WEEKLY UNLIMITED RIDE PASS ADOPTED

Fundamentally, it did not seem wise to offer a reduced rate to unprofitable, compulsory riders or to do anything that would complicate the system of fare collection. The exigencies of the case seemed to be best answered by a modified form of season ticket or pass, the cost of which would be more instead of less than the regular cost of two rides a day. Thus it became possible to argue with the prospect in this wise: "We cannot afford to reduce the cost of your rush-hour riding, but we may be able to give you any additional, non-rush hour riding at a slight increase over what you are now spending. Today, you are paying 72 cents for twelve rides a week. We are going to offer you an unlimited number of extra rides for only another 28 cents. In this way we hope to make 'any car your car any time' for shopping, social and amusement travel, for as short a ride as you care to take in bad weather, etc. We are anxious to make our service of the greatest possible use to you, and you can help us by this plan of filling seats now empty."

The first idea with regard to the pass was to limit it to a fixed number of rides per week and to limit it to the original purchaser. But to have limited the number of rides would have compelled the car operator to punch the ticket, thereby losing time and bothering the passenger. A ride limitation, unless very high, would not have eliminated the transfer nor encouraged short rides to the same extent as an unlimited-ride pass. As for confining the ticket to the original purchaser: This would have done no good at best because it is practically impossible to identify the street car rider; nor was there any desire to limit the use of the pass in this way. The fact that the pass is transferable was considered the best argument that could be used with people who could not see how they could get $1 value out of it. In other words, it was thought that they would be far more likely to buy a pass when told that they could go a-shopping or to the theater on it after the pass has been turned in by one of the school children of the family. This is but one of many possibilities. Practically, of course, most pass owners must keep it for their own use; else they would have to pay real cash on boarding the next car.

The unlimited-ride weekly pass now in use is good from Monday morning to Sunday midnight. Its holders merely flash it as they step aboard, the conductor readily recognizing it because of the color and number used for any given week. The numbers are more than 2 in. high. The only work the conductor has is to ring up each pass as presented.

The period of one week may seem unnecessarily short, but it was realized that Americans are not acquainted with the value of unlimited-ride passes. It hardly seemed likely, therefore, that people would be willing to put up, say, $4 a month for something that they can take or leave at the rate of 6 cents a ride. A dollar a week might be expected more readily in view of the fact that even the workmen's limited-hour ticket called for an advance purchase of 55 cents. When greater familiarity with the uses of such a pass has been gained by the public, the company can consider selling it on a monthly basis. Indeed, it has been considered to be feasible, particularly when the same company handles lighting and power, to bill such transportation by the month. Then the patron would have to exert initiative to stop the pass, whereas now he exerts initiative every week to buy the pass. The psychology of this needs no explanation.

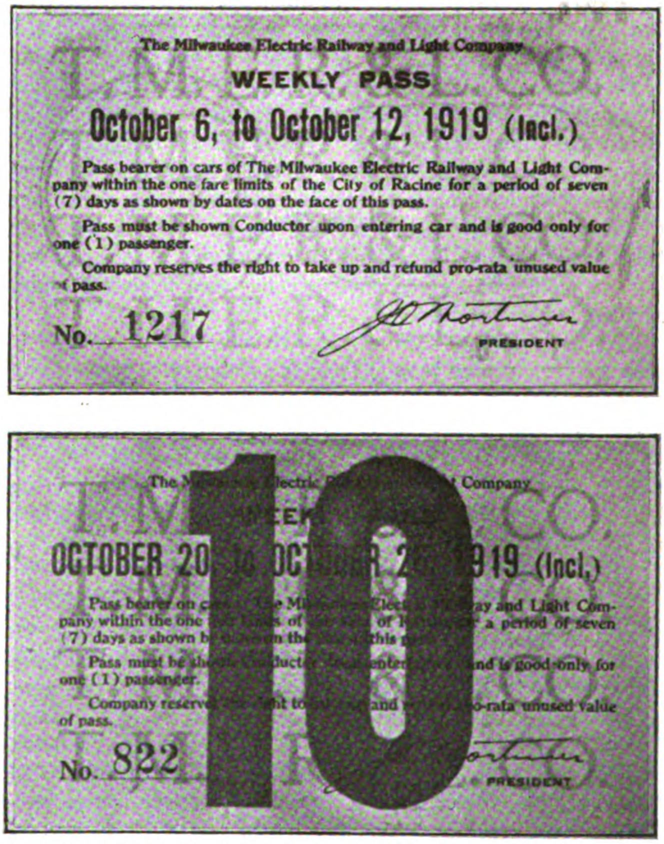
Almost all sales of the pass are made through the conductors, who receive a commission of 2 per cent. The merchants, with whom the passes were placed for sale on the same basis, did not manifest much interest until they were shown how increased sales of passes would stimulate riding and that this in turn would benefit them. The passes are placed on sale on the Thursday morning preceding the week (Monday a.m. to Saturday midnight), for which they are valid. None is sold for the current week after Wednesday.

SELLING THE PASS IDEA TO PLATFORM MEN, BUSINESS MEN AND PUBLIC

In making so great a departure from current fare charging practice, it was necessary to see that everybody at interest understood the purpose of the pass as affecting him personally. Following a preliminary newspaper advertisement and a simple car card and store card, the pass was allowed to work out its own salvation for a few weeks to see whether any serious technical defects would develop in practice. Passes were first placed on sale during the week of Aug. 18. A number of talks, as outlined in the following paragraphs, were given one month later, and newspaper advertisements were begun the last week of September.

Of course, the first people to sell were the salesmen—the conductors. At smokers given to both the night and day men, they were advised concerning the advantages of the pass to them personally. They would have but one transaction a week instead of a dozen or more with each passenger. A pass holder would never bother them about change or about misuse of transfers. With the coming of bad weather, they would appreciate more and more this means of assuring the quicker closing of the doors and of minimizing unpleasant discussions with passengers. Compared with the work of conductors on zone systems they had had a fairly easy time, despite the 6-cent fare and the time-limit transfer. It was the endeavor of the company, however, to make matters still easier for them by means of the pass. Since they were to be the chief salesmen, it was desirable also to tell them of the advantages of the pass from the passenger's viewpoint. They were also advised of other special fare schemes which had been considered but rejected as making more work for them. Under the new plan, metal tickets and cash would be registered through the fare box, while each presentation of a pass meant nothing more than a pull on the register cord.

Merchants were seen both individually in their stores and collectively before the Rotary Club and other business organizations. There were frank talks on the electric railway financial problem as a whole. It was pointed out that railways had to have more money. This might come either through higher unit fares or through more travel during the off-peak hours. Increased fares were injurious to their interests if they resulted in reducing riding. Contrariwise, more off-peak riding was of the greatest possible benefit to them. This company was anxious to get more revenue through increasing rather than decreasing the usefulness of the railway. The weekly unlimited-ride pass was an experiment along those lines. While the sale of the pass lay largely with the conductors, the merchants could help by permitting the display of advertising cards in their show windows and of advertising inserts, as in the case of the Liberty Loans, in their sales announcements.


The Milwaukee Electric Railway and Light Company

WEEKLY PASS

October 6, to October 12, 1919 (Incl.)

Pass bearer on cars of The Milwaukee Electric Railway and Light Company within the one fare limits of the City of Racine for a period of seven (7) days as shown by dates on the face of this pass.

Pass must be shown Conductor upon entering car and is good only for one (1) passenger.

Company reserves the right to take up and refund pro-rata unused value of pass.

No. 1217

PRESIDENT

10

OCTOBER 20 [illegible] 1919 (Incl.)

No. 822

PRESIDENT

SAMPLE PASSES—THE PASSES NOW HAVE THE RED SURCHARGE NUMBER, INDICATING THE WEEK FOR WHICH THE TICKET IS VALID

As an example of what many pass holders meant to the cause of better local shopping, a parallel was drawn between telephone and personal buying. People who telephoned bought less because they did not see things to arouse their desires and because the merchant had no chance to use his salesmanship. A woman who telephoned naturally could not carry any of her purchases home, whereas she would surely carry some of them home if she came in person and could ride from store to store without extra carfare. Finally, a person who bought goods personally would return less goods as unsuitable. The weekly pass would encourage riding also by making it frictionless, as through the elimination of the feeling that money was being spent and of arguments concerning transfers, etc. If a trolley ride had no unpleasant associations, it would be taken oftener. It was needless to tell them that the automobile could not replace the trolley car, for there wasn't room for the parking of even half a dozen cars before their stores. In every case, the merchants said they would be only too happy to coöperate in an enterprise that affected them so closely.

A similar line of argument was used with the moving picture men. They were advised in addition that the people hardest to sell were the workmen who did not have the opportunity at present to ride home to lunch. If they could be induced to do more riding to the movies, it would pay them to buy a weekly pass. For example, a person going to a 22-cent show might change his mind if he figured that there was another 12 cents to add just for carfare, and the going of a family would be influenced still more by a factor of this kind. All the movie people interviewed said they would gladly give the use of their screen for advertising slogans. In fact, one merchant who owns the largest theatre in Racine said that he would not advertise his own store on the screen, but he would advertise the pass because it meant more business for the theatre.

The advertising campaign with the general public is now getting under way. This is to comprise newspaper advertisements and a variety of car cards and dasher signs appropriate to the season. The man in the street will be urged to ride on a pass, and the man who is riding now will find a sign over the farebox concerning the futility of bothering about change and transfers when the pass would wipe out such annoyances!

POPULARITY OF THE PLAN

The sales of the pass during the week of Aug. 18 approximated 800 and for the week ended Dec. 20 they had risen to 2,024. For the week of Nov. 7, 19.7 per cent of the rides were taken on passes and 13.8 per cent of the revenue came from passes. The average revenue per ride from pass holders was 3.7 cents compared with 5.93 cents per revenue passenger and 5.17 cents per ride from all passengers. The 3.7 cents per ride on passes must be interpreted in the light of these facts: First, that as pass holders need no transfers they are always registered as revenue riders, so the 13 to 15 per cent dilution due to transfers does not show in this figure; second, when a child below twelve uses a pass the revenue per ride is greater than the single-trip fare of 3 cents; third, pass holders naturally want to get maximum returns, and therefore ride short distances that a unit-fare customer would walk.

The average number of rides taken daily per pass holder for the period named was 4.1 and for Sunday 2.4. Of course, the price of $1 a week is purely experimental and might be increased if it was found to injure the earnings. However, gross earnings at Racine were climbing up for several months before the introduction of the pass, and as they are still rising one cannot say whether the pass is hurting or helping. In any case, the pass seems to be fulfilling at least part of its purpose in making street car riding more popular, although there has been no increase in service.

Although the idea of the pass has met the hearty approval of the newspapers, the business men and the public, the number of pass holders is still far below the possible maximum. For this a number of reasons are apparent. The idea is new and has to work its way into the consciousness of the public as a whole; publicity must be continued by the railway over a period of months as persistently as by the tobacco manufacturer who can find sales arguments for mixing tobacco with chocolate or toasting it; shorter headways than nine or twenty minutes will make new street car riders or more frequent street car riders out of people who are now within a walking radius; lengthening of the luncheon period by manufacturers will also be a big factor, once the manufacturers and their employees understand that lunch-hour riding costs next to nothing and is coupled with short-headway service. It is also a fact that the pass has hardly had the advantage of being exploited in connection with winter weather, although pass holders have been seen to ride only two blocks on a rainy day.

PASS AN EXCELLENT PUBLICITY MEDIUM

Regardless of the sales, it must be obvious from what has been said that the pass offers an excellent opportunity for bringing the electric railway problem before employees and public in a new light.

It is difficult to analyze the classification of the pass holders. The first buyers, naturally, would be canvassers, house workmen and others who have occasion to ride or walk from block to block. Next in line are people who can ride home for lunch, and then come shoppers who may or may not get a full dollar's worth every week, but who appreciate the convenience. During the school season, high school pupils who average longer distances from home take advantage of the ticket for riding home to lunch. Many stories are told of the convenience of the pass, as of the man who got off en route to buy a forgotten loaf of bread and took the next car, happy that he did not have to pay a second fare! Conductors have observed that the pass holder soon acquires the same air of proprietorship that is associated with the free-pass rider of former days. The steady though slow increase in sales would indicate that those who buy the pass are satisfied that it is giving them a chance to make 100 per cent use of their street railway and they continue buying the pass week after week whether they save money regularly by it or not.

CHANGE IN RATES OF FARE

As already stated, beginning Monday, Nov. 24, the cash fare was raised to 7 cents and the company was permitted to discontinue the ten-for-55-cents workmen's ticket. However, the situation was complicated somewhat by the Commission's order that tickets must be sold at the rate of six for 35 cents. This order has probably prevented the maximum rate of change of cash riders into pass riders. Nevertheless, for the week ended Nov. 29, $1 passes sold jumped from 1,499 to 1,678, although this included Thanksgiving Day; and for the week ended Dec. 20 the number sold jumped to 2,024. The number for the week ended Dec. 13 was 1,915, and that for the week ended Dec. 20, 2,024. The following week showed a decrease to 1,602, due in large part to the closing for the holidays of several large factories and the schools, important producers of traffic in Racine. As this issue of the paper goes to press, sales up to and including Thursday, Jan. 1, for the week ending Jan. 3 amounted to 1,407.

How Purchasing Agents Can Help Each Other

By E. E. Stigall

Purchasing Agent Kansas City Railways

Much Good Should Come to the Industry from the Recently Organized Purchasing Agents' and Storekeepers' Association

E. E. STIGALL

Present Critical Condition of Electric Railways Emphasizes Desirability of Employing Every Means to Reduce Costs

THE Purchasing Agents' and Storekeepers' Association, which was formed during the convention of the American Electric Railway Association at Atlantic City last October, faces two conditions often surrounding a new organization of this nature—the association should have been actively at work years before, and the attendance, interest and definite plan for action may appear somewhat disappointing at the outset..

At the first meeting of the organization, nearly thirty electric railway properties were represented by their purchasing agents or storekeepers. A second meeting was held during convention week. I feel sure those in attendance are convinced not only of the necessity of this association but are certain of its growth and increasing value if cooperation is given to the president, W. H. Staub of the United Railways & Electric Company, Baltimore, Md., and the secretary, P. F. McCall, Metropolitan West Side Elevated Railway Company, Chicago. There is scarcely a street railway so small that the time and expense required for the attendance of the purchasing agent or storekeeper would not be more than justified when one considers the benefits derived from the convention and the value of such an organization throughout the year.

It is generally conceded that the time-worn cry of local conditions and a disposition to ignore what others are doing in similar lines of work should be discarded. Where men in the same kind of occupation are brought together as they will be in this organization, they gain by each other's experience. In consequence, they not only run less chance of repeating mistakes that others have made but without further delay they can adopt the methods which are proving advantageous on other properties.

Every year we find both business and professional men associating together for mutal benefit to a greater extent than before. In fact, there is a strong tendency in our cities on the part of business men to group themselves geographically according to their respective lines of business. Thus, we find the lawyers, doctors, insurance and realty dealers taking offices in buildings occupied almost exclusively by themselves. Again, we find financial institutions, brokers and commission houses, as well as wholesalers and jobbers of the same goods, locating their establishments in the same sections of the city. This has resulted from a realization that friendly competition is preferable to the old method of fighting and that real advantages are to be gained by such a policy. In the same way, our association can be a material benefit not only to the individual members and the departments represented, but to the other departments of the company and to the railway industry as a whole.

The first benefit to be obtained is acquaintanceship. Without this there is always a disposition to reduce to a minimum the contact even by correspondence which is essential if the different companies in the railway industry are to receive from each other the assistance which is the most important that they should have during the next few years.

Without this acquaintance and friendship among the men in this industry who have similar work to do there will be no team work, and many things of importance to all companies will be delayed or left undone.

The purchasing agents and storekeepers come in contact with every department in a company as well as with practically all the manufacturers who furnish equipment and materials to their respective railway systems. The conventions of the American Electric Railway Association furnish a splendid opportunity for these men to increase their value to the companies employing them not only in their specific work but in cooperating more efficiently with the other departments. In fact, these two departments are of value only as they support and are of service to the other departments of an electric railway company. On the other hand, they form the connecting link between these departments and the manufacturers who furnish millions of dollars worth of materials for the construction and operation of the electric railways. In this capacity they should take the initiative and obtain all information from the manufacturers which may tend to reduce costs or increase the efficiency of operation.

There is no need to refer to the abnormal market conditions nor the subnormal financial conditions of the industry during the past few years. The problem now is to exert the maximum effort without omitting any policy or action, no matter how relatively unimportant it may appear, which will contribute to the relief of the electric railway properties.

The chief problem before the industry now is to increase the difference between gross revenue and the operating expenses. There is a limit to what can be expected in gross, and there is undoubtedly also a minimum to which expenses can be reduced. But it is important to know if we are approaching that minimum. Further reductions may be possible. The purchasing agent and storekeeper can help in this matter. The extent to which they can be of such service depends upon the information which these officials have at their disposal and the judgment possessed by them. I believe that at this particular time every member company will make a good investment by instructing its purchasing agent and storekeeper to join this association and become at once active and aggressive in the working out of the question of cost reductions of the equipment and material used by our industry.

This is not the time to go into detail as to the plans of the association, but every purchasing agent will at once realize the possibilities of benefit which would arise from certain standardizations, the proper disposition of obsolete material and a careful review of the policies which are followed at different times by manufacturers.

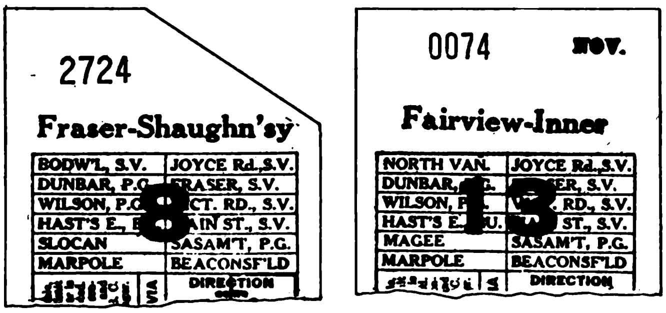
The sellers are more or less organized and at times take very uniform action regarding matters directly concerning the buyers. It is obvious that our interests compel us to organize in like manner. I feel sure that the association mentioned will benefit every member, and of particular importance will be the opportunity during convention week of meeting with the members of the Engineering Association, whose requirements form the basis of the work done in the purchasing and stores departments. Equally important is the opportunity of meeting the manufacturers' representatives and not only of obtaining much information from them but of inspecting the material and equipment which they place on exhibit.

But the convention week does not at all exhaust the possibilities for profit in the association; its advantages will continue throughout the entire year.

Economy in Transfers

ON THE system of the British Columbia Electric Railway at Vancouver approximately 1,250,000 transfers are used per month. They are printed with the day of the month in heavy block red type on the face and the month is printed in red on the right-hand top corner of the transfer. The method is shown by the right-hand transfer reproduced.

The conductors of the company are instructed to turn in at the end of each day all unused transfers. In the course of a month the total number so turned in is considerable. These transfers are placed in pigeon holes numbered from 1 to 31, and at the end of about eight months sufficient transfers are on hand to fill requirements for one whole month except for the month. This is corrected by cutting off the "month" from the right hand top corner, as shown by the left-hand transfer.

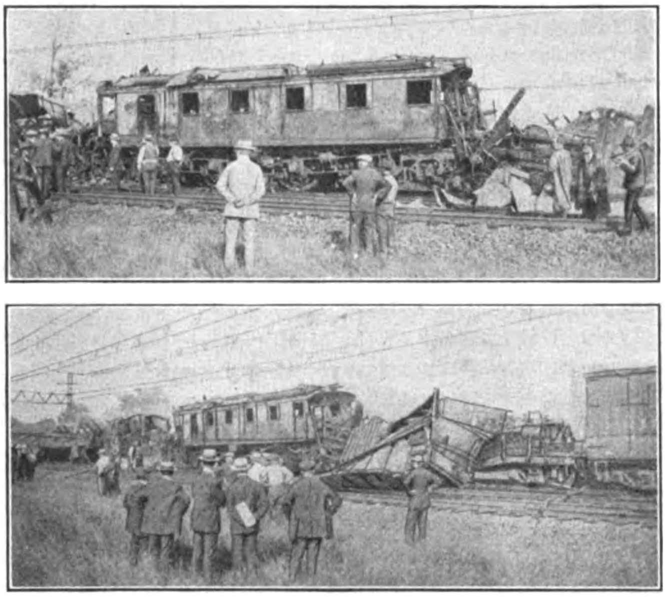


UPPER PART OF TRANSFERS WITH NAME OF MONTH CUT OFF

In this manner, if a surplus supply of transfers is printed for a particular month, such surplus is used, and absolutely no waste occurs.

East Port Chester Wreck Due to Man Failure

THE chief of the Bureau of Safety of the Interstate Commerce Commission has reported on the causes of the rear-end collision which occurred between two west-bound freight trains on the New York, New Haven & Hartford Railroad near East Port Chester, Conn., on July 31, 1919. This is on the electrified division, which is equipped with modern type signals put in service on March 18, 1917. The signals are of the normal-clear left-hand upper-quadrant semaphore type, suspended from the catenary bridges. The aspects and indications as displayed by the semaphore arms are horizontal for stop, diagonal for caution, and vertical for clear; the same indications being denoted by red, yellow and green intensified electric lights both day and night. As the accident occurred on the four-track electrified line between Devon, Conn., and Woodlawn, N. Y., it is of interest to readers of the ELECTRIC RAILWAY JOURNAL.



TWO VIEWS OF FREIGHT WRECK ON ELECTRIFIED ZONE OF NEW HAVEN RAILROAD

After reciting all of the details of the occurrence, the report states that the accident was caused by failure of the engineman on one of the trains to obey the stop indications of the automatic signal and of a flagman on the train ahead. A contributing cause was the failure of an instructor engineman who was in the electric locomotive cab to observe the signals and cause compliance with their indications. While the specific duty of the latter was to instruct the engineman in the operation of the "motor," it was inherently his duty also to observe and require proper performance of duty on the part of the engineman, whom he was required to accompany from New Haven, for the safe operation of the train.

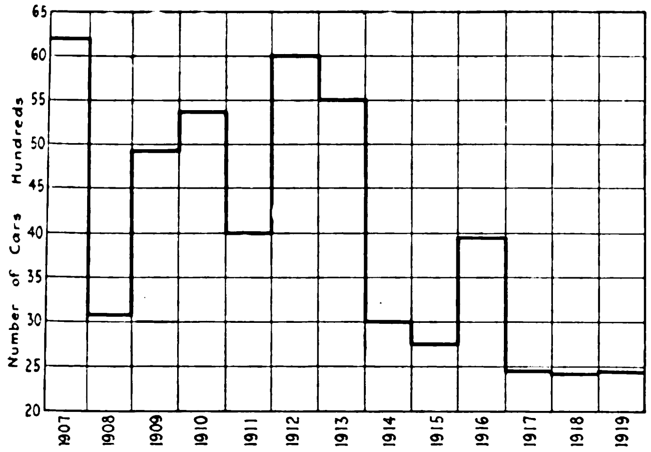
The report states in conclusion that this accident is another reminder of the inherent weakness of the human element in train operation, against which the most modern system of automatic block signals does not guard, and again directs attention, as has been done in numerous previous investigations, to the necessity of the adoption and use of some automatic train control device which will assume control of the train on the failure of the engineman to obey signal indications.

2,447 New Cars and Locomotives Ordered in 1919

The Numbers of Cars Ordered From Manufacturers and Built in the Shops of the Various Electric Railway Companies Are Approximately the Same as in the Last Two Years—Safety Cars Show More than 100 Per Cent Increase — Twenty More Companies Order or Build Equipment Than in 1918

THE accompanying tables giving statistics as to the rolling stock purchased or built by electric railways in their own shops indicate, to those who hold an optimistic view of the future, that the lowest level in the days of the industry has been reached, and that, if the railways are to continue from now on, there should be a considerable increase in rolling stock orders. This conclusion is based, first, on the increasing use of the smaller and lighter type of car for passenger service; second, on the realization that if electric railways are to continue to serve the interurban districts, more attention must be paid to the haulage of freight and express; and third, on the co-operation with motor truck express companies for the service of territories not reached by the electric railways.

The compilation of figures is considered as being representative of the industry, inasmuch as information was furnished by some 700 electric railway companies, which operate more than 95 per cent of all the electric railway rolling stock in the country. The total number of new cars and electric locomotives so recorded for this year is 2,447, twenty-eight more than in 1918, but eighty less than in 1917, which is a very creditable showing considering the financial condition of the industry. The number of companies, however, reporting new equipment, shows an increase of twenty over the previous year. These totals include one company that, for local reasons, did not care to be identified, and which purchased forty-five cars, divided as follows: ten interurban motor passenger, five city trailers, and thirty city passenger motor cars.



ROLLING STOCK ORDERED BY YEARS

Safety cars were purchased by ninety-three companies in the United States, by six in Canada, and by one in Cuba. The number of cars so bought was 1,321 in the United States, forty-seven in Canada, and fifteen in Cuba, a total of 1,383, as against 644 for 1918, an increase of 115 per cent. Attention is also called to the fact that of the 1,617 city motor passenger cars ordered for surface electric railways in the United States, 77.0 per cent, or 1,321, were safety cars. This tends to show that henceforth the light-weight car is destined as the city service car.

TABLE I—NEW ROLLING STOCK ORDERED SINCE 1907

Year	—Passenger Cars— City	Int.	Freight and Misc. Cars	Elec. Locos.	Total
1907	3,483	1,327	1,406	(a)	6,216
1908	2,208	727	176	(a)	3,111
1909	2,537	1,245	1,175	(a)	4,957
1910	3,571	990	820	(a)	5,381
1911	2,884	626	605	(a)	4,015
1912	4,531	783	687	(a)	6,001
1913	3,820	547	1,147	(a)	5,514
1914	2,147	384	479	(a)	3,010
1915	2,072	336	374	(a)	2,782
1916	3,046	374	491	31	3,942
1917	1,998	185	223	49	2,455
1918	1,842	255	278	44	2,419
1919	2,129	128	172	18	2,447

(a) Included in "Freight and Miscellaneous Cars."

Table I gives a comparison in condensed form of the rolling stock purchased since 1907. The cars are classified according to the service in which they are used, namely, city passenger service, interurban passenger service, freight and miscellaneous cars. In this table passenger cars for operation in subway and on elevated structures have been classed as "city passenger cars," and those for interurban or a combination of both interurban and city service have been placed in the column headed "Interurban Passenger Cars." Freight and express cars, snow plows and sweepers, and work cars have been placed in the "Freight and Miscellaneous" column. Electric locomotives, which heretofore have been classed in the miscellaneous column, are shown separately wherever possible.

The number of city cars, due to a 115 per cent increase in safety cars, shows an increase of 287 cars, or approximately 12 per cent. Other types of cars, however, decreased very materially.

Table II gives a detailed comparison of rolling stock ordered during the past four years. This table indicates an increase in the number of companies purchasing cars, due undoubtedly to the greater number of safety cars ordered. There were 1,383 cars of this type purchased during the past year as compared with 644 in 1918 and but 280 in 1917. The rolling stock built by electric railway companies in their own shops shows an increase over 1918, but is still less than in 1917. The companies in Detroit and Atlanta built the

TABLE II—SPECIAL COMPARISONS OF NEW ROLLING STOCK ORDERED

	1919	1918	1917	1916
Number of railways reporting new cars	160	140	182	250
Total number of cars	2429	2375	2406	3911
City Service				
Number of safety cars	1383	644	280	187
Number of two-man passenger motor cars*	635	1068	1316	2731
Number of passenger trailers	111	130	402	128
Service cars	31	(a)	(a)	(a)
Interurban Service				
Number of two-man passenger motors cars	96	200	158	303
Number of passenger trailers	32	55	27	71
Number of service cars	8	(a)	(a)	(a)
Number of freight and express cars	133	(a)	(a)	(a)
Number of electric locomotives	18	44	49	31
Number of cars and electric locomotives built in railway companies' shops	165	89	281	445

* Includes motor and trailer cars for subway and elevated lines in N. Y. C.
(a) Not available.

TABLE III—ROLLING STOCK ORDERED DURING 1919

	Number	Type	Overall Length	City or Interurban	Motor or Trailer
New England District:					
Connecticut:					
The Bristol (Conn.) & Plainville Tramway Co.	2	Passenger	35' 0"	C	M
	1	Safety	26' 0"	C	M
The Connecticut Co. (New Haven)	12	Safety	28' 0"	C	M
	40	Safety	27' 10"	C	M
Danbury (Conn.) & Bethel St. Ry.	1	Safety	28' 0"	C	M
	3	Safety	27' 9½"	C	M
Maine:					
Androscoggin & Kennebec Ry. (Lewiston)	12	Safety	28' 0"	C	M
Androscoggin Electric Co. (Lewiston)	1	Exp. & Fght.	45' 0"	I	M
Bangor (Me.) Ry. Electrical Co.	12	Safety	27' 9½"	C	M
Biddeford (Me.) & Saco Ry.	6	Safety	28' 0"	C	M
Knox County Electric Co. (Rockland)	4	Safety	28' 0"	C	M
Portland (Me.) R.R.	15	Safety	27' 9½"	C	M
Massachusetts:					
Berkshire St. Ry. (Pittsfield)	5	Safety	28' 0"	C	M
Boston (Mass.) Elevated Ry.	1	Work	42' 0"	C	M
	2	Snow Swpr.	39' 0"	C	M
	4	Dump	40' 7"	C	M
Eastern Mass. St. Ry. (Boston)	200	Safety	28' 0"	C	M
	12	Snow Swpr.	35' 10"	C	M
Medway & Dedham St. Ry. (Milford)	4	Safety	28' 0"	C	M
Springfield (Mass.) St. Ry.	10	Safety	28' 0"	C	M
Worcester (Mass.) St. Wy.	10	Safety	27' 10"	C	M
New Hampshire:					
Nashua (N. H.) St. Ry.	8	Safety	28' 0"	C	M
Vermont:					
Rutland (Vt.) Ry. Lt. & Power Co.	1	Safety	28' 0"	C	M
North of the Ohio and East of the Mississippi River					
District of Columbia:					
Capital Traction Co.	40	Passenger	41' 0"	C	M
City & Suburban Ry. Co.	5	Passenger	43' 11½"	I	M
Washington & Old Dominion Ry.	2	Passenger	......	I	M
	1	Sub. Sta. Car	......	I	
Washington Ry. & Electric Co.		Passenger	41' 0"	C	M
Illinois:					
Central Illinois Public Service Co. (Matoon)	10	Safety	27' 9½"	C	M
Chicago (Ill.) & West Towns Ry.	5	Passenger	45' 0"	C	M
Chicago, No. Shore & Milwaukee Elec. R.R. (Highwood)	12	Express	50' 0"	I	M
	15	Passenger	55' 3½"	I	T
	13	Passenger	55' 3½"	I	M
	2	Dining	55' 3½"	I	M
	10	Safety	27' 9½"	C	M
Chicago (Ill.) Surface Lines	*9	Passenger	48' 0"	C	M
Decatur (Ill.) Ry. & Lt. Co.	8	Safety	27' 9½"	C	M
	6	Safety	28' 0½"	C	M
Illinois Central Elec. Ry. (Canton)	*1	Express	40' 0"	I	M
Illinois Northern Utilities Co. (Freeport)	3	Safety	27' 9½"	C	M
Lincoln (Ill.) Muncie St. Ry.	1	Passenger	30' 0"	C	M
Quincy (Ill.) Ry. Co.	25	Safety	28' 0½"	C	M
	1	Snow Swpr.	28' 0"	C	M
Indiana:					
Beech Grove (Ind.) Traction Co.	3	Safety	27' 9½"	C	M
Chicago, So. Bend (Ind.) & No. Indiana Traction Co.	10	Safety	27' 9½"	C	M
	1	Passenger	60' 0"	I	T
	1	Snow Plow	40' 0"	C & I	M
Ft. Wayne (Ind.) & No. Indiana Traction Co.	35	Safety	30' 7"	C	M
	*1	Snow Plow	24' 6"	C & I	M
Indianapolis & Cincinnati Trac. Co	3	Express	......	I	T
Indianapolis (Ind.) St. Ry.	25	Passenger	46" 11"	C	M
Interstate Public Service Co (New Albany)	5	Freight	43' 0"	I	T
	8	Comb. P & E	62' 0"	I	M
Terre Haute, Indianapolis & Eastern Traction Co.	25	Safety	27' 9½"	C	M
	5	Freight	36' 0"	I	
	6	Flat	36' 0"	I	
Vincennes (Ind.) Traction Co.	7	Safevy	28' 0½"	C	M
Washington (Ind.) St. Ry.	3	Safety	27' 9½"	C	M
Maryland:					
Hagerstown (Ind.) & Frederick Ry.	1	Comb. P & E	47' 0"	I	M
United Rys. & Elec. Co. of Baltimore	10	Passenger	33' 6"	C	M
Michigan:					
Benton Harbor (Mich.) & St. Joe Ry. & Lt. Co.	2	Safety	28' 0½"	C	M
Detroit (Mich.) United Ry.	*50	Passenger	47' 1"	C	M
	10	Passenger	34' 9"	C	M
	*50	Passenger	46' 9½"	C	T
	10	Passenger	58' 3½"	I	M
	6	Passenger	58' 3½"	I	T
	3	Express	50' 4"	I	M
	25	Express	50' 0"	I	T
	10	Safety	27' 9½"	C	M
New Jersey:					
Burlington County Traction Co. (Hamisport)	1	Freight	26' 0"	I	T
Morris County Trac. Co. (Morristown)	14	Safety	28' 0"	C	M
Pennsylvania & New Jersey R. Co. (Trenton)	13	Safety	28' 0"	C & I	M
Trenton (N. J.) & Mercer County Traction Co.	20	Safety	27' 9½"		M
New York:					
Brooklyn (N. Y.) City R. R.	50	Passenger	45' 6"	C	T
	108	Safety	27' 9½"	C	M
Brooklyn (N. Y.) Rapid Transit Co.	92	Safety	27' 9½"	C	M
Elmira (N.Y.) Water, Lt. & R.R. Co	7	Safety	27' 9½"	C	M
	1	Snow Sweeper	24' 10"	C	M

* Built in Company's Shops.

	Number	Type	Overall Length	City or Interurban	Motor or Trailer
North of the Ohio and East of the Mississippi River—(Continued)					
Geneva, Seneca Falls, (N. Y.) & Auburn R. R. Co., Inc.	2	Safety	28' 0"	C	M
Manhattan Bridge 3c. Line (New York)	2	Passenger	44' 6"	C	M
New York & Stamford (Portchester) Ry. Co.	7	Safety	27' 10"	C	M
New York Municipal Ry. Corp. (Brooklyn)	200	Passenger	67' 0"	C	M
Orange County Trac. Co. (Newburgh)	5	Passenger	28' 0"	C	M
Richmond Light & R.R. Co., (New Brighton)	20	Passenger	51' 0"	C	M
Southern N. Y. Ry. & Power Co. (Cooperstown)	1	Comb. Work Car & Snow Plow	38' 0"	I	M
Western N. Y. & Penn. Traction Co. (Olean)	1	Comb. Pass. & Baggage	47' 0"	I	M
Ohio:					
Cincinnati (Ohio) Traction Co.	105	Passenger	44' 0"	C	M
Cincinnati (Ohio) Milford & Blanchester Trac. Co	3	Passenger	40' 0"	I	M
Lake Shore Elec. Ry. Co. (Sandusky)	16	Passenger	28' 0½"	C	M
Mahoning & Shenango Ry. & Light Co. (Youngstown)	1	Safety	27' 9½"	C	M
	25	Safety	28' 0½"	C	M
	6	Safety	28' 0"	C	M
Pennsylvania:					
Butler (Penn.) Rys. Co.	7	Safety	27' 9½"	C	M
Chambersburg (Penn.) & Shippensburg Ry. Co.	2	Safety	28' 0"	C	M
Citizens Trac. Co. (Oil City)	7	Safety	28' 0"	C	M
Harrisburg (Pa.) Rys. Co.	5	Passenger	43' 10"	I	M
Lehigh Valley Transit Co. (Allentown)	15	Passenger	48' 0"	C	M
North Branch Transit Co. (Bloomsburg)	*1	Gondola	24' 0"	I	M
	*1	Work	24' 0"	I	M
Northwestern Pennsylvania Ry. Co. (Meadville)	1	Comb. Bagg. & Snow Swpr.	45' 0"	I	M
	1	Snow Swpr.	40' 0"	I	M
Philadelphia & Garretford St. Ry. (Upper Darby)	10	Passenger	47' 3"	I	M
Philadelphia & Western Ry. (Upper Darby	1	Passenger	56' 0"	I	M
Schuylkill Rys. (Girardville)	3	Passenger	45' 6"	C	M
Sunbury (Pa.) & Susquehanna Ry.	3	Passenger	45' 6"	C	M
Susquehanna Trac. Co. (Lock Haven)	4	Safety	27' 9½"	C	M
Warren (Pa.) St. Ry.	3	Safety	27' 9½"	C	M
West Penn. Rys. (Pittsburgh)	*2	Exp. & Fght.	55' 0"	I	M
Woodlawn & Southern St. Ry.	4	Safety	28' 0½"	C	M
Wisconsin:					
Beloit (Wis.) Traction Co.	1	Safety	28' 0½"	C	M
	3	Safety	27' 9½"	C	M
Eastern Wisconsin Elec. Co. (Oshkosh)	15	Safety	27' 9½"	C	M
Milwaukee (Wis.) Elect. Ry., Lt. Co.	20	Safety	27' 9½"	C	M
	*3	Express	......	I	M
Wisconsin Vy. Elec. Co. (Wausau)	3	Safety	27' 9½"	C	M
	1	Passenger	38' 6"	I	M
South of the Ohio and East of the Mississippi River					
Alabama:					
Alabama Power Co. Anniston	2	Safety	28' 0½"	C	M
Huntsville	2	Safety	28' 0½"	C	M
Birmingham (Ala.) Ry., Lt. & Power Company	25	Safety	27' 9½"	C	M
Mobile (Ala.) Lt. & R.R. Co.	6	Passenger	47' 0"	C	M
	6	Passenger	41' 0"	C	T
Montgomery (Ala.) Lt. & Trac. Co.	10	Safety	28' 0"	C	M
Florida:					
Miami (Fla.) Beach Elec. Co.	10	Safety	27' 9½"	C	M
Miami (Fla.) Traction Co.	3	Safety	27' 9½"	C	M
St. Petersburg (Fla.) Municipal Ry.	6	Safety	27' 9½"	C	M
Tampa (Fla.) Electric Co.	10	Safety	28' 0"	C	M
Georgia:					
Georgia Ry. & Power Co. (Atlanta)	15	Passenger		C	M
	*30	Passenger		C	M
North Carolina:					
Carolina Power & Lt. Co. (Raleigh)	10	Safety	28' 0½"	C	M
Southern Public Utilities Co (Charlotte)	12	Safety	27' 9½"	C	M
(Winston-Salem)	6	Safety	27' 9½"	C	M
Tidewater Power Co. (Wilmington)	2	Passenger	50' 0"	I	M
	2	Passenger	50' 0"	I	T
South Carolina:					
Charleston (S. C.) Consol. Ry. & Lighting Co.	7	Passenger	41' 0"	C	M
Tennessee:					
Jackson (Tenn.) Ry. & Light Co.	3	Safety	27' 9½"	C	M
Nashville (Tenn.) Ry. & Light Co.	10	Safety	27' 9½"	C	M
Union Traction Co. (Nashville)	5	Passenger	43' 0"	I	M
	1	Freight	43' 0"	I	M
Virginia:					
Virginia Ry. & Power Co. (Richmond)	30	Safety	28' 0"	C	M
West Virginia:					
Charleston (W.Va.) Dunbar Trac. Co.	4	Safety	28' 0"	C	M
Princeton (W. Va.) Power Co.	1	Passenger	45' 0"	I	M
West of the Mississippi River					
Arkansas:					
Ft. Smith (Ark.) Lt. & Trac. Co.	8	Safety	27' 9½"	C	M
Southwestern Gas & Elec. Co. (Texarkana)	4	Safety	27' 9½"	C	M

* Built in Company's Shops.

TABLE III—ROLLING STOCK ORDERED DURING 1919—*Continued*

	Number	Type	Overall Length	City or Interurban	Motor or Trailer
***West of the Mississippi River*—(Continued)**					
California:					
Los Angeles (Cal.) Railway Co......	23	Safety	27′ 9½″	C	M
Municipal Ry. of San Francisco......	1	Passenger	....	C	M
Ocean Shore R.R. (San Francisco)....	2	Gas-Elec.	42′ 3″	I	M
Sacramento (Cal.) Northern R.R......	47	Freight	......	I	T
	2	Caboose	......	I	T
Colorado:					
Denver (Colo.) & So. Platte Ry. Co...	2	Safety	27′ 9½″	C	M
	1	Work	....	C	M
Ft. Collins (Colo.) Municipal Ry....	4	Safety	27′ 9½″	C	M
Iowa:					
Iowa County (Ia.) Elec. Ry. Co.....	1	Safety	28′ 0″	C	M
Ottumwa (Ia.) Ry. & Light Co......	16	Safety	27″ 9½″	C	M
Sioux City (Ia.) Service Co..........	25	Safety	27′ 9½″	C	M
Kansas:					
Hutchinson (Kan.) Interurban Ry...	5	Safety	27′ 9½″	C	M
Wichita (Kan.) R.R. & Light Co....	17	Safety	28′ 0½″	C	M
	1	Snow Swpr.	28′ 0″	C	M
Louisiana:					
Municipal St. Ry. (Alexandria).......	3	Safety	28′ 0½″	C	M
Minnesota:					
Duluth (Minn.) St. Ry.............	6	Safety	28′ 0½″	C	M
St. Cloud (Minn.) Public Service Co.	2	Safety	27′ 9½″	C	M
Missouri:					
Kansas City (Mo.) Clay County & St. Joe. Ry. Co.....................	2	Passenger	51′ 5″	I	M
Kansas City (Mo.) Rys. Co.........	5	Safety	28′ 0½″	C	M
	75	Safety	27′ 9½″	C	M
St. Louis, (Mo.) Water Works Ry...	2	Safety	27′ 9½″	C	M
Springfield (Mo.) Traction Co.......	8	Safety	27′ 9½″	C	M
United Depot, Bridge & Terminal Co.	3	Safety	28′ 0½″	C	M
Union Rys. Co. of St. Louis........	1	Dump	40′ 6″	C	M
	1	Dump	40′ 6″	C	M
Nebraska:					
Lincoln (Neb.) Trac. Co............	10	Safety	28′ 0½″	C	M
Omaha, Lincoln (Neb.) & Beatrice Ry	1	Safety	27′ 9½″	C	T
	2	Comb. Pass. & Baggage	28′ 0½″	C	M
Oklahoma:					
Tulsa (Okla.) St. Ry. Co...........	2	Safety	28′ 0½″	C	M
Oregon:					
Pacific Power & Lt. Co., (Astoria)...	1	Safety	28′ 0″	C	M
South Dakota:					
Sioux Falls (S. D.) Trac. Co........	5	Safety	28′ 0½″	C	M
Texas:					
Austin (Tex.) St. Ry...............	3	Safety	28′ 0½″	C	T
Beaumont (Tex.) Trac. Co.........	5	Safety	27′ 9½″	C	M
Dallas (Tex.) Ry. Co..............	1	Dump	40′ 6″	C	M
Eastern Texas Elec. Co. (Beaumont)	6	Safety	28′ 0½″	C	M
Houston (Tex.) Electric Co.........	1	Safety	27′ 9½″	C	M
Marshall (Tex.) Trac. Co..........	2	Safety	27′ 9½″	C	M
Northern Texas Trac. Co. (Ft. Worth)	10	Safety	28′ 0½″	C	M
	5	Passenger	53′ 0″	I	T
Texas Electric Co. (Dallas).........	8	Safety	27′ 9½″	C	M
Wichita Falls (Tex.) Traction Co....	4	Safety	27′ 9½″	C	M
Utah:					
Bamberger Electric R.F. (Salt Lake City)............................	* 3	Passenger	60′ 0″	I	M
	* 3	Passenger	60′ 0″	I	T
Utah-Idaho & Central R.R. Co. (Ogden)......................	11	Safety	28′ 0½″	C	M
Washington:					
Aberdeen (Wash.) R.R. Co.........	4	Safety	28′ 0″	C	M
Canada					
Brantford (Ont.) Municipal Ry......	2	Passenger	33′ 4″	C	M
	2	Passenger	41′ 6″	I	M
Hydro-Electic Power Co. (Ottawa, Ontario).........................	2	Safety	27′ 9½″	C	M
Kitchener (Ont.) Waterloo St. Ry...	3	Passenger	45′ 0″	C	M
Lewis (Que.) County Ry...........	12	Safety	28′ 0½″	C	M
	1	Snow Swpr.	31′ 0″	C	M
Nipissing Central Ry. (No. Cobalt, Ontario).........................	2	Passenger	52′ 0″	I	M
	1	Snow Plow	35′ 0″	I	M
Nova Scotia Tramway & Power Co. (Halifax, Nova Scotia)...........	24	Safety	27′ 9½″	C	M
	1	Snow Plow	28′ 3″	C	M
	* 1	Snow Leveler	28′ 0″	C	M
Peterboro (Ont.) Radial Ry.........	2	Safety	27′ 9½″	C	M
Quebec (Que.) Ry, Lt. Ht. & P. Co.	10	Passenger	41′ 0″	C	M
Sudbury (Ont.) Copper Cliff Suburban Electric Ry.................	1	Passenger	41′ 0″	C	M
	1	Comb. Snow Plw & Swpr.	32′ 0″	C	M
Sherbrooke (Que.) Ry. & Pier Co....	1	Safety	27′ 9½″	C	M
Three Rivers (Que.) Traction Co.....	6	Safety	32′ 0″	C	M
Winnipeg (Man.) Elec. Ry. Co.......	20	Passenger	45′ 9″	C	M
Cuba:					
Hershey Cuban Ry.................	10	Passenger	47′ 0″	I	M
	3	Comb. Bag. and Passengr	47′ 0″	I	M
	2	Comb. Bag.	51′ 0″	I	M
		and Mail	51′ 0″	I	M
	1	Freight	41′ 0″	I	M
Mantanzas (Cuba) Elec. Ry........	15	Safety	28′ 0″	C	M

* Built in Company's shops.

ELECTRIC LOCOMOTIVES

	Number	Weight Tons	Length Overall
New England District:			
New York, New Haven & Hartford Railroad.........................	5	173	69′ 0″
North of the Ohio and East of the Mississippi River:			
Washington & Old Dominion Ry.....	1		
Indiana Rys. & Lt. Co.(Kokomo, Ind.)	* 1		
Terre Haute, Indianapolis (Ind.) & Eastern Trac. Co..................	* 1	30	
Albany Southern R.R. (Hudson) N. Y.	* 1	40	50′ 0″
West of the Mississippi River:			
Sand Springs Ry. Co. (Tusla, Okla..)..	1	50	31′ 0″
Bamberger Elec. R.R. (Salt Lake City, Utah)...........................	* 2	45	37′ 0″
Sacramento (Cal.) Northern R.R......	2	60	35′ 9½″
Salt Lake & Utah R.R. (Salt Lake City, Utah)......................	1	50	31′ 0″
Utah-Idaho Central R.R. (Ogden, Utah)...........................	* 1	30	35′ 0″
Canada:			
Hydro-Electric Power Com. (Ottawa, Ont.).........................	1		
Oshawa (Ont.) Ry. Co. (The).......	1	50	32′ 0″

* Built in Company's shops.

greater part of their own cars. This increase may be due to less stringency in the labor market, on account of demobilization. Cars of all classes purchased by interurban companies show a decrease over the records of past years.

Among the larger orders for cars placed this year are the two for 200 safety cars each by the Eastern Massachusetts Street Railway and the surface lines in Brooklyn. The Brooklyn Rapid Transit Company having conducted extended tests during the early part of the year, proved conclusively that the safety car was beneficial in many of the districts served, and at the time of going to press nearly fifty cars of this type were in operation in various parts of the Borough. With regard to the Eastern Massachusetts order, the cars as yet have not been placed in actual service.

The largest single order reported for two-man motor cars was for 105 cars by the Cincinnati Traction Company. The Detroit United also placed an order for fifty motor cars. Mention should also be made of the extended use of trail cars in city service, fifty being ordered by both the Detroit United Railway and the Brooklyn Rapid Transit Company.

Table IV, which is divided into several districts, shows the rolling stock ordered by the individual railway companies, and also details the number and types purchased. Of the cars purchased, by far the greater porportion was by companies in the territory "North of the Ohio and East of the Mississippi River," this amounting to a total of 1,372 cars, or 56 per cent by sixty-seven companies, or 41.0 per cent of those that purchased rolling stock.

All cars are specified as to the service for which they were built. Electric locomotives are shown separately. No attempt was made to give details as to construction other than the over-all length. However, the majority of cars sold are either of semi-steel or all-steel construction.

Unfortunately reports from all companies were not received in time for inclusion in this compilation. Nevertheless the compilers believe that the table is representative of the present year's business. With a

TABLE IV—RECAPITULATION OF CARS AND LOCOMOTIVES ORDERED—1919

	New England	North of the Ohio and East of the Mississippi	South of the Ohio and East of the Mississippi	West of the Mississippi River	Total U. S.	Canada	Cuba	Total
Number of companies reporting	18	67	19	40	143	14	2	169
Total cars and electric locomotives ordered	371	1372	218	361	2319	94	31	2447
City Service								
Safety cars	344	550	143	284	1321	47	15	1383
Passenger cars—Motor	2	538	58	1	599	36	..	635
Trailer	...	105	6	...	111	..	..	111
Service cars	19	3	...	5	27	4	..	31
Total city cars	365	1196	207	290	2058	87	15	2160
Interurban Service								
Passenger cars—Motor	...	64	8	7	76	4	13	96
Trailer	...	22	2	8	32	..	..	32
Service Cars	...	5	..	2	7	1	..	8
Express and freight cars	1	81	1	47	130	..	3	133
Total interurban cars	1	172	11	64	245	5	16	269
Electric locomotives	5	4	...	7	16	2	..	18
Number companies ordering safety cars	15	33	13	32	93	6	1	100

definite date for publication, the possibility of receiving advices from 100 per cent of the operating companies is necessarily precluded.

Through the courtesy and co-operation of several of the car builders, it has been possible, however, to check the figures furnished by the railway companies and thus in a number of cases, where the railway companies have not reported, the figures given by the manufacturers were used.

The thanks of the ELECTRIC RAILWAY JOURNAL are extended to all those co-operating to make the publication of this information possible.

Keeping the Signals Up to the Mark

An Illustration of the Principle that Signals Require Expert Attention if They Are to Give Continuing Protection

BY CARL P. NACHOD
President Nachod Signal Company, Inc., Louisville, Ky.

SUPPLEMENTING the article printed in a recent issue of the ELECTRIC RAILWAY JOURNAL on the importance of careful attention to signal maintenance I shall outline the experience of an important railway company by way of illustrating the points set forth therein. This railway has about 70 miles of track, mostly single, in narrow streets and on hilly country roads.

On the company's lines the single-track stretches between passing turnouts are protected by automatic signals of the trolley-contact type, about 100 of these signals of two types of manufacture being used on the system. Some of the signals have been in service since 1910, and others since 1913, but they were all in rather precarious condition. Previous to the war the headway required was not frequent, and motormen could disregard the signals without serious danger. If two cars met in the block the schedule was not greatly disarranged when one of them had to back out. With this light traffic the importance of signal maintenance was not recognized until a long and serious strike with violence and damage to the railway company's property occurred in 1917.

At the time of the strike the city was full to overflowing, about 50,000 men were in training at a national army camp near by. To this camp the railway had two separate 6-mile lines, both single-track, with passing sidings. Meanwhile business conditions in the territory had developed so much due to war industries that the railway found itself unable to cope with the resulting traffic after the strike.

The importance of the signal system in facilitating traffic was now recognized. Previously the signals were under supervision of the line department, but as there was no signal specialist in the department the signal lines and general exterior wiring were in a deplorable condition and the signal apparatus suffered greatly. A complete rebuilding of the signal system was then determined upon. A signal department was organized, with a man in charge of the work of rebuilding who had the ability to get the signals ready for operation promptly, a few at a time. This simply had to be done although had the need for the signals been less pressing, all of the older ones might have been repaired more cheaply by shipping them back to the manufacturer, who is better equipped to handle this class of work than is an operating company.

As head of the signal department the railway selected an expert from the signal company who had had experience of maintaining signals on a railway as well as in the factory. The signal company was also called upon to send two experts to help do the rebuilding on the ground, and a quantity of miscellaneous spare parts was shipped from the factory on memorandum. A suitable shop was provided for rebuilding and testing, men were secured from other departments of the railway and the work started. A few signals were made operative by repairing line wires, but little work on the relays being necessary.

In the rehabilitation work. as soon as a block of signals had been fixed up it was installed at the most pressing point, close co-operation with the transportation department being maintained. The rebuilding was carried on with high speed for about three months. After that the force was reduced from six to two men with a corresponding reduction in output. During part of this time a representative of each signal company was present to assist and instruct in the work. The work, however, is still in progress.

The signal department first tried out an auto truck for maintenance work but the distances were too great for this. In addition some of the line was on private right-of-way with no near-by highways. A single truck car was finally adopted as most satisfactory in this work.

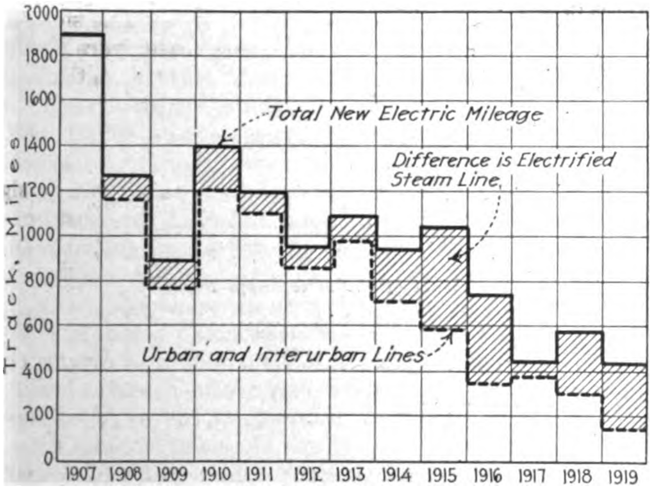
The operation of the signals is now first-class and they are much depended upon. They operate for weeks without failure, such failures as now occur being due to the old line wires which are gradually being replaced. Experience has taught the railway that periodical inspection is necessary; that the signals must not be neglected until reports of failure come in from the transportation departments, and that the maintainer who waits for trouble to appear before working on the signals or wiring is a costly luxury.

R. C. Richards, chief claim agent of the Chicago & Northwestern Railway, is credited with having organized the first safety-first committee on steam railroads. This was in May, 1910. At the present time there are on the railroads under federal management about 12,000 safety-first committees, composed of approximately 25,000 officers and other employees.

Track Extensions and Reconstruction in 1919

Seventy-three Urban and Interurban Companies Report 140 Miles of Extensions and 148 Companies Reconstructed 390 Miles of Track During the Past Year—288 Miles of Steam Road Are Electrified—More Track Was Reconstructed But Less New Track Built Than in Previous Years

THE amount of track extensions built during the past year by urban and interurban electric railways in the United States and Canada is the smallest of any year since this paper has been keeping yearly statistics of this character. The mileage of extensions built was but 140.57 or practically one-half of that recorded during 1918. If the 34.05 miles of track opened up during the year by extensions to the rapid transit lines in New York City are deducted, there were but 106.62 miles of new track built by urban and interurban surface lines during 1919. This figure represents a decrease of 50 per cent over the urban and interurban surface lines last year. However, the amount of track rebuilt by the urban and interurban companies exceeded that of the year 1918 by 234.45 miles, or an increase of 150 per cent. This undoubtedly indicates the trend of track work for the next few years, inasmuch as most of the companies feel that due to the ever increasing cost of operation and the unstable conditions affecting revenues that they cannot finance extensions except where the traffic will immediately pay the cost of service and a return on the investment.



THIS CHART SHOWS MILES OF NEW TRACK BUILT EACH YEAR SINCE 1907

The single track mileage for extensions built by urban and interurban electric railways during the year 1919, together with the mileage of track rebuilt or reconstructed and also that electrified by steam railroads during 1919 is given in the accompanying table.

The data for this table have been compiled from reports of approximately seven hundred companies throughout the United States and Canada, the majority of whom reported no extensions or reconstruction work except the usual maintenance for the year. Seventy-three companies reported a total of 428 miles of extensions built, 25.9 per cent of which was by urban companies, 6.9 per cent built by interurban companies and the balance by two steam railroads that extended their zones of electric operation.

In order to facilitate comparison with similar data for other years, a table has been prepared from previous statistical issues showing track extensions divided wherever possible as between urban, interurban and electrified sections of former steam railroads, together with the number of companies involved.

The study of the statistics for individual companies which have been grouped into five geographical districts show that the companies in the district "North of the Ohio and East of the Mississippi Rivers" have built more extensions and rebuilt more track than any of the other groups. The states of Connecticut, District of Columbia, Wisconsin, Tennessee, Colorado, Kansas, Minnesota, Nebraska, New Mexico, and Utah, all show an increase over 1918, while the New England district is the only group as a whole to show an increase over the previous year. New York State has the largest amount of track extensions with 38.23 miles as against 87.93 miles the previous year. If, however, the extensions to the rapid transit lines are not considered, Michigan is the banner state with 9.80 miles of extensions to its credit. The longest piece of new track built by any urban or interurban service road, however, was west of the Mississippi River, and amounted to 5.38 miles. This was by the Seattle Municipal Railway. Only three other extensions are greater than four miles.

The Cleveland Railway, however, reports extensions of 6.77 miles during the year but this total was made up of several smaller parts. Four extensions, however, were added to the rapid transit lines in New York City, amounting to 34.05 miles.

The largest amount of track rebuilt by any one company during the year was by the Boston Elevated Railway with the Public Service Railway and the United Railways Company of St. Louis, close seconds, the amounts rebuilt being 23.50, 22 and 21.82 miles respectively. Only four other companies rebuilt more than 10 miles of track. Each geographical group, however, showed as a whole more track rebuilt than last year, the greatest amount, however, being in the State of New York, with Massachusetts holding second place.

The most important piece of heavy electric traction electrification that has been opened up in recent years was during 1919, this being the new 280 mile extension of the Chicago, Milwaukee & St. Paul R.R. in the State of Washington, from Seattle to Othello, a distance of approximately 200 miles. The New York, New Haven

COMPARISON OF TRACK CONSTRUCTION

Year	No. of Cos.	Extensions Urban Track	 Interurban Track	 Electrified Steam Lines	 Total	Track Rebuilt
1907	(a)	(a)	(a)	......	1,880.00	(a)
1908	157	1,174.5		84.00	1,258.50	(a)
1909	160	774.7		112.40	887.16	(a)
1910	217	1,204.8		192.40	1,397.20	(a)
1911	223	1,105.0		86.50	1,191.50	(a)
1912	171	869.4		80.80	950.20	(a)
1913	181	974.9		119.00	1,093.90	(a)
1914	163	716.5		229.00	946.40	(a)
1915	136	596.0		448.20	1,044.2	(a)
1916	104	115.40	240.9	388.00	744.3	(a)
1917	121	251.10	125.60	66.00	442.7	375.40
1918	80	216.41	97.41	275.70	589.53	155.43
1919	73	110.90	29.67	287.60	428.17	390.64

(a) Not available.

& Hartford Railroad opened up a new classification yard at Cedar Hill, Conn., with small mileage.

Approximately 10 per cent of the total extensions built and track reconstructed was in Canada, the longest extension being by the Montreal Tramways Company.

Next year's plans, so far as it is possible to determine from information at hand, call for 151 miles of extensions and the rebuilding of 331 miles of track.

TRACK EXTENSIONS AND TRACK REBUILT DURING 1919

	Extensions	Rebuilt
New England States:		
Connecticut:		
The Connecticut Co.	2.97	4.24
Danbury & Bethel St. Ry	0.00	0.75
Hartford & Springfield St. Ry	4.70	3.00
Maine:		
Bangor Railway & Electric Co	0.00	1.74
Knox County Electric Ry	0.00	0.28
Portland Railroad	0.00	2.89
Waterville, Fairfield & Oakland Ry	0.00	0.50
Massachusetts:		
Boston Elevated Ry	0.20	23.50
Holyoke St. Ry	0.00	0.76
Massachusetts Northeastern St. Ry	0.00	4.00
Northampton St. Ry	0.00	0.95
Springfield St. Ry	0.00	2.50
Union Street Railway (New Bedford)	0.00	0.42
Worcester Consolidated St. Ry	0.11	0.55
New Hampshire:		
Chester & Derry R.R	0.00	0.50
Claremont Railway	0.00	0.23
Dover, Somersworth & Rochester St. Ry	0.00	0.50
Rhode Island:		
Bay State St. Ry	0.00	0.03
Rhode Island Co	0.00	4.18
North of the Ohio and East of the Mississippi River		
District of Columbia:	**Extensions**	**Rebuilt**
Capital Traction Co	0.00	1.89
City & Suburban Ry. of Washington	0.00	0.21
Washington & Old Dominion Ry	0.50	0.00
Washington Railway & Elec. Co	0.24	2.61
Illinois:		
Alton, Granite & St. Louis Trac. Co	0.00	0.12
Calumet & So. Chicago Ry. Co	2.40	0.80
Chicago & Desplaines Valley Elec. Ry	0.00	0.50
Chicago & West Towns Ry	0.00	5.00
Chicago City Railway	0.17	2.60
Chicago Elevated Rys	0.00	6.87
Chicago, North Shore & Milwaukee R.R. (Carrollville)	4.67	0.36
Chicago Railways Co	1.12	1.43
E. St. Louis & Suburban Ry	0.00	1.09
East St. Louis Railway	0.00	1.70
Illinois Central Electric Ry	0.13	0.00
Lincoln Municipal St. Ry	0.00	1.00
Indiana:		
Chicago, So. Bend & No. Indiana Ry	0.00	0.50
Ft. Wayne & North Indiana Traction Co	0.50	1.15
Indiana Railways & Light Co	0.00	2.50
Indianapolis St. Ry	1.00	2.50
Public Utilities Co	0.00	0.40
Vincennes Traction Co	0.00	1.25
Washington Street Railway	0.00	2.00
Maryland:		
United Railways & Electric Co. of Baltimore	2.33	16.25
Michigan:		
Detroit, Jackson & Chicago Ry	0.80	0.80
Detroit, Monroe & Toledo Short Line Ry	1.60	0.00
Detroit United Ry. (City System)	4.80	14.40
Ironwood & Bessemer Ry. & Light Co	0.00	1.00
Menominee & Marinette Light & Traction Co	0.00	0.50
Rapid Railway System (Detroit and Mt. Clemens)	3.60	6.60
New Jersey:		
Bridgeton & Millville Traction Co	0.00	9.00
Public Service Ry. (Yorkship Village Extension)	1.65	22.00
Trenton & Mercer County Traction Corp	0.90	3.50
New York:		
Albany Southern R.R. (Sidings)	0.02	0.00
Binghamton Railway Co. (Port Dickinson Line)	0.50	0.00
Brooklyn Rapid Transit Co. (Surface Lines)	0.00	4.00
Buffalo & Depew Ry	0.75	0.00
Buffalo & Lake Erie Traction Co	2.41	0.52
Elmira Water, Light & R.R	0.00	1.03
Empire State R.R	0.00	0.28
Fonda, Johnstown & Gloversville R.R	0.00	1.09
Hornell Traction Co	0.00	0.04
Hudson Valley Railway Co.	0.00	0.45
Interborough Rapid Transit Co. (New York), Clark St. Tunnel and Pelham Park Line	11.35	0.00
International Railway Co. (Buffalo)	0.00	1.83
Marine Railway Co. (New York)	0.50	0.00
New York Municipal Ry. Corp. (Broadway Subway, Culver Line and Coney Island)	22.70	0.00
Ogdensburg St. Ry	0.00	0.20
Orange County Traction Co. (Newburgh)	0.00	2.00
Waverly, Sayre & Athens Traction Co	0.00	0.38
Ohio:		
Cincinnati (Ohio) Traction Co.	0.00	7.40
City Ry. Co. (Dayton)	0.00	0.76
Cleveland, Painesville & Eastern R.R	0.00	4.00
Cleveland Railway Co.	6.77	17.61
Columbus, Delaware & Marion Elec. Co.	0.00	0.75
Mahoning & Shenango Ry. & Lt. Co	0.00	0.72
Ohio River Electric Ry. & Pwr. Co	0.00	1.00
	Extensions	**Rebuilt**
Peoples Ry. Co. (Dayton)	0.00	0.19
Richland Public Service Co	0.00	0.50
Tiffin, Fostoria & Eastern Ry. Co. (between Tiffin and Bascom)	0.50	0.00
Toledo Rys. & Lt. Co	0.16	2.44
Pennsylvania:		
Cleveland & Erie Traction Co	0.00	0.50
Danville & Sunbury Transit Co	0.00	0.25
Easton Pennsylvania Rys. (Pottsville)	0.00	1.38
Eastern Transit Co	0.00	1.00
Hanover & McSherrystown St. Ry	0.00	0.25
Harrisburg Rys. Co	0.00	0.97
Highland Grove Traction Co	0.75	0.75
Lehigh Valley Transit Co	1.25	4.50
Lykens Valley Ry	0.00	1.00
Mauch Chunk & Leighton Transit Co. (siding)	0.10	0.00
Montgomery Transit Co	0.00	2.00
North Branch Transit Co	0.00	0.93
Northwestern Penn. Ry. Co	0.00	0.20
Reading Transit & Light Co	0.00	8.57
Schuylkill Railways Co. (Girardville & Shenandoah)	0.75	0.25
Scranton Railway Co	0.00	1.50
Susquehanna Traction Co	0.00	0.66
Westchester St. Ry. Co	0.00	0.50
West Penn. Rys. (In Greensburg)	0.33	0.00
Wisconsin:		
Madison Railways Co	0.93	0.00
Milwaukee Electric Railway & Light Co.	0.60	6.26
Wisconsin Public Service Co	0.00	0.76
Wisconsin Valley Electric Co. (Wassau)	0.00	0.24
South of the Ohio and East of the Mississippi River		
Alabama:		
Birmingham Ry., Lt. & Pwr. Co	0.00	10.00
Sheffield Company (The)	0.00	0.57
Georgia:		
Augusta-Aiken Ry. & Elec. Co	0.00	10.00
Kentucky:		
Paducah Traction Co.	0.00	1.00
South Covington & Cincinnati St. Ry	0.00	1.45
North Carolina:		
Durham Traction Co. (Durham)	0.33	1.60
Southern Public Utilities Co. (Winston-Salem)	0.00	2.00
Tidewater Power Co. (Shipyard Extension)	2.84	0.00
South Carolina:		
Charleston Consolidated Ry. & Ltg. Co	0.00	1.90
Southern Public Utilities Co., Greenville	0.00	3.00
Tennessee:		
Nashville Ry. & Lt. Co	1.32	2.90
Virginia:		
Charlottesville & Albemarle Ry	0.00	0.21
Newport News & Hampton Ry., Gas & Elec. Co	0.00	1.23
Virginia Ry. & Pwr. Co	2.24	6.84
West Virginia:		
Charleston Interurban R.R	1.00	1.00
Monongahela Valley Traction Co	0.00	0.61
Ohio Valley Electric Ry	0.00	0.26
Wellsburg, Bethany & Washington Ry	2.00	3.00
West of the Mississippi River		
California:		
Municipal Railway of San Francisco	2.00	0.42
Petaluma & Santa Rosa R.R. (yards and sidings)	0.22	0.00
Sacramento Northern R.R. (yards and sidings)	4.00	0.00
San Francisco, Napa & Calistoga Ry	0.00	4.34
Colorado:		
Arkansas Valley Ry. Lt. & Pwr. Co	0.28	0.7
Iowa:		
Albia Light & Ry. Co	0.00	5.00
Dubuque Electric Co	0.00	2.00
Hutchinson Inter-Urban Ry	0.00	2.50
Kansas:		
Joplin & Pittsburg Ry. (siding)	1.50	0.00
Kansas City-Western Ry	0.00	1.00
Louisiana:		
Municipal Street Railway (Alexandria)	1.60	0.00
New Orleans Railway & Light Co.	2.28	0.42
Minnesota:		
Granite City Ry	0.00	1.00
Mankato Electric Traction Co	0.75	0.00
Twin City Rapid Transit Co.	1.18	5.40
Missouri:		
Hannibal Ry. & Elec. Co	0.00	0.38
Kansas City Railways	0.76	2.16
Missouri Electric R.R	0.00	0.24
St. Joseph Ry. Lt. & Pwr. Co	0.00	0.50
United Railways Co. of St. Louis	0.00	21.82
Montana:		
Butte Electric Ry	0.00	0.76
Nebraska:		
Omaha & Council Bluffs St. Ry	1.00	4.20
Omaha, Lincoln & Beatrice Ry. (University Pl. to Havelock)	2.75	0.00
New Mexico:		
City Electric Co. (Albuqueque)	0.06	0.76
Oklahoma:		
Sand Springs Ry. (sidings)	1.50	0.00
Oregon:		
Pacific Power & Light Co. (Astoria)	0.00	0.51
Texas:		
Dallas Railway	1.12	6.89
Eastern Texas Electric Co	0.38	0.00
El Paso Electric Ry. (High School Line)	0.90	0.78
Northern Texas Traction Co. (West of Grand Prarie)	1.02	0.00
Utah:		
Salt-Lake, Garfield & Western Ry.(bet. Salt Air and Garfield)	2.00	0.00

	Extensions	Rebuilt
Washington:		
Gray's Harbor Ry. & Lt. Co	0.00	0.75
Olympia Light & Pwr. Co	0.00	2.00
Puget Sound Electric Ry	0.46	0.00
Seattle Municipal Ry	5.38	0.00
Tacoma Ry. & Pwr. Co	0.31	0.00
Canada:		
Brantford Municipal Ry	2.20	0.00
Calgary Municipal Ry	4.00	0.00
Cape Breton Electric Co., Ltd. (siding)	0.06	0.38
Hamilton St. Ry	0.00	0.46
Hull Electric Co	0.00	2.00
International Transit Co	0.00	1.32
Levis County Ry. Co. (sidings)	0.24	9.50
Montreal Tramways Co	4.59	4.73
Niagara, St. Catharines & Toronto Ry	0.00	4.89
Nova Scotia Tramways & Pwr. Co., Ltd	1.14	2.01
Peterboro Radial Ry	0.00	0.33
Quebec Ry., Lt. & Pwr. Co. (Beauport Rd. and 10th Sts.)	1.65	0.00
Sandwich, Windsor & Amherstburg Ry	0.00	0.10
St. Thomas Municipal St. Ry	0.00	0.50
Sherbrooke Ry. & Pwr. Co	0.32	0.32
Toronto Railway Co	0.00	3.63
Toronto Suburban Ry	0.00	2.00
ELECTRIFIED STEAM LINES		
New York, New Haven & Hartford R.R. (yard at Cedar Hill, Conn.)	7.60	0.76
Chicago, Milwaukee & St. Paul R.R. (between Othello and Seattle)	280.00	......
Kitchener & Waterloo Ry. (purchased from Grand River Ry. in City of Kitchener)	0.92	....

SUMMARY OF TRACK CONSTRUCTION—1919

Item	New England	North of the Ohio and East of the Mississippi	South of the Ohio and East of the Mississippi	West of the Mississippi	Total United States	Canada	Total
TRACK EXTENSIONS							
Urban and Interurban Lines							
Number of companies	4	33	6	22	65	8	73
Miles of track—							
Urban	2.31	64.78	7.73	21.88	96.70	14.20	110.90
Interurban	5.67	11.75	2.00	10.25	29.67	.....	29.67
Electrified Steam Lines							
Number of companies	1	......	.....	1	2	.....	2
Miles of track	7.60	......	.....	280.00	287.60	.....	287.60
Total track	15.58	76.53	9.73	312.13	413.97	14.20	428.17
TRACK RECONSTRUCTED							
Urban and Interurban Lines							
Number of companies	19	75	17	23	134	14	148
Miles of track—							
Urban	36.18	157.37	33.96	53.23	280.74	26.32	307.06
Interurban	15.29	36.71	13.61	11.36	76.97	5.85	82.82
Electrified Steam Lines							
Number of companies	1	......	.....	......	1	.....	1
Miles of track	0.76	......	.....	......	0.76	.....	0.76
Total track	52.23	186.68	47.57	64.59	351.07	32.17	383.24

Statistics of the Electric Railway Industry

Figures Are Given by States and Districts of the Track Mileage and Rolling Stock Owned

THE accompanying table, compiled from the August, 1919, "Electric Railway List" of the McGraw-Hill Company, gives mileage statistics and cars owned by the electric railway companies in the United States. This information was gathered last June and July and can be said to be representative of July 1, 1919. No attempt has been made to bring any of these statistics up to date by adding the track extensions and the numbers of cars on order during the past year, given elsewhere in this issue, inasmuch as the physical property "junked" was not determinable.

A few words of explanation are necessary regarding the tables. Every effort was made in compiling these statistics to prevent duplication, as it was found that often the same mileage and equipment would be reported by both the holding and operating company. The mileage represents the single-track equivalent owned and operated, duplication as to joint tracks being eliminated wherever possible. Passenger and freight cars are classified as between motors and trailers. Service cars are considered as being non-revenue cars used by a company, such as work cars, snow plows, etc. "Other cars" cover funeral, sleeping and dining cars as well as those that cannot otherwise be classified.

A comparison of the totals given in this table with those of a somewhat similar table, published in the issue of Jan. 4, 1919, shows a number of what might be termed discrepancies, especially in the number of companies, which are shown as being 881 in 1919, and 991 in 1918. This difference or decrease is attributed largely to the fact that in previous years the several divisions of many of the larger companies, for which separate accounts are kept, were counted separately, while this year the number of companies shown is intended to be representative only of the number of individual operating organizations. The balance is in actual abandonments and suspensions, which is shown on page 60 of this issue.

The number of miles of track owned shows also a slight decrease, namely, from 48,484 to 48,336. This may represent an actual decrease, or it may be due to variations in the method of reporting by companies. As the nominal decrease is less than 1 per cent of the total number of miles reported, no particular significance is placed by the compilers on this figure except as it shows that the industry as regards miles of track is practically stationary. The accuracy of the method followed of collecting and compiling the figures in this table is not sufficient to warrant definite conclusions being drawn from yearly differences either way of 2 per cent or less.

The rolling stock statistics show 105,096 cars for 1919 against 102,379 for 1918, an increase of 2,717. Part only of this increase, however, should be considered as actual increase, as explained later in this statement. Certain freight equipment has not been included in this table, but a more liberal policy of inclusion has been followed this year than in the past. Thus 510 coal cars belonging to the East St. Louis & Belleville Railway, and 910 freight and express cars belonging to the Illinois Traction Company have this year been included in the table. None of the 2,300 freight cars, however, belonging to the Fort Dodge, Des Moines & Southern Railway, or any of the cars belonging to the Chicago Tunnel Company have been included.

Any comparison of details throughout the table of the various classes of equipment show that the reports as given out by the companies are not consistent from year to year, for while the total of all cars shows an increase over the previous year this increase cannot be fixed upon any of the various classes; some actually show a decrease. This undoubtedly is due in part to the discrepancies already mentioned in connection with track and also to the non-uniform use in reporting of the expression "service cars," "express cars," and "freight cars," for what is known as a "service car" on one road may be called a "freight car" or "express car" on another road. For the first time an effort has been made to determine the approximate number of so-called "service cars," the total accounting being 3,672 or an average of 0.076 car per mile of single track owned. This figure is not correct inasmuch as it was impossible to classify the 10,000 odd "other cars."

The main table includes all companies operated by overhead or underground trolley, third-rail, cable, gas-electric or storage batteries. The recapitulation separates this total into several classes and shows that of the 48,326 miles of track 46,275 are operated electrically by street and interurban railway companies.

STATISTICS OF ELECTRIC RAILWAY COMPANIES IN THE U. S.

Part I—All Companies

State	No. of Companies	Miles of Single Track	Passenger Cars		Elec. Locomotives	Express and Freight Cars		Service Cars	Other Cars
			Motor	Trailer		Motor	Trailer		
New England States:									
Connecticut..	8	1,501.44	1,826	50	108	71	4	18	300
Maine.......	13	527.54	512	10	8	28	80	89	103
Massachusetts	33	3,117.06	8,125	23	11	90	11	1,077	198
New Hampshire.......	11	246.00	291	0	2	1	..	15	20
Rhode Island.	4	436.94	1,088	25	..	..	..	71	184
Vermont.....	8	102.13	127	..	2	3	12	3	5
Total......	77	5,931.11	11,969	108	131	193	107	1,273	810
Eastern States:									
Delaware.....	2	153.00	309	..	..	..	..	..	80
Dist. of Columbia.....	8	421.55	1,048	75	6	..	..	58	300
Maryland....	12	692.72	2,156	59	13	3	48	6	103
New Jersey...	23	1,593.14	3,155	2	2	19	1	306	58
New York....	86	6,039.17	17,035	1,371	288	42	159	394	1,870
Pennsylvania.	102	4,345.76	7,483	71	4	81	68	187	1,466
Virginia......	12	443.23	941	64	3	16	2	52	36
W. Virginia...	18	660.34	622	20	13	20	10	16	77
Total......	263	14,348.91	32,749	1,662	329	181	288	1,019	3,990
Central States:									
Illinois.......	56	3,724.43	5,794	723	54	26	2,221	91	343
Indiana......	28	2,418.31	1,835	57	37	70	376	44	357
Iowa.........	23	887.16	955	48	25	8	125	4	198
Kentucky....	7	494.35	1,002	14	..	12	27	18	51
Michigan.....	20	1,761.56	2,788	59	20	123	284	37	419
Minnesota....	13	731.47	1,272	8	1	2	28	..	118
Missouri.....	23	1,174.22	2,459	172	5	6	12	..	211
Ohio.........	58	4,223.07	5,184	535	15	138	298	513	517
Wisconsin....	16	759.76	903	117	2	..	..	79	69
Total.....	244	16,174.33	22,192	1,733	159	385	3,371	786	2,283
Southern States:									
Alabama.....	12	365.54	419	90	1	3	..	25	145
Arkansas.....	10	131.01	237	..	..	..	4	2	40
Florida.......	9	205.89	287	1	..	1	1	..	41
Georgia......	12	490.98	678	33	1	2	..	32	46
Louisiana.....	9	318.28	651	48	..	6	1	106	10
Mississippi...	10	117.03	139	5	2	..	..	..	31
North Carolina.......	11	300.60	314	3	17	2	167	..	31
South Carolina	4	146.25	203	30	..	..	..	..	25
Tennessee....	11	467.26	797	57	1	..	2	12	74
Total......	88	2,542.84	3,725	267	22	14	175	177	.443
Western States:									
Arizona......	4	54.20	43	1	..	..	..	1	1
California....	36	3,423.95	3,735	117	68	2	409	148	1,481
Colorado.....	13	486.85	445	143	7	2	159	40	55
Idaho........	3	113.20	40	2	..	2	2	..	14
Kansas.......	15	529.48	368	38	2	18	80	26	37
Montana.....	8	798.06	129	31	75	1	..	11	...
Nebraska.....	4	252.08	580	10	1	..	..	6	60
Nevada......	2	10.80	9	..	..	..	..	..	...
New Mexico...	2	10.95	16	..	..	..	..	..	...
North Dakota	4	27.08	37	24	..	..	2	5	...
Oklahoma.....	16	331.22	287	6	4	1	29	22	67
Oregon.......	9	721.62	739	88	24	22	463	129	48
South Dakota.	3	25.85	28	4	..	..	..	1	3
Texas........	25	989.14	1,227	132	1	13	6	19	172
Utah.........	5	448.12	214	37	15	13	76	1	220
Washington...	18	1,084.07	1,108	34	31	19	455	8	426
Wyoming.....	2	22.00	15	10	..	..	..	..	4
Total......	169	9,328.67	9,020	677	228	93	1,681	417	2,588
Total U. S. (1919).....	841	48,325.86	79,655	4,447	869	866	5,622	3,672	10,114
Total U. S. (1918).....	991	48,484.00	80,452	3,613	645	1,107	2,745	13,817	

Total rolling stock, 1919....105,245 1918......102,379

Part II—Statistics of Companies by Population Method Used

State	No. of Companies	Miles of Track	Passenger Cars		Other Cars
			Motor	Trailer	
Cable Roads:					
California..................	3	26.58	119	..	.....
Colorado..................	1	1.25	2	..	.....
New York..................	1	0.42	2	..	.....
Pennsylvania..............	2	0.69	4	..	.....
Virginia..................	1	0.38	2	..	.....
Washington................	2	14.99	45	..	.....
Total cable roads..........	10	44.31	174	..	.....
Storage Battery Roads:					
Georgia..................	1	10.00	1	..	.....
Maryland..................	1	3.25	1	..	.....
Massachusetts.............	1	1.20	2	..	.....
New York..................	4	57.54	190	..	.....
Total storage battery rds..	7	71.99	194	..	.....
Gas-Electric Roads:					
Arkansas..................	3	3.50	4	1	2
California................	1	117.40	3	36	..
Georgia..................	1	10.60	3	..	..
Minnesota.................	3	78.62	7	2	(a) 39
New York..................	1	11.00	2	..	..
Texas....................	2	31.20	4	..	5
Total gas-electric roads...	11	252.32	23	39	46
Electrified Steam Railroads:					(c)
California................	2	17.00	3	..	13
Connecticut...............	1	450.00	32	50	106
Maryland..................	1	3.70	...	..	9
Massachusetts.............	1	22.00	...	..	7
Michigan..................	2	38.10	...	..	16
Montana..................	2	(b) 670.10	...	..	75
New York..................	4	385.76	229	..	143
Washington................	1	6.50	...	..	4
West Virginia.............	1	98.30	...	..	12
Total electrified steam rds..	15	1,691.46	264	50	385

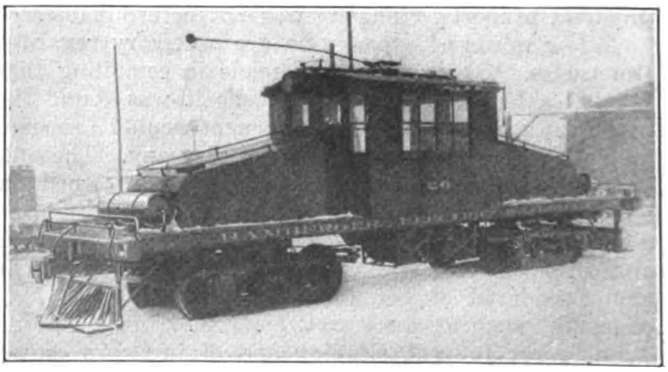
(a) Includes 2 freight and express motors and 28 trailers. (b) Exclusive of Cascade Div., C. M. & S. P., which is only in partial operation. (c) Electric locomotives.

RECAPITULATION

Class	No. of Companies	Miles of Single Track	Passenger Cars		Elec. Locomotives	Express and Freight Cars		Service Cars	Other Cars
			Motor	Trailer		Motor	Trailer		
Trolley and 3rd rail..........	798	46,265.78	79,000	4,358	484	864	5,594	3,672	10,098
Cable..........	10	44.31	174	....	...	...	....	....	.....
Storage battery..	7	71.99	194	....	...	...	....	....	.....
Gas-electric.....	11	252.32	23	39	...	2	28	....	16
Electrified steam	15	1,691.46	264	50	385	...	....	....	.....
Total in U. S..	811	48,325.86	79,655	4,497	869	866	5,622	3,672	10,114

Bamberger Road Builds Two Locomotives

DUE to a marked increase in the freight business of the Bamberger Electric Raidroad, it recently became necessary to have two additional locomotives. It was decided that all parts of these locomotives should be built in the shops of the company except the trucks (of Baldwin make) and equipment. The illustration shows the general style of the locomotive.



LOCOMOTIVE BUILT BY BAMBERGER ROAD

These locomotives are 37 ft. over all, weigh 40 tons and are equipped with four 125-hp. GE-205B interpole motors. They are arranged for multiple-unit operation The air equipment consists of two Westinghouse D3EG compressors and type EL. brake valves. A blower for cooling the motors has also been installed.

These locomotives will operate on 750 volts direct current, and are geared for a safe coasting speed of 45 m.p.h., so that, in addition to their being used for freight service, they can be used for pulling emergency passenger trains. The construction was done under the supervision of N. S. Wiltsie, general superintendent, and M. L. Allen, master mechanic.

Electric Railway Receiverships

The Companies Forced Into Receivership During 1919 Exceed in Number, Miles and Capitalization Those of Any Year Since Statistics Have Been Compiled — At End of Year 10 Per Cent of the Companies in the United States Are Under the Control of the Courts

THE FINANCIAL condition of the electric railway industry during the past few years is reflected in the large number of receiverships during the year 1919. The increasing cost of service with stationary fares is undoubtedly the main cause which has forced more companies to the wall than in any one year since annual statistics have been published by this paper. The receiverships, as will be noted, are not confined to companies operating solely in thinly populated territory or in the smaller cities. The larger and supposedly more prosperous communities such as Providence, St. Louis, Brooklyn, New York, and New Orleans, have also seen their local transportation systems placed under receivership. These conditions, however, while largely the result of accumulated burdens of regulation, contained in their franchises or of organization weaknesses can in nearly all cases be attributed to the present very unsatisfactory and decreased net earning power of the industry.

The year 1919 saw forty-eight companies in receivership while only twenty-eight were sold at foreclosure for the protection of their investors or creditors. Of the twenty-eight companies that were sold several had suspended operation and abandoned their franchises, the physical property only being sold for what it would bring to the junkman.

The number of properties abandoned, however, are not all shown in the list of receiverships for several companies voluntarily suspended service and abandoned their franchises. These, however, were small companies. With the approval of the state commissions, several of the larger companies have suspended service over certain non-profitable routes, without removing the tracks, which would necessarily mean that the investment must be written off the books and securities to that amount retired. In many cases this was financially impossible, for suspensions as a rule were made only to conserve the ever-declining net operating revenue. The creation of a surplus and a sufficient depreciation reserve were out of the question.

The accompanying compilations are designed to cover all companies in the hands of receivers on Jan. 1, 1919, and to show those that have been forced into receivership as well as those sold at foreclosure or reorganized without sale during the year. The figures as to mileage, stock and bonds have in most cases been checked by the companies concerned. In cases where the statistics did not have the approval of the company concerned, they were taken from the several financial manuals and the average taken when any disagreement existed. All figures, with the exception of receivers' certificates, are for the date of receivership. The receivers' certificates are as of Dec. 31, 1919.

In the case of some companies such as New York Railways, Pittsburgh Railways and Brooklyn Rapid Transit Company, where the system is made up largely of leased lines, the figures are intended to show all of the securities in the hands of the public that are dependent for a return on the company involved in receivership.

This compilation does not show, however, the full damage of the year to the industry, for several other companies are near the danger line so far as earning power, credit and adequate service are concerned. Many dividends have been cut and some entirely omitted, in order that interest payments on outstanding bonds may be continued. No effort has been made to tabulate such instances, but the fact that they exist is mentioned to make more emphatic that the financial condition of all the electric railways not included in the compilations is by no means sound.

The record of receiverships since 1909, Table I, indicates the number of companies and their securities involved for each successive year. In the 1919 receiverships approximately 7.8 per cent of the mileage and 9 per cent of the securities invested in the industry were involved, exceeding by a considerable degree any previous year. Of the forty-eight companies involved in receivership proceedings 50 per cent had less than 25 miles of track, 20 per cent between 25 and 100 miles and 30 per cent over 100 miles. The largest single company was the United Railways Company of St. Louis with 460.9 miles of track, although the surface lines of the Brooklyn Rapid Transit Company, prior to the time that the Brooklyn City Railroad lease was broken, had 537.87 miles of track.

Most of the receiverships were caused by a default in interest payments on outstanding bonds, due to revenues not being sufficient to meet the ever-increasing cost of operation. In several instances special reasons existed. For example, a receiver was appointed for the Berkshire Street Railway at the time the trainmen went out on strike and later, after operation was resumed, the receiver was discharged without prejudice. In Providence the receivership of the Rhode

TABLE I—RECORD OF ELECTRIC RAILWAY RECEIVERSHIPS

Year	Number of Companies	Miles of Single Track Involved	Outstanding Stock	Securities Bonds
1909	22	558.00	$29,962,200	$22,325,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	10	362.39	35,562,550	19,050,460
1915	27	1,152.10	40,298,050	39,372,375
1916	15	359.26	14,476,600	10,849,200
1917	21	1,177.32	33,918,725	33,778,400
1918	29	2,017.61	92,130,388	163,257,102
1919	48	3,781.12	221,259,354	312,915,104

TABLE II—RECORD OF ELECTRIC RAILWAY FORECLOSURE SALES

Year	Number of Companies	Miles of Track Involved	Outstanding Stock	Securities Bonds	Receiver's Certificates
1909	21	488.00	$22,265,700	$21,174,000	(a)
1910	22	724.36	19,106,613	26,374,075	(a)
1911	25	660.72	91,354,800	115,092,750	(a)
1912	18	267.18	14,197,300	10,685,250	(a)
1913	17	302.28	15,243,700	19,094,500	(a)
1914	11	181.26	26,239,700	44,094,241	(a)
1915	19	308.31	30,508,817	16,759,997	(a)
1916	19	430.14	13,895,400	22,702,300	(a)
1917	26	745.19	27,281,900	27,313,045	(a)
1918	23	524.22	37,740,325	20,149,384	(a)
1919	28	2,625.48	83,893,400	75,736,738	$42,300

(a) not available

TABLE III—ELECTRIC RAILWAY RECEIVERSHIPS AND FORECLOSURES AS OF DEC. 31, 1919

	Year of Receivership	Miles of Single Track Involved	Outstanding Securities		
			Capital Stock	Funded Debt	Receivers' Certificates
NEW ENGLAND DISTRICT					
Connecticut					
Danbury (Ct.) & Bethel St. Ry.	1917	16.00	$320,000	$588,500	$60,000
Hartford & Springfield St. Ry. (Warehouse Point)	1918	48.00	785,000	961,000	None
The Shore Line Electric Ry. (Norwich)	1919	237.80	1,000,000	6,700,000	None
Maine					
Atlantic Shore Ry. (Kennebunk)	1915	49.93	1,000,000	1,746,250	None
Lewiston (Me.), Augusta & Waterville Electric R.R. (*a*)	1918	165.91	3,000,000	3,659,000	None
Massachusetts					
Bay State St. Ry. (Boston) (*a*)	1917	989.78	24,531,500	24,345,000	None
Plymouth (Mass.) & Sandwich St. Ry.	1918	6.40	151,800	None	None
Blue Hill St. Ry. (Canton)	1919	19.70	300,000	250,000	None
Berkshire St. Ry. Co. (Pittsfield) (*b*)	1919	145.38	5,398,100	1,600,000	None
New Hampshire					
Portsmouth (N. H.) Electric Ry (*a*)	1916	19.03	....	474,661	....
Concord (N. H.) & Manchester Elec. Br. (*a*)	1916	31.50	250,000	473,000	....
Portsmouth, Dover (N. H.) & York St. Ry.	1917	42.33	(*c*)	707,000	25,000
Rhode Island					
Bay State St. Ry. (Newport Div.)	1917	22.20	(*d*)	996,800	None
The Rhode Island Co. (Providence)	1919	101.15	9,685,500	1,662,000	None
United Traction & Electric Co. (Providence)	1919	289.93	8,000,000	9,000,000	None
Vermont					
Springfield (Vt.) Elec. Ry.	1918	9.00	100,800	100,000	22,323
Total, 1-1-19	11 cos.	1,400.08	$30,139,100	$34,051,211	$107,323
Receiverships added during 1919	5 cos.	794.06	24,383,600	19,212,000	....
Less those sold or reorganized during 1919	5 cos.	1,351.60	33,179,600	30,551,661	....
Net receiverships, 12-31-19	11 cos.	842.54	21,343,100	22,711,500	$107,323
NORTH OF THE OHIO AND EAST OF THE MISSISSIPPI RIVER					
Illinois					
Chicago (Ill.) & Oak Park Elevated R.R.	1911	20.97	$10,000,000	$6,537,000	$1,645,000
Southern Traction Co. of Illinois (E. St. Louis) (*a*)	1914	15.00	(*e*)	(*e*)	....
Chicago, Aurora (Ill.) & De Kalb R.R.	1916	30.20	950,000	427,500	None
Galesburg & Western R.R. (Rock Island)	1919	16.00	500,000	521,000	None
Aurora, Elgin & Chicago R.R. (Wheaton)	1919	170.00	6,200,000	8,887,000	None
Indiana					
Winona Interurban Ry. Co. (Warsaw)	1916	70.00	750,000	2,343,700	None
Beech Grove (Ind.) Traction Co.	1917	3.90	150,000	100,000	None
Evansville (Ind.) Rys. Co. (*a*)	1918	61.50	1,519,400	2,129,000	None
Ft. Wayne (Ind.) & No. Indiana Tr. Co. (*a*)	1919	220.00	6,500,000	11,801,700	None
Vincennes (Ind.) Trac. Co.	1919	7.50	350,000	235,000	50,000
Michigan					
Marquette City & Presque Isle (Mich.) Ry.	1912	6.00	200,000	100,000	None
Trans St. Mary's Trac. Co. (Sault Ste Marie) (*a*)	1917	8.01	400,000	150,000	None
New Jersey					
North Jersey Rapid Transit Co. (Hohokus)	1912	18.00	800,000	800,000	None
Atlantic City (N. J.) & Shore R.R. Co.	1915	45.00	1,000,000	950,000	None
Monmouth County Electric Co. (Red Bank)	1916	18.50	350,000	500,000	17,500
Ocean City (N. J.) Electric Ry. Co. (*b*)	1919	10.00	100,000	75,000	None
New York					
Second Ave. R.R. (New York City)	1908	30.02	1,862,000	5,631,000	3,140,000
Rochester (N. Y.) Corning & Elmira Trac. Co.	1912	(*f*) 6.00	271,000	1,000,000	None
Buffalo (N. Y.) Southern Ry. Co. (*a*)	1913	25.35	547,200	600,000	41,800
Buffalo (N. Y.) & Lake Erie Traction Co.	1915	168.00	7,500,000	7,066,000	1,313,000
Buffalo, Lockport & Rochester (N. Y.) Ry. (*g*)	1916	58.20	4,000,000	2,750,000	None
Hornell (N. Y.) Traction Co.	1917	10.90	117,900	150,000	25,000
Manhattan & Queens Trac. Co. (Long Island City)	1917	22.00	(*b*) 20,000	(*i*) 2,186,390	None
Binghamton (N. Y.) Ry. Co.	1918	49.74	978,995	2,390,000	None
Buffalo (N. Y.) & Depew Ry.	1918	13.59	305,000	350,000	50,000
Penn Yan (N. Y.) & Lake Shore Ry.	1918	10.00	94,000	100,000	....
Brooklyn (N. Y.) Rapid Transit Co. (*j*)	1918	(Holding Co.)	87,788,268	126,107,477	18,000,000
New York Consolidated Ry.	1918	141.68	18,900,000	22,967,000	5,000,000
New York Municipal Ry. Corp.	1918	67.82	2,000,000	60,000,000	13,000,000
Surface Lines:					
Brooklyn City R.R. (*k*)	1919	231.60	12,000,000	(*l*) 12,305,477	None
Brooklyn Heights R.R.	1919	36.60	2,000,000	(*l*) 8,242,174	None
Brooklyn, Queen's County & Suburban R.R.	1919	61.92	2,000,000	(*l*) 9,256,710	None
Nassau Electric Ry.	1919	144.39	15,000,000	(*l*) 20,787,115	None
Coney Island & Brooklyn Ry.	1919	59.53	2,983,900	(*l*) 6,223,298	None
Brooklyn & North River R.R. (*m*)	1919	3.83	100,000	(*l*) 261,318	None
New York (N. Y.) Railways Co.	1919	116.22	24,932,304	66,333,930	None
Eighth Ave. R.R. Co. (*n*)	....	20.01	1,000,000	750,000	....
Ninth Ave. R.R. Co. (*n*)	....	17.37	800,000	3,000,000	....
Huntington (N. Y.) R.R. Co. (*a*)	1919	19.97	30,000	26,000	None
Interborough Consolidated Corp.	1919	(Holding Co.)	50,403,634	67,825,000	None
Ohio					
Sandusky, Norwalk (Ohio) & Mansfield Elec. Ry.	1912	33.00	600,000	600,000	None
Cincinnati (Ohio) & Columbus Trac. Co. (*a*)	1913	53.00	1,904,500	748,000	None
Cincinnati (Ohio) Lawrenceburg & Aurora Electric St. Ry. Co.	1913	31.89	808,900	750,000	None
Interurban Ry. & Terminal Co. (Cincinnati)	1914	101.24	3,500,000	1,650,000	....
Plymouth & Shelby Trac. Co.	1917	6.97	200,000	200,000	None
Pennsylvania & Ohio Ry. Co. (Ashtabula) (*a*)	1917	26.00	1,300,000	700,000	....
Columbus Magnetic Springs & Northern Ry. (Richwood) (*a*)	1918	18.50	230,000	250,000	500
Ohio River Electric Ry. (Pomeroy)	1919	12.70	300,000	315,000	None
Springfield (Ohio) Terminal Ry. & Power Co.	1919	33.00	350,000	250,000	None
Miamisburg (Ohio) & Germantown Trac. Co. (*a*)	1919	5.00	....	50,000	None
Pennsylvania					
Philadelphia & Easton Electric Ry. (Doylestown)	1912	34.10	612,600	911,000	None
Sunbury (Pa.) & Susquehanna Ry.	1913	9.20	600,000	640,000	None
North Branch Transit Co. (Bloomsburg)	1915	30.00	500,000	532,500	None
Southern Cambria Ry. (Johnstown) (*b*)	1917	30.00	1,000,000	1,284,500	None
Buffalo & Lackawanna Trac. Co. (Erie)	1918	8.80	55,000	1,000,000	None
Cumberland Ry. Co. (Carlisle)	1918	12.40	350,000	404,700	....
Pittsburgh (Pa.) Rys.	1918	605.25	21,726,750	41,579,500	None
Scranton (Pa.) & Binghamton Ry.	1918	50.00	6,000,000	4,100,000	....
Carbon Transit Co. (Mauch Chunk) (*a*)	1918	12.50	150,000	208,400	....
Philadelphia (Pa.) Railways Co.	1919	16.00	400,000	400,000	None
Penn Central Ry. Co. (Johnstown)	1919	7.50	250,000	....	....
Northampton Traction Co. (Easton)	1919	21.00	500,000	1,009,000	5,000
Northampton, Easton (Pa.) & Washington Trac. Co.	1919	17.80	1,250,000	739,000	None
Northwestern Pennsylvania Ry. Co. (Meadville) (*a*)	1919	69.40	1,500,000	2,060,000	None
Total, 1-1-19	**39 cos.**	**1,963.54**	**$92,252,445**	**$173,785,890**	**$24,232,800**
Receiverships added during 1919 (*o*)	**20 cos.**	**1,317.03**	**79,046,204**	**153,527,922**	**55,000**
Less those sold or reorganized during 1919	**15 cos.**	**901.40**	**32,981,100**	**38,898,077**	**42,300**
Net receiverships, 12-31-19 (*o*)	**44 cos.**	**2,379.17**	**138,317,549**	**288,415,735**	**24,245,500**

Island Company was caused largely by jitney competition and demands for increased wages by the trainmen. In New York and Brooklyn, the receiverships of the New York Railways and the surface lines of the Brooklyn Rapid Transit Company were caused by the inability of the companies to meet their obligations under a 5-cent fare with free transfers. In Huntington, Long Island, the company was left without power and had to cease operations, with the result that a receiver was appointed to protect the physical property. In the cases of the Northampton Traction Company and the Northampton, Easton and Washington Railway receiverships were largely the result of strikes by the trainmen for increased wages. In Jacksonville, Fla., the refusal of the people at a referendum to vote the company an increase in fare from 5 to 7 cents caused the receivership. The United Railways of St. Louis receivership was caused by the inability of the company to repay the six-months' loan of $3,235,000 made to it by the War Finance Corporation on June 1, 1918.

FORECLOSURE SALES

The foreclosure sales in 1919 numbered twenty-eight and involved nearly $150,000,000 of securities, exceeding each preceeding year with the exception of 1911, when the securities involved only were greater. Five more companies than in 1918 were foreclosed, involving nearly five times as much mileage and three times as much capitalization. The sale of the former Bay State Street Railway Company had much influence on these figures, for it involved nearly 1000 miles of track and $48,000,000 of securities. This property was sold to the Eastern Massachusetts Street Railway, a company organized in accordance with a "special act" of the State legislature and which provided for the appointment of five trustees by the governor to operate the property for a period of ten years.

No separate table of foreclosure sales has been made, but such companies as have been sold during the year have an affix (*a*) after their name in Table III. The majority of the properties foreclosed in 1919 are still operating in some reorganized or new form.

These wrecked companies, together with those whose abandonment in 1919 was a voluntary act or an aftermath of receivership and sale in prior years, are shown in Table II.

ABANDONMENTS AND SUSPENSIONS

An effort was made to separate abandoned and dismantled roads from those on which service had only been suspended and the physical property neither removed or sold. Companies which are known to have ceased operation and of which nothing can be learned to give hope of again reopening are included in the first-named class.

In the case of companies suspending service either in whole or in part, no attempt has been made to estimate the capitalization involved, due to the fact that in practically all cases any pro-ration on a mileage basis is valueless because the rolling stock and power-station equipment remain useful for other parts of the line still in operation. To estimate the value of securities involved in track and roadway construction is impossible without exact knowledge of the existing construction.

Table IV is by no means complete, as to make it so would involve longer research than time permitted. Only such companies as have been reported in this paper from time to time are included in these lists.

A few words might be said with regard to some of the lines that have been abandoned. The London & Lake Erie Traction Company advises that the city of St. Thomas (Ont.) has purchased

TABLE III—ELECTRIC RAILWAY RECEIVERSHIPS AND FORECLOSURES AS OF DEC. 31, 1919—Continued

SOUTH OF THE OHIO AND EAST OF THE MISSISSIPPI RIVER

	Year of Receivership	Miles of Single Track Involved	Outstanding Securities		
			Capital Stock	Funded Debt	Receivers' Certificates
Alabama					
Birmingham (Ala.) Tidewater Ry.	1919	32.80	$325,000	$1,500,000	None
Birmingham (Ala.) Ry. Lt. & Power Co.	1919	153.65	(*p*) 4,230,000	(*p*) 8,820,504	None
Montgomery (Ala.) Lt. & Traction Co.	1919	38.00	(*r*) 2,000,000	(*r*) 1,430,000	$250,000
North Alabama Traction Co. (Albany)	1919	7.63	75,000	225,000	....
Florida					
St. Petersburg (Fla.) & Gulf Ry. Co. (*a*)	1918	26.11	300,000	250,000	None
Jacksonville (Fla.) Traction Co.	1919	64.10	1,500,000	2,074,500	20,000
Georgia					
City & Suburban Ry. Co. (Brunswick)	1919	9.50	100,000	194,000	None
Savannah (Ga.) Electric Co.	1919	59.10	(*r*) 3,500,000	(*r*) 3,500,000	None
Kentucky					
Paducah (Ky.) Traction Co. (*b*)	1918	19.34	350,000	1,023,000	None
Southern Traction Co. (Bowling Green) (*s*)	1918	4.50	10,000	24,500	None
Mississippi					
Jackson (Miss.) Light & Traction Co.	1919	13.50	(*r*) 1,600,000	(*r*) 915,000	None
Pascagoula (Miss.) St. Ry. & Power Co. (*a*)	1919	9.08	(*r*) 500,000	(*r*) 350,000	....
Tennessee					
Memphis (Tenn.) Street Railway	1919	30.40	5,000,000	10,094,000	None
Chattanooga (Tenn.) Ry. & Light Co.	1919	79.80	(*r*) 5,000,000	(*r*) 6,185,000	None
West Virginia					
Morgantown (W. Va.) & Wheeling Trac. Co. (*u*)	1916	27.00	345,000	500,000	214,000
Grafton (W. Va.) Light & Power Co.	1917	7.00	(*t*) 400,000	(*t*) 300,000	None
West Virginia Traction & Electric Co. (Wheeling)	1919	39.00	1,869,600	4,762,000	None
South Morgantown (W. Va.) Traction Co.	1919	6.00	36,000	None	....
Total, 1-1-19	5 cos.	83.95	$1,405,000	$2,097,500	....
Receiverships added during 1919	13 cos.	542.56	25,735,600	40,050,004	$270,000
Less those sold or reorganized during 1919	4 cos.	59.03	1,160,000	1,647,500	....
Net receiverships, 12-31-19	14 cos.	567.48	25,980,600	40,500,004	270,000

WEST OF THE MISSISSIPPI RIVER

	Year of Receivership	Miles of Single Track Involved	Capital Stock	Funded Debt	Receivers' Certificates
Arizona					
Tucson (Ariz.) Rapid Transit Co.	1919	4.25	$500,000	$114,800	None
Colorado					
Denver (Colo.) & Interurban R.R.	1918	44.43	101,500	1,079,000	None
Colorado Springs (Colo.) & Cripple Creek R.R.	1919	75.80	2,000,000	2,827,878	50,000
Idaho					
Boise (Idaho) Railway Co. (*a*)	(*v*)	7.73	....	75,000	None
Iowa					
Des Moines (Ia.) City Railway Co.	1918	90.40	1,305,000	5,807,000	73,611
Kansas					
Iola (Kan.) Electric Railroad (*w*)	1918	10.50	150,000	150,000	None
Southwestern Interurban Ry. (Winfield)	1919	25.00	150,000	None	None
Louisiana					
New Orleans (La.) Ry. & Light Co.	1919	220.00	(*r*) 30,199,250	(*r*) 38,778,000	(*r*) 500,000
Minnesota					
St. Paul Southern Ry. Co. (Hastings)	1918	17.54	658,225	425,400	40,000
Missouri					
Kansas City (Mo.) Outer Belt Electric R.R.	1912	(*x*)	None	1,298,000	100,000
Kansas City, Ozark & Southern Ry. (Ava.)	1913	15.00	300,000	None	....
Kansas City (Mo.) Lawrence & Topeka R.R.	1919	12.75	251,000	400,000	None
United Railways Co. of St. Louis (Mo.)	1919	460.90	41,296,000	52,590,000	2,300,000
Missouri Electric R.R. (St. Louis)	1919	20.00	1,000,000	700,000	None
Oregon					
Southern Oregon Traction Co. (Medford)	1918	8.19	150,000	150,000	....
Texas					
Abilene (Tex.) Street Railway Co. (*a*)	(*y*)	4.75	25,000	30,000	....
Corpus Christi (Tex.) Ry. & Light Co.	1919	10.00	(*e*)	(*e*)	....
Greenville (Tex.) Railway & Light Co.	1919	8.00	300,000	300,000	None
Washington					
Spokane & Inland Empire R.R. Co. (*a*)	1919	290.47	16,397,700	4,414,500	None
Total, 1-1-19	9 cos.	198.54	$2,689,725	$9,014,400	213,611
Receiverships added during 1919	10 cos.	1,127.17	92,093,950	100,125,178	2,850,000
Less those sold or reorganized during 1919	4 cos.	313.45	16,572,700	4,669,500	....
Net receiverships, 12-31-19	15 cos.	1,002.26	78,210,975	104,470,078	3,063,611

RECAPITULATION

	Year of Receivership	Miles of Single Track Involved	Capital Stock	Funded Debt	Receivers' Certificates
Total, 1-1-19	64	3,646.11	$126,486,270	$218,949,001	$24,553,734
Receiverships added during 1919	48	3,781.12	221,259,354	312,915,104	3,175,000
Less those sold or reorganized during 1919	28	2,625.48	83,893,400	75,766,738	42,300
Net receiverships, 12-31-19	84	4,801.75	263,852,224	456,097,367	27,686,434

NOTES—

(*a*) Sold at foreclosure during 1919.

(*b*) Receiver discharged during 1919; no foreclosure sale.

(*c*) Included in that of the Atlantic Shore Ry., Kennebunk Me.

(*d*) Figure given in Funded Debt column includes also proportion of capital stock outstanding applicable to electric railway.

(*e*) Not available, company inaccessable.

(*f*) Graded but no track laid.

(*g*) Trustee foreclosed mortgage.

(*h*) No full paid capital stock, figure shown covers installment only.

(*i*) No outstanding funded debt, but current liability as shown.

(*j*) Figures given are for the total amount of securities of B.R.T. Co. in the hands of public, including also those of lesser companies, which are guaranteed by B.R.T. Co.

(*k*) Lease to Brooklyn Heights cancelled by Court and independent operations commenced Oct. 18, 1919.

(*l*) Includes certificates of indebtedness held by B.R.T.

(*m*) Operations ceased on Sept. 4, 1919.

(*n*) Leases of these two roads to N. Y. Rys. abrogated by the Court and properties returned to their owners. Now operated separately.

(*o*) Securities of B.R.T. and I.C.C., two holding companies, excluded in totals.

(*p*) Railway securities shown. Estimated to be 57.2% of the total.

(*r*) Securities cover combined property. Not able to separate railway.

(*s*) Operation suspended Jan. 1, 1919, and will not be resumed. Company defunct.

(*t*) Figures are for railway only.

(*u*) But 3 miles of this road is electrified, the balance being operated by steam locomotives. Figures shown are for entire property.

(*v*) No formal receivership proceedings.

(*w*) Operation suspended March 21, 1919. Road being dismantled.

(*x*) Has no track built, but owns 7 miles of right-of-way.

(*y*) Date of receivership not available, some time previous to Jan. 1, 1919.

TABLE IV—ABANDONMENTS (ENTIRE LINE)

	Miles	Stock	Bonds	Rec. Cer
Miamisburg & Germantown (o)	5.00	....	$50,000	.....
Parkersburg (W. Va.) & Ohio Vy. Elec. Ry. (c)	4.60	$150,000	150,000	.....
Los Angeles & San Diego (Cal.) Beach Ry.	21.54	562,500	375,000	.....
Indiana Utilities Co. (Lake James Ry.)	3.75	(a)200,000	(a) 105,000	.....
Kansas Electric Utilities Co. (Parsons, Kan.)	7.50	(b)	(b)	.....
Lebanon & Franklin Traction Co. (Dayton, Ohio) (c)	10.80	80,000	135,000	.....
Suburban Traction Co. (part of Interurban Ry. & Terminal Co.)	.....	(b)	(b)	.....
Columbus, Magnetic Springs & Northern Ry	18.50	230,000	250,000	500
Iola (Kan.) Electric R.R	10.50	150,000	150,000	.....
Ft. Scott (Kan.) Gas & Elec. Co	7.00	116,700	97,000	.....
Swansea (Mass.) & Seekonk St. Ry. Co.	10.12	....	80,000	.....
Southern Trac. Co. (Bowling Green Ky.)	4.50	10,000	24,500	.....
Madison Lt. & Ry. Co. (Madison, Wis.) (c)	3.50	(a) 150,000	(a) 146,000	.....
Alton & Jacksonville Ry	6.80	(b)	(b)	
Pascagoula (Miss.) Ry. & Pr. Co	9.08	(a) 500,000	(a)350,000	....

(a) Covers capitalization of combined properties.
(b) Not available.
(c) In 1918 list of suspensions.

ABANDONMENTS—SMALL PIECES

	Miles
Pacific Elec. Ry Co. (Riverside Line in Riverside, South of Jarupa Ave.)	....
The Connecticut Co	0.96
Illinois Central Elec. Ry. (sidings removed)	0.20
Springfield (Mass.) St. Ry. Co. (car house tracks)	0.31
Interstate Consolidated St. Ry. (siding removed)	0.06
Southern Ry. Co. (Natchez, Miss.)	4.00
United Rys. Co. of St. Louis	0.78
Ocean City (N. J.) Electric R.R. Co. (Wesley Ave. from 9th to 1st sts. and 1st St. from Wesley Ave. to Bay Ave.)	....
Buffalo & Lake Erie Trac. Co. (French St., Erie, Pa.)	0.59
Hanover & McSherrystown St. Ry. Co	0.80
Milwaukee (Wis.) Elec. Ry. & Lt. Co	0.52
Yonkers R.R. Co. (in Hastings)	1.00
Caldwell (Idaho) Traction Co. (Lake Lowell Br.)	2.00

SUSPENSIONS (PARTS OF SYSTEMS INCLUDED AS SPECIFIED)

	Miles
Eastern Mass. St. Ry. Co.:	
Fletcher St., Lowell, Mass	0.25
Newburyport to Ipswich Junction, Hamilton	16.22
Georgetown Sq. to Dummer Academy, Newbury	5.97
Bridgewater Cor. to Lund's Cor., New Bedford	27.05
Lakeville to East Taunton	4.34
Bridgewater Ctr. to Raynham Ctr	5.73
Oakdale Route, Dedham, Mass	1.42
Charles River-Needham Route	3.82
So. Braintree-Randolph Route	3.75
Prospect St.-Montrose Route, Branches from Main Line	2.61
North Chelmsford to Tyngsboro	3.28
New York Railways:	
Ave. C Line (from E 23d St. to Desbrosses St. Ferry)	13.85
Spring and Delancey St. Line (from Grand St. Ferry to Chambers St. Ferry	
Sixth Ave. Ferry Line (from 6th Ave. and 3d. St. to Desbrosses St. Ferry	
Tri-City Ry. & Lt. Co. (Muscatine Lines)	10.00
Nashville (Tenn.) Traction Co. (Whole Co.)	4.50
Fernandina (Fla.) Muncipal Ry. (property for sale)	2.25
Fryeburg Horse R.R. (Whole Co.)	3.00
Oxford Electric Co. (Norway, Me.) (Whole Co.)	2.13
Worcester & Warren St. Ry. Co. (Brookfield, Mass.)	20.10
Conway (N. H.) Elec. St. Ry. Co. (Whole Co.)	6.60
Ocean St. Passgr. Ry. Co. (Cape May, N. J.)	1.40
Fresno (Cal.) Traction Co. Passenger Service Co.) Lines, Fresno	8.14
Sacramento (Cal.) Northern R.R. (Chico to Hamilton)	11.00
Brooklyn & North River R.R. (N.Y.C.) (Manhattan Bridge)	3.83
Yonkers Railroad Co (In Hastings)	1.50
Empire State R.R. Corp (East River Rd. route between Riverside Cemetery in Scriba to Southerly terminus)	....
Buffalo & Lackawanna Trac. Co. (Local service between terminal at Lafayette Sq., Buffalo & Lackawanna City Line)	8.80
Buffalo & Lake Erie (Dunkirk City Lines)	6.27
Pelham Park & City Island Ry	3.29
Mid-Crosstown Ry. (N.Y.C.)	5.25
Third Ave. Bridge Co. (Queensboro Bridge, N.Y.C.)	3.63
S. New York Power & Ry. Corp., (Normal School Line in Oneonta)	1.03
Ohio River Electric Ry. Co. (Pomeroy, Ohio)	12.70
Tiffin-Fostoria & Eastern Elec. Ry. (Tiffin City Lines)	
Marion & Suburban Ry. (Ohio)	
Walla Walla (Wash.) Vy. Ry. (East Walla Walla and Prospect Heights Lines)	....
Yakima, (Wash.) Vy. Transportation Co. (North Fourth St. Line)	....
Suffolk Traction Co., Patchogue, N. Y	11.61
Abiline (Tex.) St. Ry. Co	4.75
Amarillo (Tex.) St. Ry. Co	8.20
East Auburn-Turner Line of former Lewiston, Augusta & Waterville St. Ry.	8.29
Huntington (N. Y.) R.R. Co. (sold at foreclosure, to be opened up again)	19.77

the car houses, sub-station and other property within the city limits, but the traction line between London and Port Stanley has ceased operations and the physical property is scrapped. The track and line materials of the Parkersburg & Ohio Valley Electric Railway was sold to a junkman for $16,000. The company owned no cars or power plant. The Miamisburg & Germantown Traction Company, formerly a part of the Cincinnati, Dayton & Toledo Traction Company, prior to foreclosure and reorganization, was sold at foreclosure and junked. The Los Angeles & San Diego Beach Railway, with permission of the California Public Service Commission, was abandoned. The Columbus, Magnetic Springs & Northern was sold at foreclosure and scrapped. The Swansea & Seekonk Street Railway ceased operation in August last and is to be sold for what it will bring for junk. This line was once before sold but the townspeople along the line formed a company to take over its operation.

The trustees of the Eastern Massachusetts Street Railway have followed a plan of suspending service wherever the lines failed to earn their upkeep unless the communities affected met the operating deficits as provided in the act under which the road is being operated.

In New York the receiver has, with the permission of the court, ceased operating the storage-battery lines in the downtown section of Manhattan as well as the shuttle service over the Manhattan Bridge, formerly operated by the Brooklyn & North River Railroad Company. The city of New York, however, has instituted private bus operation, under city supervision over the routes abandoned.

A few companies heretofore reported as being abandoned were reclaimed—among these was the Ocean City (N. J.) Electric Railroad, reported as suspending in 1918, which was subsidized by the town and operated under a trustee during the summer months with satisfactory results. The trustee was discharged on Sept. 30, 1919.

The Sharon Division of the Norwood, Canton & Sharon Street Railway, a 5-mile line in Massachusetts, resumed operation in July with two 6-cent zones, with deficits to be met from the town budget.

The Richmond & Chesapeake Bay Railroad was taken over by a newly organized company, the Richmond-Ashland Railway, and operation again commenced in July. Service was also resumed by the New York & Pennsylvania Traction Company on its line between Canistee, N. Y., and Shinglehouse, Pa., last August.

The Massachusetts Street Railway was organized by local men to take over the defunct Bristol & Norfolk Street Railway, which formerly operated between Holbrook and Randolph. It ceased operation in 1918 and was sold for junk, but its dismantlement was stopped. No information is available to show that service was actually resumed.

National Industrial Conference Board Issues Cost-of-Living Bulletin

According to a bulletin issued by the National Industrial Conference Board on Dec. 29, there has been an increase in the cost of living between July, 1919, and November, 1919, of 5.8 per cent. From March, 1919, the increase has been 13.5 per cent; from November, 1918, 10.4 per cent, and from July, 1914, 82.2 per cent. The percentages are based on the consumption of an avarage family.

Association News

Engineering Association Committee Assignments and Appointments

SECRETARY E. B. BURRITT has just issued the following lists of subjects to be covered by the Engineering Association committees and the personnel of these committees. The committees are already corresponding with regard to the year's activities, and a meeting of the power generation committee will be held in New York City on **Jan. 5.**

SUBJECT ASSIGNMENTS

Buildings and Structures: (1) Facilities for prepayment and post-payment fare collection at terminals. (2) Investigate use of lag screws instead of bolts in timber-deck structures.

Equipment: (1) Revision of standards for brakeshoes and brakeshoe heads. (2) Continue standardization of motor parts. (3) Report on helical gears. (4) Investigate feasibility of adopting standard cars. (5) Co-operate with way committee on rail heads.

National Electrical Safety Code: Continue work of committee.

Power Distribution: (1) Continue revision of specifications of overhead line material. (2) Revise specifications for crossings of power lines with railroads; on the joint committee with other engineering associations. (3) Specifications for catenary line construction. (4) Revision of specification for standard stranding of cables. (5) Specifications for standard thread for pins and insulators. (6) Harmonize specification for electric conduit construction with general specification and form of contract for railway structures of 1916.

Power Generation: (1) Recommended forms of contracts for the purchase of power (a) normal, (b) emergency. (2) Powdered coal, oil, gas and special fuels for use in electric railway power plants. (3) Tabulation of statistics on cost of power in typical cases of various sized plants. (4) Appoint member on national committee on standardization of method for determining cost of power, when this subject becomes active.

Way Matters: (1) Complete standard specifications for track spirals. (2) Standard sections for curved rail heads—in co-operation with committee on equipment. (3) Study of progress made in rail joints. (4) Revise specifications for plain bolted special work. (5) Further consideration of specification for wood block paving.

COMMITTEE APPOINTMENTS

Following are tentative, although nearly complete, lists of appointments to the several committees of the Engineering Association for the current association year:

Buildings and Structures: H. G. Throop, New York State Railways, Syracuse, N. Y., chairman; E. H. Berry, Cincinnati (Ohio) Traction Company; R. C. Bird, Central Traction & Lighting Bureau, New York City; B. P. Legare, United Railroads of San Francisco, Cal.; James Link, Knoxville (Tenn.) Railway & Light Company, Knoxville, Tenn.; W. H. Wharton, Brooklyn (N.Y.) Rapid Transit Company.

Equipment: Daniel Durie, West Penn Railways, Connellsville, Pa., chairman; W. S. Adams, J. G. Brill Company, Philadelphia, Pa.; H. A. Benedict, Public Service Railway, Newark, N. J.; R. H. Dalgleish, Capital Traction Company, Washington, D. C., James C. C. Holding, Midvale Steel & Ordinance Company, Philadelphia, Pa.; H. A. Johnson, Metropolitan West Side Elevated Railway, Chicago, Ill.; J. S. McWhirter, Third Avenue Railway, New York City; E. D. Priest, General Electric Company, Schenectady, N. Y.; F. W. Sargent, American Brake Shoe & Foundry Company, New York City; K. A. Simmon, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; J. M. Yount, United Railroads of San Francisco, San Francisco, Cal.

National Electrical Safety Code: J. H. Libbey, Eastern Massachusetts Street Railway, Boston, Mass., chairman; C. A. Greenidge, J. G. White Management Corporation, New York City; C. S. Kimball, Washington Railway & Electric Company, Washington, D. C.

Power Distribution: Chas. R. Harte, The Connecticut Company, New Haven, Conn., chairman; C. C. Beck, The Ohio Brass Company, Mansfield, Ohio; J. H. Drew, Drew Electric & Manufacturing Company, Cleveland, Ohio; R. W. Eaton, Public Service Engineer, City Hall, Providence, R. I.; H. H. Febrey, American Steel & Wire Company, New York City; C. J. Hixson, General Electric Company, Schenectady, N. Y.; Chas. H. Jones, Metropolitan West Side Elevated Railway, Chicago, Ill.; J. H. Libbey, Eastern Massachusetts Street Railway, Boston, Mass.; F. McVittie, New York State Railways, Rochester, N. Y.; M. B. Rosevear, Public Service Railway, Newark, N. J.; W. Schaake, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; A. Schlesinger, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

Power Generation: A. B. Stitzer, Republic Engineers, Inc., New York City, chairman; H. P. Bell, San Francisco-Oakland Terminal Railways, Oakland, Cal.; N. A. Carle, Public Service Electric Company, Newark, N. J.; H. E. Davis, New York State Railways, Utica, N. Y.; C. W. De Forrest, Union Gas & Electric Company, Cincinnati, Ohio; W. S. Finlay, Jr., Interborough Rapid Transit Company, New York City; C. A. Greenidge, J. G. White Management Corporation, New York City; F. C. Hanker, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; A. H. Kruesi, General Electric Company, Schenectady, N. Y.; E. H. Scofield, Minneapolis (Minn.) Street Railway; Fred'k A. Scheffler, Fuller Engineering Company, New York City; W. C. Slade, The Rhode Island Company, Providence, R. I.

Way Matters: R. C. Cram, Brooklyn (N. Y.) Rapid Transit Company, chairman; W. F. Graves, Montreal (Que.) Tramways, vice-chairman; H. A. Abell, New York State Railways, Rochester, N. Y.; Charles A. Alden, Bethlehem Steel Company, Steelton, Pa.; Wm. R. Dunham, Jr., The Connecticut Company, New Haven, Conn.; H. Fort Flowers, Differential Car Company, Inc., New York City; A. E. Harvey, Kansas City (Mo.) Railways; E. C. Johnson, Pacific Electric Railway, Los Angeles, Cal. C. G. Keen, American Railways, Philadelphia, Pa.; E. M. T. Ryder, Third Avenue Railway, New York City; C. A. Sinclair, Washington & Virginia Railway, Washington, D. C.; E. A. West, Denver (Colo.) Tramway.

Accounting Discussed at Providence

W. E. JONES, general accountant The Rhode Island Company, was the principal speaker at the meeting of the Rhode Island Company section held on Nov. 3. He gave the 100 members present a graphic picture of the amount of detail work necessary on the part of the accounting department in properly recording and reporting the company's operations. He described the many financial reports which are compiled, and touched on the company's financial condition as reflected by those reports. He stated that out of every dollar expended on the property during the nine months ended Sept. 30, 1919, 67 cents went for employees' wages, exclusive of the amount paid on the monthly payroll. This left but 33 cents with which to buy coal, materials, and supplies, etc., pay accident and damage claims, and provide for other general expenses. A very small margin was left with which to pay taxes and any return on the investment.

Mr. Jones stated the following to be the relative amounts expended on the various accounts, in terms of cents on the dollar: Maintenance of way and structure, 10; maintenance of equipment, 9; power, 13; conducting transportation, 39; traffic in general and miscellaneous, 11; taxes, 9, and rentals and interest, 9.

Among items of business taken up at the meeting was the matter of a meeting place for the section. It was decided that future meetings would be held in Slocum Post Hall, and the date of the meeting was changed to the second Thursday of each month. C. E. Redfern, ex-president of the section, stated that provision for the expenses of the monthly meeting had been made in such a way that it would not be necessary to make any additional assessments. He also outlined a campaign for increasing membership. The section voted to continue affiliation with the American Electric Railway Association.

British Tramway Workers Get Large Wage Awards

THE Interim Court of Arbitration of Great Britain has awarded large increases in wages to employees of tramways, light railways and omnibus lines. The present award will, it is stated, add close to $5,000,000 to the annual wage bills for the tramway industry. In a special statement of the Municipal Tramways Association it is said that in the effect on the transportation industry, crippled by the financial aftermath of the war, this last advance is of the utmost gravity. On the present basis few tramways, whether municipally or privately owned, can continue if they are to maintain their undertakings in a sound financial state. Increases in fares will be necessary up to the statutory maximum, where the fares are not fully up to the legal powers at the present time, and in very many instances higher charging powers must be conferred. The result will be that the price of transportation must rise with the rise in the cost of labor and materials represented in its service, just as much as the prices of other commodities have risen for the same reasons. The immediate need is to lift the basis of fares to a new economic level.

This is absolutely essential if the country is to be assured efficient urban transportation, and the recent wage award has made this necessity a matter of extreme urgency.

Letters to the Editors

Mr. Gould Discusses Energy Saving

CHICAGO, ILL., Dec. 26, 1919.

To the Editors:

Your report of my remarks in your issue of Dec. 20, page 991, is a bit involved. In the discussion of the paper on economies in car operation by Mr. Phillips at the Grand Rapids meeting, I spoke briefly with a view to emphasizing the possibilities for energy saving at the car through better handling of the controller and brake by the average motorman. Other factors remaining unchanged, an increase in the average rate of acceleration and retardation will lower the car energy consumption.

Fundamental curves showing watt-hours per ton-mile plotted against the rate of acceleration in miles per hour per second have frequently been published. For a given car and equipment, the energy acceleration curve and the energy retardation curve have about the same shape. These curves show that faster feeding or faster braking, up to a certain good rate, will bring about a substantial reduction in energy consumption, but feeding or braking beyond this rate does not appreciably reduce the energy demand. It does, however, shorten the power-on time and consequently increases the possible coasting time, but these quantities have not the same value in equivalent energy reduction as they have in the parts of the curve represented by slower feeding and braking.

Briefly, there is a certain proper rate of feeding and braking at which motormen should operate a given car. This rate, if maintained, will afford all the reduction in energy consumption that consistently can be expected through the introduction of power-saving devices. The so called "cannon ball" acceleration is undesirable because of discomfort to passengers, undue stresses on equipment, slipping wheels, blowing breakers and the possibility of accidents. And, coupled with these, is the fact that cannon ball acceleration does not appreciably reduce the energy consumption below a good average rate of feeding.

Through the installation of Economy Railway watt-hour meters we have been able conclusively to demonstrate the foregoing from the practical operating standpoint, and also to show that on cars equipped with watt-hour meters motormen will quickly learn to take full advantage of the series running position when it means reduced energy consumption, rather than habitually feeding through to multiple when there is not an opportunity to run on the full multiple notch.

Another point mentioned at the Grand Rapids meeting, which was not quoted correctly, was my statement with regard to distribution and other losses. We have conducted a great many tests and sales demonstrations with Economy watt-hour meters in regular operating service, and in a number of notable instances we have not only metered all the motors on a line, but also have segregated the line so that we could meter the a. c. or d. c. feeders. In this way we obtain a measure of the total power at the switchboard and the actual propulsion power as recorded by the Economy meters on the cars.

The point made at the Grand Rapids meeting was that the difference between the power as measured at the switchboard and at the cars varies from 6 per cent or 8 per cent on a line of a city system to as high as 30 per cent on an interurban line with rotary converters. This difference is made up of conversion and distribution losses, lighting and brake-compressor motors, but no allowance has been made in the foregoing figures for electric heating. The point is that until the actual propulsion power is measured at the car and the sum of the car readings is compared with the switchboard output, the average railway property does not realize the slack between energy generated and energy used solely for propelling the cars.

We have reports of energy saving for a period of years varying from 10 per cent to 20 per cent, and along with this saving the users of Economy meters are able definitely to put a money value on their distribution losses and miscellaneous uses of power and in numerous cases are able to allocate and reduce these losses. The foregoing partly illustrates the reason for our slogan: "Meter the energy. That's what you want to save."

L. E. GOULD, President.

Let Railways Do the Bussing and Trucking

NEW YORK, Dec. 26, 1919.

TO THE EDITORS:

The Dec. 10 quarterly meeting of the New York Electric Railway Association was marked by some able papers and discussion on the inroads of the motor truck and, to a lesser extent, on the competition of the motor bus. Unadulterated objection to auto-motive equipment, it is pleasing to see from this meeting, is giving way to the desire to learn just what there is in the motor truck and the motor bus from the economic and service standpoints.

Indeed, it is high time that the facts of the automotive situation were faced without self-deception. If the electric railways could secure "a fair field and no favor," the scope of the motor bus and the motor truck would be greatly circumscribed. Unfortunately, several years of agitation have brought amelioration only in spots. Neither of the two junior common carriers is generally subject to anything like the flock of taxes, of service and of rate regulations that have descended in the course of time upon both the steam railroad and electric railway, and candor compels the confession that the self-propelled vehicles are not likely to be subjected to similar burdens within a period near enough to be of substantial help to the older utilities.

We have but to study the course of events in Great Britain to see why genuine relief is remote. In that country, the tramways have agitated for years and years against the unfair competition of the motor bus; unfair because the bus could enter the public service field so readily, could compete with existing lines, could charge any fare the traffic would bear and yet withal pay almost nothing to the community. Indeed, it has taken more than a decade of hard work to secure local legislation on such an obvious matter as motor-bus charges for road maintenance. As for overall parity in taxation, that is as far off as ever.

If the municipally-owned tramways of Great Britain have sought justice in vain against the encroachments of privately-owned bus companies, what chance have the electric railways of the United States? It is still as much as a politician's life is worth to introduce or vote for measures that will give a square deal to our electric railways. Had we not better follow the example of the British tramways, both public and private, and go into the automotive game, too? Perhaps, the quickest way to insure that self-propelled vehicles be made to assume the burdens of the common carrier is to inaugurate such services ourselves! There is little likelihood that effective legislation can be obtained against the small sniper of traffic. He is hard to regulate at best, and he is frequently the recipient of much sympathy from that part of the public which doesn't love a corporation. Furthermore, the public will not readily tax out of existence a new and flexible mode of transportation which it has found so convenient a supplement to transit on rails. It is notworthy that even the drastic lesson of Toledo has not resulted in the banishment of bus operation there.

The problem of making self-propelled vehicles pay their due share of road upkeep is not so simple as it seems. The paving burdens of the electric railway's predecessor did not arise solely from the harm caused to cobbles by the hoofs of its horses; there was a well-defined feeling that the railway ought to pay something for getting a sort of right-of-way that the placing of rails on the highway was a hindrance rather than a help to other traffic. A parallel charge can hardly be made in the case of buses or motor trucks employed in public service, inasmuch as they use exactly that same runway as other vehicles. Just what roadway maintenance charge should be assessed against a 1½-ton or 2-ton bus running every hour or half-hour over a state highway that carries scores to hundreds of private vehicles per hour? If, as in at least one Eastern State, there is a special State tax of $2 per seat per annum for public service vehicles as such (aside from other vehicle taxes), it cannot be asserted that the bus is not contributing something toward the upkeep of the highway.

Above and beyond all is the fact that so large and so influential a part of the population now has a selfish interest in securing ever-better roads, that no evidences of road destruction by public-service or private-service vehicles will halt the spending of money for roadway improvement. It is not difficult to foresee the day when the automotive interests will clamor for the removal of the suburban or cross-country railway in unpaved track, which follows a non-paved highway, because it is using to the exclusion of others, one-fourth to one-third of the entire roadway for the sake of running a car every 60, 30 or even 15 minutes at a lower speed than the bus. Let us not overlook the fact that there is a considerable kick in an industry that now numbers nearly 7,000,000 licensed vehicles.

It would be a sad error to ignore either the motor bus or the motor truck development merely because many of the pioneers have come to grief in the public service despite the advantages they enjoyed in lighter taxation or no taxation at all. Every young industry makes mistakes. The automotive field is already passing out of the haphazard, individual-operator stage into that of skilled organizations which are capable of determining where to draw the line in character and cost of service. Such organizations, whether for goods or passenger carriage, should logically be an integral part of existing railway systems. That has been the development abroad and that must be the development here if we are to be spared a ruinous struggle between modes of transportation which should and can be reciprocal instead of antagonistic.

CARRYALL.

Bulletin News Page

Summary of the Principal Happenings of the Industry of Current Interest Since the Last Issue of this Paper was Published

PRINTED JANUARY 2, 1920

Both the municipal and the private tramways in Great Britain are seriously affected by the award of the court of arbitration increasing the wages of adult tramway employees. Taking into account the present and the previous increases of wages and the shortening of hours it is contended that on the present basis of fares few, if any, of the municipal undertakings can carry on. As for the private companies, they are calling upon the government to amend the antiquated limitations of maximum fares and for relief from street maintenance and other expenses.

The directors of the North Eastern Railway have provisionally sanctioned a scheme for the electrification of the main line between York and Newcastle, a distance of 80 miles, and of a loop line 31 miles long.

A Swiss firm has outbid English concerns for turbines for Edinburgh.

The Railroad Commission of California informs the Governor that one of the big problems facing the commission is the settlement of the electric railway situation. The commission sees the automobile a most formidable and determined competitor of the electric railway.

Mayor Couzens of Detroit proposes the construction of a $15,000,000 municipal-railway to compete with privately-owned lines of the Detroit United Railway.

The President's Industrial Conference will reconvene on Jan. 12 with public hearings to aid in drafting the final recommendations of the conference. The conference regards as intolerable any interruption in essential public utilities.

Robert N. Wooley of the Interstate Commerce Commission sees the electrification of the steam roads as the next step that must be taken in the transportation world.

The Boston Elevated Railway will have $15,000,000 to spend in the next five years as the result of the enactment of the Cambridge subway bill.

There is published this week, practically in full, the findings of the arbitration board increasing the dividend on the stock of the Cleveland Railway under the Tayler franchise from 6 per cent to 7 per cent.

The three engineers appointed to appraise the Memphis Street Railway have filed their reports. It now remains to reconcile the figures, which disagree.

Application has been made to foreclose the Shore Line Electric Railway in Connecticut.

Representatives of the bondholders' protective committee have purchased the property of the Fort Wayne & Northern Indiana Traction Company under foreclosure.

The Huntington (N. Y.) Railroad, which suspended service on Sept. 21, may be put back into operation.

The Savannah (Ga.) Electric Company has been placed in the hands of Howard C. Foss, district manager of Stone & Webster.

Important divergencies of opinion have developed between Henry L. Doherty, operating the Toledo Railways & Light Company, and the commission appointed by the court to draft plans for the settlement of the controversy in that city; but it would not appear that any of the differences are insurmountable.

The San Diego (Cal.) Electric Railway on Jan. 1 installed a zone system of fare collection on its lines. The city of San Diego is divided into two zones with a 5-cent fare for a ride in each.

The Detroit (Mich.) United Railway has withdrawn its request for a 1-cent transfer charge. It is announced that a charge for transfers is no longer needed. The company will continue to operate on a straight 5-cent fare basis.

The Charleston (W. Va.) Interurban Railroad has applied to the State Public Service Commission for an increase in rates on its Charleston lines. The increase asked averages 35 per cent.

The recent decision of the Illinois Supreme Court upholding the power of the State Public Utilities Commission to increase electric railway rates above the limit fixed by municipal franchise provisions, has ended a dispute of long standing between the city of Quincy and the commission.

The flat 6-cent fare ordered for the Chicago (Ill.) Surface Lines by the State Public Utilities Commission, went into effect at midnight on Dec. 27. It will continue pending the final valuation of the properties and the fixing of a permanent rate.

The State Board of Public Utilities Commissioners has authorized the Trenton & Mercer County Traction Corporation, Trenton, N. J., to increase its fare from 6 cents to 7 cents and to charge 1 cent for each transfer.

Colonel Albert T. Perkins, general manager for the receiver of the United Railways, St. Louis, Mo., has refused the request of the St. Louis municipal authorities for a conference to discuss the question of reducing fares on the company's lines.

The Union Street Railway, New Bedford, Mass., has been authorized by the State Public Service Commission to file a new schedule increasing its fare.

The Interborough Rapid Transit Company, New York, at the eleventh hour, succeeded in securing funds to meet obligations that came due on Jan. 1.

The Tacoma Railway & Power Company and the Pacific Traction Company, Tacoma, Wash., have filed with the State Public Service Commission tariffs under which they propose to charge 10-cent fares in Tacoma.

The power to order the abandonment of the skip-stop in Memphis, Tenn., rests with the State Public Utilities Commission, according to a decision handed down on Dec. 24 by Judge McCall. The city has been enjoined from enforcing the terms of an ordinance directing the Memphis Street Railway to stop its cars at all street intersections.

The preliminary hearings before the Connecticut Public Service Commission on the zone system in effect on the lines of the Connecticut Company, New Haven, have been concluded.

The voters of Salem, Mass., on Jan. 27, will pass on the action of the City Council in barring jitneys from the city limits.

Colonel Timothy S. Williams formerly president of the Brooklyn (N. Y.) Rapid Transit Company, has announced his retirement from all connection with the company.

Federal Judge Julius M. Mayer on Dec. 28 instructed the receivers for the New York Railways and the Brooklyn Rapid Transit Company to apply to the Board of Estimate for a conference with city officials, with a view to arriving at a final solution of the transit problem in New York City. The Board of Estimate on Dec. 30 adopted a resolution calling for an investigation of all the traction companies in New York.

Recent Happenings in Great Britain

Wage Award Affects Tramways Seriously — Eighty-Mile Main Line Electrification Announced

(By Our Regular Correspondent)

The award of the court of arbitration increasing the wages of adult tramway employees by 4s. a week and of youths by 2s. a week, threatens to place British tramway undertakings in as bad a financial position as that now existing in connection with American electric railways. After the two tramway associations had time to consider the position, they issued statements in the latter part of October.

RAILWAY CRISIS AT HAND

The Municipal Tramways Association says that the award has precipitated a crisis which for some time past had been overtaking the urban transportation industry. The report refers to the accumulation of arrears of maintenance and repairs during the war, to the fact that overtaking of the arrears can now be carried out only at greatly increased cost, and to the fact that tramway extensions required for the development of new housing schemes cannot be undertaken owing to financial embarrassment.

The present award will add nearly £1,000,000 to the annual wages bill. This raises the cost of transportation to a level which it is hard to justify. Taking into account also previous increases of wages and shortening of hours, it is contended that on the present basis of fares few if any undertakings can carry on. Immediate increases of fares up to the statutory maximum will be necessary. Even such increases will not prevent some of the weaker concerns from having to cut their losses and go out of business.

MUNICIPAL TRAMWAYS ALSO SUFFER

No less emphatic is the report issued by the conference of tramway companies who are members of the Tramways & Light Railways Association. It is affirmed that to bear the burden and give an efficient service the industry must be put on such a basis as will enable it to yield a fair return on capital spent and to attract fresh capital for developments. The government is called on to amend the antiquated limitations on maximum fares and to relieve the undertakings of street maintenance and other expenses which do not properly belong to the tramway service. The relief which has been granted under the statutory undertakings (temporary increase of charges) act, 1918, is inadequate and is only temporary. Some change is also necessary as to workmen's fares which at present result in a loss. Assuming the existing conditions to continue (the report affirms) the inevitable end is bankruptcy, first of the weaker undertakings, and later even of the strongest.

It will thus be seen that here as well as in America there is need for a careful general investigation. Now that we have a Ministry of Transport possibly justice can be done without anything in the way of an elaborate inquiry before a special commission such as that which has been going on in the United States. Unfortunately, however, for the municipal tramways, they were largely excluded and at their own desire from the ministry of transport act passed last summer. By a strange irony the reason advanced for the exclusion was that they were prosperous. They will be prosperous no longer unless something is done. Even if fares are continually raised, a point must come when a further increase will decrease revenue rather than increase it.

The men employed on the railways (as distinguished from the tramways) are now putting forward fresh demands. The standardization of wages is again under discussion with the government. The National Union of Railwaymen are also seeking to have the railways administered and directed by joint boards of control on which the employees would be well represented.

NORTH EASTERN TO ELECTRIFY

A step in the latter direction is indicated in the answer to a Parliamentary question given in the end of October. The government intimated that it was impossible to consider any joint management proposal during the coming two years of State control of railways. It proposed, however, to appoint a railway advisory committee and will be glad to see one or two railway workers appointed members of the body.

Early in November the important announcement was made that the directors of the North Eastern Railway had provisionally sanctioned a scheme for the electrification of the main line between York and Newcastle, a distance of 80 miles, and of a loop line 31 miles long from Northallerton to Ferryhill, via Stockton. It seems probable that the work of conversion will not be begun for some time yet as the Ministry of Transport, which is just getting into working order, will have to consider the scheme and provide for a certain amount of standardization in view of future electrification, and possibly before anything definite is done the Ministry will desire to await the passing of the electricity supply bill which is dragging its way slowly through Parliament.

In any event, the scheme is the biggest thing in the way of heavy electric traction which this country has yet seen. The main line of the North Eastern Company carries every variety of traffic from the London and Edinburgh express passenger trains to slow local trains and heavy mineral and goods traffic.

The protected third-rail system with high-pressure direct current is proposed, but in yards, sidings, and big stations overhead wire conductors will be used. Electric locomotives will be employed throughout and will be fitted to take energy both from the third-rail and from the overhead wire. The details of the present scheme have been worked out by Sir Vincent Raven, chief mechanical engineer to the North Eastern Railway, and Merz & MacLellan, consulting electrical engineers to that company.

LONDON DELEGATION IN UNITED STATES

Some interesting points emerge in connection with the London Underground Electric Railways. Some time ago a delegation representing these undertakings sailed for the United States where the members are to carry on an investigation into the working of American electric railways and also the manufacturing processes associated with them and with automobiles. Operation, traffic, engineering—in fact, all aspects—will have attention. The members of the commission are Frank Pick, commercial manager of the associated companies; C. J. Spencer, manager of the London United and other tramways included in the "underground" group of companies; G. W. Shave, engineer of London General Omnibus Company; and A. R. McCallum, assistant mechanical engineer to the underground railways.

The scheme of tramway extensions which the London County Council proposes to promote in the next session of Parliament provides for 43 miles of track, mostly on the conduit system, at an estimated cost of £3,031,000. Cars and electric cables would cost £245,000 in addition, and street widenings £928,000 more, giving a total of more than £4,200,000. The lines are urgently required, especially those for linking up dead-end terminals, and it is estimated that taking the results over the whole system the proposal will be justified on financial grounds. This is not very apparent on the face of it when one looks at the enormous cost of construction at post-war prices and the very high wages now payable to tramway employees. However, the extensions which have been proposed by the London County Council are urgently needed as a substantial step toward unifying the tramway system of London.

SWISS OUTBID ENGLISH

Some sensation has been caused by the Corporation of Edinburgh accepting a tender by Brown, Boveri & Company, Baden, Switzerland, for the supply of turbo-alternators at £106,618. This was £70,000 lower than the lowest British tender. Sir Charles Parsons, of the famous firm of C. A. Parsons & Company, who were among the tenderers, has stated that if he had done the work without any profit at all he would not have come within measurable distance of the Swiss offer.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Wants Buses Halted

Brooklyn City Railroad to Ask Injunction — Commissioner Would Operate Bus Lines Permanently

The Brooklyn (N. Y.) City Railroad, which operates the surface lines recently separated from the Brooklyn Rapid Transit System, has served notice upon Grover A. Whalen, Commissioner of Plant and Structures of New York City, that on Jan. 12 it will institute legal proceedings to restrain him from operating municipal bus lines in competition with the lines of the company.

The buses which the company seeks to have barred operate in competition with several lines of the Brooklyn City Railroad and are under the supervision of Commissioner Whalen. The court action will be based upon the fact that the latter has failed to obtain a certificate of convenience and necessity for their operation, and that they are materially affecting the electric lines' receipts. In the papers served upon Commissioner Whalen the railroad declares that, unless the buses are halted, the company may have tò cease operating certain of its lines.

A recent decision of the State Supreme Court concerning the operation of a bus line in competition with the Niagara Gorge Railroad is thought to cover the Brooklyn situation. In that case the court granted a permanent injunction against the bus line on the ground that the latter had not obtained a certificate of public convenience and necessity.

At a recent meeting of the Board of Estimate & Apportionment, Commissioner Whalen recommended that the city go permanently into the bus business. He submitted statistics dealing with the operating expenses and fixed charges for motorbus service over nine routes with 100 buses. His estimate appears in the accompanying table.

Buses, 100, at $5,500	$550,000
Spare parts	10,000
Garage equipment	10,000
	$570,000
OPERATION AND MAINTENANCE.	
Liability insurance, accident	$50,000
Garage	25,000
Chauffeurs, 180, at $1,800	324,000
Depreciation, buses, 30 per cent	165,000
Depreciation, other equipment, 10 per cent	2,000
One superintendent	3,500
One assistant superintendent	2,000
Thirty-two starters and checkers, at $1,350	43,200
One inspector equipment	2,000
One auditor-bookkeeper	2,500
Three clerks, at $1,500	4,500
One stenographer	1,300
Contingencies	10,000
Toal of above items	$635,000
Total of above items per day (100 buses and 365 days)	$1,740
Total, above items per day per bus	17.40

Gasoline, oil and tire per mile:
(Gasoline, Oil Tires and Repairs) Total
4 cents 6½ cents 1½ cents 12 cents

Mr. Whalen declared that, if ninety-two buses were purchased, the daily profit, with 60,000 passengers per day, would amount to $376.

Industrial Conference Reports on Labor

Presidents' Body Will Resume Sessions on Jan. 12, When Public Hearings Will Begin

Tentative recommendation for the establishment of machinery to prevent or retard labor conflicts in private industry were announced on Dec. 29 by the President's Industrial Conference, with a view to obtaining constructive criticism before a final plan is adopted.

The plan, as outlined, contemplates the creation of a national industrial tribunal and regional boards of inquiry and adjustment, which would move to the settlement of disputes before there was any stoppage of production. Decisions would have the full force and effect of a trade agreement between the parties to the dispute.

PUBLIC UTILITY SERVICE ESSENTIAL

Remarking that some public utilities, such as railroads, are essential to the very existence of the people, the conference's tentative statement expressed the opinion that the "interruption in such essential public utilities is intolerable." But the conference states that further consideration is required of the problem whether some method can be arrived at that will avert all danger of interruption to service.

When the conference reconvenes on Jan. 12 public hearings will be held to obtain expert advice as to the drafting of the final recommendations in the light of such criticism of the tentative report as may be received.

With regard to public utilities the conference made the following statement:

> The plan here proposed presents greater difficulties in application to certain public utilities than to competitive industry. The continuous operation of public utilities is vital to public welfare. As the capital invested is employed in public use, so is the labor engaged in public service, and the withdrawal of either with the result of suspending service makes the people the real victim.
>
> The conference believes that a plan of tribunals or boards of adjustment and industry should be applied to public utilities, but in the adaptation of the plan two problems present themselves: First, governmental regulation of public utilities is now usually confined to rates and services. The conference considers that there must be some merging of responsibility for regulation of rates and services and the settlement of wages and conditions of labor. Such co-ordination would give greater security to the public, to employee and to employer. Second is the problem whether some method can be arrived at that will avert all danger of interruption to services. These matters require further consideration before concrete proposals are put forward.

Competition for Detroit

Mayor Couzens Will Outline Plan for 140 Miles of New Line to Cost $15,000,000

Shortly before Christmas Mayor Couzens of Detroit, Mich., announced that he had practically perfected plans for a railway system in Detroit independent of the Detroit United Railway. The plan which Mayor Couzens is expected to present to the City Council very soon, although not made public, is understood to include a railway comprising about 140 miles of trackage to cover every section of the city and run over the boundary lines of the city in some places.

CROSSTOWN LINE PLANNED

In speaking in favor of his plan the Mayor stated that with the aid of his advisors, including a well-known New York traction expert, he is endeavoring to make the proposed system as "fool proof" as possible. He is determined to give the best kind of service as to cars and as to streets as well by means of a plan that will not be assailable by the supporters of other plans.

Although the plan does not include dealings with the Detroit United Railway, it is believed that the city would not be adverse to an interchange agreement if the railway company wished it, after the Mayor's plan was fully worked out.

Included in the proposed system it is believed there will be a line crossing Woodward Avenue independent of the Detroit United Railway's existing crosstown lines, a line to enter or skirt the village of Hamtramck and a line on Clark Avenue to tap the Fort Street line. This latter line would permit the city to take advantage of the Supreme Court decision of several years standing which gives the city the right to oust the Detroit United Railway from Fort Street.

ORDINANCE TO BE PRESENTED SOON

The plan will be presented by the Mayor in the form of an ordinance which it is expected will soon be prepared by the Corporation Counsel's office.

The Street Railway Commission, the members of which resigned when the Mayor rejected their proposed Taylor, or service-at-cost plan, will not be replaced at present. The Mayor will act as his own street railway commission and will consult transportation experts in working out his plan.

Elsewhere in this issue mention is made of the improvement program that was announced recently by the officers of the Detroit United Railway.

Commission Sees Clearly Electric Railway Needs

New and Changed Relations Necessary Between Railways and the People—Auto an Element

Declaring that the regulation of public utilities as practised by the State Railroad Commission of California during times that threatened public welfare from many angles has been sustained and that it believes further proof of the soundness of the practices of the commission will be found with the return of normal conditions, the commission on Dec. 3, in a letter to Governor William D. Stephens, reviews its work during the year ended June 30, 1919. The letter, which transmits the annual report of the commission to the Governor, points out as among the most important acts of the commission its intervention in the Key Route strike, settlement of the Los Angeles power controversy, and its San Diego railway decision.

MANY APPEALS FOR INCREASED RATES

The predicament of the State's utilities, due to the constantly changing operating conditions, was reflected principally in applications to the commission for authority to increase rates, the petitions in every case setting up the claim that increased labor costs and higher material prices had destroyed the margin between financial soundness, with ability to function properly, and profitless operation; between efficient service to the public and service hampered by income insufficient to meet constantly increasing demands for service. The petitions for higher rates covered every class of utility. Of their actions on the petitions the commissioners say:

> The commission found it necessary to grant many increases because of the showing made by the utilities, which was carefully checked, and from investigations made by the commission's staff. As a matter of fact, the need for increased income for the utilities to enable them to function to the highest point of efficiency was obvious. We believe that on the whole the commission's rate decisions have been received by the public as necessary acts of fair dealing on the part of the commission—acts fair alike to the consumer and the utility.

One of the big problems facing the commission, the Governor is informed, is the electric railway situation, the unsettled conditions in the electric traction service field and the necessity of considering measures for possible financial relief and improvements in service being matters that are daily becoming more pressing. In pointing out the difficulties of the electric railways, the commission says:

> The following figures will indicate in a graphic manner the gravity of the situation, the figures showing the collective financial result of electric railways in this State making operative reports to the commission:

Gross Income		$37,202,685
Operating expenses	$27,897,137	
Other deductions..	1,151,443	29,048,580
Net revenue		$8,154,105
Taxes	$1,979,190	
Interest	8,955,586	$10,934,776
Net deficit		$2,780,671

> This deficit is the combined losses of twenty roads and profits of fourteen roads, a total of thirty-four with nearly 2,000 miles of road and more than 3,000 miles of track.
>
> There are now pending before the Railroad Commission formal applications asking relief from some of the largest electric railways. Fares have already been increased on the San Francisco-Oakland Terminal Railways, the Oakland, Antioch & Eastern Railway, Stockton Electric Company, Humboldt Traction Company of Eureka, San Jose Railroads, Union Traction Company of Santa Cruz, Fresno Traction Company and the electrically operated transbay service of the Southern Pacific Company (the last named is under federal control). During the year a readjustment of interurban fares on the Pacific Electric Railway was authorized, thus producing considerable additional revenue. These increases, however, were more than offset by increased operating expenses.

SAN DIEGO SETS A PRECEDENT

Added importance is attached by the commission to the San Diego Electric Railway investigation and decision. In that case the commission laid down a number of new principles and rules for the conduct and regulation of electric railways in the State. For the first time the commission departed from the one-fare rule and adopted the zone system of fares within the limits of a municipality. The following is from the commission's letter:

> For more than a year the commission carried on an investigation into the railway situation in San Diego, the inquiry following an application by the San Diego Electric Railway and the Point Loma Railroad for financial relief and permission to abandon a number of its lines. The exhaustive investigation revealed a deplorable financial and operating condition, with a steadily increasing loss to the owners of the road and a corresponding reduction in the efficiency of service. A larger income had to be provided or inevitably service over practically the entire system in San Diego abandoned in the near future.

Creation of the zone system of fares, a direct order to the company compelling rehabilitation of its system, refusal to allow the company to abandon its lines, and recommendations that the city change its paving requirements are incidents in the general plan evolved by the commission.

AUTO VS. STREET CAR

On the general railway situation throughout the State the commission says:

> A thorough investigation has been under way during the past year and it has become clear that there is no uniform remedy that can be applied to the electric railway difficulties in this State. Each property will have to be considered on its merits.
>
> The "high cost of living" has borne heavier on the electric railway business than any other industry for the reason that for electric railways the standard fare has been the nickel. Not only have franchise provisions fixed on this unit, but the 5-cent fare has become an institution for American cities.
>
> The electric railways have met in the recent past a most formidable and determined competitor—the automobile. Both the private automobile and the jitney have made enormous inroads on the passenger traffic that was formerly dependent upon electric railways. The automobile truck is an even more serious competitor in the freight traffic field, for the electric interurban railways almost without exception are depending for their freight revenue on short-haul business. And yet it is clear that both the passenger automobile and the freight auto truck as competitors of the steam and the electric railways are even now only in the first stages of their development.
>
> Electric railway utilities find it more and more difficult to obtain necessary new capital, and for many companies the only escape from financial collapse is through drastic reorganization.

The commission declares that the only permanent and effective remedy for this unhealthy situation will be found through the creation of new and changed relations between these properties and the people as represented by the municipality and other authorities. In this connection the commission says:

> We do not believe that obstacles should be thrown in the way of the economic evolution we are now witnessing in the transportation field. And if the motor vehicle can give better and more efficient service at a lower cost than other forms of transportation, it would be unwise and indeed, in the long run, ineffective, to interfere with such a development.
>
> We are by no means convinced, however, that the day has come when the communities can dispense with their electric street and interurban railway systems, and other agencies, in our opinion, are not as yet in a position to take the place of these utilities.

On this subject the commission says further:

> It seems to us that the relations between these roads and the public must first be changed through a remaking or modification of franchise provisions. The people apparently do not appreciate that matters stood differently in the past when certain franchise provisions were first established. Then street railway operation was considered a speculative and highly profitable business. There is no doubt that during the last half dozen years or more the speculative element has been entirely eliminated from street railway profits.
>
> An indiscriminate raise in fares is not a remedy for the street railway situation. After fares are raised beyond a certain point the street railway is permanently the loser. One plan which might be looked upon with favor lies in a partnership between the communities and the company until such time as the communities see fit themselves to render electric railway service. The machinery to bring about such changed relations may take different forms. Recently the resettlement franchise has been chosen in several instances.

I. C. C. Member Urges Electrification

Electrification of steam railroads, forced by the search for cheap power, is predicted by Robert N. Woolley, of the Interstate Commerce Commission, as the next step that must be taken in the transportation world. Mr. Woolley in an interview said that this could be done by converting bituminous coal into coke at the pit heads of the mines and the use of the coke as fuel in gigantic electrical stations. He is quoted as follows:

> It is generally conceded that the electrification of steam railroads must come in the not distant future. The super-power plant would make electrification possible at an earlier date. It would increase traffic capacity from 25 to 50 per cent, would increase speed in transportation and would practically eliminate railroad congestion, particularly during the winter season.
>
> The advantages to be secured through the electrification of the roads are many. An electric locomotive will handle twice the load of a steam locomotive. It operates best in cold weather when a steam locomotive has its greatest troubles. On down grades what is known as regenerative braking returns from 25 to 50 per cent of the power used in climbing. An electric locomotive can be operated over a 1,000-mile run with only casual inspection.
>
> Electrification is the cheapest and most practical method of producing an increase in traffic capacity. This could be accomplished by additional tracks or by the elimination or reduction of grades, but the entire cost of electrification, including power stations and transportation lines, is less than the cost of either.

Many Toledo Sessions

Franchise Settlement Commission Fast Working Out Its Plans—Immediate Municipal Ownership Impossible

Following the session on Dec. 22 of the municipal-ownership division of the commission which is charged by the court with developing franchise settlement ordinances for Toledo, Ohio, it was announced that that division had abandoned hope of providing for the immediate purchase of the railway property of the Toledo Railways & Light Company. By unanimous vote it was decided that rather than report back that nothing could be accomplished now, the commission would precede along the general lines upon which the service-at-cost branch was working. The ordinance of the service-at-cost division will provide that a fund shall be created for the purchase of the railway but that the accumulation of the fund shall not be begun for ten years.

H. L. Doherty, operating head of the company, made his first appearance before either branch of the commission at the session of Dec. 26. He asked Henry W. Ashley, chairman of the municipal-ownership division, if he wished to see him, but Mr. Ashley replied that the members of the commission had nothing to take up with Mr. Doherty at the time.

Mr. Doherty then addressed the service-at-cost division of the commission. He told the members that he was apprehensive of three features of the proposed service-at-cost franchise grant. The points he mentioned were the valuation of the railway property, the maximum fare which will be allowed if any fare limit is fixed and the rate of return the company will be allowed to receive on its investment. The chairman of the service-at-cost division explained that what had been done by the division was only tentative. The object of the commission was to prepare sound ordinances with the Cleveland plan as a basis. Mr Doherty said it seemed to him that whenever anything was found in the Cleveland plan favorable to the company the tendency at Toledo was to change it.

On the same day, namely, Dec. 26, the municipal-ownership division of the commission devoted its session largely to a consideration of the provisions of the service-at-cost ordinance. Law Director Martin explained just how it will be possible for the municipal-ownership division to adopt for its own purposes the ordinance as drawn by the service-at-cost section of the commission, changing it only by providing for the addition of 1 cent or a fraction of 1 cent to each fare to create a fund to make the initial payment on the property and to acquire title within a few years. Mr. Martin told the commission that he knew of no way under the present laws in which the city could obtain at once the money to make the initial payment for the property. Although the municipal-ownership section of the commission is considering the adoption of the terms of the service-at-cost plan with modifications, it is understood that section of the commission will defer acting upon it for the present pending the possibility of the passage of the Legislature of the Brach bill to authorize cities to extend their general credit for buying electric railway properties.

The session on Dec. 27 of the service-at-cost section of the commission was a very important one from the standpoint of the subjects covered, but it did result in considerable differences of the opinion between the commissioners and the representatives of the company. The service-at-cost members voted unanimously to establish a maximum fare of 7 cents with a 1-cent charge for transfers. They did this over the protest of Mr. Doherty. This supersedes the commission's former decision for a 6 and 1 maximum fare. The commissioners expressed the belief that it was unlikely the actual maximum rate would ever be required to be put into effect. Mr. Doherty said that if a maximum fare was provided for, the company would have to insist that control of the service should pass to the company when the maximum fare was in effect. He was not in favor of a maximum fare. True service-at-cost should be service-at-cost. Mr. Doherty urged that the section of the Toledo plan covering the terms of purchase by the city should provide for a call price of $110 a share for the stock of the company throughout the life of the grant.

Fast Through Service Established

The formal opening on Dec. 17 of the through service over the line of the Wheeling Traction between Wheeling, W. Va., and Steubenville, Ohio, was made a most interesting occasion. About sixty Wheeling business men responded to the invitation of C. P. Billings, manager of the Wheeling Traction Company, to inspect the line.

The first stop was made at the new power plant of the Wheeling Electric Company, located at Beach Bottom. By special arrangement with the manager of the plant the entire party was given the opportunity to inspect this station from which power is now being transmitted as far north and west as Akron, Ohio.

At Steubenville the party was the guest of the Steubenville business men at luncheon.

The new special service which the traction company is inaugurating between Wheeling and Steubenville gives a through car from Wheeling to Steubenville every half hour. It is the hope of Manager Billings that this service can be reduced from one hour and thirty minutes to one hour and five minutes. Most of the road between Warwood and Steubenville is single track, and in order to give fast through service additional sidings will be provided.

In this connection Manager Billings states that the company is planning to erect a package warehouse at some central point in Wheeling.

An announcement in this direction is expected soon. This station will be used for the receipt and distribution of freight packages sent by shippers from Wheeling to suburban towns. A part of this plan also contemplates the putting on of regular baggage cars to be used at certain hours of the day.

Changes Proposed in New Jersey Commission

Charges of neglect and misconduct in office brought against the Board of Public Utility Commissioners of New Jersey by officials of Montclair were dismissed on Dec. 31 by Governor W. N. Runyon. The charges were submitted to the Governor after commissioners had granted the request of the Public Service Railway to establish a zone fare system. The Montclair officials demanded that the commission be ousted from office.

The chief grievance against the board was based upon the alleged fact that the zone fare system was inaugurated without a complete prior valuation of the company's assets and liabilities having been made.

The Governor's statement says that the board's duty was to evolve a scheme which should meet the running expenses of the utility company during emergency times, and that this the board did after long consultations with experts, and voluminous testimony.

The question of whether or not the board's judgment was bad does not enter, the statement says, and since no evidence of wrongdoing was found the charges were held without foundation. The Governor said:

> While I am thus constrained to dismiss the charges against the commissioners I do not hesitate to reaffirm my opinion that the public has lost confidence in this commission, and I hereby state that, as a member of the State Senate, at the coming session of the Legislature, I shall introduce a bill abolishing the existing commission of five men and substituting a new commission of three.

News Notes

Muscatine Grant Modified.—The people of Muscatine, Ia., by a vote of 1983 to 530 have decided to amend the franchise of the Clinton, Davenport & Muscatine Railway. About 50 per cent of the normal vote was cast. The amended franchise provides for a 4-cent fare from 5 until 8 o'clock in the morning and from 5 to 7 in the evening, with a straight 7-cent fare the remainder of the day. To take advantage of the 4-cent fare the passenger must buy a book of seventy-five tickets for $3.

$15,000,000 for Boston "L" to Spend.—The enactment of the Cambridge

Subway bill into law provides the Boston (Mass.) Elevated Railway with $8,000,000, which together with an additional $7,000,000 will place at the disposal of the board of trustees a total of $15,000,000 which it is planned to spend on a five-year improvement program providing for the development of rolling stock, the rehabilitation and general improvement of the power division, changes in repair shops and additional track construction.

Power Employees Get Increase.—An increase of 13 per cent in the pay of power house and substation men, electrical workers and others engaged in the generation and distribution of electric light and power has been announced by W. E. Coman, general manager of the Washington Water Power Company, Spokane. The raise affects approximately 200 men and took effect on Dec. 1, adding $40,000 a year to the company's payrolls. This is the second increase this year, the first having been granted last June. The increase was granted because of the abnormal cost of living.

Want Service in "The Flats" at Cleveland.—Fielder Sanders, Street Railway Commissioner, has prepared a resolution which will grant the Cleveland (Ohio) Railway a franchise to lay tracks on West Third Street from Scranton Road to Broadway and thence to Broadway and East Thirty-fourth Street. This would give service to about 10,000 people who work in "the flats," a district occupied by lumber yards, factories, mills and furnaces. Company officials say that the initial outlay for such a line would be about $200,000. The line could be so arranged as to make connection with downtown cars when the station on the square is completed.

Men in Pittsburgh Record Sentiment in Vote.—The first reliable test of sentiment among the platform employees of the Pittsburgh (Pa.) Railways, who went on strike last summer in opposition to the directions of their international officers, came in the election in the third week of December when the men re-elected those of their local leaders who led them in the strike and who finally induced them to return to work. The settlement of the strike was opposed by the men because of the terms incident to it, but P. J. Ward, business agent of Division No. 5, Amalgamated Association, was returned to office with his entire slate, in the election. All offices were contested. Mr. Ward had three opponents.

May Develop Bayonne Peninsula.—The Public Service Railway, Newark, N. J., has considered the advisability of building a "high-speed" line, either elevated or subway, from Port Richmond, through the Bayonne peninsula and Hudson County, to New York City. Richard E. Danforth, vice-president and general manager of the company, revealed this plan in testifying before the Public Utility Commission in the zone hearing recently, on the "usefulness" of the abandoned "Old Dummy Road" right-of-way in Bayonne. Mr. Danforth explained that such a line would build up the Bayonne peninsula, which is 5 miles long and 1 mile wide. He is quoted as saying that he would like to see the project started within five years and built through to the Hudson River.

Extension Favored.—A resolution indorsing the extension of the Cincinnati, Lawrenceburg & Aurora Traction Company's line from Anderson's Ferry to the Dixie Terminal and the Rapid Transit Loop was adopted at a meeting of the public utilities committees of the Chamber of Commerce, City Club and Business Men's Club held at the Chamber of Commerce in Cincinnati. The resolution when fully expanded will provide that the Rapid Transit Commission finance the project. The cost will be more than $1,000,000. It was said that the revenues derived from the road and a sinking fund will pay for the construction work in forty years. The resolution adopted will be submitted to the boards of directors of the three organizations for final approval.

Strike Rids Los Angeles System of Radicals.—When the strike on the Los Angeles (Cal.) Railway Corporation's system was over early this fall there was no "reinstatement" of employees. Service was being maintained and the company selected only those desired from among former employees who applied. The name of each former employee who desired to re-enter the service was posted in the carhouse out of which he had previously worked. Over the list was an invitation for any employee to make known to the management reasons why any applicant listed should not be employed. The platform men who desired to work in peace and quiet free from the labor agitator, were quick to aid the management in keeping out those who had made trouble before. The final result of the strike, therefore, has been the entire elimination of the radicals.

Proposed Extension of Boston Elevated.—Plans for the extension of the Boston (Mass.) Elevated Railway by utilization of tracks of the New York, New Haven & Hartford Railroad were considered by representatives of the Boston Elevated Railway, the New York, New Haven & Hartford Railroad and the Massachusetts Public Service Commission at a meeting held in Boston on Dec. 19. The project as discussed provides for the use of the tracks of the Midland Division of the New York, New Haven & Hartford Railroad from a point near Andrews Square, Dorchester, to the Dorchester Terminus, returning from that point over the tracks of the Shawmut Division of the New Haven Railroad. Details of this scheme are under consideration and a public meeting on the proposition will be held by the Massachusetts Public Service Commission on Dec. 29, 1919.

Buses in St. Louis.—Trials and exhibition trips of the two double-deck motorbuses which have been received by the Missouri Motorbus Company have been completed and promoters of the company have announced that service on an east and west through route in St. Louis would begin during the week ended Jan. 3. J. Lucas Turner, general manager of the company, said that all the buses necessary for complete service on the line would be on hand by Feb. 1. The buses are of the same pattern as those used on Lake Shore Drive in Chicago. Conditions for the operation of motorbus lines are still somewhat uncertain as the Board of Aldermen has not acted on the pending ordinance on the subject. The promoters of the bus company contend that pending the enactment of an ordinance, they can run subject to the general traffic regulations, inasmuch as they claim no special privilege.

Nine-Hour Day in Brooklyn.—The Brooklyn (N. Y.) Rapid Transit System on Dec. 22 put into effect the first of its nine-hour schedules on its surface lines, as agreed in the settlement of the recent strike. The Halsey Street carhouse was chosen for the readjustment. Under the agreement 50 per cent of the runs are to be completed in eleven hours, 40 per cent within thirteen hours and the remaining 10 per cent within fourteen hours. Company officials said the change from a ten to a nine-hour basic day would necessitate a 10 per cent increase in the number of car crews. About fifty days are left to work out similar new schedules for the remainder of the routes. The new rule of seniority, by which employees are paid the maximum rate of 62 cents an hour after three years instead of ten, as heretofore, also is in effect for the first time. The guards and conductors on the elevated now reach their maximum rate of pay after eighteen months.

Program of Meeting

New England Street Railway Club

The meeting of the New England Street Railway Club at the Hotel Somerset, Boston, Mass., on Jan. 15 will be manufacturers' night. Ordinarily nothing more need be added to that bald announcement, but the committee has felt constrained to describe the entertainment which has been arranged as "a super production of scintillating and musical talent, a deluge of fun, to delight and entertain everyone, irrespective of age, creed or race." All this is introduced with a half-tone of five young women, who bring to mind all that has been said recently about "Aphrodite." "Pep and Speed" are promised "all for the price of $3.50 for members and guests." Checks should be sent to John W. Belling, P. O. Box 2564, Boston, Mass.

In a separate statement to the members it is explained that the secretary will, on Jan. 1, vacate his headquarters at 12 Pearl Street, Boston, in the interest of economy and for the good of the club until such time as the club's finances permit establishing more desirable quarters.

Financial and Corporate

Experts Again Disagree

Millions Apart on Memphis Street Railway Appraisal, Involving in All Less Than $15,000,000

The three engineers who have completed their appraisal of the physical properties of the Memphis (Tenn.) Street Railway agree upon a valuation, based upon the original cost price, of $9,306,012. That valuation includes, besides the actual value of the tangible property, an allowance for overhead cost, working capital and the cost of financing during construction.

REPORT PRESENTED TO COMMISSION

Ross W. Harris, the expert employed to represent the City of Memphis, in a lengthy supplemental report, places the physical valuation at $7,900,000.

Albert S. Richey, representing the Public Utilities Commission, adds to the valuation above $785,579 development cost and $1,920,544 as the value of superseded property, which the company originally paid for but which is now worn out or not in use. This brings his total valuation up to $12,024,165.

J. H. Perkins, representing the railway, places the total valuation at $13,158,516. He arrives at that value by adding to the physical valuation agreed upon by all three experts a larger sum for superseded property and development cost.

Mr. Harris admits that if superseded property is to be considered the company can honestly show expenditures through the past seventeen years of $1,264,183 for material and equipment not now in use. That added to his original investment figures would make a possible maximum valuation of $10,570,225.

The report of the engineers has been placed in the hands of the commission and it is supposed that it will order a reopening of the hearing, based upon the findings of the appraisers, some time early in the year.

The appraisers did not go into franchise values or the financial affairs of the company in any way, basing their report solely upon the present physical valuation of the entire plant at the present cost to reproduce it. The real estate holdings of the company were, however, figured at the original cost.

APPRAISAL FOLLOWED FARE REQUEST

The physical valuation upon which the company is permitted to make a reasonable return will be fixed by the decision of the commission from the report of the appraisers.

The appraisal at Memphis grew out of the request of the company for an increase in fares to 6 cents. This request was allowed by the State Commission on June 13 in accordance with terms noted in the ELECTRIC RAILWAY JOURNAL for June 21, page 1247. At that time the commission ordered an examination of the value of the railway property by experts, one to be appointed by the commission, and one by the receivers, with the right reserved by the city to appoint an engineer in its own interest.

From the information so far to hand the company has not announced its future course of action, but the city, through its counsel has publicly stated that it believes the emergency necessitating an increase in fare has passed and that in any event it will oppose allowance for some of the items in the appraisal which have been included under "going value."

The latest investment manuals show that the Memphis Street Railway has outstanding $2,500,000 of 6 per cent preferred stock, $2,500,000 of common stock, $8,324,000 of consolidated mortgage 5 per cent bonds, $1,250,000 of collateral trust 6 per cent notes and $250,000 of unsecured 6 per cent notes, making its total capital liabilities $14,824,000, or just about twice the "bare bones" value as found by the engineer for the city.

Receiver for Savannah Electric Company

Howard C. Foss, Savannah, Ga., district manager of Stone & Webster, has been appointed receiver for the Savannah Electric Company on the application of the General Electric Company, holder of an unsecured claim of $3,807 for electrical equipment and supplies. It was stated that the company is unable to pay its indebtedness or to pay interest on its bonds due on Jan. 1, or to borrow additional money necessary for extensions and improvements.

A committee of the holders of securities of the compnay has been formed for protective purposes. On this committee are Charles Francis Adams, Stedman Buttrick and George C. Lee, with Elbert A. Harvey as secretary. This committee invites the holders of the first consolidated mortgage bonds dated Jan. 1, 1902, to deposit their bonds on or before March 1, 1920, with the Commonwealth Trust Company, Boston, depository, which according to usual custom will issue transferable certificates for all bonds deposited. In calling for the deposit of these securities, it is pointed out that the bonds should be accompanied by the Jan. 1, 1920, and subsequent coupons. Registered bonds should be accompanied by a properly executed transfer thereof in blank.

Application to Foreclose

Shore Line Leases Broken and Application Made to Foreclose Connecticut Line

The affairs of the Shore Line Electric Railway, Norwich, Conn., under the receiver, appear to be moving fast toward a climax. Abandonment of lines has been referred to previously in the ELECTRIC RAILWAY JOURNAL. Now comes the turning back to the Connecticut Company, New Haven, Conn., of lines operated under lease from that company and the application by the Old Colony Trust Company, Boston, Mass., for an order to allow it to foreclose a mortgage made by the Shore Line in 1916 to secure $2,725,000 of bonds.

In his application to the court for the termination of the lease made with the Connecticut Company the receiver of the Shore Line represented:

1. That the Shore Line Electric Railway entered into a lease with the Connecticut Company, under date of July 7, 1913, by the terms of which lease the Shore Line Electric Railway was entitled to the possession for the period of ninety-nine years from the first day of May, 1913, of certain electric railways belonging to the Connecticut Company, extending from the town of New London to South Coventry, in the town of Coventry; a railway extending from Moosup in the town of Plainfield to the village of East Killingly; the apparatus connected with said electric railways and certain railway stock and equipment used in connection therewith; certain rights to operate cars over the railroad of the New York, New Haven & Hartford Railroad between Taft's, so-called, in the town of Norwich, and Central Village, so-called, in the town of Plainfield, and certain papers and documents showing the nature of said right conveyed.
2. That the Shore Line Electric Railway took possession of said property and as said lessee has operated said electric railway lines described in said lease.
3. That your receiver has operated said leased lines since Oct. 1, 1919, the day of his appointment as temporary receiver of the Shore Line Electric Railway, and the result of said operation shows a net loss of operating expenses over and above operating revenue.
4. That your receiver has determined it is not for the interest of the receivership estate to adopt said lease and has given notice to that effect to the Connecticut Company.

The receiver consequently made application to this court for an order:

1. Approving his action in electing not to adopt said lease.
2. Authorizing him to enter into an agreement for the termination and cancellation of said lease.

Divested of the lines mentioned the receiver will be left to operate only the Norwich & Westerly line, the Groton & Stonington line, the Westerly & Atlantic Beach line and the lines westerly from New London towards New Haven.

Before Judge Warner and before the Public Utilities Commission the receiver recently stated that there were outstanding $300,000 of preferred stock, $700,000 of common stock, $3,200,000 of bonds, $1,000,000 of Class A debentures and $2,500,000 of Class B debentures. The Morton F. Plant Estate, he said, owns all of the bonds, all of the preferred stock except $2,200, all of the common stock except $9,800 and all of the debentures except $35,000.

The reports of the receiver showed that the lines in operation were run at a loss of $21,850 in October and $3,751 in November.

Cleveland Railway Arbitration Findings

Substance Presented of Two Reports in Recent Dividend Case Increasing Return to 7 Per Cent

On July 18 the City Council of Cleveland, Ohio, by appropriate resolutions proposed to arbitrate with the Cleveland Railway the question whether the dividend rate upon the capital stock of the company should be increased from 6 to 7 per cent, the arbitration to be conducted in the manner described in the Tayler service-at-cost franchise.

ARBITRATION UNDER FRANCHISE ORDINANCE

Arbitrators were chosen as provided in the ordinance, hearings were begun on Sept. 15, and subsequently seventeen public sessions were had at which testimony was offered and arguments of counsel submitted. Briefs were then filed by counsel and the board gave consideration to the matter in conference.

Both parties requested the board, in addition to the award on the single issue presented, to make such findings of fact and make such recommendations as to railway conditions in Cleveland as, in their opinion, were justified by the evidence submitted.

As explained very briefly in the ELECTRIC RAILWAY JOURNAL for Dec. 20, page 1018, the decision by the majority was to increase the return to the company to 7 per cent. The arbitrators were City Light Commissioner W. E. Davis, representing the city; Joseph R. Nutt, president of the Citizens Savings & Trust Company, appointed by the railway, and Attorney A. A. Stearns, named by United States District Judge D. C. Westenhaver as the third member or umpire. All three members signed the report making recommendations to stabilize the stock value of the Cleveland Railway, but only Mr. Nutt and Mr. Stearns signed the decision increasing the dividend rate.

ESSENTIALS OF REPORT REVIEWED

The report signed by all three members follows in full except for the introduction:

We find without disagreement:

1. The Tayler franchise and the amendments thereto have been shown by ten years of trial to be sound in principle, practical in operation and of great benefit to the Cleveland Railway and its stockholders and to the public. It has kept the Cleveland Railway from exposure to the dangers and misfortunes that have overtaken the railway properties in most other large cities. The protective features of the franchise, together with the exceptionally high standard of railway management and intelligent municipal supervision which the Cleveland Railway has had, have resulted in giving to Cleveland the best street railway service, at lowest cost of any city in the United States.

2. The stock of the Cleveland Railway, is so protected by the provisions of the franchise that the investment ought to be ranked with municipal securities. The protective features referred to are

(a)—The valuation fixed upon the physical property at the time the franchise was passed was conservative, and, unquestionably, by subsequent improvements and betterments and liberal expenditures for upkeep, the property has greatly increased in value.

(b)—The provisions for increase of fare insure payment of interest, except possibly under stress of war conditions, and the readiness of the parties to meet the extraordinary conditions by agreement as to increase of maximum rate of fare has heretofore provided for interest requirements.

(c)—The provisions for arbitration of disputed questions prevent either party to the compact from exercising unreasonable power affecting the rights of the public or the parties. This privilege of arbitration, safeguards all interests involved and strengthens the security of the investment.

(d)—The semi-public control prevents all exploitation of the property by those in control of the stock.

(e)—The city cannot avail itself of the provisions of the franchise or the law of the State to bring about municipal ownership except by redeeming the stock at 110.

(f)—The city may renew the franchise by exercising the power reserved in the grant, and the extreme improbability that the city will ever fail to renew the franchise and permit the property to revert to the company makes the grant practically a perpetual one. The failure to renew would turn back the property to the company for the last fifteen years of the term with the privilege of charging the maximum rate of fare and the privilege of reducing the service without check from public authority. It is unreasonable to assume that public opinion, to which the city must always respond, would permit such a course of action. The city renewed the franchise in May, 1919, which was the first time the emergency has been presented since the grant has been in force. So long as the company continues to give good service and at a lower cost to the car rider than any other city, no political administration will face the criticism of the public resulting from the failure to renew the franchise when such failure increases the fare and reduces the service. This apparently self-evident fact adds to the security of the investment.

STOCK A SAFE INVESTMENT

(g)—If it be assumed that the city at some time and under conditions of the future not now foreseen will fail to renew the franchise, the privilege resulting to the company of operating the property for fifteen years at the maximum rate of fare has been shown by the testimony before us to probably afford the company, even under the present high cost of operation, sufficient earnings to liquidate the entire capitalization during that period.

The foregoing protective features are deemed by this board to justify the finding that the stock of the Cleveland Railway is a safe and dependable investment.

3. Notwithstanding the successful operation of the Tayler plan due to the intrinsic merit and to the high class administration of the property both by railway and city officials, and notwithstanding the protective features whereby the investment is made secure, it appears from the evidence before us that the public, including many persons trained by the study of financial problems. are unacquainted with the conditions and protective features of the Cleveland Railway franchise.

The natural tendency to consider the Cleveland Railway merely as a public utility and to put it in the class with other public utilities which have failed to give either service or profit, and to discredit any enterprise which is in part politically controlled, becomes a burden and handicap to the company in time of stress when financial conditions are disturbed, and we recommend an amendment to the franchise providing for the setting up of a reserve fund at a rate not less than $300,000 per annum to be held in trust for not less than ten years, and at the end of each ten-year period to be used for betterments and extensions in the event the franchise at the end of that time is renewed, for which no capital shall be issued, thus tending to reduce the rate of fare; otherwise, to be held for the liquidation of stock at the termination of the grant.

4. We recommend that Sec, 20 of the grant be amended so as to provide for the maintenance of the system in an average condition of 70 per cent of its capital value, in place of 70 per cent of its reproductive value, as now provided.

The majority report of the board, signed by Mr. Stearns and Joseph R. Nutt, reads in part as follows:

The parties hereto, are advised that the board of arbitration finds that the rate of interest on capital stock of the Cleveland Railway should be 7 per cent, effective Jan. 1, 1920, and that the franchise ordinance should be amended to conform thereto.

While the underlying principle of the compact was that the status quo should be preserved to the utmost limit possible, yet in the nature of things the covenant must from time to time yield to necessity.

In the present emergency the railway asked the city to agree to an amendment raising the interest rate, and the city declined to do so. This was not one of the questions reserved for arbitration, and the refusal of the city to consent to the amendment would have ended the matter, except that the city agreed that the question might be arbitrated, and that an arbitration tribunal might be created in the manner provided in the franchise, and the railway joined in this agreement, and thus the parties stipulated together that the question should be arbitrated and the award made binding upon both.

No other amendment is proposed or submitted under the terms of this arbitration except the single question as to whether the rate of interest shall be raised from 6 to 7 per cent.

The railway company in the first instance, presented two general reasons why the rate of interest should be raised:

1. That 6 per cent was not a fair return, meaning that the existing stockholders and others who might acquire stock ought to have a larger return upon their investment, due to the decrease in the purchasing power of money.

2. That the railway company has a certain necessary program of extension and enlargement to meet the requirements of public necessity, and that conditions were now such that they could not finance this program on a 6 per cent basis.

The first of these reasons have been eliminated from our consideration, as the railway now disclaims reliance upon it, and, furthermore, the evidence discloses that a 6 per cent return is not yet discarded in this market as a fair return. The finding must therefore, rest wholly upon the second reason urged.

The exact question is, therefore. Will the railway be able to finance the program at 6 per cent?

The most important result of this meeting is the full and complete illumination of the question of the safety of the Cleveland Railway stock as an investment. A right understanding of the franchise discloses that the stock of the Cleveland Railway is safeguarded and protected so as to become a quasi-municipal investment.

The protective features of the stock which were developed in this hearing are the conservative valuation originally fixed upon the physical property, and the subsequent appreciation of value due to liberal expenditures for upkeep, the automatic increase of fare, the provisions for arbitration, the semi-public control preventing exploitation by stockholders, the provisions for purchase at 110 in the event of municipal ownership, the power in the city to renew the franchise and the strong probability that the grant will be renewed and so become practically perpetual, and the opportunity for liquidation of the stock by operation at the maximum rate of fare in the event the city does not renew the franchise.

It does not necessarily follow, that because Cleveland Railway stock is safe, sound and dependable as an investment and a quasi-municipal security it can be sold in this market on a 6 per cent basis.

We have before us bankers and financiers who testify that in their opinion Cleveland Railway will not sell in this market on a 6 per cent basis. The impressions which they find in the public mind and which they partly indorse, together with the fact that numerous 7 per cent safe offerings are coming into the market, turn the scale in their opinion against the Cleveland Railway security.

Any of these financial experts could easily be convinced, on close study of the franchise provisions, that the views of the public about the stock are wrong, but their testimony relates merely to the view of the public and not to whether it is right or wrong, and they very well understand, as does everyone, that no campaign of education with interpretations from experts could be carried out so as to convince the public of its error. The public mind engaged in buying securities does not operate in that way. Hence they testify that the stock will not be sold on a 6 per cent basis, and no one testifies that it will.

If it be accepted as the only opinion before us that Cleveland Railway stock will not sell in competition, with other 7 per cent securities unless it also earns 7 per cent. then the interest rate must be raised if the Cleveland Railway is to continue to serve the public.

Counsel for the city do not dispute the

point that the opinion evidence before us is wholly to the effect that the stock will not sell upon a 6 per cent basis. They have contented themselves with saying that the stock is of such character that it is safe investment, and that the public ought to be willing to buy it on a 6 per cent basis, and the evidence produced by the city supports very strongly this claim.

The city contends that under the circumstances the rate of interest should not be increased, but that the facts about the stock should be laid before the stock buying public and an effort made to sell before resorting to the proposed amendment.

It is claimed that it is not a proper subject of opinion evidence as to whether the stock will sell, any more than it would be a subject of opinion evidence as to how far a certain man might be able to jump, that the proper thing to do would be to let him try.

Many practical situations arise, however, in which opinion evidence as to the future must be resorted to.

The Cleveland Railway situation is acute. The program of extension to meet the requirements of the public is already upon us. Commitments are already made in excess of the resources in sight.

The interests of the public are such that we cannot wait for experiments.

Bondholders Buy Fort Wayne Line

The property of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., was sold under foreclosure on Dec. 29 for $1,301,000 to W. J. Devine and P. M. Chandler, representing the bondholders' protective committee.

The terms of the original plan for the reorganization of the company, drawn up last summer, were reviewed in the ELECTRIC RAILWAY JOURNAL for Aug. 30. Notice is given now, however, that the committee representing the first consolidated mortgage thirty-year 5 per cent gold bonds of the Fort Wayne & Wabash Valley Traction Company deposited under agreement dated Sept. 12, 1917, and the protective committee representing the first and refunding mortgage 5 per cent twenty-year gold bonds and other securities of the Fort Wayne & Northern Indiana Traction Company deposited under agreement dated Oct. 31, 1917, and the protective committee representing the first mortgage 5 per cent bonds of the Lafayette & Logansport Traction Company deposited under agreement dated Jan. 15, 1918, have approved certain revisions of the plan and agreement of reorganization dated Aug. 18, 1919, under which a somewhat better representation will be given to the Lafayette & Logansport Traction Company bonds and to the Wabash River Traction Company bonds, and also an additional amount of the first mortgage bonds of the new company will be reserved for expenses and contingencies; also the right will be reserved to the new company to issue, with the approval of the Public Service Commission of Indiana, at any future time, a class of securities which will be subject to the first mortgage bonds but prior to the adjustment mortgage bonds and all junior securities, in order to assist in providing for the future requirements of the company.

The holders of the undeposited bonds may deposit them under the plan, as revised, up to the close of business on Jan. 10.

Clearing the Title

The extra term of the Circuit Court of Taylor County, which convened at Grafton, W. Va., a few days ago with Special Judge S. M. Musgrove on the bench, was in session for a short time during the third week of December. The object of the special term was the entry of an order of dismissal in the pending suit of the city of Grafton against the Grafton Traction Company, which stood in the way of a consummation of the deal for the transfer of the railway to a syndicate which is seeking to purchase it.

The claim of the city is for paving. It amounts to about $7,000, but the city has consented to accept $5,000. For the purpose of clearing the title to the property, it was necessary to have this suit dismissed. The order of the dismissal was entered at the first day of the special term and the court then took an adjournment in the hope of hearing that the prospective purchasers were ready to pay over the money.

Under an agreement entered between the creditors of the railway and the purchasers of the property the latter was to close up the deal not later than Jan. 15, but assurance was given that the matter would be consummated before that time. The court will not enter a final adjournment order until the deal is closed, for in the event there is failure to pay over the money, the order of dismissal will be set aside and the case of the city against the traction company will be restored to the docket.

Long Island Road May Resume

The prospects appear to be good for putting the Huntington (N. Y.) Railroad back into operation. Service over the line has been suspended since Sept. 21.

The complete cessation of operation followed the cutting off of power by the Long Island Railroad after Supreme Court Justice Faber had appointed Wallace E. J. Collins, Huntington, as permanent receiver of the road. At the same time Justice Faber signed an order dissolving the company.

Subsequently the property was disposed of by the receiver to William A. Dempsey. He thinks that part of the road can be run profitably. The conditions under which he is willing to resume service were outlined by him at a meeting in Huntington on Dec. 12. He said he wanted a franchise that would permit him to discontinue any part of the line that might prove unprofitable. His plan was to extend service to Bookman's corner in Melville next May, as an experiment to continue throughout the summer, to determine whether the line could be operated on a paying basis without stopping that portion of it.

The town board later decided in favor of Mr. Dempsey. The board of supervisors has also ratified this decision. The service when resumed will provide railway facilities in Huntington, from Holesite to the Jericho Turnpike. If Mr. Dempsey resumes services as he has proposed, there will be a gap between the ends of the Huntington and the Babylon line. What will be done with the remainder of the line is a matter for conjecture.

The old company went into the hands of Mr. Collins as receiver on Sept. 20. About 20 miles of railway were involved in the sale. There were outstanding $30,000 of stock and $26,000 of funded debt.

Interborough Receivership Averted

The Interborough Rapid Transit Company, New York, N. Y., through a plan approved by Federal Judge Mayer, succeeded on Dec. 31 in raising enough money to carry it over the first quarter of the new year.

The company needed $3,300,000 to meet payments due on Jan. 1, failure to meet which, it was asserted, would throw the company into bankruptcy. The Interborough Consolidated Corporation, the holding company of the Interborough, and a bankrupt, finally agreed to lend the Interborough Rapid Transit Company $1,000,000, and this with money borrowed from other sources made up the amount needed.

The loan was effected through a petition by a committee representing $32,900,000 of the Interborough Metropolitan Company collateral trust 4½ per cent gold bonds, out of a total issue of $63,776,000, and through a request by James R. Sheffield, trustee in bankruptcy of the Interborough Consolidated, to Federal Judge Mayer for instructions. The permission of the court was necessary before the money could be transferred. Half of the $1,000,000 goes back to the bankrupt concern in payment of a debt due by the Interborough Company.

The total amount needed to meet pressing obligations was given as $6,600,000 but it was said the company wanted at least $7,300,000, of which $4,000,000 was then in its treasury. Later, it was indicated that the Consolidated Corporation had more than $1,900,000 and that if the company could raise the difference between this amount and $3,300,000 it would be safe.

Mr. Hedley gave out a statement saying the company had been barely saved from a receivership by pledging of almost the last security it held, a $450,000 4½ per cent mortgage on Brooklyn real estate, and by the sale of the $2,900,000 of six-month 7 per cent secured notes.

Mr. Hedley said the only security left to the company was a credit of $2,200,000, the balance of an amount placed with the city as security when the subway was built. While the company's present difficulties had been bridged, he said, a similar situation will confront it in April and again in July unless the fare is increased. He expressed hope that new developments in the traction situation will bring about a meeting between officials of the traction companies and the city.

Financial News Notes

Road Suspends for a Day.—The St. Albans & Swanton Traction Company, St. Albans, Vt., has resumed operation after a shut-down of twenty-four hours. Conditions became so onerous that the company could no longer continue to give service, but the city, following the suspension, agreed through the City Council to change the charter so as to lessen the obligations of the road. The differences appear to be settled for the time being at least.

Remarkable Increase in Direct Stock Sales.—During the single year of 1919, up to and including Dec. 24, Byllesby companies, including the Standard Gas & Electric Company, Chicago, Ill., sold $3,220,100 of their preferred stock direct to their customers, the number of sales for the year being 5,356, or an average of a little more than six shares to an investor. Compared with 1918, this is an increase of 47 per cent in the volume of stock sold and 24 per cent in the number of purchasers.

Plans Return to Regular Dividend Rate.—The Montreal (Que.) Tramways, which suspended the payment of its 10 per cent dividend rate early in 1918, owing to the unsettled state of the fare question, is reported in a press dispatch to have resumed the payment of arrears, a declaration of 2½ per cent being ordered for the second quarter of 1918, with the intention of making periodical payments until the arrears are paid up. It was stated that the regular 10 per cent rate would be resumed early in the new year.

Abandonment Again Threatened.—The citizens of Ocean City, N. J., have appointed a committee to prepare a petition containing an ordinance to empower the city to engage in the transportation business. The plan of the ordinance is to give the city power to continue the operation of the Ocean City Electric Railway. The bondholders of the company expressed a determination to discontinue running cars after Dec. 31. It was said that the company may finally operate a car two or three times a day until some decision is reached by the city.

Baton Rouge Notes Offered.—Stone & Webster, Boston, Mass., are offering for subscription at 98½ and interest, to yield more than 7.50 per cent, $300,000 of three-year 7 per cent convertible gold notes of the Baton Rouge (La.), Electric Company dated Jan. 1, 1920 and due Jan. 1, 1923. The proceeds from the issue are to be used to retire $147,000 of coupon notes of the company due Jan. 1, 1920, and the floating debt and also will provide additional funds for construction requirements. The company does the entire electric railway, electric lighting, power and gas business in Baton Rouge.

Completes Little Rock Refunding.—It was announced that the Little Rock Railway & Electric Company, Little Rock, Ark., would pay at maturity on Jan. 1, 1920, the $600,000 of 6 per cent bonds then due. Payment was to be made at the office of the Interstate Trust & Banking Company, New Orleans, La. It was announced that in connection with this payment this company would issue $1,000,000 of 7 per cent one-year notes dated Jan. 1, 1920, and due on Jan. 1, 1921. The First National Bank, Little Rock, is reported to have underwritten this issue.

Small Bond Issue Asked.—The Trenton, Hamilton & Ewing Traction Company and the Trenton & Mercer County Traction Corporation, lessee, have asked the Board of Public Utility Commissioners of New Jersey for permission to issue $26,000 of bonds for the payment of the proposed extension of the Trenton Junction division into Trenton Junction proper. Work on the extension will be started as soon as the bond issue is approved. Of the bond issue $10,000 will go to the Philadelphia & Reading Railway as part payment for the construction of a tunnel under Sullivan Way.

Purchase Price Fixed.—A price of $55,000 has been agreed upon for the purchase by the city of the Greenwood Avenue line of the Western Washington Power Company in the Ballard District of Seattle, Wash., and it is expected the deal will be consummated in the very near future. The deal includes two one-man cars valued at $6,050 each, five trailers now being rented by the city, and a one-acre tract at present used as a carhouse, besides 20,000 ft. of track on Fifteenth Avenue, N. W. Permission is also granted the city to use the Everett interurban tracks outside the city limits.

Successor Company Planned.—Rumor has it that the new company which will succeed the Lewiston, Augusta & Waterville Street Railway, sold under foreclosure recently, will be known as the Androscoggin & Kennebeck Railway. It is said that the plan of reorganization has not yet been prepared and presented to the bondholders, but that it is expected the plan will very shortly be in the possession of the security holders. The protective committee for the holders of the first and refunding mortgage bonds of the Lewiston, Augusta & Waterville Street Railway is composed of Henry W. Cushman, Frank Silliman, Jr., Frank D. True. and C. Stevenson Newhall.

Houston Valuation Hearing Jan. 5.—The hearing of the case of the Houston (Tex.) Electric Company against the city of Houston, whereby an injunction is sought to restrain the city from interfering with the railway in collecting a higher fare than 5 cents, has been suspended to Jan. 5. The hearing has been held before a master in chancery who has been investigating the valuation of the traction company's property, rates of return, and other facts in determination of the question of whether the rate of 5-cent fare authorized by the city is confiscatory. When the hearing is resumed Lamar Lyndon, valuation engineer, who made a valuation of the property for the city, will present his report. The report has been in the hands of the city for some time and the figures have already been before the master, but Mr. Lyndon will appear to explain these in detail.

Hearing on Staten Island Abandonment—Public Service Commissioner Lewis Nixon of the First District of New York held a hearing on Dec. 29, St. George, Staten Island, in reference to the proposal of the Staten Island Midland Railway and the Richmond Light & Railroad Company to discontinue service. These companies have been owned by the estate of the late H. H. Rogers and have been steadily losing money for a period of several years. The trustees of the estate are now no longer willing to finance these continuing losses, and propose to discontinue the operation of the lines at an early date. The two electric railways named, it is reported, have had deficits aggregating $100,000 each year for several years past. The deficit for the month of November is stated by the representatives of the company to have been $17,000. The hearing was held to see if it is possible to work out a plan by which the operation of the lines may continue.

Refunding Completed at Toledo.—The Toledo Traction, Light & Power Company, Toledo, Ohio., has sold to Harris, Forbes & Company $10,000,000 principal amount of Toledo Traction, Light & Power Company first lien 7 per cent two-year gold bonds, proceeds from this issue to be used to refund the $10,500,000 of bonds maturing Jan. 1, 1920. The $1,200,000 of Toledo Traction, Light & Power Company second lien bonds which were called for payment on Jan. 2, 1920, have all been converted into Cities Service Company common and preferred stocks, the holders of these second lien bonds, having in addition to receiving a good income return on their bonds for two years, received a large increase in market value owing to appreciation in market prices of the Cities Service Company stocks into which these second lien bonds were convertible. For the twelve months ended Nov. 30, 1919, earnings of the Toledo Traction, Light & Power Company, with all earnings of the street railway department eliminated, were $4,183,552, and $1,728,627 net, and after providing for interest on the first lien bonds there was a balance for the twelve months of $856,233. The bonds were offered for subscription by Harris, Forbes & Company and the National City Company, New York, N. Y., on more than 7½ per cent. The company is reducing the amount of the outstanding first lien bonds by $500,000.

Traffic and Transportation

Quincy Case Reviewed

Sequence of Events Presented Leading to Opinion Upholding Commission's Power to Raise Fares

The opinion of the Supreme Court of Illinois, handed down on Dec. 17, in which the court held that the State Public Utilities Commission has the power to authorize electric railway fares in excess of those fixed by municipal franchise, came as a result of a long-drawn-out contest between the city of Quincy and the commission. The city took exception to the action of the commission in permitting the Quincy Railway to raise its rates.

The decision of the Supreme Court was discussed in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 27, page 1064. A review of the events leading up to the rendering of the opinion follows:

> During the year 1912 the Quincy Railway accepted a so-called franchise ordinance from the city of Quincy which fixed the rates for electric railway service for a period of twenty years. The ordinance fixed the fare at 5 cents.
>
> On Jan. 30, 1918, a petition was filed with the Public Utilities Commission of Illinois by several companies affiliated with the Illinois Traction System, asking for increased rates to meet the conditions existing on account of the war. On May 16, 1918, an order was entered by the commission granting certain relief asked for in this application, among others being that of the parties should take or claim any ad- in fares in Quincy amounted to a cancellation of the sale of six tickets for 25 cents and the sale of reduced fare tickets to school children and established a flat 5-cent fare.
>
> On June 24, 1918, the city of Quincy took a statutory appeal under the public utilities act to the Circuit Court of Sangamon County from the opinion and order of the Public Utilities Commission so far as it applied to the Quincy property. Owing to the fact that the record before the commission involved numerous other properties a stipulation was entered into between the parties concerned in this appeal that the record to be sent to the Circuit Court for review should comprise only so much of the record as related to the Quincy property, and it was further stipulated that neither of the parties should take or claim any advantage by reason of parts of the record being left out of the record taken on appeal to the Circuit Court.
>
> The purpose of this stipulation was to bring before the court the simple legal proposition as to the right of the Public Utilities Commission of Illinois to increase fares above those provided by the city ordinance, and it was this question which was finally litigated through the courts to the recent decision by the Supreme Court of Illinois.
>
> On Feb. 5, 1919, a hearing was had on the appeal before Judge E. S. Smith of the Sangamon County Court at Springfield, and the court affirmed the order of the Public Utilities Commission. The city of Quincy then prosecuted an appeal to the Supreme Court of Illinois, whereupon the record of the commission relating to the Quincy property and the order of the Circuit Court of Sangamon County affirming the order was taken to the Illinois Supreme Court and the legal question involved there presented for consideration.
>
> On Dec. 17, 1919, the Supreme Court of Illinois filed its opinion in this matter, affirming the order and decree of the Circuit Court of Sangamon County. The effect of this decision is to hold that the commission has jurisdiction and power to increase fares above those fixed by city franchise ordinances. The theory of the opinion of the Supreme Court goes upon the well-settled principle of law that the State of Illinois, under its police power, has full and complete jurisdiction over rates and fares for its public utilities and that by the passage of the public utilities act the State had delegated to that body, as its agent for that purpose, jurisdiction to consider and fix such rates.

Meanwhile, under an order of the commission dated June 17, 1919, the company was allowed further to increase its fares to 7 cents with four tickets for 25 cents. The company recently applied for a continuation of the 7-cent rate, which was to have become inoperative on Dec. 31.

Seven Cents in Trenton

Commission Estimates New Rate Will Give Company Income of $1,237,235 —One Cent for Transfer

The State Board of Public Utility Commissioners on Dec. 27 granted authority to the Trenton & Mercer County Traction Corporation, Trenton, N. J., to increase its fare from 6 cents to 7 cents and to charge 1 cent for each transfer. The present fare is 6 cents with free transfers. The company also sought to increase the fare in the four zones on the various suburban lines. The increase means virtually an 8-cent fare in many instances. The new rate of fare goes into effect on Jan. 4.

The commission based the increase upon the actual physical valuation of the company's property as made by the board's inspectors. The new rate of fare will give the company a gross income of $1,237,235 a year and the return to the company on capital invested will be 4.5 per cent on the new property valuation or 5.8 per cent on the new value less extreme depreciation, all according to estimate.

One of the reservations of the commission is that the company must appropriate annually for maintenance and depreciation a sum equal to one-quarter of the revenue. Using the pre-war prices results in a valuation about $1,000,000 less than is claimed by the company. J. G. White & Company estimated that the property was worth, as of June 1, 1918, $4,875,615. Deducting $1,000,000 because of the high unit prices used and allowing for additions since the date of the inventory, makes a total value at the present time, according to the company's appraisal, of $4,229,728.

An allowance of $100,000 for working capital is made as against $40,000 allowed in 1915. The operating expenses for 1920, with the latest increase in wages allowed for, are estimated at $660,000, taxes are taken at $85,000 and maintenance and depreciation at $320,000. The board estimates that the new fare will amount to $1,223,035; that miscellaneous revenue will amount to $14,200.

Chicago Fares Reduced

Surface Lines Now Charging Flat Six-Cent Rate Ordered by Commission

The Chicago (Ill.) Surface Lines began charging a flat 6-cent fare on Dec. 27 in compliance with an order of the State Public Utilities Commission issued on Dec. 23. It is generally understood that the new rate will not be adequate to provide a reasonable return. The commission, in fixing it at 6 cents, hoped, however, to provide funds for the payment of bond interest, pending a final valuation of the companies' properties and the fixing of a permanent rate.

As announced in the ELECTRIC RAILWAY JOURNAL for Dec. 27, page 1065, the commission took action because it found that the Surface Lines were receiving too large a return. The revenue under the ticket plan adopted on Dec. 1 exceeded the commission's estimate. Judging by the experience of other large cities it was expected that an average fare of 6.25 cents would result. Even with the establishment of over 200 agencies only 12 per cent of the paying passengers used tickets sold at the rate of fifty for $3.50 and only 1 per cent those sold at the rate of ten for 65 cents. The result was an average revenue fare of 6.85 cents for the first eighteen days of December.

FREE TRANSFERS STAY

On the question of fixing the rate at 5 cents and charging for transfers, the commission's latest order said:

> This is the method used in some cities like Philadelphia and Cleveland which, nominally, have a 5-cent fare, but in which, taking the charge for transfers into consideration, the average fare is considerably more. This would involve a deviation from the fixed policy in Chicago for many years and in our opinion should not be seriously considered in a tentative order. It will be time to consider a departure from this fixed policy, if at all, when the evidence is closed and the case is ready for a final order.

The commission directed that all outstanding tickets should be accepted for transportation or redeemed by the companies at the prices paid for them. Tickets from the fifty-ride books are to be accepted for transportation, even though detached and presented by persons other than the original purchasers.

Attorneys for the city objected strenuously to the entry of the 6-cent fare order. They would be satisfied with nothing but a 5-cent fare, and one of the commissioners reprimanded Special Counsel Cleveland, saying that the municipal authorities could see no merit in any fare order that did not "bear the stamp of the City Hall."

The Surface Lines' case in the valuation proceedings has been closed. The commissioners agreed that the city would have to proceed without further delay in completing the hearings so that a final order might be entered at an early date. The next session was set for Jan 7. Meanwhile the course which the city will take in its fight for a 5-cent fare remains in doubt.

Request for Transfer Charge Withdrawn

Remarkable Improvement in Conditions Has Made Additional Fare Charge Unnecessary, Says Detroit Company

The Detroit (Mich.) United Railway in a letter to Circuit Judge Adolph F. Marschner on Dec. 26 waived its claim for a 1-cent transfer charge. This notice followed a few days after Mayor Couzens announced that he had almost perfected plans for railway service in Detroit, independent of the Detroit United system, as referred to elsewhere in this issue.

With the request for the additional charge of 1 cent for transfers withdrawn, the Detroit United Railway will continue to run its cars on a straight 5-cent fare basis as long as present conditions continue. The company states that the additional charge, which was asked for by the company at the time of the strike settlement last spring during a period of business uncertainty, is now not necessary because of improved conditions.

Judge Marschner's court order, issued on June 11, following a conference of the Mayor, city attorneys and legal representatives of the railway provided for a straight 5-cent fare on all lines with free transfers to all lines. This provided for the increase of fares on the Pingree or 3-cent lines to 5 cents, but left the franchises untouched. Workingmen's tickets good during certain hours on the 5-cent lines were eliminated.

Under the agreement reached, a board of arbitration was provided which was to settle the question of the necessity for the 1-cent charge for transfers, after the new fare arrangement had been in operation for a trial period of three months. This board was composed of Mayor James Couzens, the city's representative; John J. Stanley, president of the Cleveland Railway, appointed by the Detroit United Railway, and Frank H. Goddard, the third member, who was chosen by the first two named.

Monthly audits of the railway company's books were made by city auditors, and as a result it was claimed that the books showed a net income each month instead of a deficit as the company had claimed would result without the charge for transfers. The auditors made no allowance, however, for depreciation while the Detroit United officials claimed a monthly depreciation of $75,000. The amount of depreciation claimed was exceeded by the net earnings during the months of August and September, as the auditors contended that a net income for August was shown as approximately $210,000, and in September approximately $180,000.

The work of the arbitration board is automatically ended by the waiver action by the company. City officials had not urged the matter of arbitration, as it was felt that such proceedings would be of no advantage to the city except as vindication of the stand taken by the city officials during the controversy last June. In view of the fact that the company admitted during the controversy that 1-cent transfers, if granted, would mean an increased revenue of about $1,000,000 a year, the waiver action represents a saving of that amount to the car riders of Detroit. This is held by the Mayor to be vindication of the action taken at the time of settlement.

In the communication to Judge Marschner, abrogation of the court order in its entirety is not asked. The Detroit United Railway merely asked that the matter of arbitration be dropped for the present. This leaves the company free to make a request for additional income later if the addition of new equipment and cost of repairs make it necessary.

The letter to Circuit Judge A. F. Marschner, signed by B. F. Weadock, attorney Detroit United Railway, said:

When the order was entered providing for arbitration on the necessity of charging 1 cent for transfers there was a general feeling of business uncertainty, and the indications were that this unsettled and depressed condition would continue. Had it so continued, the 1 cent for transfer would not have provided a sufficient fare.

However, in the latter part of June affairs assumed a more settled aspect, business picked up, it began to increase, it continued to increase, until finally it reached an abnormal state.

This new situation required more equipment. We had hoped to add it, but unfortunately, certain conditions existing during and following the period of the war, made it impossible for the company to purchase the additional cars and material to afford better service.

If we had not been thus prevented, the added burden, even with the great increase in business, would have demanded this extra charge. But until needed we will not ask it.

Our engineers inform us that a sum exceeding $15,000,000 is immediately necessary to bring the present tracks and equipment to sufficient capacity to handle properly the street car riders of Detroit. We realize this necessity. We hope to meet it and we even hope a public spirit of co-operation may assist us to meet it.

However, while the present business activity continues and we are forced to curtail the necessary service, it does not seem right to ask the people for this additional cent.

I therefore desire to advise your honor that the company withdraws its request for a cent for a transfer, and consequently arbitration is not at present necessary.

The city has a copy of this communication.

Court Seeks Action in New York

Suggests City Grant Temporary Eight-Cent Fare Pending Full Consideration of Traction Tangle

United States Judge Julius M. Mayer, in a report on the traction situation in New York City, made public on Dec. 28, instructs Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company; Job E. Hedges, receiver of the New York Railways, and James R. Sheffield, trustee of the Interborough Consolidated Corporation, a bankrupt, to apply to the Board of Estimate for a public hearing to the end that plans for the temporary relief of the companies and for a final solution of the problems facing them may be brought about.

Judge Mayer points out that efforts so far to obtain a conference with the city officials have failed, that early in 1920 a crisis will arise that may threaten the lives of some of the companies and which will surely lay heavy hardships upon them and upon the public, and that the time has come for prompt and speedy action. The temporary plan suggested by the court provides in brief for an 8-cent fare, the restoration of the system of free transfers on the surface lines, cessation of rents on leased lines and setting aside any surplus, after prescribed conditions are filled, to make payments on account of court claims.

The permanent plan provides for concessions by the companies, such as the surrender of perpetual franchises.

The following temporary plan is proposed in Judge Mayer's memorandum:

1. By concurrent action of the Board of Estimate & Apportionment, the Public Service Commission and the Transit Construction Commissioner a temporary increase in fare to 8 cents to be granted, such increase to terminate June 30, 1920, unless it is extended by proper official action. This increase to be open to all companies operating subway, elevated or surface lines in New York which accept this plan, so far as it affects their respective lines.

2. In the case of solvent companies the acceptance to be by the corporations themselves by resolution of their boards of directors. In the case of companies whose property is in the hands of receivers the acceptance to be by the corporations, by the receivers with the approval of the court, and by the committees of security holders in so far as such committees have been organized.

3. In the case of surface lines, the following conditions especially applicable to them should be accepted for the first half of 1920:

a. In respect of the lines formerly embraced within the New York Railways:

a1. So far as affects transfers and public convenience, they shall be operated as one system substantially as they were operated by the New York Railways prior to the receivership, the fare to be 8 cents, with no extra charge for transfers.

INTEREST THE ONLY RENTAL

a2. No rentals are to be paid except by way of maturing interest upon underlying bonds held by the public.

a3. No interest is to be paid upon the first real estate and refunding mortgage bonds or the adjustment mortgage bonds which are now in default.

a4. Any surplus earnings after the payment of operating expenses, taxes and interest on underlying bonds as aforesaid shall be spent as may be jointly approved by the court and the public officials upon additions and betterments, including equipment, the aim to be to distribute this expenditure among the various lines as nearly as may be practicable in proportion to their contribution to net earnings. The balance, if any, to be paid in satisfaction of or on account of tort claims incurred prior to receivership.

b. In respect of the lines formerly embraced within the Brooklyn Rapid Transit System:

b1. They shall be operated so far as affects transfers and public convenience, as one system substantially as they were operated prior to the surrender of the Brooklyn City lines, the fare to be 8 cents, with no extra charge for transfers.

b2. No rentals are to be paid, except by way of maturing interest, upon underlying bonds held by the public.

b3. No interest is to be paid upon the certificates of indebtedness issued by the various surface line companies.

b4. Any surplus earnings after payment of operating expenses, taxes and interest upon bonds as aforesaid shall be spent as may be jointly approved by the court and the public officials, upon additions and betterments, including equipment, the aim being to distribute this expenditure among the various lines as nearly as may be practicable in proportion to their contribution to net earnings. The balance, if any, to be paid in satisfaction of or on account of tort claims incurred prior to receivership.

b5. It is recognized that in the case of the Brooklyn City Railroad, by reason of its relatively low bonded debt, this temporary plan furnishes a smaller return as compared with its total securities than in the case of most of the other surface lines of the Brooklyn Rapid Transit System. Some fair disposition can no doubt be made of this situation.

c. No income is to be used in the payment of other rentals or dividends to stockholders.

d. If deemed preferable by the public officials, the surplus above underlying fixed charges could in whole or in part be paid into a suspense fund, the disposition of which would be determined by the ultimate plan.

4. The Interborough Rapid Transit Company to agree as follows:

a. Its income, after paying operating expenses and taxes, to be applied to the payment of its fixed charges, including interest on bonds and notes and the payments under the Manhattan lease.

b. The balance, if any, to be disposed of only on joint approval of the court and the public officials.

5. In respect of the subway and elevated lines of the Brooklyn Rapid Transit system:

The income, after the payment of operating expenses, taxes and interest on underlying bonds and receivers' certificates, to be applied as follows:

a. An amount to be approved by the court and the public officials to be paid into a fund for the satisfaction or reduction of the tort claims that accrued prior to the receivership.

DISPOSAL OF REMAINDER

b. The remaining earnings to be applied as follows: (a) The receiver to retain the company's preferentials as provided in Contract No. 4. (b) The city then to receive its preferential under said contract.

c. Under the terms of the order creating the receiver's certificates, 70 per cent of the earnings received by the receiver must be impounded for the security and payment of the receiver's certificates, the remaining 30 per cent to be available for expenditure upon the property.

d. Both the Interborough and the Brooklyn Rapid Transit companies and the receiver of the latter are to waive for the first half of 1920 any right to have the earnings for the half year applied toward the reduction of accumulated arrears of their preferentials.

6. The foregoing plan provides for a temporary arrangement, including an increased fare, which (unless extended by the public officials) will end with the first half of the calendar year 1920. It is hoped that before then a plan for readjusting the relations between the various companies and the city and plans for the reorganization of such of the traction companies as are insolvent or require reorganization will have been worked out and agreed to by all the necessary parties. If this should prove impracticable, the extension of the temporary arrangements for a few months more would be in the hands of the public officials, to be dealt with in their discretion.

It is manifestly impossible to propose in advance the terms of any new arrangements for final solution, as they will involve conference and careful consideration. Nevertheless, it is desirable to promote prompt discussion, and to that end some general principles may be suggested.

The Board of Estimate adopted unanimously on Dec. 30 a resolution offered by Comptroller Charles L. Craig for an investigation by the board into the affairs of all of the traction companies. The same day Transit Construction Commissioner John H. Delaney sent to the board a letter advocating city ownership, stating that representatives of the rapid transit companies were desirous of a conference with the city administration. Nothing was done by the Board of Estimate toward providing a method for the coming investigation.

San Diego Zone Fares Effective

Careful Preparations and Wide Publicity Mark Installation of Higher Rates—Much Advertising by Company

A two-zone system with a 5-cent fare in each zone, became effective on the lines of the San Diego (Cal.) Electric Railway on Jan. 1. By the new plan, under which the city is divided into an inner and an outer zone, the cash fare for a ride from the city limits to the center of San Diego becomes 10 cents. Free transfers are continued. The system was authorized by the California Railroad Commission in an order handed down on Nov. 14, and was described in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 15, page 961.

While the new rates were at first spoken of as a 10-cent fare to the end of the outer zone, under the ticket system devised by the company the highest city fare paid is really 7.5 cents, and on monthly book tickets, the rate is 6.5 cents per ride, with transfer privilege to any part of the city. The 7.5-cent tickets come in strips of four, which cost 30 cents, and may be purchased in any quantity and are good for bearer. The 6.5-cent commutation tickets are good only for the purchaser and must be used on the date printed thereon.

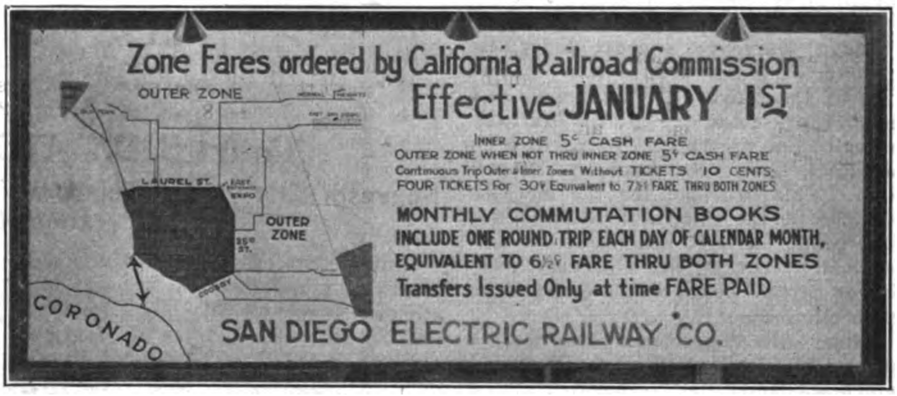
EXTENSIVE PUBLICITY PROGRAM

A minimum of confusion attended the installation of the new system. Since this is the first occasion on which the California Railroad Commission has authorized the establishment of zone fares on urban lines, the working-out of the plan is awaited with great interest both by the company and the commission. Careful preparations were consequently made to educate the public concerning the new fares.

The company employed varied forms of publicity in stating its case and in informing its patrons as to the working of the zone plan. Large display advertisements in the newspapers were used, each day the advertisement stressing some particular phase of the new rates, and, in addition, folders and circulars printed in English and in Spanish were circulated among residents of the city and suburbs, giving all the needed information.

Likewise the company carried extensive advertising of the new rates in all publications reaching the 12,000 or more men in the destroyer section of the Pacific fleet, whose base is at San Diego. These men are liberal patrons of the electric railway system, and every effort was made to see that they were informed of the provisions of the new rates.

The suburban newspapers were also used, by means of display advertisements, to acquaint the patrons of the lines with the new rates, as these include an increase in fares to all suburban points. For instance, the round-trip fare to Chula Vista under the old rate was 30 cents, while under the new rate it is 40 cents. The round trip to Coronado from the inner zone, formerly 15 cents, is raised to 20 cents under the new rates, including transportation on the ferry.


Zone Fares ordered by California Railroad Commission
Effective JANUARY 1ST
INNER ZONE 5¢ CASH FARE
OUTER ZONE WHEN NOT THRU INNER ZONE 5¢ CASH FARE
Continuous Trip Outer & Inner Zones Without TICKETS 10 CENTS
FOUR TICKETS For 30¢ Equivalent to 7½¢ FARE THRU BOTH ZONES
MONTHLY COMMUTATION BOOKS
INCLUDE ONE ROUND TRIP EACH DAY OF CALENDAR MONTH,
EQUIVALENT TO 6½¢ FARE THRU BOTH ZONES
Transfers Issued Only at time FARE PAID
SAN DIEGO ELECTRIC RAILWAY CO.
OUTER ZONE
LAUREL ST.
EXPO
OUTER ZONE
25TH ST.
CORONADO

MAP ADVERTISING SAN DIEGO FARE CHANGE

At the corner of Fifth Street and Broadway, one of the chief transfer points in San Diego, a large sign-board was erected on the scaffolding of a department store building in course of construction, where all passers-by could see it. The sign-board has a map of the city plainly showing, in contrasting colors, the two zones into which the city has been divided. A facsimile of the map is shown above.

Metal markers have been placed on the different car lines to designate the boundaries of the zones, so that passengers may readily distinguish whether they board cars in the inner, or 5-cent zone, or the outer, or 10-cent zone.

ADVERTISING CAR EMPLOYED

Another form of publicity for the new rates and the new method of fare collection was the sending of a special advertising car over the different routes in the city, with employees on board to explain the new system, and to sell tickets to patrons who desired them.

There is some doubt as to how the method of collecting fares on the city lines will work out. Under the system formerly in operation, all cars were operated on the pay-as-you-enter plan. Under the new rates inbound passengers pay as they enter, but outbound passengers pay as they leave, so that there can be no dispute as to whether the ride included both zones. Passengers entering the car in the outer zone are given identification checks, which are collected by the conductor when the car reaches the limit of the inner zone.

The conductors were called to the office of M. J. Perrin, manager of transportation, in small groups for the week preceding the installation of the new rates and were schooled in the operation of the system. The tickets have been placed on sale at banks and other institutions as well as at the company's offices. Books of forty of the 7.5-cent tickets, issued as a convenient form for Christmas gifts, proved good sellers.

Fare Plea at Charleston

West Virginia Company Would Increase Rates 35 Per Cent—Varying Opinions on Case

Diverse findings have been arrived at by the various authorities examining into the application of the Charleston Interurban Railroad for an increase of fares in the city of Charleston, W. Va. In a statement submitted to the Public Service Commission by the company, it would appear that the company's earnings on its investment are very small—perhaps as low as 1 or 2 per cent.

Don O. Blagg, city attorney of Charleston, in offering opposition to the allowance of the increase, placed the company's net earnings at 8 to 10 per cent.

The company sets forth that it applied to the Public Service Commission for authority to increase its passenger rates for the following reasons: (a) Increased cost of operation and maintenance. (b) Increased cost of necessary additions and improvements.

At the time an increase of rates was granted to the petitioner it was generally assumed that at the conclusion of the war a readjustment of prices of labor and commodities would occur, resulting in a considerable reduction in the cost of materials and probably some reduction in the price of labor. Since the cessation of hostilities, however, the prices of material and labor have both continued to increase and are still increasing.

MATERIAL WAGE INCREASE

The petitioner has materially increased the wages of its employees, but further increases in wages will be necessary to maintain a fair level with increases being granted elsewhere and to meet the increased cost of living to such employees.

The cost of the new construction and reconstruction necessary to be done will amount to several hundred thousand dollars, and, because of the bad financial showing of electric railways all over the country, petitioner feels compelled to rely largely upon its own resources and local sources of revenue for funds necessary to make improvements.

The increase of rates now requested is the first ever asked applicable to the city of Charleston itself. It is an increase of 40 per cent upon the cash rate and of 30 per cent upon the ticket fare rates, making an average increase of approximately 35 per cent or less upon the present rates.

The increase granted in 1918 was a small advance upon the interurban lines, largely in the way of an adjustment and equalization of rates upon a 2-cent per mile basis. The increase now sought is upon the basis of 2½ cents per mile, distributed as equitably as may be by zones over its interurban lines. This is an increase of 25 per cent over the existing rates, and taken in connection with the increase granted in 1918, and with the commutation rates allowed, makes a total increase of approximately 35 per cent upon the rates existing prior to 1918, which were the initial rates fixed by the petitioner.

H. E. Nease, the Public Service Commission's own statistician, after an examination of the accounts and property of the company, file a report in which he found that the company, in the first six months of 1918, earned 18 and 20 per cent net on its investment. He explained:

> During the six months period ended June 30, 1918, the company expended $89,744 for additions and betterments, bringing the total gross investment up to $1,690,037, and the depreciated investment up to $1,477,252.

A question was raised regarding the charging of operating expenses amounting to $24,000, incurred in connection with reconstruction and other expenses incident to the double-tracking of Virginia Street, against the income for that six months period. With that item charged off, Mr. Nease shows, the net income for the period was $108,158. He continues:

> In my opinion, this is not a proper charge to the operating expenses applicable to this period, but should be spread over a number of years. Not more than $1,500 of the amount should be included in the expense for this period. Eliminating this item for expenses, the total net operating income for this six months period, therefore, is approximately $131,000, or about 18 per cent on the investment.

The report shows that the net investment of the company on Dec. 31, 1918, was $1,387,507, or more than five times what the investment of the company was fifteen years ago. It also shows that the net income of the company for the year 1918 was $234,795, or five times what the net income was ten years ago.

Last Five-Cent Fare Abolished

By order of the Public Service Commission of Massachusetts the Union Street Railway, New Bedford, Mass., has been authorized to file a schedule of new tariffs which has become necessary on account of the insufficient margin existing between the operating expenses and the gross revenue.

By this order, the last single 5-cent fare will disappear in the State of Massachusetts. It is worthy of note that this fact is striking evidence of the notable efficiency of operation and management of the Union Street Railway in that it has operated so long under the original fare schedule.

Declines Conference on St. Louis Fares

Officials of the United Railways, St. Louis, Mo., have declined to confer with city officials regarding a reduction of the fares. Col. Albert T. Perkins, general manager for the receiver, has notified Director of Public Utilities Hooke that a conference would be useless, as the determination of the fare questions is entirely within the province of the Public Service Commission.

Mr. Hooke requested the conference, in order to arrive at a compromise without necessitating the renewal of a hearing before the commission. Rolla Wells, receiver for the company, previously indicated he would oppose any reduction of the fare. He asserted that there is no reason for reducing the schedule at this time, as the company is not making money at present. He declared that 4 cents of every fare collected went for wages of employees. After receiving the communication from Colonel Perkins, Mr. Hooke said that no further move would be made by the city until a decision is rendered by the Public Service Commission on the petition for a rehearing of the case. He said that additional evidence would be adduced to show that the present scale of fares is exorbitant.

Transportation News Notes

Pupils' Fares Reduced.—The New York & Stamford Railway, Port Chester, N. Y., has reduced the fare to pupils attending the Greenwich (Conn.) schools. The new rate is 5 cents.

Eleven Hurt at Toledo.—Eleven persons were seriously injured on Dec. 16 when a package freight car of the Lake Shore Electric Railway collided with a car of the Toledo Railway & Light Company at the east end of the Cherry Street Bridge, Toledo, Ohio.

Springfield Six-Cent Fares Continue.—The Public Utilities Commission of Illinois has issued an order continuing the 6-cent fare charged by the Springfield Consolidated Railway until March 1, 1920. The company's application for a 7-cent fare is at present before the commission.

Seven Cents Asked in Olympia.—The Olympia Light & Power Company, which furnishes electric railway service in Olympia, Wash., has applied to the City Council for an increase in fare from 5 cents to 7 cents. The company is operating its car lines at a loss of $2,000 a month.

Ten Cents in Northport.—The town of Northport, N. Y., has authorized the Northport Traction Company to increase its fare from 5 cents to 10 cents. The line connects Northport Village and the station of the Long Island Railroad. The increase was made subject to the approval of the State Public Service Commission.

Six-Cent Fare Again Extended.—The city of Spokane, Wash., has agreed to an extension of the present 6-cent fare charged by the Washington Water Power Company and the Spokane & Inland Empire Railroad for a further period of ninety days. The city will make a demand on March 2, 1920, when the agreement is scheduled to expire, for a return to a 5-cent fare.

Tacoma Asks Ten Cents.—The Tacoma Railway & Power Company and the Pacific Traction Company on Dec. 18 filed tariffs with the Public Service Commission, asking for permission to charge a 10-cent fare on the Tacoma railway lines. The companies are represented by James P. Howe and Scott Henderson, who assert that increased fares are necessary to avoid bankruptcy. Under the State law, the tariff will become effective thirty days after filing, provided no protests are made.

Would Add Five Cents to Fare.—Increases from 20 cents to 25 cents on the ferry rate between Bristol and Bristol Ferry and from 25 cents to 30 cents in the rate between Bristol Ferry and the Newport Naval Station, are proposed by the Newport & Providence Railway, Newport, R. I., in tariffs filed recently with the State Public Utilities Commission. At present the company charges 5 cents between Union Station and the Two-Mile Corner in Middletown. Under the new tariff the fare will be 10 cents.

Commission to Pass on Skip Stop.—The attempt of the city of Memphis, Tenn., to force the Memphis Street Railway to abandon the skip stop on its lines, was temporarily halted on Dec. 24 when Judge McCall ruled that the power to order the discontinuance of the skip stop vested with the State Railroad & Public Utilities Commission. The company has obtained an injunction restraining the city from enforcing the terms of an ordinance providing for the stopping of cars at all street intersections.

Motor Trucks to Supplement Interurbans.—The Toledo & Indiana Railroad, Toledo, Ohio, will supplement its interurban freight service with a motor truck system reaching towns in the vicinity of Bryan, Ohio, according to plans recently announced. Motor trucks will connect at Bryan with the company's freight car which leaves the Toledo terminal daily at 4 p.m. Goods consigned to Montpelier, Edgerton and other towns will be delivered at the Bryan rate plus a charge of 20 cents for each hundred pounds.

Jitney Settlement Up to Voters.—The City Council of Salem, Mass., has authorized a special municipal election to be held on Jan. 27 to determine whether the Council's recent action in revoking jitney licenses shall be rescinded. A petition asking the Council to reconsider the revocation of jitney licenses was signed by 400 persons. The operators plan to resume service under the clause of the city charter which provides for the automatic suspension of any measure against which is directed a measure signed by a specified number of voters.

Protest Against Increased Fare.—The borough of Ambridge, Pa., and the citizens of Baden, Pa., near Pittsburgh, Pa., have filed with the Public Service Commission of Pennsylvania complaints against the increased fares of the Beaver Valley Traction Company, which went into effect on Dec. 1. The Ambridge complaint, in addition to objecting to the fares, asks the commission to compel the railway to furnish excess fare certificates. The Baden complaint opposes the discontinuance of the two-minute service between Baden and Ambridge, and asks that the company establish a ten-minute service during the rush hours.

Ten Cents on Iowa Interurban.—Ten-cent fares went into effect on Nov. 16 on Urbandale, Valley Junction and Fort Des Moines lines of the Interurban Railway, Des Moines, Ia. This was in accordance with a decision of Federal Judge Martin J. Wade that the three lines are interurbans and subject to the minimum interurban fare of 10 cents. All three lines terminate in suburbs of Des Moines. Five-cent fares will be collected when the passenger boards the cars and an additional 5 cents when the car reaches the city limits. Transfers will be accepted and children will be compelled to pay only one-half fare.

Skip Stops Go in St. Louis.—The Public Service Commission of Missouri has ordered the United Railways of St. Louis, Mo., to discontinue the skip stop and restore the old stops. The United Railways was permitted to use the skip stop during the coal shortage caused by the miners' strike. The Southwestern Regional Coal Committee notified the company some time ago that the emergency was ended and that the use of the skip stop was no longer necessary as a fuel conservation measure. The commissioners announced that the company might later make application for permission to install a permanent skip-stop schedule.

Kansas City Wants City Plan Commission.—The municipal authorities of Kansas City, Mo., have under consideration a proposal for the creation of a City Plan Commission. By the terms of an ordinance already drafted the president of the Kansas City Railways would be, ex officio, a member of the commission, since the sponsors of the idea feel that, as the working out of the plan depends largely upon the solution of the traffic problem the co-operation of the railway is essential. P. J. Kealy, the company's president, has taken an active part in the campaign for the creation of the commission.

Preliminary Hearings Concluded.—The preliminary hearings at Hartford on the zone system of fares as in use on lines of the Connecticut Company have been finished. The witnesses for the company have been cross-examined, and the Public Service Commission now has taken up the consideration of complaints from different communities regarding locations of zone points and similar matters. It is not anticipated that these hearings will result in any material change in the zone system. In fact, there was hardly any opposition to the zone system as such, the complaints being chiefly because some of the car riders have to pay higher fares.

Seven Cents in Chester.—On page 1023 of the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 20 appeared an announcement of an 8-cent fare on the lines of the Southern Pennsylvania Traction Company, Chester, Pa. This was an error. The Southern Pennsylvania Traction Company filed a tariff calling for an 8-cent fare effective October 26. On Oct. 24 the City Commission of Wilmington, Del, refused permission to the Wilmington & Philadelphia Traction Company, which leases the Southern Pennsylvania Traction Company, the right to increase its fares to 8 cents in the city of Wilmington, restricting them to 7 cents. Accordingly, under special permission from the Public Service Commission of Pennsylvania, a new tariff was filed effective upon less than thirty days' notice for a 7-cent fare on the Southern Pennsylvania Traction Company's lines in order to make the fares uniform throughout the system.

Freight Traffic Increases on Utah Line.—The Bamberger Electric Railroad, the general offices of which are at Salt Lake City, Utah, is enjoying a substantial increase in freight traffic, arising out of the securing of joint freight rates from and to points on its line in connection with the several connecting steam carriers. This arrangement was consummated with the officials of the United States Railroad Administration during last summer. Since the rates have been published, the railroad has been able to induce a number of industries to locate warehouses and factories on its lines, and the result is a very rapid development of revenue-producing freight traffic. In the company's terminals at Ogden and Salt Lake City, where freight rates are on a parity, industries prefer an electric rather than a steam location on account of the closer proximity to the business center, the cleaner service, the better and prompter service by means of the comparatively small organization of the electric railway as compared with the complicated red tape of the big steam carrier.

Personal Mention

T. S. Williams Retires

Former President of Brooklyn Rapid Transit Company Connected With System for Twenty-five Years

Col. Timothy S. Williams, formerly president of the Brooklyn (N. Y.) Rapid Transit Company, who has been connected with the company for the last year as general manager for the receiver, Lindley M. Garrison, announced on Dec. 24 that he would retire from all connection with the system shortly after Jan. 1. Colonel Williams tendered his resignation last November to take effect Dec. 31. He stated that he had no definite plans for the future.

Colonel Williams resigned the presidency of the company soon after Mr. Garrison was appointed receiver. He is still an official of a number of the underlying companies which make up the Brooklyn Rapid Transit System.

Colonel Williams has been connected with what is now known as the Brooklyn Rapid Transit System for twenty-five years, less a few months. Following his graduation from Cornell University in the class of 1884, he became a reporter on the old *Commercial Advertiser*, in New York City. He left newspaper work to become private secretary to Governor Hill. Governor Flower retained him. In 1895, when Governor Flower retired from office and undertook the reorganization of the Long Island Traction Company, Colonel Williams was made secretary of the reorganization committee.

Later in the same year he was made secretary and treasurer of the Brooklyn Heights Railroad, and when the Brooklyn Rapid Transit Company was formed he was made a director and secretary and treasurer. In 1900 he became vice-president of the corporation and its constituent companies and in 1911 he succeeded Edwin W. Winter as president.

Colonel Williams has always taken an active interest in the affairs of the American Electric Railway Association and has served on a number of its most important committees. He was elected fourth vice-president of the association in 1914 and gradually moved up, but in the spring of 1917 resigned as first vice-president, owing to the demands upon his time as president of the B. R. T. in connection with the subway plans then under negotiation. In the fall of the same year he was elected second vice-president of the association, the position which he now occupies. Colonel Williams' policy in regard to publicity has always been a broad one. He has been popular with newspaper men, and the ELECTRIC RAILWAY JOURNAL has benefited by this policy in that it has had easy access to information relating to improvements on the property. The most important event of Colonel Williams' administration has been, of course, the development of the subway system in Greater New York by the New York Municipal Railway Corporation, a subsidiary of the B. R. T., under the dual subway contract. This construction will stand as a monument to Colonel Williams' administrative ability.

L. H. Bean, formerly manager of the properties of Stone & Webster at Tacoma, Wash., has sailed for Genoa at the head of a party which will conduct a general engineering investigation in Belgium, France and Switzerland and other European countries.

Edward H. Sharpe, who has been general agent for the Pacific Electric Railway, Los Angeles, Cal., at San Bernardino for the past two years, has been appointed assistant to O. H. Smith, general passenger agent of the company. Mr. Sharpe's headquarters will be in Los Angeles.

J. M. Johnson, who resigned last May as general superintendent of the Ithaca (N. Y.) Traction Corporation, on Dec. 1 assumed the duties of superintendent of traffic of the Trenton & Mercer County Traction Corporation, Trenton, N. J. Mr. Johnson entered the electric railway field in 1909 as superintendent of transportation of the South Shore Traction Company, Long Island City, N. Y. He resigned three years later to become general superintendent of the Manhattan Bridge Three-Cent Line, Brooklyn, N. Y., remaining with the company for five years. In 1917 he joined Ford, Bacon & Davis, New York, as a valuation engineer, resigning the following year to become general superintendent of the Ithaca Traction Corporation.

Obituary

Ralph L. Shainwald, president of the Standard Paint Company, New York, N. Y., died on Dec. 10.

Frank R. Grover, a Chicago attorney, died on Dec. 10 at his home in Evanston, Ill. Mr. Grover was one of the promoters of the Chicago, North Shore & Milwaukee Railroad.

Henry R. Rea, president of the Morris County Traction Company, Morristown, N. J., died on Dec. 19. Mr. Rea had been active for many years in business circles in Pittsburgh, Pa.

K. M. Watson, general claim agent of the Northern Texas Traction Company and the Tarrant County Traction Company, Fort Worth, Tex., is dead. Mr. Watson was a former president of the Texas State Railway Claim Agents' Association, and had been prominent in electric railway circles in Texas for years.

A. L. Dewey, auditor of disbursements of the Chicago (Ill.) Surface Lines, died on Nov. 10. Mr. Dewey had been with the electric railway companies in Chicago for many years. Prior to the merger of the properties in 1914 he was general auditor of the Chicago City Railway.

Benjamin Phillips, assistant superintendent of transportation of the Chicago (Ill.) Surface Lines, died suddenly on Nov. 22. Mr. Phillips had served as assistant traffic manager since the merger of the companies in 1914. Prior to that time he was general superintendent of the Chicago Railways. He entered the service in 1884 as a conductor.

Stephen P. Brown, civil engineer, was drowned on Dec. 6 when he broke through the ice on Sebec Lake, Dover, Me. Mr. Brown recently resigned as vice-president of the Ford, Bacon & Davis Corporation. He aided in the construction of the Pennsylvania Terminal at New York and had charge of constructing the Canadian Northern Railroad Terminal in Montreal.

John F. Barker, formerly president of the Gilbert & Barker Manufacturing Company, Springfield, Mo., died of heart failure on Nov. 21. He was largely instrumental in the forming of the Gilbert & Barker Manufacturing Company in 1865, having previously been employed at the water shop of the United States Armory in Springfield. On the organization of the company mentioned he was elected treasurer and manager, a position which he occupied until 1884, when he was elected president. This office he held until his retirement in 1911. For forty-six years he was the dominating personality of the business and for this entire time he enjoyed the affection and esteem of his associates and employees.

Henry W. Hodge, one of the foremost American engineers in bridge building, died suddenly on Dec. 22 at his home in New York City after a six-weeks illness. Mr. Hodge was born in Washington, D. C., fifty-four years ago. He supervised the construction of some of the largest buildings in New York City, including the Woolworth Building. Among the bridges which he designed are that of the Great Northern Railroad over the Mississippi River and that of the Chicago, Rock Island & Pacific Railroad at Duluth. In 1916 he was appointed a member of the Public Service Commission for the First District, resigning the following year to become Director of Military Railroads and Bridges with the American Expeditionary Forces. He was consulting engineer for the Brooklyn Rapid Transit Company and many other corporations.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Sales of Railway Supplies During 1919 Largely for Maintenance

Rolling Stock Sales, Particularly of Safety Cars, Increased While Rails and Track Accessories Showed Less Activity— Automatic Substation Business Heavy

Nineteen-nineteen has past and with it a record of good business for some manufacturers and poor business for others. Despite the large number of orders placed for devices to increase economy, the volume of business placed by the electric railways during 1919 was slightly less than that placed during 1918. The great majority of sales were made on a maintenance basis, the railways with few exceptions failing to make purchases in large amounts even after the prices of certain commodities had fallen 5 to 10 per cent. From time to time, certain lines did exceptionally well and booked a large amount of business. In almost every case, however, devices were ordered which would permit of savings to the railways.

All kinds of power saving apparatus, pneumatic door-control equipment, one-man car devices, and accessories have had a greater degree of success than the majority of lines sold.

More Cars Purchased Than in 1918

Wherever possible, railways placed orders for rolling stock although the extent to which they were handicapped by lack of finances is readily shown by a comparison of cars purchased during 1919 with the two previous years. Total purchases of cars of all kinds for 1919 amounted to 2,444 or just twenty-five cars more than the number of cars purchased in 1918, which was 2,419. From a financial standpoint the year just closed was much better than the previous ones on account of the higher prices prevailing during 1919 for rolling stock. The total number of cars built in 1917 was 2,455 which indicates that car building has neither gained nor lost during the past three years. Because of the fact that a number of large sales were brought about in specific localities during the war, it would appear that the business since the war has increased sufficiently to keep pace with rolling stock orders placed during the war. During 1919, 165 cars were built in railway shops as compared with eighty-nine cars built in company shops in 1918 and with 281 built in this manner in 1917.

That the one-man car has set a new high record for sales, is readily shown by the number of safety cars purchased this year. Of this type 1,383 were purchased, an increase of more than 100 per cent over the number ordered in 1918. In addition, the 1,383 safety cars placed this year represent 56 per cent of the total number of cars for the year. This is the first year that the number of one-man cars has ever exceeded the number of two-man cars ordered. In 1918, 644 safety cars were ordered as compared with 1,074 two-man cars, while during 1919 the tables have been reversed, 1,383 safety cars being purchased as against 897 two-man cars. Of this number 635 were motor-passenger city cars and 262 were interurban cars. The increase in sales of safety cars has been phenomenal. In 1917, 280 were ordered, in 1918, 644 were purchased and in 1919 contracts have been let for 1,383 such cars.

Few freight cars were built during the year, the total service cars in all amounting to only thirty-one cars. Some few freight cars were probably built in company shops, but the total amount was but a small percentage of the number of freight, gondola or flat cars purchased in previous years.

Car Deliveries Improve

Deliveries throughout the year on rolling stock have been exceptional. During the early part of the year deliveries were four to five months at the longest, while as the year progressed they gradually grew better, until in the late fall safety cars in small quantities were being quoted at a month to six weeks for partial delivery and two to three months for the remainder. Orders for 200 or more safety cars were three to four months. Deliveries on the heavier cars ranged from three to four months, although some orders were completed in less time. On account of the numerous orders being received, car manufacturers decided to build safety cars on a large scale, and accordingly several of them built from one to three hundred safety cars to be held in stock in case purchasers did not appear before the cars were completed. This accounted for the excellent deliveries that were obtained during the last quarter.

During 1918, car builders were rushed with war work and could not give the attention to car orders that was possible during peace time. Much the same plan was followed in 1919. Cars were turned out along standard lines and any companies requiring special features in cars were notified that the delivery would be lengthened considerably. The companies which wanted cars wanted them badly with the result that they took whatever they could get.

Owing to the relative high price of newly built cars, railway managers have at different times scoured the country in an effort to pick up enough used cars to serve their purposes. In nearly all cases, however, any company which was fortunate enough to have a few extra cars which could be repaired or rebuilt, busied themselves by getting the cars in shape and putting them out to help decrease headway and give better service.

Rails Have Light Sales

Reconstructed and extended track mileage during 1919 was less than during 1918 and offered a poor field for sales.

Approximately 150 miles of new track or less than one-half of 1 per cent was added to the total track mileage. In the U. S. alone, about 390 miles of electric railway mileage was rebuilt. Of this mileage most of the work was in short sections. Two hundred and eighty-seven miles of steam lines were electrified.

At the beginning of 1919 there was little space available for rolling rails but as the year progressed the mills sent out notices to the effect that they could take on additional rollings. The space, however, was not contracted for. Rollings which up to that time had been comparatively light dropped off more and more, and throughout a fairly dull summer and quiet autumn excellent deliveries could be had on rails in at least two mills. One mill was prepared to roll immediately and to ship within two weeks of the receipt of the order provided it was only moderately large. Rollings for 1919 have been very small and although they may in the aggregate amount to more than those of 1918, it must be remembered that the output in 1918 was smaller than has ever been known in the electric railway industry.

Conditions during the winter were not nearly so severe as for the year before with the result that the demand for snow and ice removal equipment, trolley wire, sleet cutters, brushes and brooms and other equipment was not so good as usual. After a fairly mild winter it was not surprising that few orders were placed during the spring and summer season for snow plows and sweepers.

Purchasing during 1919, which for the most part has been strictly for maintenance needs, was smaller than usual. Of course, some railways have received fare increases either by an increased flat fare, zone fare or by use of transfers, and purchases from these companies have been of the usual pre-war amounts.

Rail grinders have been active with sales estimated as being larger than in 1918. Fare boxes and fare registers also have had a fair amount of business and were slightly ahead of the previous year's sales. Field coils, commutators and controller parts had a regular demand and sales in these and other copper specialties were almost normal. Armature and coil winding machines failed to sell readily early in the year but later picked up and sold much better toward the end of the year although total sales were not far ahead of those of 1918. Wire products were steady with a slightly lessened demand for steel guys and cable. Copper trolley wire and transmission fell off in sales, due largely to the small amount of extensions and new work done. Demands for composition brass and copper wire have been greater than during 1918, although perhaps not to a large degree.

Almost all accessories used on safety cars have experienced good sales and the majority show sales ahead of those for last year. Air-brakes and safety control apparatus including door and step mechanism have had a very good season.

HAND BRAKE SALES GOOD

Hand brake sales for the year were better than those of 1918. Car roofing was fairly active. Curtain fixtures had a steady demand. Both these products sold well in the automotive industry, however. Carbon brushes experienced good sales.

Sales of track hardware, tampers, picks, sledges, hammers, bars, chisels and mauls were actually but 5 to 10 per cent less than in 1918. Increased prices and lack of track construction accounts for this decrease. Conditions in this line are improving and the future looks promising. Steel tie and fabricated track sales are about equal to those of last year. Pneumatic tie tampers have had light sales although they have developed new business in bonding rails and for tearing up asphalt between tracks.

Lifting jacks sold well although most stocks were placed through jobbers making it difficult to trace all sales. Brakeshoes have sold in fair volume. This was also true of steel axles. Recent sales show improvement but buying is spasmodic.

Transformer demands have been steady. Railway motors, however, have not been as active as in pre-war years. Fewer heavy cars, which take two to four motors, were built last year than for the past three years. Motors for safety cars are smaller and cost considerably less than those for the heavy two-man cars, which partly accounts for the reduced total amount received from motor sales. Automatic substations had remarkable sales, the General Electric Company reporting nineteen installations totalling 11,650 kw. In addition the company has a total of 11,800 kw. on order, which will be placed on seventeen different railways. Installations by this company in 1918 amounted to only 4,600 kw. which shows an increase in last year's business of more than 200 per cent.

Cedar pole sales improved slightly although a number of reports show a variance. Chestnut pole sales do not show up so well and are below a normal pre-war year. Pole and wood tie preservatives have sold slightly under last year's mark. The demand for paint and varnishes was less than in 1918.

Railways which held scrap until the third or fourth quarter had no difficulty in disposing of it at good prices. Relaying rails were in demand and good prices were obtained on all used material.

PRICES MOUNT HIGHER

Regardless of demand, prices of practically all materials, railway supplies and equipment increased at least once during the year. Some items, such as cotton cord, insulated wire, register cord, coils and insulation advanced a number of times. During the fourth quarter bronze castings such as are used in line material dropped 5 per cent while malleables were again marked up, this time the increase amounting to 7½ per cent.

LABOR NOT DEPENDABLE

In addition to a shortage of certain raw materials, labor has been less dependable than ever before. Malleables have been far behind on deliveries, owing to a shortage of unskilled labor. Much malleable capacity is now idle which would be available if the necessary labor could be secured. Higher wages are being paid everywhere, yet production has not been increased. Working days have been cut down to eight hours, which has had no effect other than to materially increase wages on account of overtime.

Railway credits have been maintained fairly well during the past year. Fewer roads than ever took advantage of cash discounts and central stations and holding companies frequently took thirty to sixty days longer before settlements were made. On the whole, however, collections have been satisfactory.

BETTER TIMES AHEAD

With reduced operating expenses resulting from the use of safety cars and financial relief which, to a considerable extent, will be realized by fare increases and transfer charges which the general public has been educated to expect, the prospects for the coming year are brighter than they have been for the past three years. Although the number of cars ordered has been approximately the same during 1917, 1918, and 1919 the increased cost of the cars in the past two years has resulted in a greater expenditure for rolling stock. It is believed that during the past three years the low point in sales of electric railway supplies has been reached and that 1920 will show a rising curve.

Rolling Stock

La Crosse City Railway, Winona, Minn., expects to purchase eight safety cars this year.

Brockton & Plymouth Street Railway, Plymouth, Mass., expects to purchase two safety cars this year.

Lincoln (Ill.) Municipal Street Railway expects during the year to purchase one open or summer car.

Charles City (Iowa) Western Railway will be in the market during the year for one electric locomotive.

New York & Stamford Railway, Port Chester, N. Y., expects to purchase seven safety cars during the year.

Westchester Street Railway, White Plains, N. Y., expects to purchase several safety cars during the year.

Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala., expects to purchase two closed passenger cars this year.

United Railways, St. Louis, Mo., expects to purchase 100 large cars of the Peter Witt type and also twenty safety cars.

Winona (Ind.) Interurban Railway expects to purchase a number of freight trail cars, the number depending upon price and delivery.

San Francisco, Napa & Calistoga Railway, Napa, Cal., will be in the market for one new 50-ton electric freight locomotive during the year.

Capitol Traction Company, and **Washington & Maryland Railway, Washington, D. C.**, expect during 1920 to buy one 7,500-kw. turbine generator set with accessories.

Interstate Public Service Company, Indianapolis, Ind., expects to purchase five double-truck flat cars, one motor ditcher and shovel car, one motor service car and three flat cars.

Recent Incorporations

Cleburne, Tex.—A company is being organized at Cleburne, Tex., for the purpose of building an electric interurban line from Cleburne to Glen Rose, thence to the West Texas oil fields, a distance of about 50 miles. Funds for preliminary surveys and organization work have been subscribed.

Pawhuska Railway & Public Service Company, Pawhuska, Okla.—The Pawhuska Railway & Public Service Company has been organized with a capital stock of $20,000. The company has a franchise for a car line within the city limits of Pawhuska. The incorporators are: A. W. Hurley, Charles B. Peters and Vernon Whiting, all of Pawhuska.

Fort Worth & Mineral Wells Railway, Mineral Wells, Tex.—Two allied companies have been organized for the purpose of constructing an interurban electric railway between Fort Worth and Mineral Wells, about 50 miles, and between Mineral Wells and Breckenridge, about 55 miles, with branch lines from the latter town to Eastland, Ranger and Cisco. One of these companies is the Fort Worth & Mineral Wells Railway and the other is the Fort Worth, Mineral Wells & Breckenridge Railway. H. E. Robinson of Fort Worth is president of both companies. Surveys have been made and a right-of-way obtained for the proposed lines.

Franchises

Seattle (Wash.) Municipal Railway.—Plans for a system of subways and elevated lines for the business section of Seattle were submitted on Nov. 15 to Mayor Fitzgerald by Thomas F. Murphine, superintendent of the Seattle Municipal Street Railway. Mr. Murphine contends that the rapid growth of Seattle has made it necessary to find means without delay for handling traffic in the downtown district. Plans proposed involve expenditure of more than $5,000,000.

Gainesville & Sherman Traction Company, Gainesville, Tex. — The Gainesville & Sherman Traction company has submitted propositions to the citizens of Gainesville, Whitesboro and Sherman looking to the construction of an interurban electric railway between Gainesville and Sherman, about 30 miles. From these three towns a total cash bonus of $175,000 and stock subscriptions to the amount of $275,000 are asked. George M. Easley of Dallas is president and Burt C. Blanton of Dallas is general manager of the company.

Track and Roadway

Sand Springs Railway, Tulsa, Okla.—The Sand Springs Railway will soon begin the construction of a system of interurban lines that will radiate from Tulsa in several directions. One line will traverse the coal regions to the east and southeast of Tulsa and may extend to Broken Bow, a distance of about 20 miles. Another will be built north to Pawhuska.

Dallas (Tex.) Railway.—The Dallas Railway has executed a contract with property owners of the Mount Auburn addition to construct and operate a car line in this addition within six months. The property owners agree to raise a cash bonus of $45,000. The Dallas Standard Traction Company, which now operates a shuttle car line connecting with the line of the Dallas Railway, will be discontinued when the new service is established.

Dallas (Tex.) Railway.—The Dallas Railway has made requisition on the city for approval of the proposal to spend $140,000 in laying a double track on Masten Street from McKinney Street to Pacific Avenue, and the requisition has been approved. This line will divert the North Dallas lines that now run down McKinney Avenue to Lamar Street and will bring them directly into the business district via the most direct route, and is the improvement suggested by Mayor Wozencraft some time ago.

Power Houses, Shops and Buildings

Moncton Tramways, Electricity & Gas Company, Moncton, N. B.—The car house and machine shops of the Moncton Tramways, Electricity & Gas Company were destroyed by fire on Dec. 25. The damage is estimated at $50,000.

Wheeling (W. Va.) Traction Company. — The Wheeling Traction Company is planning to build a carhouse and repair shop in Warwood, W. Va. The present carhouse at Wheeling, will not be dispensed with but will be used for the Ohio side cars while the new structure in Warwood will be used for all cars on the West Virginia side of the river.

Trade Notes

Haynes L. Everest has just been appointed general sales manager of the Hart & Hegeman Manufacturing Company, Hartford, Conn. Arthur E. Lubeck succeeds Mr. Everest as Western sales manager at Chicago. Mr. Lubeck was formerly assistant Western sales manager and for many years has been in the electrical business in the Middle West.

W. M. Pegram, New York Central lines at Columbus, Ohio, has recently been granted a patent on a device for holding abutting rail ends in alignment without the use of bolts. The rail ends are supported by the head with two angle bars which fit into a base plate. Due to the beveled surface of this base plate there is a wedge-like action between the toes of the angle bars and their seat so that the pressure of a wheel or loaded car in passing over the joint tends to tighten it.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that Edward D. Kilburn, who since March 15, 1917, has been New York district manager of the company, was recently elected vice-president and general manager of the Westinghouse Electric International Company. Mr. Kilburn was graduated from Cornell University, and immediately after leaving college he entered the employ of the Westinghouse Electric & Manufacturing Company, for a number of years being located at the Syracuse office of the company. Subsequently, he was transferred to the Westinghouse Machine Company with headquarters at New Haven, Conn. In 1915 he returned to the electric company as manager of the power division of the New York office. A year later he was also made manager of the railway and lighting divisions, subsequently becoming manager of the office.

Westinghouse Air Brake Company, Pittsburgh, Pa., in order to provide facilities adequate to handle the increasing export business and to develop its foreign trade to a greater extent than has been heretofore possible, has organized an export department with headquarters in the Westinghouse Building, Pittsburgh, Pa. Active operations will commence Jan. 1, with E. A. Craig as export manager. Mr. Craig has been associated with the company for thirty-two years. In 1905 he was appointed as auditor and assistant secretary and since 1906 has been Southeastern manager. This department will be represented in the New York office by W. G. Kaylor and in South America by R. M. Oates. The Westinghouse Air Brake Company controls the following foreign companies: The Compagnie des Freins Westinghouse, Sevran, France; the Compagnia Italiana Westinghouse dei Freni, Turin, Italy; the Westinghouse Brake Company of Australasia, Ltd., Concord West, New South Wales, Australia; the Westinghouse Eisenbahn Bremsen Gesellschaft, Hanover, Germany; the Société Anonyme Westinghouse, Petrograd, Russia; and the Westinghouse Brake Company, Ltd., of London, represented in China by Jardine, Matheson & Company, Ltd., Shanghai; in Denmark and Sweden by Frantz Alling, Puggaardsgade 4, Copenhagen; in Holland by Vaillant and Sluyterman, Noordeinde 18a, The Hague; in Japan by Sale & Frazar, Ltd., Yaesu Cho, Tokyo; in Norway by "Vulkan," Jernstoberi and mek. Vaerksted, Christiania, and in South Africa by Bellamy & Lambie, 621 Consolidated Buildings, Johannesburg.

New Advertising Literature

Electro Dynamic Company, Bayonne, N. J.: Bulletin No. 100, covering its type "S" interpole direct-current motor.

Roller-Smith Company, New York, N. Y.: Bulletin No. 100, covering its "S. S." types electrical instruments for signal system testing. Direct-current and alternating-current portable ammeters and direct-reading portable ohmmeters are shown and spoken of in this bulletin.

General Electric Company, Schenectady, N. Y.: Bulletin No. 68,420, superseding Nos. 68,402-2 and 68,405. It illustrates and describes CR 4,015 inclosed automatic starters for small direct-current motors.

Wagner Electric Manufacturing Company, St. Louis, Mo.: Bulletin No. 119 on its distribution type transformers, also Bulletin 120, a twenty-page publication, the "Manual of Electrical Testing."

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 55 New York, Saturday, January 10, 1920 *Number* 2

Reserves Should Be Provided For Depreciation

WE ARE glad that the association passed a resolution at the Cleveland convention indorsing the principle that railway companies should provide reserves to care for depreciation. The resolution was modified slightly from the form in which it was originally drafted and presented to the convention, but in essence the thought was not changed that proper electric railway accounting requires this provision to keep the capital value of the property intact whatever may have been the theory and practice of years gone by. The formidable list of decisions by commissions and courts quoted in the able paper of Mr. Fish proved conclusively that the authorities hold public utilities responsible in practically all cases where a lessening of property values comes from neglect to provide such funds. Hence utility managements have no choice in the matter if they are to preserve intact the equities of the security holders in their respective properties. Of course most companies now have such renewal funds but the passage of the resolution will stimulate a review by each company of the adequacy of the amounts charged in its case.

It may seem strange to many that electric railway companies in the early days disregarded so generally what is now recognized as an elemental matter in correct public utility accounting. We must remember, however, two facts. The first of these is that in the early history of electric railroading the life of equipment was greatly over-estimated, so that its annual depreciation was correspondingly under-estimated. The second was that in those days of rapidly improving equipment the traffic increased so rapidly as to give the impression that the value of the franchise owned by the company constantly increased in amounts which would counterbalance possible losses through depreciation of the physical property. The imperfections in this reasoning are apparent now, but many other things have been learned since those days. One of these is that a franchise to operate cars on a public street, when carrying with it obligations to pave and perhaps sprinkle the streets and to operate a certain schedule of cars at a limited rate of fare, will quite as often be found to be a liability as an asset.

Power Engineers Have Laid Out a Real Year's Work

THE committee on power generation of the Engineering Association met in New York City this week and mapped out a program full of promise and of hard work for several men. The plan may be summarized thus: The reports which will be prepared, only three in number, will be based on first-hand, up-to-the-minute data. They will show how electrical energy can best be bought or sold, what other fuels promise substantial savings over lump coal, and what are reasonable costs of producing energy in 1920 as compared with a few years preceding in power plants of various sizes. Each of these subjects will be handled by a competent sub-committee which will be expected promptly to "deliver the goods."

Whether electric railways produce or purchase the energy required to propel their cars, their managers as well as their engineers must keep posted on power-plant development. In the former case it is obvious that failure to realize what is going on will result in rapid progress toward the rear of the procession. On the other hand, the railway man as a purchaser cannot make a good bargain unless he knows approximately what it costs to produce the energy which he buys or proposes to buy; and in addition he cannot afford to buy energy from a producer who is behind the times. For this reason the committee on power generation has an important and continuing function to perform. This is as true this year as ever. And if the discussion at the 1920 convention is as interesting as that at the first committee meeting, the success of the power session of the Engineering Association's annual meeting is assured.

A Bigger Job For the Commissions

DURING the course of the hearings before the Federal Electric Railways Commission at Washington last summer much was said pro and con relative to the efficacy and value of state regulative commissions. One could not always judge from what was being said whether the speaker belonged to the group representing the public utilities or to one of the other groups before the commission. As a matter of fact the witnesses drawn from the group representing the public who objected to state regulation of public utilities were usually more outspoken in voicing their objections than were the objectors in the utility group. This state of affairs leads one to question as to whether the commissions as a whole are making the most of their opportunities.

Originally, the demand for state regulation came from the public and not from the utilities. The expressed idea back of the demand was that some regulative body was necessary to insure that the patrons of public serving companies should receive just treatment. But when the state legislatures began the task of creating such commissions they found it necessary, in order to avoid discriminatory and confiscatory legislation, to protect the investor in the utility as well as the user of the utility. In the early days of commission regulation, protection of the consumer was the large problem with the commissions, while in these latter days operating costs have so increased that the tables have turned and now it is the investor who needs protection. As a result of this change in conditions, the public, or at least a noisy part of it, is desirous of doing away with state commissions. In discussing this matter with the writer recently a prominent member of the staff of one of the great state commissions said in substance that the commission with which he is connected did not dare to grant the rate increases which they sometimes felt were justified because the higher rates, if granted, would arouse public resentment to such a pitch that the commission law would be repealed and that such a repeal would be a real blow to the public utility user and to the investor.

Consideration of this aspect of the situation leads to the thought that possibly the commissions are adhering too strictly to the letter of the law governing their action. It would seem that if a public utility commission is to do its whole duty, it can not be simply a judge or an umpire. Neither can it be a mere board of arbitration or mediation. It must be all of these things and others as well. It must educate the public as well as discipline the utility. In addition to rendering a fair and impartial decision on a petition it might be well worth while if it took pains to see that the public had placed before it the full facts upon which the decision was based. That commissions can do much in the way of influencing public relations has been demonstrated by the Maine commission in Portland and other Maine cities. Some of the educational work of this commission in connection with the adoption of the zone fare system in Portland was described in our annual convention issue.

Asking for a Trolley System in 1919

YES, astonished reader, it's a fact! People are still asking for trolley cars in preference to any other mode of transit. The name of the town is a secret, but we'll tell you that it has about 25,000 people and grew to that dimension only within the last five years or after the building of electric railways had ceased to be a popular outdoor sport. Of course, you will be interested in some of the terms that the community is prepared to offer.

We'll just mention two. First, no paving taxes will be demanded; second, the character of service, such as headways, are to be free of those restrictions that can become so unreasonable with the years. Strange, isn't it, how fair-minded a community can be when the electric railway has not yet literally rooted itself in the ground and can't get away? Perhaps the technical reader will wonder why the ubiquitous jitney or the gaudy bus isn't filling the breach. The jitney is there all right at 25 cents per ride. As for buses, the community knows that it cannot expect well-lighted, properly-heated, and smooth-riding vehicles of that kind for the fare given by electric railways. Therefore, it has no hankering for a city service with buses. Very frankly it asks either for the electric railway or for the trackless trolley which may be likened to an electric railway in the making.

What a fine thing it would be if we could send to this town on a pilgrimage of study and penitence the representatives of the hundreds of communities that are squeezing the last penny in taxes and service regulations out of their electric railways and permitting the harassment of unregulated competition as well. At any rate, the spirit and preference manifested by this municipality are certainly encouraging to those of us who cannot help believing that the electric railway is still the most popular and economical carrier of the people in most places most of the time, if only given a fair deal as against other forms of transportation.

The Safety Car Promises to Be the Car of the Future

THAT rapid strides have been made in the adoption of the one-man safety car is apparent to anyone who studies the tables on rolling stock published in our statistical issue of last week. Another striking fact, developed by the tables, is that the lowest level in car orders since 1907 has passed, due principally to the noteworthy record of the one-man safety car. The figures for 1919 showed not only an increase over the previous year of 115 per cent in the number of safety cars ordered, but also that 272 more cars of this type were ordered during this one year than the combined total for the past three years. A 100 per cent increase is also found in the number of companies purchasing this type of car. A comparison with 1917 showed a 400 per cent increase in the number of cars and a gain of 127 per cent in the number of companies. As to the outlook for 1920, forty-eight companies, or slightly more than 5 per cent of those in the country, have already reported that they were planning to purchase 748 cars, of which 598 are urban motor cars. Of the forty-eight companies ordering cars, twenty-six or 54 per cent are planning for 181 safety cars, and of those ordering two-man cars three companies will take 96 per cent of the total 417 cars.

We feel that from year to year the percentage of the urban companies ordering safety cars as well as the percentage of urban motor cars for surface lines ordered will continue to increase, due principally to the greater utilization of this type of car on the larger properties. It is only a matter of educating the public, and this ought not to take more than five years, to judge from the time required by the prepayment car to meet with general adoption. Based on this precedent, in 1923, the majority type of cars in most of our urban centers will be the safety car.

A Reasonable Platform for Employer and Employee

AT THE Cleveland meeting of Thursday Edwin Gruhl presented a scholarly but not academic paper on labor contracts. It is reprinted in full elsewhere in this issue. Mr. Gruhl is associated with a company that has endeavored constantly to get the viewpoint of its employees. This was illustrated in the account of the activities of the Milwaukee Electric Railway & Light Co. on behalf of its workers given in the Sept. 9, 1916, issue of the ELECTRIC RAILWAY JOURNAL.

The discussion generally was opposed to the plan offered by Mr. Gruhl on two grounds. One of these was that the union element as represented by recent actions was unwilling to carry out its contracts or to become financially responsible so that they could be penalized if they did not fulfill their agreements. The second reason advanced in opposition to the unionization of properties was that it deprived of liberty of choice those men who did not wish to affiliate with the union.

The history of electric railway companies includes experience with a great variety of relationships between employers and employees, ranging from no contract at all through individual contracts and the open shop, co-operative committees and profit-sharing, to the closed shop. Judgment on comparative merits of the different plans employed should be based largely, in our opinion, on the results secured by each in the way of efficiency, the maintenance of discipline and the extent to which the results bring a recognition of the mutual interests of the company and the men. If experience with labor unions in the past had shown that their influence was in the directions just mentioned there would be less objection to them. Unfortunately their establishment on a property has had more often the opposite effect, namely, a weakening of discipline, a deterioration of service and a constant demand by the men for higher wages without any equivalent in the way of increased output or regard for the ability of the company to pay more money.

Mr. Gruhl's paper, as we understand it, is based on the thought that any bargain between a company and its employees, whether it is an individual contract or a collective one, must bring benefit to both parties to be satisfactory. Both sides must be willing participants in it and they must shoulder their respective burdens of responsibility for the outcome. As Mr. Gruhl points out, a labor contract is not essentially different from a contract to sell merchandise, for in the last analysis every commodity can be reduced to a labor equivalent. Labor involves so large an element in electric railway transportation, the continuity of this service is so essential to the communities served, and the present annual number of strikes is so considerable, that some way must be found for bringing about a mutual understanding of the situation by which both employer and employee will benefit. Until labor organizations, of whatever form, can demonstrate by their records of achievement and good faith that they do bring about these beneficial results to both parties, railway managers will very properly be opposed to the organization of their men by any outside agency.

Here Is a Job For a Statistician

EVEN the automobile industry is being aroused to the fact that "the car of the future will be a light-weight car." Advertisements have been appearing recently in leading daily papers with the above statement in large type as an introduction, and unsigned by any manufacturer or association. Apparently some one or group of individuals in the automobile world, as in the electric railway industry, has realized that automobiles, as well as electric cars, are carrying a great deal of unnecessary weight.

In the automobile the excess weight results in a greater gasoline and oil consumption per mile and a greater wear on tires. In our own industry unnecessarily heavy cars result in greater power consumption per mile and a greater depreciation in track. Slower schedules and consequently poorer service and less riding should also not be overlooked.

The propaganda for the light-weight automobile says: "Five million tons—the load of 100,000 freight cars stretching from New York to Chicago—the cargo capacity of 212 Leviathans, a weight greater than the effective tonnage of the combined navies of the United States, Great Britain, and France. All this is being carried daily as unnecessary dead weight by 6,500,000 American motor cars and trucks."

Here is an opportunity for some good statistician to figure up how much excess weight is being carried by the eighty odd thousand American electric railways cars. The result might also be quite impressive. Who is the first to volunteer?

Will Brooklyn Be Car-less?

IS BROOKLYN to have the experience of Toledo and Lawrence, Mass., with complete cessation of electric railway operation? This contingency is certainly suggested by the communication sent by Receiver Garrison of the B. R. T. to the Board of Estimate of New York on Jan. 7. If the company is allowed to charge 8-cent fares until a permanent settlement is reached, it would be worth while to continue operation, otherwise not. One of the aphorisms of the late Mr. Whitridge is that there is no profit in carrying passengers at less than cost, and this rule applies as well in Brooklyn as in any other city. If a franchise changes from an asset to a liability, a receiver, we should think, if authorized to do so by the court in charge of the property, would have the right to discard the franchise and make such other use of the property as the best interests of the creditors require. Just what Mr. Garrison, and the court under whose order he acts, will do we cannot of course say. But a most careful engineering analysis of the situation has shown that an 8-cent fare is necessary, and if this is the case it is a reasonable question as to how long the company is warranted in carrying passengers at less than cost.

The Spirit of Meeting Competition

ELECTRIC railways have sometimes been accused of sitting back and complaining of their misfortunes instead of taking aggressive action to meet competition which they faced. One of the thoughts expressed in the interview with Mr. Wheelwright which appeared in last week's issue is an excellent example of a progressive attitude. He discloses the fact that serious thought is being given to the use of one-man safety cars on a 22-mile interurban line as a means of meeting the competition from automobiles which is anticipated with the completion of a new paved highway paralleling this line. The idea is to replace an hourly service using large cars, with a ten or fifteen-minute service using safety cars.

There are undoubtedly many factors to be considered in such a venture and its practicability carries some doubt, though it is certainly not impossible. But the spirit which is embodied in the idea is most commendable. The company has not waited for the highway to be completed and the competition to become a fact before it gave heed to the problem but rather has anticipated the probable circumstances by months by definite planning and preliminary trials of the proposed use of the lighter, smaller equipment.

The running time on this 22-mile line at present is seventy minutes, corresponding to a schedule speed of 18 m.p.h. If we take into consideration the very much better rate of acceleration and retardation of which the safety cars are capable as compared to big, heavy interurban cars, and the fact that the lighter cars will slow down much less on the hills, it does not seem improbable that the same running time might be maintained with the safety cars. The question of safety at such a speed on open track is a matter for serious consideration, and there are numerous other operating questions which can be answered only by trial. Nevertheless, there are many economies which would accrue; there would result a better load factor in the energy required, better voltage regulation and less line loss. The principal advantage would be the holding of present traffic, or its increase. The idea merits consideration.

A. E. R. A. Holds Mid-Year Meeting at Cleveland

Increased Scale of Dues Was Approved, Resolution on Replacement Reserves Was Adopted and Papers on Depreciation and Labor Contracts Were Read and Discussed—Banquet Was a Brilliant Affair

THE ninth annual mid-year meeting and dinner of the American Electric Railway Association was held at the Hollenden Hotel, Cleveland, Ohio, on Jan. 8. It was preceded by a meeting of the executive committee, held at the same place on Jan. 7. Condensed minutes of this meeting are given elsewhere in the present issue. In the absence of President J. H. Pardee, the first vice-president, Richard McCulloch, presided at all sessions of the meeting, including the banquet. More than 300 attendants registered for the association sessions and nearly twice that number attended the dinner.

Morning Session

The meeting was called to order at 10.30 o'clock Thursday morning with a short address by the chairman.

ADDRESS OF VICE-PRESIDENT MCCULLOCH

In opening his remarks Mr. McCulloch outlined the critical situation of the industry and explained the purpose and plan of the program for the meeting. Following this he said, in part, as follows:

"I do not agree with some of the critics and pessimists who are prophesying that the street railway business is a dying industry. I do not believe that any method of urban or interurban transportation yet devised or which will be devised will ever compare with electric transportation on rails for economy or reliability. Certain other methods may have their advantages in fair weather, or for short hauls, or under other special conditions, but for effective transportation 365 days during the year, nothing compares with the electric street car. The electric railway is a necessity to the American city, and it is the duty of each municipality, as well as that of each railway company, to see that the electric railway functions, and functions under the best possible conditions. There would be no difficulty in bringing this about if what is popularly known as 'the street railway problem' were treated in each community from a business standpoint, and not regarded only as a political shibboleth.

"To put the problem which is now confronting us in its simplest form, the electric railways of this country have for a number of years been faced with an alarming increase in the prices of labor and material without a corresponding increase in revenue. This dilemma has become acute during the past two years, and receiverships, disintegrated systems and forced abandonment of lines as a result have multiplied. With the disappearance of net earnings, credit also took flight and both railways and municipalities have seen the serious situation suddenly develop of an industry essential to the community in business, convenience and conservation of health, unable to expand with the growth of the community, unable to finance its maturing obligations, and in some cases unable even to meet its operating expenses.

"The industry was in this chaos when the President appointed the Federal Electric Railways Commission with authority to inquire into the condition of the electric railways and recommend such action as was found desirable to remedy the situation. The forthcoming report of the commission will afford some guide to those authorities who wish to help in the situation and who do not know how, or to those who do not at present possess sufficient courage. Much of our trouble, however, comes from those who are using electric railway affairs as a political football, and the report will be largely lost on them.

"It is rather remarkable that at the meeting of the Federal Electric Railways Commission, municipal ownership was not generally advocated by municipalities, although the purchase of the electric railway at a fair price and its operation by the municipality, making up the deficit out of the general taxes, offers the simplest and most obvious solution of the present quandary.

"There are three parties who must be considered in the adoption of any permanent street railway settlement—the public, the investor and labor. When the problem is approached in a spirit of fair dealing and with an open mind, it does not seem that the interests of these three parties are irreconcilable, or that fair solutions are impossible although these solutions may differ in different localities.

"The public demands such service as it may determine upon, and it should be willing to pay the cost of this service, such cost including the upkeep of the property and a fair return on the investment.

"The investor demands that his property be maintained in first-class condition, that he be assured the return of his money at the expiration of the term of his loan and that he receive a fair return on his investment. By fair return he means a return equal to what he could obtain in other enterprises involving similar hazards.

"Labor demands the best practicable working conditions, and a rate of pay equal to that in other enterprises requiring similar skill and training.

"This is not a mathematical problem to which there is one fixed solution applicable to every community. It is a problem involving many variables and some constants which must be assumed. It does seem, however, that the basic demands are so simple that if they are approached by both sides in good faith and with a mutual desire to reach an agreement, solutions may be found which will again put the industry on its feet.

"Two questions have been selected for discussion by this meeting; the necessity of a proper charge for depreciation and the matter of labor contracts. They are of great importance and were primarily suggested by the character of the testimony given by some witnesses before the Federal Electric Railways Commission.

"It should be determined whether or not each railway company should set aside annually out of its earnings a sum sufficient to keep the property intact. Many companies are already setting aside a depreciation fund, but the accumulation of such a fund has been a fruitful cause of contention in rate of fare cases. The matter of the 2½ per cent to 4 per cent of physical property value required to insure future replacement may represent the difference between apparent solvency and actual insolvency. The street railway industry should look this matter of depreciation squarely in the face and not deal with it as a matter of expediency.

"The question of labor has always been of supreme importance, but labor matters have forced themselves to the front especially since the beginning of the war. The scarcity of men, the advance in cost of living and other causes produced an insistent demand for higher wages. This has been one of the most difficult problems for a railway operating under a fixed rate of fare to solve. Many companies now have labor contracts which never had them before. No two contracts are alike. What should a labor contract contain? That is certainly a pertinent subject.

JOHN H. PARDEE
President A. E. R. A.

"Your attention has already been called to the tremendous amount of work which the association has been doing both at its New York office and in connection with the hearings before the Federal Electric Railways Commission. Your president, who unfortunately is absent and whose unworthy representative I am, called your attention to the work of the association and its necessity for greater revenue in his address at the convention at Atlantic City in October. He appointed a committee on revision of dues which is to report at this meeting, and in the consideration of the report I bespeak your hearty support of the association."

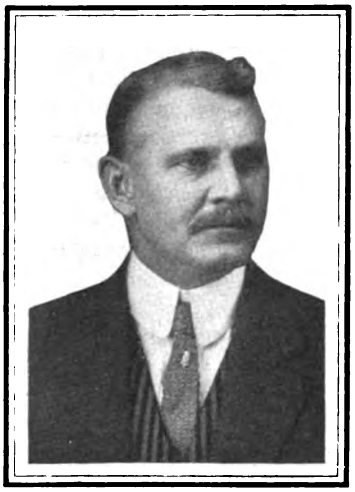
INCREASE IN DUES IS APPROVED

Following Mr. McCulloch's address, Chas. L. Henry presented for the committee on constitution and by-laws, in the absence of Chairman L. S. Storrs, several amendments to the by-laws necessary to provide for an increased scale of dues. These changes were in accordance with recommendations of a special committee on revision of dues, of which Philip J. Kealy was chairman, which recommendations received the approval of the executive committee at its last New York meeting. The proposed changes in the by-laws had been submitted to the membership in advance of the Cleveland meeting in accordance with the provisions of the constitution. Mr. Henry presented the revisions as submitted, and moved their adoption, but before adopting them the meeting amended them so as to eliminate the special scale of dues provided for the fiscal year 1920. The scale adopted is therefore as follows:

REVISED FORM OF SECTION XIV—FEES

XIV. (a) Companies seeking company membership in the Association shall pay an admission fee of $10. (b) For the fiscal year beginning Nov. 1, 1919, and thereafter railway member companies shall pay in advance annual dues in accordance, except as to minimum and maximum, with the amounts of their gross earnings from electric railway operation during the preceding fiscal year of the respective members as follows: Companies having gross receipts of $50,000 or less, shall pay fifty dollars ($50) per annum; companies having gross receipts of more than fifty thousand dollars ($50,000) shall pay fifty dollars ($50) plus 0.00025 times their gross receipts, provided that no company shall be called upon to pay more than $2,500.

For the fiscal year beginning Nov. 1, 1919, and thereafter, manufacturer member companies shall pay in advance, annual dues in accordance, except as to minimum and maximum, with the amounts of their gross earnings derived from the business of manufacturing or selling materials or furnishing service to electric railways during the preceding fiscal year of the respective members as follows:


RICHARD M'CULLOCH
First Vice-President A. E. R. A.

Gross Receipts:	Rate
Under $50,000	$50
Between 50,000 and $100,000	75
Between 100,000 and 250,000	110
Between 250,000 and 500,000	175
Between 500,000 and 1,000,000	300
Between 1,000,000 and 2,000,000	550
Between 2,000,000 and 3,000,000	800
Between 3,000,000 and 4,000,000	1,050
Between 4,000,000 and 5,000,000	1,300
Between 5,000,000 and 6,000,000	1,550
Between 6,000,000 and 7,000,000	1,800
Between 7,000,000 and 8,000,000	2,050
Between 8,000,000 and 9,000,000	2,300
Over 9,000,000	2,500

RESOLUTION ON REPLACEMENT RESERVES

The first formal paper on the program was one by Williston Fish, vice-president West Penn Rys., in explanation of the situation regarding funds to cover replacements and abandonments of electric railway physical property, and by way of introduction to an appropriate resolution. Mr. Fish's paper was an exhaustive treatise on the subject of depreciation and will be reserved for more extended abstract in a later issue of this paper. A few of its "high spots," however, are given in the following paragraphs:

At the outset Mr. Fish said that no proof is needed to show that almost all elements of an electric railway have limited lives. Eventually they must be retired, replaced or abandoned, or, quoting Shakespeare, "If it be not now yet it will come." Money is required for these purposes and the question before commissions and courts in making and passing on valuations and rates, before city councils in making rates and framing ordinances, and before electric railways in presenting their cases, is: When and how can this money be obtained?

The speaker then took up in detail the several phases of the subject, including definitions, the distinction between depreciation and maintenance, the relation of depreciation to the fixing of values and rates, the requirements of statutes and commission rules as to maintaining depreciation reserve, the advantages of a depreciation reserve and of paying for depreciation as it accrues as compared with payment at maturity, and the proper employment of the reserve fund.

In conclusion he summarized the many citations from commission rulings and other sources of information which the paper contained somewhat as follows: First, he said that all authorities agree that depreciation is a fact in law and nature. Second, a rule seems to be that in fixing the value of a property, prudently planned and properly managed, to determine the amount on which due return is to be figured "cost to reproduce new" is taken, less that part of the accrued depreciation which the revenues, after paying operating expenses, taxes and a fair return, have been sufficient to provide. Third, all authorities agree on the principle that in fixing a tariff of rates, it is proper to include in annual requirements any depreciation, as a separate item, not already included in maintenance. But if a company adopts the 100 per cent efficiency theory, with the plan of meeting depreciation as it matures, then it can scarcely ask for a depreciation allowance in excess of its maintenance figure. Fourth, statutes give to the Interstate Commerce Commission and a number of the state commissions power to require the utilities under their charge to any adequate depreciation reserves. It seems to be a general opinion of commissions that have considered the matter, that depreciation reserves should be carried. Fifth, the depreciation reserve has three functions; (a) to provide money for replacements when made; (b) to equalize annual replacement demand upon revenues, and (c) to maintain the investment's integrity.

To have a depreciation fund ready for use is to "put something aside for a rainy day." The theory of this reserve should be adopted, and its practice also, as far as possible. Companies should go after rates and economies that will provide the means for this fund; and the fund should be liberal.

RESOLUTION ADOPTED IN AMENDED FORM

After Mr. Fish had presented the resolution as published in advance of the meeting, contributions to the discussion from Bentley W. Warren and J. R. Bibbins were read respectively by H. C. Clark and E. B. Burritt. Abstracts of these are given below. An informal discussion was participated in by I. A. May, John S. Bleecker, A. W. Brady, C. L. Henry, Martin Schreiber, W. F. Ham, Bion J. Arnold and C. L. S. Tingley. The results of the discussion were certain amendments to the original resolution which, as passed, reads as follows:

"*Resolved*, That the American Electric Railway Association recommend to its member companies that, wherever possible, they provide in their accounting practice for the creation of adequate reserves to insure the property in advance of their actual replacement or abandonment, and that such reserve shall be provided for in cost-of-service franchises."

Before adjournment of the morning session, on motion of General George H. Harries, the association voted to cable the greetings of the meeting to President J. H. Pardee, at the time in Manila, P. I.

Depreciation, With Special Reference to Service-at-Cost Agreements*

BY BENTLEY W. WARREN

General Counsel Boston Elevated Ry.

NO ONE could follow the four weeks hearings before the Federal Electric Railways Commission without realizing the widespread interest in the service-at-cost plan for urban transportation. The same interest is manifest in many sections of the United States, and it seems almost certain that, in some form, the plan will be adopted in an increasing number of communities and applied to many railway systems.

In New England, the service-at-cost idea, as advocated at the Washington hearings, has not attracted much support. The reason, however, is simple. The New England States have fortunately been free from the fallacies of contractual relations between municipalities and transportation utilities. Cities and towns have been generally recognized as mere governmental agencies, for which others might be substituted at the pleasure of the Legislature, and the real purpose of the carriers as grantees of certain public easements, which they must exercise for the public benefit of travelers in return for reasonable compensation for the private capital devoted to maintaining these public easements, was early understood and insisted upon. Consequently, the regulatory laws of those states as interpreted by their courts, have now for many years brought about a situation in which the cost of the service has constituted the standard of state regulation. Local restrictions have frequently been swept aside and may in *all* cases be abrogated, when deemed by the Legislature a hindrance to the most efficient fulfillment of the public purpose for which the utilities were chartered and are permitted to continue.

With the increasing scope of the state regulation in New England and the prospect of the increasing adoption of local service-at-cost franchises in various other jurisdictions, certain problems, common to both methods of treating those utilities, are presented. Unless properly solved, these problems threaten disaster to the industry and to the public which looks to it for transportation service.

At the outset is the determination of the value of private capital devoted to this public service. All witnesses at Washington agreed upon the necessity for this determination. In New England, it has been substantially accomplished through years of supervision of all security issues. Consequently, the total capitalization approximately represents the total cost of the property. Elsewhere, some method of appraisal and valuation has been found either necessary or desirable. By whatever course effected, such determination furnishes the basis for fixing the amount upon which the private investors are entitled to a return.

The rate of fare is supposed to go up and down in accordance with the cost of the service furnished by the utility. In this cost is of course included the proper or stipulated return upon the investment, the current operating costs and the permanent maintenance of the property at a proper standard of efficiency. There is noticeable a general disinclination on the part of the public's representatives to permit as much elasticity as is reasonably needed to assure the best service to the public, in respect (a) to return on investment, (b) to current operating requirements, and (c) to such prompt and complete renewal and replacement of property elements as the progress of the art, quite as much as the actual wearing out of those property elements—shows to be necessary. Proper provision for all these items of the cost-of-service depends upon the rates of fare. By keeping down capital return, operating allowances and renewal reserves, the public representatives expect to keep down the total cost of service and consequently the individual cost to each person served. Low fares for the present generation are made almost a fetish.

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*Abstract of discussion on depreciation resolution.

DESIRE TO PROTECT PRESENT USERS A FALLACY

This desire to protect, above all, the present users of a public utility is as general as it is fallacious. Its motive is easy to understand. Public representatives, whether Interstate Commerce or State Commissions, municipal officials, state legislators, or special and temporary appointees, are keenly sensitive to the interests and criticisms of their contemporaries. The approval of the latter is desired, their condemnation is feared, even continance in office may be involved. The next generation, however, is unrepresented. It has no votes, it writes no letters to the press, it makes no speeches in political campaigns, and has no voice at public hearings. It might, perhaps, be seriously argued that in every proceeding affecting proper maintenance and renewals of public utilities there should be appointed a guardian, *"ad litem,"* to represent the unborn future users of the utility, following the analogy of probate court proceedings.

Most successful business enterprises, whose managers are free to conduct them as seems wise, will be found to have erred on the safe side of overmaintaining their properties. While the New England electric railways are struggling along without dividends, with no credit, with insufficiently developed and in many cases antequated or depreciated plants, we see the New England shoe factories and textile mills flourishing, their plants worth more than their books indicate, enjoying the best of credit and always prepared to take advantage of a favorable, or to overcome an unfavorable turn of the wheel of fortune. Why is this? The managers and investors in New England manufactures and in New England transportation belong to the same race. Indeed, the investors in both are often the same people. Is it not because the manufacturer manages his own business, decides how much of his income he will apply to maintenance and renewals, and improvements, while the poor transportation operator nervously fingers over the many pages of the commissions' accounting directions, usually seeking the aid of one or more expert accountants, and charges all sorts of items to construction and betterment accounts, which any conservative man conducting his own business would charge to operation? The Interstate Commerce methods of accounting, like those of many State Commissions, tend to top-heavy capitalization, and this is, I imagine, what the service-at-cost plans will do.

A quarter of a century ago, it was the boast of certain steam railroads that they had absorbed their construction accounts years before. Those companies can bear even the exigencies of a great war and preserve their credit. The old horse railroad accummulated a surplus sometimes apparent in the balance sheet, sometimes discoverable only upon inspection of the property. New cars were bought and charged to maintenance. The construction accounts were rarely opened except to meet the cost of actual extensions and not always then.

The introduction of electricity has developed the street railway into much more of a mechanical and machinery proposition than was the horse railroad. With this change has come not only a more rapid wearing out of property elements but of necessity a more frequent substitution of new and better appliances and machinery. Under modern conditions applicable to electric railways it may well be doubted whether any expert estimates of the life of the various major items of property are of great practical value in determining proper reserves.

A Massachusetts shoe manufacturer in the course of one of those questionnaires to which Washington officialdom likes to harass business men was asked the length of life of his machinery. He has apparently made a practical instead of a theoretical charge for depreciation. His reply throws light on that whole subject, "I know that if a new machine is invented next year better than mine, mine will be dead. It will be junk, worth only what the metal in it is worth. Its life depends on the date of the next invention. I wish you would tell me that date. I have tried to learn it. When I do, I can answer your question. I am in a competitive business and must be prepared to adopt the best and latest machine as soon as it appears."

The street railway is also in a competitive business so far as the need of adopting the best and latest appliances is concerned. Its competitor is not another street railway, but is the endless, ever-insistent demand of the public that the best is none too good and must be furnished.

RESERVES SHOULD BE DOUBLE WHAT ESTIMATED LIFE INDICATES

Unless this matter of replacement and renewal receives proper attention and liberal treatment, service-at-cost plans will not bring the reilef that is anticipated. It is possible that the best estimates upon the life of power stations and rolling stock, for examples, based solely upon their durability and serviceability, measured by present standards, ought to be cut in two in order to meet future developments and improvements, that is, the reserves should be twice what the estimated life would indicate. This would involve no injury to the car riders, with the capital return limited, and the amount in which it is to be paid determined. Any excess reserve would be in the property and could not under any proper system of regulation be withdrawn from it. Neither could such resources be utilized to enhance the value of the property in case of its purchase by the public if the provisions for creating and using the reserves were properly drawn. The alternative must be in all probability a second controversy in the future as to the value of the property devoted by the utility to the public use. It is easy to protect the public against the inclusion of over liberal reserves in the value of the property to be paid for by the public. It is not easy to convince the public that insufficient reserve and apparent consequent impairment of property are due to the past failure of the public to pay remunerative fares sufficient to maintain that property.

The Boston Elevated Railway Co. has never paid over 6 per cent dividends. All of its stocks and bonds have been issued under public supervision. Indeed, its stock represents an investment in cash of approximately $112 a share, so that its average dividends have been substantially less than 6 per cent of the amount paid in by its stockholders. It was the only company having a fare fixed by statutory contract and was allowed to charge only a flat 5-cent fare. In recent years, until public control substituted the 10-cent fare, its revenues were not enough properly to maintain the property. A large part of the public now thinks that condition is in some way the fault of the company and that the public ought not to pay a return upon the actual investment because part of that investment has disappeared for the reason that that same public has been paying too little to keep the property up. Companies proposing or forced by public sentiment to enter into service-at-cost arrangements should guard against accepting provisions likely to end in a situation similar to that of the Boston Elevated. Unless they do they will ultimately find their relations with the public little more satisfactory than at present. Renewals must as surely be provided for as the payroll. In my opinion, that provision should take into account probable increased cost of the renewals, whether from higher cost of the same things or the highest cost of better things available, and required by the higher standards prevailing when the time for renewal arrives. The tendency to insist upon capitalizing every last cent of theoretical betterment represented in the substituted item over the earlier one should be resisted. No utility and no part of the public will suffer from conservatism in swelling the capital and construction accounts.

Depreciation—Some Lessons from 5-Cent Fare History*

By J. R. Bibbins
Engineer The Arnold Company, Chicago, Ill.

IT IS indeed appropriate and timely that the American Electric Railway Association should be called upon to consider the much befogged issue of depreciation as an element in cost-of-service franchises and to formulate in specific terms a basis for proper accounting therefor, both with reference to current accounting and also the actuarial problem of providing for the future. The writer will not attempt to burden the proceedings with arguments in favor of considering depreciation in any of its forms, for he believes that the existence of depreciation is so forcibly proven in utilities as well as other industries, that the whole question simply resolves itself into a moral issue—who is to pay the piper? Should the utilities stand on a platform of pay-down, pay-as-you-go, or pass on to the future the burden of accruing as well as matured depreciation?

The writer desires to record himself definitely in favor of the resolution as presented.

However, there is one aspect of the problem which he regards as most vital and fundamental, and yet which has practically been lost sight of in discussions of this subject by those who should have considered it most profoundly. And this is: Considering past history, has the public in fact paid for the capital investment used up in its service in the rate of fare collected?

The cost-of-service basis is today accepted by the utilities as the only practicable and fair means of securing a rate of fare commensurate with the current cost of transportation. So far it is eminently just and scientific. But why do we apply the cost of service today and neglect to ascertain whether this same basis has applied in the past, and whether the public has accepted service at less than cost? Manifestly, this is an actuarial problem, not a simple problem of today; for there are two fundamental, distinct elements involved, one dealing entirely with current costs of operation and money, and the other dealing entirely with the heritage of the past and the probabilities of the future.

To prescribe a reserve for unmatured depreciation as an element of today's cost of service, is eminently sound accounting and reflects past experience as applied to future expectations. So far, so good. But the other element, based upon the actualities of past history, should not be neglected, for it is entirely in the interest of the utilities to ascertain whether the past holds for them any equity or credit (of the existence of which the public seems to have no knowledge) resulting from the above-mentioned fact that the service may have been given at less than cost. That such an important consideration in the interest of utilities should have been lost sight of in practically all current proceedings, is a matter of curious interest.

By-Gones Are Not By-Gones in This Business

This whole subject resolves itself into a determination of the historical investment and return as gaged by standard practices of today and scientific accounting. It is indeed curious that so few historical determinations have been made by the utilities. On the other hand, there seems to be a widespread expression against this policy, in other words, "Let by-gones be by-gones," "let the door of the past be closed." Thus the utilities have deliberately sacrificed in probably the majority of cases practically the only opportunity which is open to them today to certify to their past loss and to the fact that the "pay-down" plan of cost-of-service has not been met in the past; that is, that the public has accepted service at less than cost.

Is it not obvious that to close the door of the past deliberately throws the utilities into a defensive position, where in many cases an offensive position could be taken, and makes it necessary for them to combat the public's demand for depreciated value as a basis of rates, with no other weapons of defense than hysterical argument and lengthy legal procedure, neither of which may have a sound basis of fact or reasoning capable of proof in direct and explicit form? On the other hand, a historical determination often yields results which in themselves are unanswerable and constitute a positive defense, as distinguished from the very uncertain defense based upon argument, opinion or persuasion.

To be specific: let us examine the history of the 5-cent fare in the railway utilities, ascertaining the true net investment from year to year, the true annual rate earned thereon, and the net result in the form of cumulative surplus or deficit from the beginning up to the present time.

The result of such a determination would offer positive proof as to whether the public had or had not contributed in past years sufficient revenue to permit the utility to conduct its business on the standard basis of accounting which is demanded today. Thus in a capitalization case, a fare case or a service case of today, the moral issue involving both sides of the controversy would stand out clearly, that is, can the past generation justly transfer a part of its proper burden of the cost-of-service to the present generation alone, or evade its responsibility still further by subtracting from the property or assets of the utility an amount representing such shortage in revenue?

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* Abstract of discussion on depreciation resolution.

Does it not appear that the problem is far too broad and fundamental to be treated in the usual narrow way of simply denying the existence of depreciation in the effort to "save our bacon," while on the other hand there is actually involved the whole problem of apportionment of responsibility between past, present and future generations?

The writer believes that if the complete facts were spread open to analysis, both the riding public and finally the voting public would be brought to a clear understanding and fair attitude in the matter, where unlimited expenditure of effort and funds in legal procedure could never accomplish the same result.

[By way of illustration of his contentions Mr. Bibbins traced the investment history of a large railway property on a 5-cent fare over a 50-year period, giving the results in graphical form. (See E. R. J. Sept. 20, 1919, page 570). He summarized the results as below. —EDS.]

The hard facts which the owners of this property face today, as drawn from this typical economic study, may be summarized as follows:

Apparent rate earned, 1860 to 1919	6.85 per cent
Apparent rate earned, electric period, 1891 to 1919	6.60 per cent
Actual rate earned, electric period, corrected for cost of carrying deficits and assumed amortization of accrued depreciation to date	5.27 per cent
Actual rate earned, electric period, corrected finally to cover renewal fund reserve necessary to meet future renewal liability at the highest peak of renewal work (using pre-war normal prices)	5.03 per cent

Thus the actual economic history of electrical operation of this property has seemed to be on a basis of less than five per cent, considering present-day renewal costs. With such an exhibit spread upon the records, does it seem wise to attempt to close the door of the past? And can any amount of argument, opinion or persuasion satisfy the fair-minded public as fully as by the results of such an accurate historical determination?

The writer submits that if such a policy of open-minded research were generally accepted, and favored by the utilities, there would be little difficulty in securing acceptance of the basic priciple involved in the resolution under consideration by this association. One of the most recent applications of the principle proposed is in the Minneapolis cost-of-service franchise, which was in fact worked out with this principle in view.

Afternoon Session

The afternoon session was called to order at 2.30 by Chairman McCulloch. After the opening of the meeting Martin Schreiber, Public Service Ry., offered a resolution on the death of George V. Weston. The resolution, which was adopted by a rising vote, follows:

"The American Electric Railway Association has learned with the deepest sorrow and regret of the sudden death of George V. Weston, one of its most valued and esteemed members. Mr. Weston had, in connection with the association committee on valuation, just completed a work of such great value to the industry that its final effect cannot now be properly estimated. The qualities of loyalty, faithfulness, fairness and untiring energy which characterized his connection with the association and the committee, marked his personal and business relations throughout his entire life. It is therefore fitting that the association, in this meeting, express by this resolution its sorrow at his untimely demise and its appreciation of his service, both to the organization and the industry.

"The secretary is hereby instructed to spread this resolution upon the minutes of the association and to convey a copy thereof to Mr. Weston's family."

Edwin Gruhl, Milwaukee Electric Ry. & Light Co., then read a paper on "Essentials of a Labor Contract." This paper appears in full elsewhere in this issue.

At the close of Mr. Gruhl's paper the secretary read a written discussion contributed by F. W. Hild. An abstract of this discussion is published on another page. R. I. Todd, Terre Haute, Indianapolis & Eastern Traction Co., also read a short paper on the same subject, which is abstracted elsewhere. F. W. Doolittle, Milwaukee Electric Ry. & Light Co., then said that Mr. Gruhl had performed a real service to the association by his very clear preservation of the points of issue between labor and the railway managements. He then read a paper, abstracted elsewhere, amplifying the opening statement in regard to the mutuality of interest of labor and company by saying that the failure to have mutuality could not be placed at the door of the managers but rather at that of the other two parties—labor and the public.

C. D. Emmons, United Rys. & Electric Co., Baltimore, Md., followed Mr. Doolittle in the discussion. He called attention to his experiences in Massachusetts, when in three years there were seven cases of the labor union breaking its contract with absolute disregard of the rights and interests of the company and the public. As to arbitration, he said the unions would not submit to that manner of settlement unless they knew in advance that two of the three arbitrators were favorable to their cause. He cited one instance where a man suggested by the union's own counsel and supposedly appointed, was afterward rejected when it was gleaned that he was not committed to an award to labor.

Mr. Emmons then spoke briefly of the co-operative plan which has been substituted for the union in Baltimore. The union committee has been displaced by a body of twenty-eight members elected from the membership of an association of the employees. This association has a contract with the company and there is also an individual agreement between each employee and the company. Both company and men co-operate as far as possible in all matters of mutual concern. Company representatives sit in at the meetings of the employees and advise with them and there seems to exist a feeling of satisfaction on the part of the men that they are controlling their own affairs. The arrangement is producing satisfactory results for the company.

Fred G. Buffe, Kansas City Rys., gave a brief review of the serious difficulties which have been had in his city during the past year. One strike was called when the men were suddenly organized, and another when they went out in sympathy with the striking laundry workers. Finally, the company determined to operate the system without the union men and began with eighty cars, the regular service calling for about 600. From this beginning, service was gradually built up to normal, although it took several months to acquire and break-in a complete new operating force and involved a tremendous task. But it was demonstrated that service could be given without the union.

Mr. Buffe said that at present his company has the finest force of trainmen and the best spirit that it has ever enjoyed, and is making every effort to pay the men properly and to see that they get a square deal in every respect.

He mentioned the effort being made in Kansas City, Kan., by Governor Allen, to work out a plan whereby the labor unions will be financially and individually responsible in the contracts entered into. He characterized this effort as the one constructive step forward being made in the country to establish the responsibility of the unions on an equitable basis.

General George H. Harries closed the discussion on the labor problem. He said that the paper of Mr. Gruhl presented a very interesting theory for settling labor disputes, but he was afraid it was somewhat idealistic. Personally, he was not an idealist, and he laid down the axiom that where theory harmonizes with actual conditions it may be accepted as fact, otherwise it is no more than a dream. He said that individual freedom of contract is an American principle and asked what, under the plan proposed, a company could say to the unorganized majority of employees who did not want to join the union.

At the close of the discussion on Mr. Gruhl's paper Mr. McCulloch said that the executive committee had received several letters suggesting that more frequent meetings of the association be held during the year and asked for discussion on this point.

Mr. Henry thought no more frequent general meetings were needed, but after saying that the midyear meeting might be held somewhat later in the year to bring it more nearly midway between the October meetings, suggested that the executive committee might hold meetings in different parts of the country at which those in the vicinity could meet with the committee and topics local in their character could be discussed.

Mr. Coates suggested that two such meetings of the executive committee be held annually at points other than in New York and the place of the annual meeting. This was put in the form of a motion and carried. The meeting then adjourned.

Justice to Both Sides in Arbitration*

By F. W. Hild

General Manager Denver Tramway

Contracts between organizations, whether conducted as commercial enterprises or as mutual benefit organizations, such as labor unions, should carry with them responsibility and reliability of performance by the parties thereto. Unfortunately, a number of instances have developed where only one party to the contract is bound and that one the company. For that reason many people believe that until the labor unions assume and demonstrate their full responsibility by legally incorporating their organizations, the essentials of a labor contract are best represented by zero—nothing. There seems to be a growing realization on the part of union labor of the importance and necessity of thus establishing responsibility. In the meantime, however, since contracts are being entered into between the employer and groups of employees, there are at least two matters to be considered by those in the electric railway industry.

The question of settling wage controversy by arbitration seems to be regarded with anything but uniformity among the labor unions. Some apparently are strongly in favor—others as bitterly opposed. That section of organized labor known as the Amalgamated Association of Street and Electric Railway Employees of America is among those which have announced themselves as favorable to arbitration, and this, of course, has its appeal to public opinion.

The companies would find small objection to arbitration if the arbitrators, when fixing wages, could also fix the rates of fare necessary for the revenue to pay the wages. In the absence of this happy condition the company can agree to arbitration only if provision is made for safeguarding it against serious loss or possible insolvency which might result from the wage awards. It is, therefore, important that a labor contract providing for arbitration should also contain a section requiring the arbitrators fully to consider the artificial limitations upon the company's revenues and to make their findings accordingly.

Naturally, the more explicitly this can be set forth, the better for all concerned. For the union, according to my experience, will object to the safeguarding clause while insisting upon the arbitration clause.

In Denver, the company agreed to the arbitration clause, only on condition that the union also agree to the following clause being written into the contract:

> Section 2. As a part of this agreement it is recognized as a basic principle that the public is entitled to good, adequate and convenient service, that the employees are entitled to good compensation and good working conditions and that the investors in the company are entitled to a secure and reasonable return upon their investment as represented by the fair value of the property and both parties hereto agree to exercise their best endeavors in the attainment of these objects collectively.

Under this clause the arbitrators in determining the question of compensation at issue must consider the obligations of the company to all three of the parties interested—the public, the investors as well as the employees, and in the preparation of an arbitration case under such an agreement the company should present exhibits in the order named covering substantially the following:

Service requirements for the public; list of employees and their compensation; cost of living; occupational comparisons; hours of service and working conditions; revenues and expenses.

Each of these is quite a story by itself. Compensation figures should be given on the basis of yearly earnings as the result will show interesting comparisons with some of the crafts where higher hourly wages are in effect but which offer no such continuity of employment as is in the street railway industry.

Objections to Union Collective Bargaining*

By Robert I. Todd

President Terre Haute, Indianapolis & Eastern Traction Co.

THE paper by Mr. Gruhl presents many very interesting and original suggestions regarding the best mehods of handling the labor question in connection with his discussion of the details of what are the "Essentials of a Labor Contract." These are all worthy of careful consideration, but some of them are such as could hardly be safely followed.

The principles laid down in this paper would seem to contemplate the unionizing throughout of all the labor departments of the street and interurban railway properties of the country and dealing with all employees collectively, covering not only the platform men, but including as well in one collective organization, the power house and substation men, shop men, track men, linemen, etc. The developments in recent months show that the tide is drifting the other way, which drift has been strongly augmented by the results of collective bargaining, through forced unionization of street railway properties, particularly during the war period just passed, and which has been so disastrous not only to the companies themselves but also to the comfort and convenience of the public whom they serve. It would seem to be clearly the duty and obligation of all street railway companies in the country to use every effort in their power to prevent such unionization of their properties and consequent union collective bargaining which has practically ruined many of the street railway properties of the country.

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*Abstract of discussion on Mr. Gruhl's paper.

* Abstract of discussion on Mr. Gruhl's paper.

Labor unions throughout the country have absolutely refused to incorporate and assume any financial responsibility, preferring the present method of making contracts through union collective bargaining, which are binding on the company on the one side, but are treated as mere "scraps of paper" by the unions whenever it suits their selfish interests, or even their idle whims. The history in the past shows that no labor organization would accept the plan of assuming any financial responsibility as proposed in Mr. Gruhl's plan for collective bargaining.

We are now entering a period when a great deal of attention will be paid to the particular relations between capital and labor. At such a time the owners of the street and interurban railway properties throughout the country certainly need the benefit of all the points which have already been threshed out in the courts and decided in their favor. Whatever is shown to be reasonable and desirable will be conceded in the way of better working conditions or for satisfactory adjustment of grievances, and all will agree that fair wages are to be paid. Certainly this does not require, and should not be accompanied by, an abandonment of the rights of the companies and especially those rights which have been decided and definitely settled by the courts.

The right to stop by injunction the meddlesome interference by outside labor agitators, who are not employed upon or in any way interested in the property, should in no case be surrendered. Therefore, in considering the drawing of such a contract as suggested in this paper, the possibility of such interference by outside labor agitators should be distinctly borne in mind, and the form of the contract should be such that it will be well within the cases which the courts have already considered in handing down their decisions.

The following are some of the points decided:

1. That it is within the right of an employer to deal with his employees as an organized body or to refuse to deal with them in any other manner than separately and individually.

2. That it is within the right of all employers to refuse to recognize the union and to enter into contract between employer and employees stipulating that the employees shall not join a union and that no union men shall be employed or shall work on the property.

3. That it is entirely competent in making a contract, to provide that there shall be no strikes or cessation of work in a body and such a contract will be upheld and protected in law.

4. That when a contract has been entered into between an employer and one or more employees, it is not possible for the employer to secure an injunction against the party to such a contract breaching same, but notwithstanding this, he may secure an injunction against any third person intermeddling in the contract relations so created, and attempting to persuade the employees into committing a breach of the contract. And as is generally known, if the outside labor agitator can be eliminated from the situation, as a usual thing labor troubles are very generally eliminated.

The term "collective bargaining" is too often used to cover a plan which takes from the companies and their employees the opportunity of making a mutually satisfactory bargain, which is certainly not justified from any proper point of view. Collective bargaining between a company and its employees is entirely different from and not to be compared with, union collective bargaining, where demands on the part of the union are generally determined by persons in no way concerned or interested in the property.

As it has been clearly demonstrated that labor unions do not consider themselves bound by the terms of a contract, it would seem extremely unwise to go beyond those absolutely essential points upon which the employer would base his rights to go into court in case of any complication arising. These particular points would be as follows:

First: The time for the beginning and ending of the particular wage agreement, with provisions for renewal and readjustment of the wage from time to time during the continuance of the employment of the employee.

Second: A provision whereby the employee agrees to refrain from engaging in any strike or counseling, aiding, or inducing others to engage in a strike or any cessation of work in a body, but in case of any grievances which cannot be satisfactorily adjusted, that he will leave the service of the company singly and without co-operation of others and in such a manner as not to interfere with the regular operation of the business of the company's cars.

Third: A provision defining the duties which the employee is to discharge in consideration of the wage which the company agrees to pay.

To these provisions, which may be considered applicable to all contracts, particular provisions can be appended defining methods of adjusting grievances by means of arbitration. In all states where public service commissions are in existence, it would seem that this is the particular tribunal to which such grievances should be submitted for arbitration, as the arbitration power which decides the rate of wage of employees should also be the body which has authority over the revenues of the company as well. Other provisions might be added providing for other benefits or obligations on either of the parties, as may suit the particular case. In no event, should any provision be inserted in the contract, providing for the remedy which the other party may have in case of a breach, as the obligations of the contract being agreed upon, the law itself will supply a more satisfactory and adequate remedy than it would be possible to secure by such an agreement or contract.

While Mr. Gruhl is entitled to great credit for the manner in which he has presented the paper prepared by him, it would not be to the best interest of the industry to follow many of the suggestions made.

Economies Are Possible Through Co-operation*

By F. W. Doolittle

Milwaukee Electric Ry. & Light Co.

OBVIOUSLY, the key note of Mr. Gruhl's remarks is mutuality of interest. Since looking this paper over, I have considered some phases of the practical results obtainable from a recognition of this relation. At least three parties must co-operate, if the electric railway is to live as a self-supporting industry. In the order of their entry into the industry though not necessarily in the order of their importance, for all three are essential, these parties are those who devote their money to the enterprise, those who engage in it as employees and those for whom the service is rendered. Unless the company and the employees co-operate the enterprise must fail, and if they do co-operate a basic wage both to capital and to labor may be had together with some added compensation as a result of the economies effected. Unless the company and the public co-operate, the industry cannot continue; but if they do, the business can be made to compensate the capital already invested at least on such a scale as will induce new capital to come in as needed and the result of this co-operation will be to secure for the public a quantity and quality of service which is commensurate with its needs. Unless the employees and the public co-operate, the enterprise cannot be remunerative, and eventually the employee will have to seek other employment and the public will have no service.

This common interest of the several parties has been pointed out time and again, but has not yet become the rule of practice as generally as it should. Perhaps in no place better than in Cleveland have the advantages of such co-operation been proven.

To be more specific, the possibilities of co-operation between the company and trainmen along the lines of increased speed of cars, economy in the use of power, and attention to matters of safety, resulting in decreased expenditures for injuries and damages and for equipment maintenance, may be made to yield considerable sums, available for increased wages on one hand and decreased operating expenses on the other. The expenditures for these items will in the average property run between 40 and 50 per cent of the operating revenue. Economies effecting a saving of 10 per cent, divided equally between reduction in the cost of service and increase in trainmen's wages may easily net the trainman an amount equal to two to three day's wages per month.

As between the company and the public, such things as staggered hours of closing, the maintenance of a clear track, the skip stop, the use of one-man cars and similar economies may effect lower rates of fare, a decrease in the length of time necessary to complete a journey, increased safety, and considerable betterment both in quantity and quality of service. Co-operation between the employee and the public in matters of safety in operation, speed in loading and unloading, thoughtfulness and courtesy, permit the employee to effect economies such that his compensation will be on a scale high enough to attract the best men into the business, will serve to make existing fares attract the additional investment sufficient to extend and amplify the service and will yield big dividends in satisfaction, both to the employee and the public.

That these economies, possible as a result of the recognition of the common interests of all parties, are considerable is borne out by the fact that the use of one-man cars will under normal conditions effect savings sufficient either to reduce fares 12 per cent or to increase service 30 per cent or to increase wages over 40 per cent or to increase the amount available for return by about the same amount.

It is likely that the high speed achieved in Cleveland due to clear track, skip stops, and co-operation in loading and unloading, amounts to an annual saving of at least 10 per cent in trainmen's wages, while the use of two-car trains throughout the day, resulting in greater headway, has probably effected an equal saving.

The economies resulting from co-operation between employee and company are relatively of greater importance in the power and maintenance departments than in the transportation department, and have in certain cases where seriously attempted resulted in substantial gains in wages and material reductions in costs.

The matters of taxes, paving requirements, snow removal, free lighting and power and similar items should be made the subject of careful study by companies and municipal authorities. Such portions of these expenses as are fairly a part of the cost of furnishing transportation, should be reflected in the rate of fare, but the car rider and the company are alike interested in seeing that the mere circumstance of convenience should not be made the basis of the appointment of the company as a tax collector to raise funds from a single class of the public, the car rider.

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*Abstract of discussion of Mr. Gruhl's paper.

A Memorable Association Banquet

RICHARD McCULLOCH acted as toastmaster at what proved to be one of the most brilliant, instructive and entertaining, as well as best-attended, mid-year banquets enjoyed by the association members in years. Perhaps it was because of the slow yet certain improvement in conditions in the industry which is being sensed, that the members responded so heartily to the sentiments and thoughts expressed by the speakers before this social gathering after a day of serious endeavor. But if there were any executives present who had not yet felt this optimism, they were converted and given a new hope and a new interest in the electric railways as a result of the brilliant talk of Andrew Squire, general counsel of the Cleveland Railway, and of his introduction of Hon. Warren G. Harding, United States Senator from Ohio. The latter's response was an address so meaningful, so sincere, so true to the problems of the electric railways, that it brought the members to their feet several times in admiration and applause.

Mr. McCulloch paid a high compliment, which was heartily indorsed by the members, to John J. Stanley, president of the Cleveland Railway. He said that Mr. Stanley was unique as a street railway president, for he had given his stockholders a raise in pay at the same time he had increased the wages of the motormen and conductors.

Mr. Squire went back into the very early history of the horse, cable and electric car line developments in Cleveland, and gave some of the background of the work of Tom and Albert Johnson, and of Judge Tayler, in working out the present service-at-cost franchise. He pointed out that the principal defects in the plan had been the absence of reward for initiative and efficiency, and the fixed rate of return on the stock coupled with the requirement to sell stock at par. The inability of the company to secure money at 6 per cent has recently been adjusted by an arbitration to a 7-per cent return with the consent of the City Administration. Mr. Squire said, however, that the real success of the service-at-cost plan was due to the efforts of Mr. Stanley, who has a large sum of his own money invested in the property. He predicted that when Mr. Stanley some day steps out and the property is administered by men having only a salary interest, the success of the service-at-cost plan will rapidly decline.

Mr. Squire then introduced Senator Harding and spoke of him in the highest terms, bringing forth great applause when he mentioned the Senator as Ohio's choice for the Presidential candidacy. Senator Harding spoke reminiscently of the first time he had met Mr. Squire, which had been at the home of the late Mark Hanna, about twenty years ago, when the Senator was a member of the State Assembly and had been interesting himself in the contractual relations between public utilities and municipalities. At this time Mr. Hanna had pointedly remarked: "You are interesting yourself in street railway franchises. What the h—— do you know about them?" The Senator said that he had never been able to answer that question.

The Senator paid the electric railways a high tribute when he said that they had responded to the needs of the country by playing a big part in some of the most important things of the war. He characterized the hauling of workmen at home as being no less important than the transportation of soldiers in France. But with all their effort, the Senator said, he knew of no industry or corporation that had been penalized more severely than the electric railways. He scored the Administration for having doubled the expense account of the street railways without having any disposition apparently to help provide means for meeting it. The key-note of his further address was that there should be a square deal for capital as well as for labor, summing his thoughts up in the statement that an honest investment in an honest public service must be assured an honest return.

The Senator said he doubted the wisdom of public ownership and thought it was merely a scheme for drawing the dollars in the people's pocket from an impersonal treasury. He then illustrated at some length the manner in which organized labor might easily become a powerful capital-producing machine, accruing to its own great advantage, based on the assumption that it was capable of collective undertaking as well as collective bargaining. If it would direct its efforts along this line, he figured that it could own one-ninth of the entire electric railway properties of the country in ten years, supposing that each employee invested one hundred dollars a year. The result of this would be to transform the laboring classes into capitalistic masses. He laid great emphasis on the thought that saving is safer and surer than seizure.

Edgar A. Guest, poet and humorist, then kept the members in laughter with his stories and wit, interspersed with poems which seemed most appropriate and pleased his audience immensely.

The ladies in attendance at the mid-year meeting were entertained under the direction of S. D. Hutchins, of the Westinghouse Traction Brake Company, and his committeemen.

They were served a six o'clock dinner at the Hollenden Hotel, after which they saw Frances Starr in "Tiger, Tiger." They joined the men in dancing after the banquet. There were about fifty ladies in the party.

American Executive Committee Meets

ON JAN. 7 the executive committee of the American Association met in Cleveland, Vice-President Richard McCulloch presiding. Members and guests in attendance included J. G. Barry, W. S. Bartholomew, E. B. Burritt, J. K. Choate, F. R. Coates, W. Caryl Ely, Thomas Finigan, Jr., S. B. Hare, General George H. Harries, B. A. Hegeman, Jr., C. L. Henry, E. R. Hill, P. J. Kealy and J. J. Stanley.

The report of the committee on revision of dues was considered informally, no action being necessary, as the committee at its preceding meeting had taken the steps necessary for the consideration of the report by the association at the Cleveland meeting. The matter of enlarged office space for the association headquarters was next discussed, but it was decided not to do anything along this line for the present. A plan for the printing of a simple catalog of manufacturer members' products and a list of these members was then approved.

On the invitation of the committee B. J. Mullaney, who directs the activities of the Illinois Committee on Public Utility Information, gave an explanation of the work of the organization. It has now been in operation for about nine months and has made itself felt as an agency for disseminating facts regarding the public utility business, outside the State as well as within, and is appreciated by the newspapers generally. Mr. Henry followed with a statement of a similar work which has been undertaken in Indiana, and endorsed the plan heartily. On his motion, the general scheme was approved for wide application with the states as organization units. Barron G. Collier was appointed to represent the association on a joint committee of representatives of interested utilities to foster the plan. Although a definite plan for such a joint committee has not yet been formulated there is reason to believe that it will be in the near future.

The arrangements to be made for the continuation of the Washington office were next discussed, and a sub-committee, consisting of General Harries, Mr. Choate and Mr. Kealy, was appointed to report as to steps to be taken. The committee will present its report at a later meeting. The executive committee also considered the desirability of holding meetings of the association more frequently than twice a year. The preference, however, was for a continuation of the present practice except for the possible placing of the mid-year meeting date a few weeks later than present practice.

The topic of possible changes in the method of conducting the association magazine *Aera*, was then brought up and it was decided to make it a special order for the next meeting.

Essentials of a Labor Contract[*]

The Author First Outlines the Principles Underlying the Proper Relation of Employer and Employee and Then Sets Forth and Discusses Section by Section a Suggested Labor Contract

By EDWIN GRUHL
Assistant to the President The North American Company,
New York City

> The losses incurred by strikes, from which we have not been exempt; the ceaseless discussion of the relation between labor and capital, incident to modern times; and the increasing sensitiveness of capital to social disquiet, all unmistakably suggest that, so far as possible, corporations employing large forces of men should ground their policy on equity, avoid unnecessary antagonism, and consequent hostile legislation. We owe this duty to society, and we owe it to the large interests confided to our charge. It may be impossible to prevent occasional disputes, but when they arise, we should not be found evidently in the wrong, and bearing the stigma of oppressing labor, or of neglecting wise and just rules for its employment and control.—*Report of the Committee on Labor and the Graduated System of Compensation.—American Street Railway Association*, 1884.

IN 1918 forty-six strikes of electric railway employees took place, involving approximately 17,000,000 people, of average duration of six days. During the first eleven months of 1919 seventy-five strikes occurred, involving approximately 40,000,000 people, of average duration of over nine days. The economic loss to communities thus deprived of local transportation service is staggering. In Pittsburgh the Public Defense Association brought suit against the Association of Employees and the receivers of the railway, for damages enumerated at $2,000,000, for a strike in that community which lasted four days. Losses no less real but concerning which no legal proof was available, probably exceeded this claim in substantial amount.

Nor can it be said that our labor relations are now on the high road to settlement. Despite the very large increases in hourly wage rates which have occurred in the street railway industry, the amounts conceived in some quarters as necessary compensation to provide a minimum standard of comfort are far from being achieved. Testimony introduced before the Federal Electric Railways Commission indicated that a *minimum comfort wage* of $2,000 per year was necessary. Applying this minimum comfort wage to the total employees in the industry would amount to more in wages than all the gross receipts collected from the public.

CO-OPERATION MUST BE SECURED

Personal service these days comes high. The electric railway industry performs a personal service. Nearly 70 per cent of its cost of operation is paid in wages. Yet the public demand is that street railway fares remain cheap. Increases in fares have in only a few instances brought corresponding increases in revenues. The economic limit of what the industry may charge for its service has been reached in many cases. Under the present scheme of operation, the industry cannot support increased labor cost. Co-operation in fact as well as in theory, instead of antagonism between employer and employee, is necessary to approach the reasonably necessary return on capital invested and the minimum comfort wage for labor employed.

It is not believed that anyone in the industry resents the idea of real partnership with its employees. Perhaps one of the troubles which has contributed to the disrupted conditions which now confront the industry has been the endeavor by traction managements to carry the entire community burden on their own shoulders. It is far better to share the responsibility for successful public service with employees and with the public authorities.

There are evidences of a change in the temper of the public toward strikes in essential industries. Paralysis of community activity is a terrific penalty to pay for the lack of a comprehensive plan of labor relations. It is too much to expect that the public will tolerate being deprived of the necessities of life because employer and employee cannot come to an understanding. Two alternatives are open. Either employer and employee must agree to an automatic and equitable determination of their differences, through contract and without recourse to the usual methods of industrial warfare, or the iron hand of government will be impressed upon the industry to the possible detriment of both. This has been the gradual trend in the strike-scarred countries of Australasia, where arbitration is in large part made compulsory and definite penalties on employer or individual employee, as the case may be, are meted out for failure to observe the procedure prescribed by statute.

LEGISLATION THAT HINDERS RATHER THAN HELPS

In this country such a movement is already under way. In Wisconsin street railway labor narrowly escaped being deprived of the so-called right to strike, and only an effective legal presentation on the unconstitutionality of such a law prevented its enactment. As it was, legislation was enacted at the 1919 session of the Wisconsin Legislature which created a State Board of Conciliation[1] whose findings when approved are backed by the full plenary power of the Railroad Commission of that State compelling performance upon the part of the employing company. The law does not compel performance upon the part of the employee, yet it may be seriously doubted whether, in the event an award of the Conciliation Board were unsatisfactory to the men, labor counsel would advise a strike against the State, all so-called constitutional rights notwithstanding.

The Commonwealth of Massachusetts at its 1919 special session[2] had before it "An act to secure continuity of service on street railways under public control," a bill accompanying a report of the Street Railway Commission. This act makes strikes unlawful and in addition to the usual powers inherent in the State to prevent unlawful acts, provides a unique means of compelling performance upon the part of the employee in the shape of a lock-out from the industry for a period not exceeding one year. Prohibition of strikes is also a feature of the Cummins railroad bill, now advanced toward passage in Congress. The Merchants' Association of New York has submitted to the Chamber of Commerce of the United States for referendum vote a resolution:

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[*] A paper read at hte mid-year meeting of the American Electric Railway Association, Cleveland, Ohio, Jan. 8, 1920.

[1] See ELECTRIC RAILWAY JOURNAL, Vol. 54, No. 20, page 891.

[2] For text of bill see the issue of this paper for Nov. 8, 1919, page 873. An account of the defeat of the measure will be found in the issue for Dec. 20, page 1014, and editorial comment thereon in the issue for Dec. 27, page 1030.

> That the tenure of service of employees of public service corporations, particularly of transportation corporations, should be regulated by law in such manner that each person who voluntarily elects to enter such employment shall, as a condition of such employment, be legally obligated by contract to continue therein for a specified term, during which term he may not lawfully quit that employment nor the corporation lawfully discharge him from its service, except as provided by such contract; and that such contract should provide adequate penalties for violation of its terms by either party.

Such regulation inevitably carries with it supervision and even definite statutory enactment of terms and conditions which may prove more onerous than helpful to the industry. It is far preferable to accomplish the same commendable purpose by contractual agreement satisfactory to both employer and employee. In the street railway business the question is not one of quarrelling over the lion's share of the products of industry but of mutual self-preservation. The principles of partnership must take the place of class antagonism and both employer and employee must present a united front in the interest of the industry on which their bare interest return and livelihood depend.

PRESENT COLLECTIVE BARGAINING IS ONE-SIDED

Collective bargaining is a loosely used term. Viewed merely as an idea without delineation of details or the methods by which it is practised, it finds a ready acceptance by the great mass of the public. The apparent struggle between a large accumulation of capital operating through a corporation on the one side and "downtrodden workman" on the other, produces sympathy for the latter. This sympathy may come from either a sense of fair play or support of what is believed to be the under-dog. But bargaining in its present-day business sense contemplates the exchange of a definite quantity of goods or personal service for its equivalent value in money. Goods can be measured by length, area, volume, weight or the piece. Personal service can only be qualitatively judged by the hour, day or month. Bargaining for personal service means nothing until both sides to the trade can measure the quantity of service to be given in exchange for the agreed amount of money. The value of the service depends largely upon the value of the product produced thereby. Collective bargaining cannot be practiced in its complete sense until the output of labor is more accurately measured and a relationship is established between wages and selling price of product resulting from the labor for which such wages are paid. To paraphrase a recent writer, the present-day collective labor contract requires definitely what the employer shall pay and requires him to guess as to what he is to get; it specifies definitely what the employee is to get and permits him to guess what he is to pay.

There is no difference in opinion as to the object to be achieved by a labor contract. It is well stated in the extract from the proceedings of one of the first meetings of this association more than a generation ago, quoted in the foreword of this paper. It is reiterated in the Code of Principles adopted by the association in 1914:

> The relation of adequate wages and efficient operation should always be recognized, but electric railways, being public servants regulated by public authorities, should be protected against excessive demands of labor and strikes.

Orderly arbitration rather than strike was also emphasized at the convention of the Amalgamated Association of Street and Electric Railway Employees' Association in 1913. At this meeting the international president stated that the success achieved by that association had been due to the fact that

> arbitration was the cornerstone upon which the association had been built. The assurance to the employer and to the public that in cases of dispute between us there will be no strike but that the matters in dispute may be submitted to arbitration has been the means by which you have secured your agreements and through which you have established your splendid organization. You are not only the employees of the corporation but you are also the servants of the public and you must take that fact into consideration. You must remember that the public sentiment is more necessary in your contest that it is to any other class of workers in their contest. . . . To abandon that principle now would be to change the entire policy of your organization and leave you practically without an anchor, and I feel you cannot afford to take that position. It would spell disaster and destruction to this magnificent organization.

This is a commendable unanimity of purpose but in obvious contrast with the record of strikes in the street railway industry.

PARTIES ARE EQUALLY RESPONSIBLE

Labor contracts have in the past taken the form of individual agreements and collective agreements. There may be advantages in the individual agreement as such, but it is not my purpose to discuss them here. It is the collective agreement in which most of the members of this industry are interested.

The first essential underlying any labor contract must be the recognition that both parties to it are in every respect on the basis of absolute equality. There are few people in the industry today who would be unwilling to become party to a collective labor contract if they were assured that the responsibilities rested with equal weight on both parties. True collective bargaining assumes the right of employees to be represented as a group by fellow employees of their own choosing empowered by a majority vote to so represent them.

It is also essential to any workable agreement that there be the greatest freedom of action and willingness by both parties collectively and individually in subscribing to the principles and future course of dealing which are laid down in the labor contract. There can be no coercion of employer by employee or employee by employer. The parties to the contract cannot be expected to fulfill its conditions in the spirit essential to success where such contracts are signed under duress. So-called labor contracts are too often merely treaties of peace readily construed as scraps of paper or records of mutual distrust. It is not believed that there is any disposition on the part of any employer in the industry to make any employee join what he does not want to join, or to prevent him from joining what he does. Individual freedom to contract is an American birthright.

There also must be no difference as to the definite responsibility of the parties. The complement of collective bargaining is collective responsibility. But this does not mean that the theory of the collective agreement deprives the individual of the right to make an individual contract. Equality of bargaining power brings with it equality of obligations, and it is only right and proper that the collective agreement be personally subscribed to by all existing and incoming employees so there can be no dispute as to its terms and conditions and no question as to the individual responsibility to observe it. If there is to be collective bargaining, the individual must agree to bargain collectively, and individually to adhere to the collective agreement. The individual agreement to bargain collectively sounds like a paradox but has a real existence and is the outgrowth of a studied desire to eliminate the disadvantages of the individual contract and the ordinary collective agreement.

There seems to be a mistaken economic notion that labor contracts are peculiar or different from ordinary contracts used to sell goods, and there is considerable nonsense about an employee binding or selling himself into involuntary servitude. There is, in fact, no difference between contracting to sell productive effort concretely as a finished product or as the labor part of that product in the course of manufacture. Every money consideration is, in fact, convertible into terms of labor, and the individual who complains most against tying himself down definitely to a job has no compunction about contracting for the equivalent of several weeks' compensation in buying a victrola on the installment plan or in renting his house. A contract for personal service is as proper for a street car employee as it is for a baseball player or a prima donna. Nor should there be any greater hesitancy about subscribing definitely to terms, conditions and conduct at the time employment is entered into in this industry than in the case of government officials, policemen and firemen in subscribing to an oath of allegiance. It is human nature to wish to reserve freedom of future action but it is far better that this freedom be restricted by individual choice than by government regulation. Where all the advantages of bargaining collectively have been assured to the individual and full rights of collective action have been established, the individual is not so hampered that he can conscientiously refuse to subscribe individually to a contract that has been secured for him collectively.

Collective bargaining as now practiced seldom carries with it individual sanction. There is the usual delegation with no further credentials than their own assurances, the usual contract when these minds have met and smoked many cigars, the usual slim but well-cappered mass meeting, and so forth.

A FEW PREAMBLES ARE STATED

Having brought about a real meeting of minds and placed both parties in the same position of responsibility toward their obligations, we come to the preambles of the contract itself. The purpose of the contract may be thus expressed:[3]

> Whereas, it is agreed by both parties, that they are jointly engaged in performing a public service and it is for their mutual interest and the convenience of the public that there should be continuous and uninterrupted street railway service.

We may also recognize in the preamble the reciprocal rights and obligations that reflect the relation of the parties one to the other and that are the legal considerations under which the agreement is formally entered into. What are these diverse interests which each party must recognize? The right on the part of labor to a wage which is at least a living wage and in addition compensation for added skill and effort; for hours which at least do not undermine health, with the possibility of added hours for diverse interest and recreation; for conditions of employment that will at least minimize the danger of accident and in addition will go as far as possible to make work a pleasure. On the other hand there should be a return at least sufficient to induce capital to flow into the business with a possibility of additional return for efficiency of management; hours of labor at least within those necessary to perform public service with a betterment to hours which will mean the maximum utilization of equipment; working conditions that at least promise satisfaction of service to the public and that will in addition provide successive increments of good-will and increased prosperity.

> Whereas, it is agreed by both parties that harmony and co-operation are essential to assure to employees as a minimum requirement a living wage and such restriction of hours and conditions of labor as are essential to health, safety and well-being; to assure to the company as a minimum requirement a return necessary to induce capital into the business and satisfactory and adequate service as required by its duty to the public; and permit the sharing of such additional returns by both parties as may be the product of their efficiency, management and productive effort.

SOME MUTUAL PROVISIONS

With this description of the fundamental objects and the reciprocal rights and obligations of the parties, we come to the provisions of the contract itself, with the separate undertakings as to future conduct. The requirement is that these must be mutual, must be possible of achievement, must be enforcible and not against public policy, and withal, must be definite and simple.

Duration of the contract, if fixed, should be for a long period, but preferably indeterminate.

> This agreement shall continue in force for an indeterminate period except that it may be terminated by either party upon giving six months notice to the other party of its intention so to do.

The individual right to quit and the right of the company to discharge are important features which are certain, if not mutual and definite, to lead to grievances and conflict. The individual right to leave at any time carries wih it the correlative right to discharge at any time. The individual right to leave after notice or after sufficient time to efficiently fill the place carries with it the reciprocal obligation of discharging only on notice and for cause. If the company is obligated to pay fifteen days' wages upon discharge, the employee ought similarly to waive fifteen days' wages on quitting work.

> It is agreed that the company shall not discharge any member of the association from its employment without adequate cause and the association agrees that its membership will not cease their employment with the company at any time except upon giving the notice required to cancel

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[3] This and following clauses are intended merely as illustrative in definite and simple form of the principles of a labor contract embodying the writer's individual views. They do not textually follow present practice although in many cases are not inconsistent with the manifest intent of existing contracts.

> this agreement. Individual members may leave upon giving such notice as the company may from time to time require, and the company shall not require any notice longer than that required to efficiently fill the place of the member about to leave.

A Basis of Wages and Relation of Wages and Rates

With a contract of indeterminate duration it is desirable that some automatic basis of wage adjustment be provided in the contract applicable to all employees of the company. While definite wage rates may be fixed in the labor contract, a situation may readily arise, as it has in the past two years, where the resulting compensation becomes too low to attract and hold employees in the industry. The contract fails because performance under it has become impossible. The question of how large an increase in wages is justified in labor controversies is now being solved under fairly standard procedure by the device of index numbers. The wage is calibrated with the cost of living. Such a method has been repeatedly used by arbitration boards before the war, was used by the Railroad Administration in determining the increase in railroad wages under government operation, by the War Labor Board in its determinations, and recently by the government in fixing the advances to which coal miners were entitled.

This basis of adjustment in wages is readily possible in competitive industries where no restrictions are placed upon the cost at which the product of the enterprise will be sold. Even here, as has forcibly been brought to the attention of the public in the recent coal wage controversy, there is a direct relation of wages paid to selling price. The provision to regulate wages in accordance with the cost of living may become impossible of performance in an industry where the price of service is not permitted to increase with its cost. The Conciliation Board law of Wisconsin recognizes the necessary relation of rates of charge for service to wages paid. Several of the public service commissions while not definitely empowered to determine wages, have under general arbitration clauses accepted this same responsibility. There is no reason why the wages of labor should not be based on the same equitable considerations as the wages of capital. No comprehensive plan of regulation can succeed which does not take into consideration the fair return to both parties to the labor contract.

Consideration of the reciprocal rights of employees and the company as expressed in the preamble suggests the provision:

> The company agrees, when and as provided with the revenues necessary, therefor, to pay to all employees now receiving $150 per month, or less, increased wages which, when compared with those being paid in 1913, compensate the employees for the increased cost of living, and to adjust wages either upward or downward in the future in order that the same may be kept in substantial accord with the cost of living as measured by the index number during each half yearly period in each calendar year.

The cost of living is the variable component of the total wage paid, and the increase must therefore be based upon that portion of the wage representing the cost of living in 1913.

> The first $50 of monthly compensation shall be increased in the proportion that such index number of the cost of living during the period bears to the same number averaged during the year 1913.

These provisions relate, however, only to the bare standard of subsistence for both employees and the company, and provision is properly made for the division of the increased increment of earnings arising from increased productivity.

> The company agrees to establish profit-sharing plans by which employees may earn additional compensation by reason of their increased productivity.

Application of these provisions may readily be made to the various occupations employed and a scale of wages for each period ascertained and recorded in memorandum agreements attached to the labor contract. This is particularly convenient where the plan of collective bargaining desired by the employees requires separate representation for each occupation.

The agreements as to hours and working conditions are not so simple. One source of conflict in many labor contracts are the multifarious provisions on relatively unimportant operating details. Obviously, no labor contract applicable to the entire industry and all occupations can be made a manual of operating procedure or a book of rules, particularly where conditions of operation are subject to such frequent change as in the business of local transportation. As a consequence a breach of contract is not only possible but inevitable. What is needed is not a catalog of possible grievances but machinery for settling individual grievances efficiently and promptly.

A street railway must supply service when and as demanded. Its hours of labor are not of its picking and choosing, and to talk in generalities of an eight-hour day, penalties for overtime and days of rest, is to forget that it is an industry in which the whistle never blows. It is a misfortune for both the employee with mealtimes and bedtimes at wholly unorthodox hours and the company with its equipment idle during the greater part of the day, that our communities are continuously getting into worse habits of transportation. But it is a condition of the industry, which both must face with the spirit of accommodation and which can be very much remedied by co-operation.

How Shall Grievances Be Settled?

Just what plan of settling grievances is adopted depends upon the plan of collective bargaining employed. Representatives selected by employees for the purpose of negotiating on wages and form of additional compensation for efficiency can also serve as the medium through which any complaints as to hours and working conditions are taken up with the management. Obviously, the particular form of representation required is a question for the decision of employees. No company desires to interfere in any way with the freedom of approach on any question affecting the employees and the company. It is desirable, however, that the procedure involved shall be organized, routed and dispatched in the same way as the other operating problems which confront the management. The representatives nominated and elected by the employees for different branches of the business may be known as grievance committees, labor adjustment committees, co-operative councils or by any other designation. The procedure by which such employees are chosen is properly made part of the contract as the company has the right to insist that representation is permanent and satisfactory to each individual employee as part of his contract for service. Until such committees are well established and a code of procedure has been worked out, it is undesirable to limit in any way the discussion of problems of wages, gain-sharing, efficiency, hours, continuity of employment, improvement of working conditions, safety, or discipline and discharge. There is naturally a tendency to regard many of these questions as an exclusive function of the management which can in no way be debated without interfering with the necessary discipline which must accompany efficient service. However, where such committees have been given free scope of action, the general experience has been that self-government has been a success and that employee representation carries with it responsibilities which are not disregarded. One company has worked out a complete code of service violations for its transportation department, with maximum and minimum penalties for specific violations ranging from tardiness to dishonesty. This company has left all appeal on these penalties to a committee of three, two of which are duly elected representatives of the employees of the station, and the third a company representative. A majority vote of this body upon which employees' representation is two-thirds, is binding. There have been few appeals and, strange to say, such as have been made have been decided against the appealing employees. Instances have even occurred where the company representative was out-voted on a recommendation of lightening the penalty of the fellow employee. In this case the operation of discipline has been tied into the operation of a bonus plan according to which the bonus fund is divided among the undisciplined employees.

The most satisfactory adjustment of runs to traffic demands is also a matter upon which co-operative action of committees of employees and company representatives has resulted in a solution of the problem of spread of duty and hours of service which is economical, convenient and mutually satisfactory. By this means a normal distribution of spread of duty has been evolved which conforms to best established practices, but the plan permits of deviation in those exceptional traffic conditions which every street railway occasionally faces.

> It is mutually agreed that the employees in each department shall have the right to elect representatives to be known as adjustment committees. Such committees shall generally consist of two members from each group of employees having headquarters at different geographical locations and belonging to the same department, provided that the employees shall have the power to determine the number of members to be represented by each such adjustment committees and to provide for as many of such committees as may be needed for the convenient transaction of business.
>
> Memorandum agreements respecting wages, hours, or working conditions may be executed between employees in any department of the company represented by such committee and the superintendent of such department. Such agreements when approved by the parties hereto shall be in full force and effect as if they were incorporated in this agreement at the time of its execution.

MAKING ARBITRATION COMPULSORY

The possibility of disagreement between the parties carries with it the necessity of an adequate provision to insure arbitration. The usual provision for three arbitrators may be made, one being chosen by each of the parties. Where possible, however, it is desirable that the third arbitrator be definitely determined so that no opportunity for dispute may arise because of failure of the arbitration provision to operate. Where commissions have been established by the state, with definite powers over the rates of fare which the street railway is permitted to charge the public, such questions at least which involve the minimum requirement of the employees for a living wage and of the company for a return necessary to induce capital into the business, should be referred to it. This is particularly essential where the question in dispute is whether increases in wages can be paid from the returns being earned by the employing company. It is also essential that the scope of arbitration cover not only disputes as to wages, hours and working conditions, but questions as to the interpretation of the agreement itself, thus precluding any possibility of the plea that the issue involved is not arbitrable.

> If any dispute between the parties hereto shall arise concerning the interpretation of this agreement or respecting wages, hours or working conditions, which cannot be settled satisfactorily to both parties by negotiation, then it is agreed that such dispute shall be referred to a board of arbitration consisting of three members, one of which shall be chosen by each party and the third shall be . . . . The decision of any two of these arbitrators shall be final and binding upon both parties.

AGREEMENT TO ABANDON USUAL METHODS OF INDUSTRIAL WARFARE

The acceptance of arbitration carries with it the abandonment by both parties of the usual methods of industrial warfare. This understanding may be made definite by prohibiting participation in any interruption of public service. This does not involve the individual right to quit employment for which provision has already been made, but concerted or collective action or conspiracy with this end in view.

> It is mutally agreed by all the parties that they will not, nor will any of them permit, encourage or take part in any lock-out, strike or other interruption of the public service, but will proceed to settle all causes of difference by arbitration as herein provided.

The foregoing provisions embrace in simple form a complete contract, the undertakings of which are mutual, possible and it is believed enforcible.

ENFORCING THE CONTRACT

The simple reason why many so-called labor contracts fail is that they are too often regarded as mere gentlemen's agreements not enforcible against anybody. They are regarded as establishing at most a usage or customary standard which the employee may disregard without hindrance. We are frequently reminded in defense of such an idea that enforcing specific performance of a contract for personal service is involuntary servitude or slavery. We are also advised, with however less conviction, that the collection of damages for breach of contract is impracticable, and that labor organizations are without liability and in no sense responsible for the acts of their individual membership. The individual members are described as downtrodden, struggling, property-less beings, upon whom the interests of society impose the same disability to make contracts as the law applies to infants and lunatics. The picture is not flattering to the type of independent American employee with whose loyalty and fellowship this industry is familiar and it is surprising that such medieval notions should so often be aired by professional labor counsel. The average employee will be found as honorable in the observance of his plighted word as any other individual. He is not seeking rights without obligations. and while his conception of lawful obligations may be limited, he appreciates fair play and detests a welcher. We may safely expect him to regard voluntary servitude as honorable service.

If need be, a collective agreement properly drawn is enforcible. Individuals may quit work "singly or in concert" if the Clayton act applies, but they cannot conspire to wreck contractual relations. And if collective bargaining is safeguarded by the individual contract, enforcement is made doubly sure by injunction with its various contempt penalties, by liability for damages of the employees' organization or individuals, or by fines and penalties, either imposed by contract or by general statute, as suggested by the proposed law for street railway employment in Massachusetts.

STRENGTHENING THE LABOR UNION

A general objection is anticipated to the form of contractual relation described. It may be urged that it minimizes the function of employees' organizations through provision for individual contracts, and that it is designed to weaken rather than strengthen the position of the labor union. This is not the intention nor the effect. Under a labor contract such as outlined, it is entirely possible, and in many ways highly desirable, to deal with a union of employees which will assume collectively the responsibilities which under a looser form of association must be shared by the individual employee. Mutual provisions of such an arrangement may provide that the union shall supply the company with all the competent employees which the company may require in order to effectively carry on its business and perform its duties to the public, and that the company shall employ only such applicants for positions as indicate their willingness to become members of the union. It may provide on the one hand that the union take over the training schools being conducted by the company, and assume responsibility for the integrity of its members; on the other hand, that the company obligates itself in consideration of this service partially to reimburse the union for its educational, sickness, accident, death and pension benefit expenses. The liability for damages because of breach of contract, largely assumed by the individual employee in the contract outlined, can be limited through the formation of a corporation under the laws of the state in which the company operates. The corporation may have a sufficiently large authorized issue of shares of capital stock for each of the present employees and for the increase in numbers, and provision may be made that employees when entering employment provided by the union, shall subscribe for one share of stock of relatively large par value, making an initial payment and assuming a future liability for the balance, and that the holder of each share of stock will be entitled to one vote at meetings of the corporation. The stock may then, together with the additional obligation incurred by the employee in becoming a shareholder, be deposited with the company as a guarantee that the employee shareholders of the union will faithfully carry out their contract with the company. In the event that the union should break its contract by concerted cessation of work, the company may sue the union and the union in turn may call its unpaid subscriptions to pay damages in event that such are awarded.

EVOLUTION OF THE UNION

It is probable by gradual process of evolution that the scope of the employees' union will be much extended and its usefulness improved. A successful labor organization, however, is one which will supply all the benefits of co-operative action demanded by employees; which will not discriminate in favor of specific occupations or trades but will occupy the entire industry, giving the benefit of its collective bargaining power to every occupation however humble and small in number; which will provide adequate insurance against sickness and death, including medical attention; which will provide pensions when the age of retirement is reached; which will provide educational facilities to increase the productive capacity of the individual and increase the possibilities of higher returns; which will encourage and advocate rather than hamper the introduction of more efficient methods and labor-saving devices; and which will recognize its responsibility in securing adequate rates of fare and insist on dividing the gains growing from such co-operative effort—an organization whose claim for support to its membership will not be solely one of parading cut and settling disputes or maintaining its leadership but will be one in the real interest of the employee.

San Antonio Has an Inbound-Outbound Zone

Adopts Plan for Sixty-Day Trial in Lieu of Six or Seven-Cent Fare Which Court Decision Makes Possible

THE San Antonio Public Service Company put into operation on Sunday, Nov. 30, 1919, a new system of fare collection which it has called a "zone system" in its announcements to the public. Summed up in a word, this plan consists of collecting a 5-cent fare to ride into the business district and another to ride out of it, or two fares across the city.

All but one of the seventeen lines operated are what the Texans call crosstown lines, though more generally known as through routes. They all enter the central business district from an outlying district on one side of the city, pass through this district and extend to another outlying residential section on the opposite side of the city. Until Nov. 30 the fare was 5 cents for a ride of any length, or from one side of the city to another, and transfers were free. Beginning on this date, all principal downtown transfers were abolished and each line was divided into two parts, the ride downtown and the ride uptown, and a 5-cent fare collected for each part of the ride. The zone limit was made the first side, on the inbound trip, or a central zone defined as the "downtown loop." This loop comprises the area within Houston Street, Alamo Plaza, Commerce Street and Main Avenue—six blocks long and three wide. Passengers inbound toward this loop pay as they enter, boarding at the rear of the car and alighting from the front exit. When the car reaches the first side of the loop, however, passengers are required to leave by the rear door. Passengers boarding the car from this point on, in the loop, and all other outbound passengers, get on at the front and leave by the rear door, paying as they leave. Passengers who desire to ride to a point within the loop not reached by the car on which their ride originated are permitted to change to the first car available and no transfer is necessary. Likewise, passengers within the downtown loop may take the first available car to carry them to the point from which they can get the proper outbound car. In this case, also, no transfer is issued and the fare on the outbound car covers the entire ride. This particular part of the scheme makes it possible for passengers to board a car within the loop and ride to the opposite side of the loop or to any point within and get off without paying any fare. At the end of the first week's trial, the amount of such free riding was becoming noticeable. It is intended, of course, that patrons whose ride originates and terminates within the loop will enter at the front and pay as they leave. A passenger who rides through the city on the same car pays one 5-cent fare when he gets on and another when he gets off.

The installation of this new plan of fare collection met with very little opposition on the part of the public, more than likely because an advertising campaign had been conducted by the company which had brought the people to a fairly general realization that some form of relief was necessary. The fact that this particular plan was recommended by the City Commission, as related below, no doubt had a bearing on the absence of complaint also.

In general the company felt, at the end of the first week, that if anything the fare collection under this plan was being done better than before with the straight pay-enter system. There are only three heavy unloading points on the system at which any great number of fares must be collected at one stop, but none of these has been heavy enough to cause any serious delay or manifestation of impatience on the part of passengers. The near-side stop has been retained for both the pay-enter and pay-leave services.

The primary object of the new zone scheme was of course to increase the revenue, but the result up to the end of the first week was very disappointing in this respect. The two-fare plan apparently had caused many people to refrain from riding, had added a few more patrons to the jitney competitors who now give a slightly longer ride for 5 cents in a few cases than the railway, and had been the cause of the military post commander setting up an army bus service to bring employees into the city, saying that his was necessary in order to hold their services.

EVENTS LEADING UP TO ADOPTION OF ZONE PLAN

The San Antonio company's present zone plan is the outcome of about a year's effort to secure increased revenues, though present indications are that it will not mark the end of this effort. About a year ago the company went before the Commission Council with a petition for a 6-cent fare. A long hearing followed during which the company proposed, as an alternative to a flat increase in fare, a zone plan about the same as the one now being tried. After the hearings had been concluded, the commission reached the decision that the company ought to have relief but that inasmuch as its franchise specified a 5-cent fare, the commission doubted its authority to grant any alteration of the contract. The company made a second petition to the commission and again received recognition of need for relief but no means of providing it.

The railway then brought the matter before the federal court on the ground that strict enforcement of the franchise meant confiscation of property without due process of law, and that the contract had been abrogated years ago when the State Legislature passed the bill providing for half-fares for all school children. In this petition before the court, the company asked for the right to charge a 7-cent fare. After consideration of the case, the court issued an injunction against the city's enforcement of any of the ordinances passed to reinforce the commission's position of holding the company strictly to the terms of the franchise with its 5-cent fare provision. The court made no reference whatever as to what rate of fare might be charged and apparently left the matter wide open for the company to set up whatever fare it chose.

At this stage of the controversy, the commissioners came to the company and expressed their intention to appeal the decision of the court but offered to make it a friendly case if the company would agree to give a sixty-day trial to the zone plan which is now being operated. Desiring to keep within the graces of the authorities where this was practicable, the company decided to try out the zone plan. If this gave the necessary increase in revenue, to enable the company to earn a reasonable return on the invested capital, then this would be fully as satisfactory as a flat increase to 6 or 7 cents, and there are many advantages in retaining the nickel as the fare unit. If this plan does not accomplish the object in view, it seems likely that a flat fare of 7 cents will be adopted.

Proposed Electrification in South Africa

PLANS have been prepared for the electrification of sections of the South African Railways, involving a total of 860 miles, or a single-track equivalent mileage of 1219. An expenditure of more than $50,000,000 will be necessary. The three sections involved in the present plan are between Cape Town and Touws River, Komati Poort and Randfontein, and Durban and Bayside respectively. Direct current at 3,000 volts for the contact system; three-phase, 50-cycle distribution, and regenerative control on some sections, are among the recommendations.

Three types of locomotives are proposed. The freight locomotive would be designed for hauling a 1,200-ton train at a speed of about 40 m.p.h. on the level, or one of 1,800 ton, at 30 m.p.h. Motors would have a capacity of 2,800 hp. on a one-hour rating, a total of four double motors being provided. The locomotive would be in two double-truck sections or units, articulated together, each having two driving axles, a jackshaft connected through crank and siderod to the driving axle, and a pair of motors geared to the crankshaft. The locomotive is estimated to weigh 134 tons and produce 48,000 lb. tractive effort. The passenger locomotive designs are similar in general construction, except that they provide for gearing for a speed of 55 m.p.h. on the level, for the exertion of a tractive effort of 13,000 lb. at the one-hour rating of the motor, and for an estimated weight of about 81 tons. The third type of locomotive mentioned is a shunting locomotive of about 68 tons weight, to produce a tractive effort of 14,000 lb. at 12 m.p.h. The estimated profit for electrical operation on these divisions amounts to nearly $4,000,000 annually.

The Imperial Government Rys. of Japan announce a decision to extend the elevated railway system of Tokyo to accommodate both steam railway and local electric railway lines. The extension will connect the steam lines which are now separated by a gap in the city and will also greatly improve the rapid transit system in the capital. It is planned to complete this work within the next two years. This statement will be of interest in supplementing the article by Shiro Sano, appearing in the issue of this paper for July 5, 1919, page 4.

Maintenance of Way for Street Railways[*]

The Organization and Methods Employed for Carrying on the Work Necessary for Maintaining the Tracks of the Connecticut Company Are Described

By W. R. DUNHAM
Engineer Maintenance of Way The Connecticut Company, New Haven, Conn.

STEEL TIE CONSTRUCTION

THE lines of the Connecticut Company run along the shore of Long Island Sound for a distance of about 40 miles from Stamford on the west to New Haven on the east. Two of the lines turn inland, one running up the Naugatuck River valley about 30 miles to Waterbury and one running north about 40 miles to Hartford. These two lines are connected by a line running up the Housatonic River Valley from Stratford to Derby and by another crossing west from a point near Meridan to Waterbury. Of the 680 miles of track 45 per cent is unpaved, 17 per cent is paved with macadam, 8 per cent with a better grade than macadam, while 30 per cent has a so-called permanent pavement on a concrete foundation.

The organization for carrying on this work consists of the maintenance-of-way engineer who reports to the vice-president and general manager, three assistant engineers, six assistants to take care of surveys, drafting, etc., and a clerk. Each assistant engineer is assigned a definite territory of about 221 miles of track. It is his duty to make estimates and generally supervise all work, to insure that standards are followed and to act as the eyes of the department. He makes frequent inspections of his division, and in company with the roadmaster visits all the work on his division. There are eleven operating divisions on the property under the jurisdiction of the local managers or superintendents, but the divisions of the assistant engineers combine two or more operating divisions. There are four roadmasters on the property with headquarters at the larger centers, and one general foreman acting as roadmaster. This gives an average of 142 miles of track per roadmaster and 95 miles for the general foreman. Like the assistant engineers the roadmasters' divisions are not necessarily the same as the operating divisions, but in some cases include two or more.

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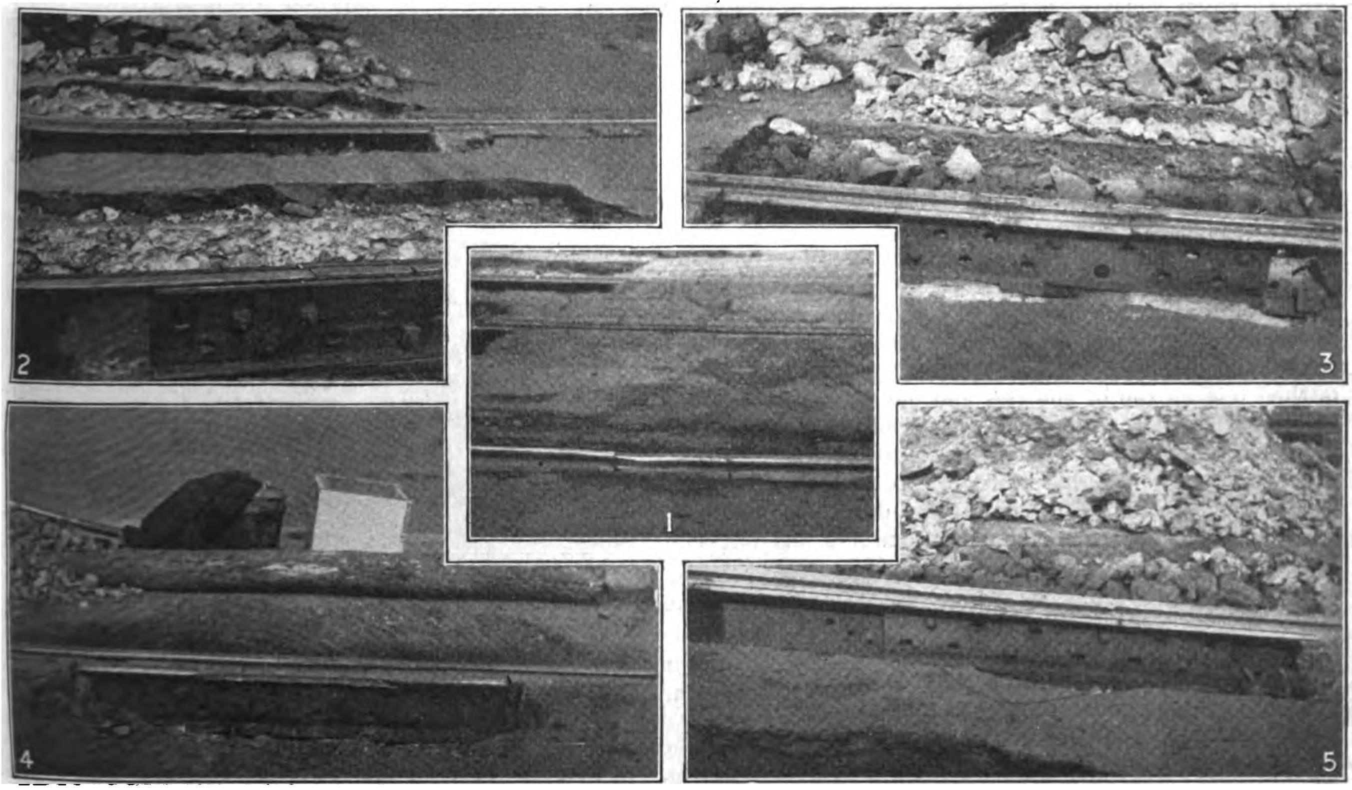
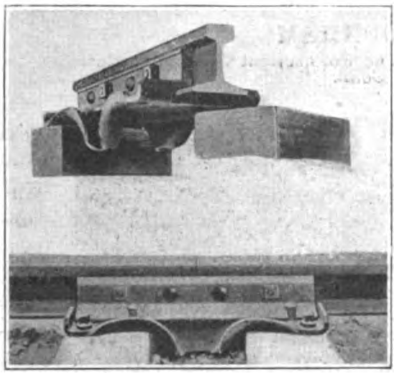
[*] Abstract of a paper read before the New England Street Railway Club, New Haven, Conn., Dec. 4, 1919.



JOINT FAILURE AND METHOD OF RECLAMATION
1—Failure with Dutchman cut in. 2—Ready to weld using old plates. 3—Joint after welding. 4—Joint after grinding. 5—Ready for service.

The percentage of paved and upaved track per roadmaster is, for Bridgeport, paved, 58 per cent; unpaved, 42 per cent; for New Haven, paved, 78 per cent; unpaved, 22 per cent; for Hartford, paved, 49 per cent; unpaved, 51 per cent; for Meridan, paved, 37 per cent; unpaved, 63 per cent. These figures do not represent the paving conditions in these cities, but the cities are the headquarters of the roadmasters and are used to differentiate the various headquarters.


RAIL JOINT PLATE AND ITS APPLICATION
Top—Under side of plate. Bottom—Side view of plate applied

In addition to the roadmasters, there is a general foreman of welding, who reports directly to the engineer of maintenance of way. This foreman of welding has charge of all the welding work and trains the operators. He keeps the machines in repair and has general supervision of this work. A foreman in the city section averages about 20 miles of track during the six months from October to March inclusive, one man for each mile of track from April to June inclusive, and one man for each 2½ miles of track from July to September inclusive.

BALLAST IS A VITAL PART IN TRACK CONSTRUCTION

The several parts of construction done by the way department will be considered in the order that they occur on the company's track record chart.

In regard to ballast, there is not much to be said as far as maintenance is concerned, as this more properly belongs under construction work. We use a great deal of broken stone in new construction and make use of old macadam taken up in connection with improved pavements in cities. We also use power-house cinders for adjoining suburban lines.

With a typical section of track construction, for the Hartford division, due to the character of the soil we first lay a concrete trough, the bottom of which slopes from the sides to the center. A ballast of broken stone is laid on this and at low points it is drained by tile pipe into city manholes. At the sides the concrete is built up so as to make side walls. We thus have a concrete trough filled with broken stone. On this ballast we lay our standard ties and rails. A 6-in. concrete foundation is then laid on top of the ties and ballast for the pavement. The soil is a brick clay on the Hartford division and during the winter and spring months this works up through telford or broken stone ballast laid without concrete. The above described method was developed to meet these conditions and has worked very well.

TIE CONSTRUCTION IS SIMILAR TO GENERAL PRACTICE

We use ties 6 in. x 8 in. x 8 ft. long, spaced 24 in. center to center and beginning 12 in. from the rail ends. On single tracks the ends of the cross ties are lined true on the right-hand side going either north or east. Where one end of the tie only is exposed as in side locations on highways, the exposed ends are lined true, while with double tracks the outside ends of ties are lined true. We are not using creosoted ties on our lines, although personally I favor their use on suburban tracks, either unfilled or back-filled, and in macadam or similar pavement provided there is little likelihood of the tracks being rebuilt for permanent pavement before the estimated life of the tie expires.

In permanent pavement we have practically standardized on steel ties as furnished by the International Steel Tie Company. An accompanying illustration shows this type of construction as used on our lines. These ties are spaced 6 ft. on centers, the joint ties being placed directly under the joints. The bearing surface of these ties under the rails is 3 ft., so that there is a space of about 3 ft. between bearings. As the bottom two-thirds of the rail is imbedded in concrete, this helps to support the rail, and results so far have been very satisfactory with no perceptible rail movement.

The use of steel ties cuts down the amount of grading, both in width and depth, so that the higher first cost of steel ties over wood ties is decreased by the smaller number used and the lower cost of excavation. By welding the face of the rails to the ties, the cost of crossbonds, labor and material can be eliminated, thus further reducing the cost. The labor cost of laying this type of track is less also as the ballast can be spread to a level surface at the tie base grade and the ties can be laid directly upon it, obviating any appreciable lift for surfacing except for final adjustment. There are also one-third fewer rail fastenings per foot of track for steel ties and practically no gaging.

"FIFTY-SEVEN VARIETIES" OF RAILS USED

Our standard T-rails are 5-in. 80-lb. A.S.C.E. section for all work except where it is contemplated that a permanent pavement may be installed, for which this rail will not be adapted. For permanent pavement we use 7-in. 95-lb. or 6-in. 100-lb. T-rails, A.R.A. Type A, except in one city where by original grant a grooved girder rail must be used. In this city 9-in. 125-lb. Boston grooved girder rail is the standard. We specify Bessemer process steel for T-rails and A.E.R.A. standard open-hearth high-grade carbon for grooved girder rails.

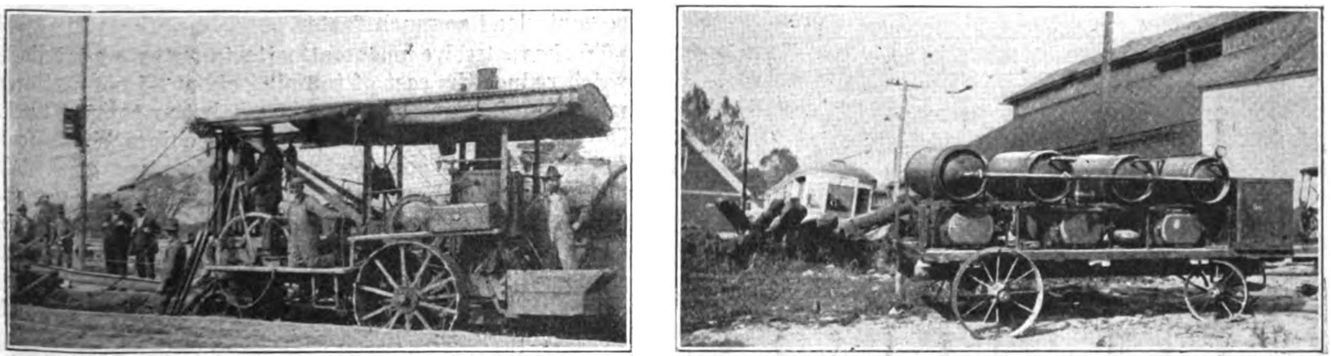
As our lines are made up of a combination of those of former individual companies, we have, in our tracks fifty-seven different rail sections not including guard sections in special work. Since 1914 we have gone into the reclamation of old rails rather extensively, and during the past five years 4776 tons of old rails have been reclaimed by electric welding and grinding; 6520 tons of new rails have been used in this renewal. This represents a net saving in cash of $200,000 based on pre-war prices for new rails and scrap. By the use of this rail

RYZON
POWDER
JACKING OUT TRACK

about sixty freight cars per year were released for other uses. In addition, the cost of handling new and scrap rails was avoided, thereby saving labor. Practically all of this rail has seen from fifteen to twenty years of service. From present appearances, the rails are good for as long a service as they have already given. The average annual cost for maintenance of this track has been from 1.7 cents to 3.2 cents per foot. This maintenance consists of building up with the electric welder and then grinding.

RAIL WELDING HAS PROVED VERY USEFUL

Our standard joints for both high and low T-rails are the continuous joints, 24 in. long, drilled "5-4-5" for four bolts. We use 1-in. bolts for high T-sections and ⅞-in. bolts for low T-sections. All bolts have "O.K." nuts which consist of a patented nut and nut lock combined. For grooved girder rails we use twelve-hole channel bars with 1-in. bolts and "O.K." nuts. From 1908 to 1911, inclusive, we welded 15,000 joints in various sections of rails by the Lorain process. These were mostly high T and girder rails, and this welding has been a success. Some of the welded sections have had to be removed, due to municipal paving work, but the percentage of actual joint failures has been low. Most of the rail welded had been in service fifteen years or more under city traffic before the welding was done. Accompanying illustrations show some joint failures and the methods of reclamation we employ. During the past year we have welded 1930 joints and have had no absolute breaks. There have been instances of fracture in one of the four seams, but these have been infrequent, and were due more to inexperience of the operators and ourselves with the process.



TOOLS USED IN TRACK CONSTRUCTION—AT LEFT, KEYSTONE DIGGER; AT RIGHT, THE TAMPER OUTFIT

On practically all our new work and on extensive retieing, we tilt our rails toward the track center, 1 to 20. We believe this reduces our pavement breakage along the rails, as the resultant of the load passes through the rail parallel with its vertical axis and nearly coincident with it. This removes the tendency of the rail to overturn and relieves the adjacent pavement from the lateral crushing effect. The load is also applied on the center of the railhead on new rail and has the same effect as on the proposed curved railhead. On old rail which has become beveled to the taper of the car wheel, tilting transfers the wear from the gage line to the outer edge of the head, gradually moving toward the center. When the center is reached, the whole rail head tends to wear equally.

The type of tie plate which we use for tilting is made under the Lundie patent. We originated this to accommodate the large number of rail sections with varying widths of base, as this enables us to carry but one standard plate in stock. Our standard plate will fit many of our rail sections and there is no necessity for right and left plates.

BENT JOINTS MAY DEVELOP SERIOUS TRACK CONDITIONS

A great many joints, especially in suburban tracks, become surface bent. These bends may not extend more than a few inches back from the rail end, but if not taken care of properly, they will develop a serious track condition. These bends are caused by the use of joint plates of too light a section, loose bolts, or general lack of attention. Our first step in remedying this condition is to install an Abbott plate under the joint. The joint ties are then well tamped, so that the surface bend may be rolled out by traffic. The Abbott plate is a piece of flat steel bulldozed in the center for stiffness. For angle bar joints the ends are turned up to form a buttress for the angles to rest against. Accompanying illustrations show this joint plate and its application.

In tracks where the surface bends are quite long we raise the whole joint with a vertical rail bender after installing the Abbott plate and tightening the bolts. The joint ties are tamped hard, but the shoulder ties are left a trifle slack. In addition to this, we have in some instances welded the angle bars to the rail and to the Abbott plate.

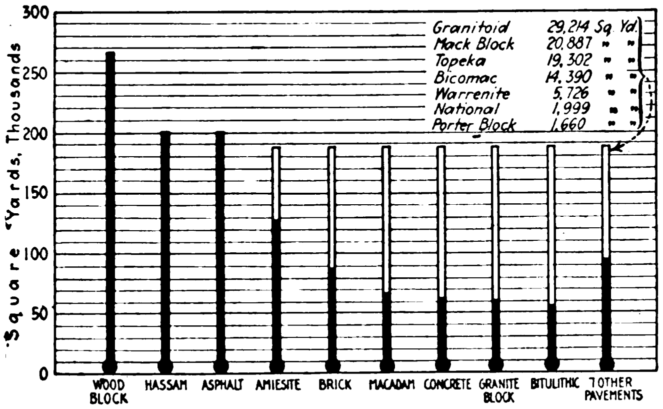
Many joint failures are due to loose bolts, and many loose bolts are caused by the stretching of the bolt beyond its elastic limit when the joint is first made. In order to determine the ease with which bolts may be stretched when installed, we made some tests in 1913 on ¾-in., ⅞-in. and 1-in. bolts. We found that in some instances a stretch as high as 80,000 lb. per square inch on the bolts was being placed with a 38-in. wrench. With a ¾-in. bolt we found that at 63,000 lb. per square inch, the bolt had stretched $\frac{7}{32}$-in.

OFFICE RECORDS ENABLE PIECES IN THE FIELD TO BE IDENTIFIED WITH BLUEPRINTS

A proper record of special work is one of the important considerations in special work maintenance. In order to identify the pieces in the field with the blue prints in the office, we have a diagram of each operating division and the diagrams for each of the divisions are bound in book form and are brought up to date the first of every year. This shows every special track-work layout on the system and each layout has its own number. All plans of layouts drawn in the office and every manufacturer's plan has a circle in the top right-hand corner with the name of the division in the upper half, and the location number in the lower half of this circle. These plans are kept in envelopes with the divisions, street names and location numbers on them, and are filed in drawers in a cabinet, one or more drawers to a division.

There are about 1350 special work layouts on the system, or an average of two per mile of track. Special track work is ordered to our own specifications, which are made after a careful study and conferences with the different manufacturers. We have three types in use, manganese or hardened steel centers, manganese or hardened steel inserts and built-up construction. The selection of the type for any particular location is based upon the traffic conditions. In the fall of each year the roadmasters and assistant engineers inspect the various locations and make reports as to requirements. The reports are checked up by personal inspection of some of the locations by the engineer of maintenance of way, and the material is ordered for the locations which in his judgment are in the worst condition. Orders for the materials necessary for repairs of other locations are held in abeyance until the season opens, and are placed during the season.

Our standard steam-road crossings are manganese spines continued through the steam lines. The main guard and easer rails consist of one double web casting, to which trolley rails are bolted with heavy steel angle bars bent to the angle of the crossing. The trolley line has guard rails through the crossing with rolled steel separator blocks.



PAVING CHART

In addition to the renewal of pieces, we use the electric welders for building up special-work centers, abutting rail ends, etc. Welding manganese centers is not very successful, however, and about 50 per cent of the welds last only for a short time. The work done on these centers is more in the nature of a temporary patch to last until a new piece can be installed. When welding center plates which have become loose, we find it more satisfactory to take the loose plates out, weld them and then replace them, as the heat generated in welding tends to loosen the plate if it is tightened up first and then welded.

LABOR-SAVING DEVICES KEEP COST DOWN

We have gone into labor-saving devices to quite an extent and have found their use a great benefit. For example, an accompanying illustration shows the method employed in breaking out 9-in. 106-lb. girder rail, electrically welded, with two 15-ton Barrett jacks. Six men and a foreman performed this work. The track was paved with macadam and this gang broke out about 500 ft. of single track per day, with no excavation except jack holes. After the rails are removed, they are taken from the job by a crane car, which has a maximum capacity of 1½ tons at the end of the boom when extended at right angles with the track. The reach is 27 ft. and the maximum lifting capacity is 3 tons. We have four crane cars of this type.

The Keystone digger shown in another illustration is at work in an excavation. With this machine we have excavated at a cost as low as 7 cents per cubic yard. This was an extreme condition perhaps, but in general the machine cut our cost of excavation about 67 per cent. When not in use on our own work this machine is rented out and the money received for rental, so far, is nearly equal to the original cost of the machine. In figuring the cost above, interest on the investment, depreciation and annual repairs are included. Other labor-saving machines used are a small "Rex" mixer and a "Thew" electric shovel. On one job where we used the Thew shovel we were, on account of a breakdown, obliged to do some excavation by hand and so had a very good basis for comparison. We found that with the shovel our excavations cost 71 per cent less than by hand. We also found that due to short hauls our service in hauling away material cost 22 per cent less with the shovel, as we could load so much faster.

We have twelve pneumatic tie tampers on our lines, which reduce the cost of tamping about 25 per cent over hand tamping and also give us a better-tamped track. The illustration of one of these machines shows four tanks and three compressors used for two guns. All of the electrical equipment on these machines is standard for our cars. This was arranged so that they would be interchangeable with our standard car stock.

In addition to using the tampers for tamping ties, we use them for breaking out concrete by the use of jack-hammers and drills. A drill will bore a 1¼-in. hole through 6 in. of concrete in from forty-five seconds to one minute. We drill a set of holes and sledge or jack the concrete into small sections. Tie tampers are also used for cleaning cement grout from salvaged paving block. Two men with one machine clean from 250 to 300 blocks an hour, which is much quicker than the work can be done by hand.

PAVING CHART SHOWS AMOUNTS OF DIFFERENT PAVEMENTS LAID

The Connecticut statutes provide that the railways must keep in repair so much of the highways as lie between the rails and two feet on each side of the outer rail. This has always been interpreted to mean entire renewal of pavement when the municipalities renew the street surface. This adds a great burden to the company, not only in the cost of work but in affording a good roadway for their competitors at no expense to them. The municipalities also determine the character of the pavement, although in recent years in many instances, a city has laid one type while the company has laid what it thought was one more suitable for its construction. The form of chart given herewith shows the different amounts of pavements laid. For the past two years we have been laying concrete where we could and have over 200,000 sq.yd. of this particular kind. We have also laid about 260,000 sq.yd. of wood block, but it is not a satisfactory type with us.

As already stated, our lines follow the coast for about 40 miles and then turn at right angles and run inland.

Thus our shore lines cross many rivers and smaller streams, while the lines in the interior cross their tributaries. We have 309 bridges on our system, or an average of a bridge for every 2.2 miles. Some of these are under the jurisdiction of municipalities, while a number are on our own property. On the municipal bridges we pay from one-quarter to one-third of the cost of a new bridge, and about the same proportion for any repairs that become necessary unless the repairs are necessary for our loads alone, in which case we bear the entire cost.

In order to maintain a proper record of these, we number all bridges. The first two figures used indicate the division and the remaining figures are the bridge number, thus beginning at the west end of the system. "Bridge No. 101" indicates the first bridge on the Stamford division, and "Bridge No. 421" indicates the twenty-first bridge on the New Haven division. The record kept in the office shows diagramatically the location of all bridges and by the color the limiting loads. This record also lists the bridges by numbers with the locations and local names. This is brought up to date the first of each year and a copy is furnished the general manager for his information. In addition to this diagram a loose-leaf system gives detailed information as to the span or spans, the limiting loads, and what part of the structure is the limiting feature.

Motor Carriers on California Highways

In a Comprehensive Report the Commission Summarizes Motor Transport Situation to Date—700 Companies Operate Passenger Bus Systems in State

ELECTRIC lines which are engaged in giving trolley express and freight service are in competition with the very alert motor-truck lines. These in some parts of the country have developed remarkably during the past few years. A recent report of the California Highway Commission states that "at least 95 per cent of the traffic over the rural highways of the state is motor driven." In the last three years in Fresno County the number of passenger motor cars using the state highway has multiplied by six and in the same time the number of motor trucks multiplied by twenty. Meanwhile the number of two- and four-horse wagons decreased by one-half.

Of course most of these are privately-owned vehicles, but there are about 700 companies operating passenger-bus systems in the State. The lengths of the runs range up to the 500-mile trip between San Francisco and Los Angeles with a one-night stopover en route. When a check was made recently there were 136 principal freight and express motor companies in the State, employing 196 trucks which ranged in capacity up to 10 tons (with trailer). Two of these runs are 110 and 138 miles in length respectively.

Business for the motor-truck freight carriers has been built up even in territories served by rail on the theory that the motor carrier can give quicker service with fewer handlings than any other means of shipment. This is an important consideration in getting perishable commodities, such as cream, eggs, etc., out of the hot central valleys of the State and to the commercial centers. In this service the motor carriers can economically call for and deliver with a single handling and seem to have kept the cost of service low enough to offer a profitable rate below the express rate. Some companies make a rate distinction between classes of freight so that perishables will be delivered, at a higher rate, within twenty-four hours, while freight which the shipper is willing to have stored a day or two until full loads for through trucks are assembled is hauled for less.

An angle of the taxation question which has not yet been worked out is the entire lack of uniformity in motor-carrier licenses granted by small towns. The "prohibitive" rate imposed by certain municipalities (although no rate at all is in force in others) is a factor that has discouraged capital from entering the interurban motor carrier business. Despite this there has been a good deal of financing in the motor carrier business that has not turned out profitably. For example, in three years more than fifty motor-truck companies have failed financially or have given up the business of freight handling on the run between San Francisco and San José. This would seem to be a favored location for such business because the highway running between these two cities, which are 50 miles apart, is entirely hard surfaced.

While there are many angles to this failure of freight truck lines, one cause that stands out prominently is poor judgment in selecting equipment. Many operators have made the fatal mistake of placing more importance on first cost than on economy of maintenance and operation. This is the rock on which many ventures wreck and the difficulty appears almost as often in the passenger as in the freight business. Ordinarily a rebuilt passenger car has not been found to succeed in handling freight and the converse is equally true, *i.e.*, the rebuilt freight truck usually cannot be converted into a successful passenger car.

There have been some notable successes, however, in both freight and the passenger motor carriers. The Peninsular Rapid Transit Company, for example, operates eighteen buses between San Francisco and Palo Alto, a 33-mile run on which they give a twenty-minute service and receive what is comparatively continuous patronage throughout the day. This company built up its own car bodies on 2-ton White chassis. The cars are entirely enclosed; they seat twenty-six passengers. The these buses runs on an average of 270 miles per day.

Corrugated Cardboard Spacers Between Wood Paving Blocks

ACCORDING to a recent issue of the *Canadian Engineer*, St. Thomas, Ont., is the first Canadian city to use spacers of corrugated cardboard between rows of wood paving blocks. These spacers are being employed in work now being done by the municipal railway. Rows of blocks are separated from each other by strips of corrugated paper, $1\frac{1}{4}$ in. wide by $\frac{3}{16}$ in. thick. The joints so formed are then filled to about one-half their depth with coal tar pitch and the remainder of the joint is swept full of clean sand. Along the web of the rail a strip of felt is laid. Paving pitch is poured around this so as to waterproof the pavement from rail to rail. The blocks are laid on pitch paint on the concrete base. The spacer of corrugated cardboard is said to have been used for the first time in June, 1919, in Bridgeport, Conn., in the track allowance of the Connecticut Company.

A Bright Spot in the Industry

Application of Principles of Service Betterment and Full Publicity Wins Increases in Railway, Gas and Electricity Rates in Record Time Without a Dissenting Voice

THINGS have been happening and happening fast in Charleston, S. C., within the last thirty days. And these events have been so favorable to the Charleston Consolidated Railway & Lighting Company, of which Philip H. Gadsden is president, that his friends will want to know "how he did it." But the facts will bear out the statement that there was nothing about the circumstances savoring of "putting something over," or of securing concessions which were not entirely merited or without the full approval and consent of all concerned. The instance does mark the result of a full capitalization upon the products of the hearings of the Federal Electric Railways Commission in an effective and constructive advertising campaign, coupled with substantial improvements in service.

Imagine the state of affairs—quite without historical precedent—whereby the public, organized labor, employees, newspapers and company are all agreed in an effort to bring about increased rates for the local utility company, and you have a mental picture of the situation in Charleston. The principal events followed upon each other's heels about like this:

Charleston Consolidated Railway, Gas & Electric Co.

Charleston, S. C., Nov. 12, 1919

To the Mayor and Aldermen of the
City of Charleston.

Gentlemen:

We wish to express our sincere appreciation of the prompt response by the City Council to our application for increased rates.

We fully realize that the community has a right to expect in return, uninterrupted and efficient service.

We believe the support of the public has been due in large measure to the publicity given to the financial affairs of the company. We hope to retain this good-will for the future by continuing the policy of keeping the community informed of the effect upon our financial condition of the increased rates which have just been granted.

Yours very truly,
P. H. GADSDEN,
President.

On Oct. 14 Mr. Gadsden appeared before the local Council and presented some of the broad aspects of the conditions in the electric railway and other public service industries. He was followed by B. A. Hagood, general counsel for the company, who informed the Council of the local utility situation and asked for increases in the rates for street car, electric lighting and gas services. On Oct. 23 the Council had a public hearing and there was not a voice raised in dissent of the proposed increase in rates. On Oct. 28 the Council met, suspended the rules and put the proposed measure granting increased rates through the first, second and third readings all in one evening, thereby saving four weeks time over the ordinary procedure in order to meet the company's contention that, to be effective, the relief sought must be prompt. At its next meeting, on Nov. 11, the Council ratified its action taken at the previous meeting and made the increased rates effective at once. The next morning the company had in force a 15-cent increase in the gas rate, a continuation of the 10-cent maximum for electricity but with a readjustment of the blocks, and a 7-cent cash fare with four tickets for 25 cents in lieu of a 5-cent fare.

A number of things had a bearing on the favorable outcome of the Charleston company's application for relief from the greatly increased operating costs. In the first place, Charleston has the unique distinction of never having had a strike on its street car system, and this fact has probably inspired a good degree of confidence in the management in the discharge of its obligation to furnish dependable, uninterrupted service. In the second place, the company is largely owned by local people and President Gadsden has been a resident of the city practically all his life and knows and is known to everybody. Again, the momentum of the granting of increases in other cities all over the country no doubt helped. The State Railroad Commission has no jurisdiction over local transportation, so that there was no element of divided authority or doubt of authority in the case. But the main two instrumentalities in carrying through the favorable action were the improvements in service and the education of the community in the facts. However, Mr. Gadsden is not one of those who would hold up the success attained in Charleston as an example which might be applied with equal success everywhere, but he does find pleasure in the thought that here is one case where the doctrine of service and education which has been so generally preached, has been very effective.

SERVICE BETTERMENT

Preparation for the application for increased rates began many months ago. Improvements were needed and it was decided that the company should demonstrate, in advance of the application, that it was determined to give the public adequate and satisfactory service. Accordingly, improvements were begun which will require an expenditure of $1,800,000. These comprised the purchase of eight new safety cars and a number of large center-entrance double-truck cars for use on the long line to the Charleston Navy Yard, extensive improvements at the power house which were needed for both the lighting and railway services, the building of a new railway substation, new city track, etc. Most of these improvements were completed and in operation, or well along toward completion when application for increased rates was made.

How these improvements were financed is a question which has probably arisen in the mind of the reader.

Statement from the Hearing in Washington on July 22, 1919, Before the FEDERAL ELECTRIC RAILWAY COMMISSION Appointed By the President to Make Recommendations for Relief in the Electric Railways Situation.

I think that the business judgment of this country is that the situation of the street railways of the country is critical and one that must receive attention as soon as possible on account of the enormous values involved. I think it is one of the most important matters before the country. From a financial point of view it seems the most acute internal problem that we have to face.

HOMER F. FERGUSON,
President of the Chamber of Commerce of the United States.

ONE OF THE ADVERTISEMENTS RUN IN CHARLESTON NEWSPAPERS TO MAKE THE MOST OF THE MATTER PRESENTED BEFORE THE FEDERAL ELECTRIC RAILWAYS COMMISSION

In this matter, too, the company was in a somewhat fortunate position. Among many other enormously costly projects carried out during the war, was the construction of a $20,000,000 port terminal near Charleston. A large block of power was required and the government wanted the Charleston power company to supply it. To do this entailed an investment of about $700,000 in new power equipment and the company could not see its way clear to finance it. So the War Department purchased necessary materials and equipment up to $350,000, and the War Finance Corporation supplied the other $350,000. The company financed the additional improvements amounting to about $1,000,000.

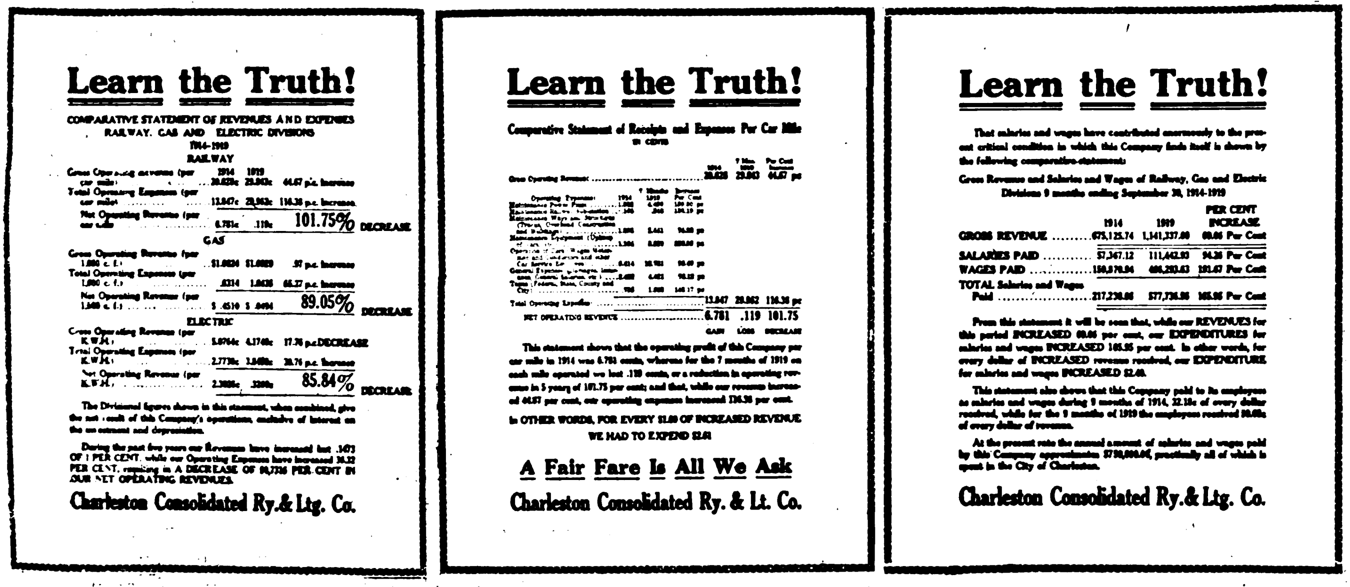
Going back to the time at which the company decided that it must seek relief through an application for higher rates, the losses for the entire company were running about $25,000 a month on the average. Nevertheless, the members of Local 610, Amalgamated Association, wanted a substantial increase in their scale although their contract did not expire until Nov. 16, 1919.

With the help of W. D. Mahon they were induced to live up to their contract and were advised of the company's absolute inability to pay a higher wage until it could secure greater revenue from its service. This induced the trainmen to work for the proposition and they gained the support of the local labor federation so that when the matter finally came before the City Council, labor introduced a resolution asking the aldermen to support the company's petition. To complete this phase of the story, it should be said that the company has just signed a new contract at the expiration of the old one, granting the men 10 cents an hour increase in pay, time and one-half for overtime over nine hours and for work on five legal holidays, and fourteen days vacation a year with pay. The terms of this contract were reviewed in the issue of this paper for Nov. 15, 1919, page 951.

WASHINGTON HEARINGS WERE CAPITALIZED AT CHARLESTON

The effective use made of the material emanating from the hearings of the Federal Commission, and the publicity campaign covering the local situation which followed this, may probably be credited with having had the most far-reaching results in educating the community to the justice of the company's application for increased revenue. Beginning on Aug. 4, a half-page display advertisement presenting a statement made before the Federal Commission was run in the evening paper and the following day in the two morning papers. This same scheme was followed throughout the campaign, thus giving equal space to all papers and presenting the same advertisement in all papers. The full series of advertisements devoted to statements before the commission, all of which were prepared with a standard heading as seen in the accompanying illustrations, included eleven insertions in each of the three papers and ending with the issue of Sept. 6. These advertisements presented statements by the Committee of One Hundred, by Edward N. Hurley, A. Merritt Taylor, Francis H. Sisson, Lucius S. Storrs, Homer F. Ferguson, Thomas A. Edison, Dr. Thomas Conway, Jr., and Frank J. Sprague.

These advertisements having paved the way for a presentation of home conditions, because the people were now well aware that the condition was general in character and the consequence of the war and not of the local management, they were followed by a series of twenty-one display advertisements in each paper covering local conditions, beginning with the issue of Sept.



Learn the Truth!

COMPARATIVE STATEMENT OF REVENUES AND EXPENSES
RAILWAY, GAS AND ELECTRIC DIVISIONS
1914-1919

RAILWAY

	1914	1919	
Gross Operating Revenue (per car mile)	20.628c	29.843c	44.67 p.c. Increase
Total Operating Expenses (per car mile)	13.847c	29.962c	116.38 p.c. Increase
Net Operating Revenue (per car mile)	6.781c	.119c	101.75% DECREASE

GAS

	1914	1919	
Gross Operating Revenue (per 1,000 c.f.)	$1.0824	$1.0929	.97 p.c. Increase
Total Operating Expenses (per 1,000 c.f.)	.6314	1.0435	65.27 p.c. Increase
Net Operating Revenue (per 1,000 c.f.)	$.4510	$.0494	89.05% DECREASE

ELECTRIC

	1914	1919	
Gross Operating Revenue (per K.W.H.)	5.0764c	4.1740c	17.76 p.c. DECREASE
Total Operating Expenses (per K.W.H.)	2.7730c	3.8480c	38.76 p.c. Increase
Net Operating Revenue (per K.W.H.)	2.3034c	.3260c	85.84% DECREASE

The Divisional figures shown in this statement, when combined, give the net result of this Company's operations, exclusive of interest on the investment and depreciation.

During the past five years our Revenues have increased but .1473 OF 1 PER CENT, while our Operating Expenses have increased 30.32 PER CENT, resulting in A DECREASE OF 90.736 PER CENT IN OUR NET OPERATING REVENUES.

Charleston Consolidated Ry. & Ltg. Co.

Learn the Truth!

Comparative Statement of Receipts and Expenses Per Car Mile
IN CENTS

	1914	7 Mos. 1919	Per Cent Increase
Gross Operating Revenue	20.628	29.843	44.67 pc

Operating Expenses:	1914	7 Months 1919	Increase Per Cent
Maintenance Power Plant	[illegible]	[illegible]	[illegible] pc
Maintenance Railway Substation	[illegible]	[illegible]	[illegible] pc
Maintenance Ways and Structures (Tracks, Overhead Construction and Buildings)	[illegible]	[illegible]	[illegible] pc
Maintenance Equipment (Upkeep of Cars, etc.)	[illegible]	[illegible]	[illegible] pc
Operation of Cars (Wages Motormen and Conductors and other Car Service Expenses)	[illegible]	[illegible]	[illegible] pc
General Expenses (Damages, Insurance, General Salaries, etc.)	[illegible]	[illegible]	[illegible] pc
Taxes (Federal, State, County and City)	[illegible]	[illegible]	[illegible] pc
Total Operating Expenses	13.847	29.962	116.38 pc
NET OPERATING REVENUE	6.781	.119	101.75
	GAIN	LOSS	DECREASE

This statement shows that the operating profit of this Company per car mile in 1914 was 6.781 cents, whereas for the 7 months of 1919 on each mile operated we lost .119 cents, or a reduction in operating revenue in 5 years of 101.75 per cent; and that, while our revenue increased 44.67 per cent, our operating expenses increased 116.38 per cent.

In OTHER WORDS, FOR EVERY $1.00 OF INCREASED REVENUE WE HAD TO EXPEND $2.61

A Fair Fare Is All We Ask

Charleston Consolidated Ry. & Lt. Co.

Learn the Truth!

That salaries and wages have contributed enormously to the present critical condition in which this Company finds itself is shown by the following comparative statement:

Gross Revenue and Salaries and Wages of Railway, Gas and Electric Divisions 9 months ending September 30, 1914-1919

	1914	1919	PER CENT INCREASE
GROSS REVENUE	675,125.74	1,141,337.00	69.06 Per Cent
SALARIES PAID	57,367.12	111,442.93	94.26 Per Cent
WAGES PAID	159,870.94	466,293.43	191.67 Per Cent
TOTAL Salaries and Wages Paid	217,238.06	577,736.36	165.95 Per Cent

From this statement it will be seen that, while our REVENUES for this period INCREASED 69.06 per cent, our EXPENDITURES for salaries and wages INCREASED 165.95 per cent. In other words, for every dollar of INCREASED revenue received, our EXPENDITURE for salaries and wages INCREASED $2.40.

This statement also shows that this Company paid to its employees as salaries and wages during 9 months of 1914, 32.18c of every dollar received, while for the 9 months of 1919 the employees received 50.62c of every dollar of revenue.

At the present rate the annual amount of salaries and wages paid by this Company approximates $730,000.00, practically all of which is spent in the City of Charleston.

Charleston Consolidated Ry. & Ltg. Co.

A FEW SAMPLES OF THE SECOND SERIES OF ADVERTISEMENTS DESIGNED TO EDUCATE THE PUBLIC AS TO THE CONDITIONS FACED BY THE LOCAL COMPANY

NOTICE TO THE PUBLIC

City Council Has Granted an Increase in Street Car Fares, within City limits and the Increase will be effective

Thursday, November 13, 1919

Cash Fare - - 7c or 4 TICKETS 25c

Tickets can be purchased from the

CONDUCTORS ON CARS

at MAIN OFFICE, 141 Meeting Street
Robertson Cigar Company, 11 Broad Street
De Lorme Drug Store, King and Calhoun Streets

We ask the co-operation of the public in having as near as possible the exact fare ready, so as to facilitate the operation of the cars.

THE INCREASED FARE DOES NOT AFFECT THE COMMUTATION SUBURBAN TICKETS

Charleston Consolidated Railway & Lighting Co

THE CLIMAX OF THE STORY

20 and ending with that of Nov. 6, and all appearing under the caption, "Learn the Truth."

The contents of these advertisements may be summarized as follows:

1. Announcement that the company would present statements of facts in the papers to show that it was operating at a serious financial loss and the causes of this condition.
2. Presented statistics showing the number of companies that had been forced into receivership; the numbers dismantled, abandoned, etc.

3 to 6. Presented figures pertaining to the railway costs and earnings.

7. Directed attention of the public to the fact that the railway was not the only part of the company's business suffering from high operating cost and stated that the receipts in the gas and electric division also were inadequate to meet cost of operation.

8 and 9. Presented figures relative to costs and earnings of the gas department.

10. Asked the question "Are costs higher?" and then presented a long list of comparative figures of costs in 1914 and 1919, for various materials and supplies, most of which applied to the railway division.
11. Showed the increase in operating expenses in the electric division.
12. Gave a comparative statement of revenue and expenses for all three divisions of the company per car-mile, per cubic foot of gas, and per kilowatt-hour, by divisions.
13. Gave comparative gross revenue and salaries and wages paid for the entire company for the first nine months of 1914 and 1919.
14. Showed that the company was suffering a very serious loss and carried the message that relief to be effective must be prompt.
15. Carried the same message, but applied to the railway division alone.
16. Carried the same message, but applied to the gas division alone.
17. Carried the same message, but applied to the electric division alone.
18. Presented a statement of the gross revenue and operating expenses for the first nine months of 1919, by divisions and totals for the company.
19. Placed before the public the improvements which were being made and the cost of these as divided among the three divisions.
20. Gave a detailed tabulation of these improvements and the cost of each job.

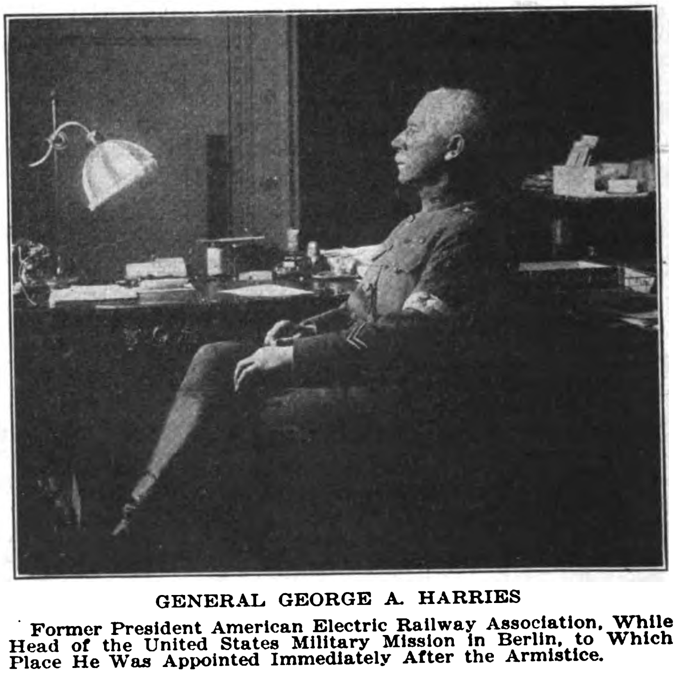
It is interesting to note that nothing less than one-quarter-page space was used in this publicity campaign, running from this up to a full page. The entire cost of the space thus used was under $2,000.

In addition to the educational campaign carried on through purchased space in the newspapers, the hearings before the Federal Commission were further capitalized upon by distributing the daily bulletins sent out to all member companies by the publicity committee of the Committee of One Hundred from Washington, to the 500 members of the Chamber of Commerce, to a long mailing list of other business men, to the Mayor and Board of Aldermen and even to the Governor and other State officials. All of these bulletins were mailed separately to the individuals. Also, a letter printed in pamphlet form was distributed to all employees of the company, informing them of the situation and enlisting their active support in educating all of the people with whom they came in contact as to the necessity for increased rates.

NO "KICKS" SO FAR

Perhaps it will be said that as the railway commissioner of the Federal Electric Railways Commission, Mr. Gadsden was in a strategic position to see the opportunity which the hearings of that body afforded for reaching the public of any community with the true situation faced by the electric railways. He was; but the big thing is that the opportunity was not lost. The increases sought have been secured and since the case was entirely devoid of the usual antagonism and "soreness" toward the increase, there is every reason to believe the company will derive very nearly if not quite the full theoretical increase in revenue. In the few days passed at the time of the writing of this article, both company men and newspaper men report that they have heard nothing in the way of a "kick" and have, on the contrary, heard a number of people voice the feeling that they were glad the company got its increases, that it fully deserved them.

General Harries at Berlin



GENERAL GEORGE A. HARRIES

Former President American Electric Railway Association, While Head of the United States Military Mission in Berlin, to Which Place He Was Appointed Immediately After the Armistice.

THE accompanying view shows Gen. George H. Harries, vice-president of H. M. Byllesby & Company, while head of the United States Military Mission in Berlin after the armistice. At the Atlantic City convention of the American Electric Railway Association, General Harries gave an account of some of his experiences while in Berlin. He has recently given talks on the same subject before the Society of Illuminating Engineers in Chicago, Chicago Electric Club, and the Commercial Club of Omaha.

A. E. R. E. A. Standard Material Specifications

Joint Action With the American Society for Testing Materials Will Assist in the Speedy Adoption of Desired Standards

By T. A. Chance

IN AN earlier issue of the ELECTRIC RAILWAY JOURNAL I discussed some of the points in connection with the A. E. R. E. A. standard specifications for finished articles of equipment. Some comment on the materials specifications are given in this article.

QUENCHED AND TEMPERED CARBON-STEEL AXLES, SHAFTS AND SIMILAR FORGINGS (SECTION ET 9B)

This specification is one which was originally fathered by the electric railway association and was later adopted by the American Society for Testing Materials. The latter society is one which is becoming more and more the natural agent for the dissemination of standard specifications. It does not seem wise for an operating organization such as the Engineering Association to attempt to compete with one formed of men especially skilled in the manufacture of materials, and it would therefore be the part of wisdom for the A. E. R. E. A. to adopt as its standards those which have been adopted by the A. S. T. M. This, then, would establish for the quenched and tempered axle specification the A. S. T. M. standard specification for quenched and tempered carbon-steel axles, shafts and other forgings for locomotives and cars, bearing the designation A-19.

It is possible that there would be criticism of this course; but engineers are practically agreed on the desirability of reducing to a minimum the number of standards covering like parts, and active steps are being taken by all engineering societies toward the final adoption of a set of American standards and for materials, and this work is being handled largely through the A. S. T. M. Failure to co-operate will not show independence but rather give cause for provocation. Should there be any criticism of the A. S. T. M. specifications on the part of the A. E. R. E. A. the discussion should be carried on through the committees of the former.

ANNEALED CARBON-STEEL AXLES AND SIMILAR FORGINGS (SECTION ET 11B)

The same comments hold for this specification as for the previous one. The main provisions are covered in the A. S. T. M. specifications A-18 for carbon-steel and alloy-steel forgings. The A. E. R. E. A. specification is unreasonable in that it provides both a complete chemical specification and complete physical property specification.

It is well known that the two specifications are inseparably connected so that if a definite series of physical properties is desired it should be specified without naming the chemical content, other than the impurities, leaving the manufacturer free to provide the composition necessary to obtain the desired physical results.

If it is felt by the association that the A. S. T. M. specification does not contain all the elements that should be incorporated in an axle specification of this character the proper course to pursue is to propose to the A. S. T. M. a revision of the specification mentioned above or the creation of a new specification covering annealed steel axles alone.

SOLID WROUGHT-CARBON-STEEL WHEELS FOR ELECTRIC RAILWAY SERVICE (SECTION ET 12A)

Here again we have a difference between the specifications of the association and that of the A. S. T. M. specification for wrought solid carbon-steel wheels for electric railway service, bearing the designation A-25. The association specification bears a somewhat drastic requirement as to the substantial agreement in carbon content in different parts of the wheel. The data so far gathered by the association do not, I believe, warrant the assumption that such an agreement in carbon content materially increases the serviceability of the wheel, so as to warrant its inclusion in a standard of the association.

Furthermore, as in the case of the annealed steel axle specification, if it is the mature judgment of the association (which is very doubtful) that such a provision should be included, the matter should preferably be handled through the A. S. T. M. It is of no advantage to the association to include doubtful provisions in its standard specification which will only cause the manufacturers either to refuse to work to the specification, or else ask an extra price. By such action the association merely handicaps its members who desire to use specifications as proposed without being assured that it is providing any advantage to compensate for the penalty.

CASE-HARDENED FORGED STEEL BEARS (SECTION ET 14A)—QUENCHED AND TAPERED FORGED CARBON-STEEL BEARS (SECTION ET 15A)—CASE-HARDENED FORGED STEEL PINIONS (SECTION ET 16)—QUENCHED AND TEMPERED FORGED CARBON-STEEL PINIONS (SECTION ET 17A)

There is probably no particular objection to these specifications, other than the fact that the purchaser is limited to the trade product of a very few manufacturers. The specifications therefore mean little or nothing and the standing of the association standards would therefore be raised by their elimination.

In conclusion I would say that the desire of the association to increase the use of its standards by its members is entirely laudable, but analysis shows that revisions and eliminations should be made in the equipment standards as they now exist, and the same undoubtedly holds true for the other branches of the art. The association should look to it that this work be undertaken in the coming year, and that it be conducted on a broad-minded basis, without fear, favor or prejudice of anyone.

Mounting Circular Work on a Lathe

THE shopman operating a lathe sometimes has trouble in mounting a circular piece of work concentrically upon the face plate. If the piece to be turned is not mounted in the center of the face plate the turning marks left by the lathe tool will present a very rough appearance. A convenient method sometimes used in such a case consists first of setting the lathe in motion and then holding the end of a piece of chalk on the revolving face plate so as to draw a circle with a diameter just a little larger than the work to be turned. With this circle as a gage it is a comparatively simple matter to mount the circular piece to be machined centrally within it.

Association News

Power Generation Committee Begins Work

THE Engineering Association committee on power generation met at association headquarters on Jan. 5, with the following members in attendance: A. B. Stitzer, Republic Engineers, Inc., New York City, chairman; N. A. Carle, Public Service Electric Co., Newark, N. J.; H. E. Davis, New York State Rys., Utica, N. Y.; W. S. Finlay, Jr., Interborough Rapid Transit Co., New York City; C. A. Greenidge, J. G. White Management Corporation, New York City; F. A. Scheffler, Fuller Engineering Co., New York City, and W. C. Slade, the Rhode Island Co., Providence, R. I. W. C. Karr, Republic Engineers, Inc., was also present by invitation.

The main three subject assignments made by the executive committee were then taken up in order; namely, (1) power contracts, (2) special fuels and (3) power-plant statistics, as listed in the issue of this paper for Jan. 3. Reports from the sub-committees on these topics as to their plans were received. These sub-committees are as follows: Topic 1, W. C. Slade, chairman, N. A. Carle, E. H. Scofield, C. W. de Forest; Topic 2, W. S. Finlay, Jr., chairman, F. A. Scheffler, H. P. Bell, F. C. Hanker, A. H. Kruesi; Topic 3, C. A. Greenidge, chairman, H. E. Davis, N. A. Carle.

On the first topic, presented by Mr. Slade, it was decided to prepare a suggested form of contract for the purchase and sale of power, basing it upon the form prepared last year, the first draft to be submitted to the members of the sub-committee and their suggestions to be incorporated in an explanatory appendix. For the second sub-committee Mr. Finlay stated that an analysis would be made of the economic factors involved in the use of fuels other than lump coal and the results will be presented in graphical form. A review of progress in this field to date will also be included. Mr. Greenidge said that data on the cost of power would be collected by means of a questionnaire, the information to be given for a period of years and to cover only operating costs. Actual costs will be requested, but the results of the canvass will be "masked" to protect the contributors.

The power generation committee was enthusiastic over the prospects for the year's work and, as indicated above, plans a report of great value.

A Trap for Undesirable Material

ON A LARGE railway system operating some new cars equipped with multiple-unit electro-pneumatic switch-group control, considerable trouble was experienced due to overheated resistors. Investigation showed that the switch groups were not notching up properly, due to an accumulation of pipe scale which clogged up the magnet-valve port-holes. The equipments were new and the accumulation of pipe scale had come from some of this being left in the pipe upon installation, and also because some scale loosened from the inside of the pipe after the cars had been put in service. In order to prevent the pipe scale from entering the contactor box a T-fitting was installed in the air-line ahead of the switch group as indicated in the accompanying diagram. The opening of the "T," leading to the contactor box, was fitted with some rather fine brass netting so as to strain out all undesirable material. The lower opening in the pipe "T" was closed with a plug which could be easily removed and would thus permit cleaning.

These cars were operated for a considerable distance on lines which ran to seashore resorts. During damp weather there was an excessive accumulation of moisture in the air piping, which entered the air connections of the various control valves and caused sluggish operation. In order to provide for draining and blowing out this moisture, an additional stop cock was installed in the piping of the switch at the end opposite to that at which the air entered. This provided a means by which the motorman could drain and blow out any excess of moisture before the car was placed in service.

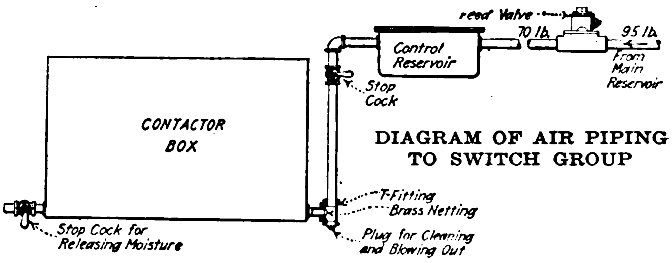


DIAGRAM OF AIR PIPING TO SWITCH GROUP

Letter to the Editors

Compute Car Weights by Considering Total Passengers Carried

THE J. G. BRILL CO.
PHILADELPHIA, PA., Dec. 26, 1919.

To the Editors:

In the ELECTRIC RAILWAY JOURNAL of Dec. 13, page 883, there is an editorial entitled "What Will the Car of Tomorrow Weigh?"

The basis of the car weight in this editorial is per passenger seat. It would seem that this is not the most satisfactory method of determining whether a car is light or heavy. If, for instance, we take the weight of a safety car at 15,000 lb. and the seating capacity at thirty-two passengers, the weight works out to 468 lb. per seat. If this car had been designed to carry but thirty-two passengers, then there would be a good reason for working out the weight on the seat basis, but as these cars are capable of carrying a total weight of passengers equal to the weight of the car and frequently do so, there is actually a pound of car for each pound of passenger weight carried, and we believe that this is the proper method of working out the comparative weight of cars. At least, it should be used in addition to the weight per seat.

Most of the double-truck cars, according to our calculations, will show about 2 lb. of weight of car to 1 lb. of passenger weight carried. This is obviously a very strong talking point in favor of the light-weight safety car, and we think it is only fair to the safety car to compare its weight with that of the double-truck car on a total passenger basis instead of only on the per seat basis where the comparison is not so favorable.

W. S. ADAMS, Designing Engineer.

Bulletin News Page

Summary of the Principal Happenings of the Industry of Current Interest Since the Last Issue of this Paper Was Published

PRINTED JANUARY 9, 1920

The San Francisco (Cal.) Municipal Ry. must have a higher fare if it is to continue to pay the present wage of $5 a day to platform men.

The Louisville (Ky.) Ry. has asked the city authorities of Louisville for a 7-cent fare with a 1-cent transfer charge.

The New York Rys., the Brooklyn Rapid Transit Co. and the Interborough Consolidated Corp. have applied to the Board of Estimate of New York City for an 8-cent fare.

Straight 7-cent fares went into effect on the lines of the United Railways & Electric Co., Baltimore, Md., on Jan. 1, under authority of the State Public Service Commission.

The Clinton, Davenport & Muscatine Ry., Muscatine, Iowa, is now charging 7-cent fares on its lines in Muscatine. The fare increase was authorized by popular vote.

The Washington Railway & Electric Co. has applied to the Public Service Commission of the District of Columbia for permission to install a straight 7-cent fare on its lines and to charge 2 cents for each transfer.

Ten-cent fares will go into effect on the lines of the Tacoma Railway & Power Co., Tacoma, Wash., on Jan. 18.

The Morris County Traction Co., Morristown, N. J., has applied to the State Board of Public Utility Commissioners for authority to install 7-cent fares on its lines.

The City Commission of Trenton, N. J., is considering a plan for the operation of jitney buses within the city limits.

The Aurora, Elgin & Chicago R.R. has been authorized by the Public Utilities Commission of Illinois to raise fares on its lines in Elgin and Aurora to 8 cents.

The Cincinnati (Ohio) Traction Co. did not advance its fare on Jan. 1 from 7 cents to 7.5 cents, owing to its success in securing needed funds from other sources.

The Wisconsin Railroad Commission will reconsider its recent order authorizing the Milwaukee Electric Railway & Light Co. to raise its fare to 7 cents.

The Lewiston-Clarkston Transit Co., Clarkston, Wash., is now charging 7-cent fares.

The City of Seattle, Wash., has instituted legal proceedings to compel the Seattle & Ranier Valley Ry. to transport city firemen and policemen in uniform free of charge.

The Public Service Commission for the Second District has suspended an increased rate which the New York State Rys., Syracuse, proposed to place in effect on its Mohawk Valley lines.

D. E. Waggoner, president of the Security National Bank of Dallas, Tex., proposes that the Dallas Ry. be allowed to increase its fare.

The Supreme Court of North Carolina has handed down an opinion upholding the right of the State Corporation Commission to grant fare increases in spite of limitations contained in municipal franchises.

E. G. Connette, president of the International Ry., Buffalo, N. Y., has tendered his resignation to the directors of the company.

The personnel of the Brooklyn (N. Y.) Rapid Transit Co. has been reorganized, owing to the fact that much of the work in connection with the new lines of the New York Municipal Ry. has been completed.

George Weston, noted electric railway enginner, died on Jan. 7 from acute indigestion.

The application has been granted which was made to foreclose the Shore Line Electric Ry., Norwich, Conn.

In recent decisions in Illinois the Supreme Court of that State has ruled that "going value" must be taken as an element of valuation.

Complete Memphis appraisal report shows unanimity of opinion on values not apparent in unofficial figures.

The Androscoggin & Kennebec Ry. has succeeded the Lewiston, Augusta & Waterville Street Ry., following receivership and foreclosure.

Solly Joel, of Bernato Brothers, is said to have purchased control of the local London railways from the Speyer interests.

An important paving case with possible bearing elsewhere has just been decided in favor of the Illinois Traction System.

Agitation has been started looking toward the removal of cars from Broadway, New York, and their replacement with buses.

Public telephones will be installed at each of the 517 rapid transit stations in the several boroughs of Greater New York.

Hastings, the quiet little village on the Hudson which had its bucolic existence disturbed by the suspension of service some time ago by the Yonkers Railroad, stands in prospect of securing limited railway facilities.

The arbitration is under way which was provided for in the settlement of the strike of the employees of the San Francisco-Oakland Terminal Railways, Oakland, Cal., last October.

The Detroit (Mich.) United Railway is beginning to order material for use in carrying out the extensive construction program which it announced recently.

A subway for street cars is being discussed at Cincinnati, Ohio.

Publicity men in particular will be interested in "A Straphanger's Philosophy," elsewhere in this issue.

The plan of reorganization of the Oakland-Antioch Railway has been modified. The reorganization committee found it impossible to market the bonds under the plan previously approved.

$80,466,100 of electric railway securities will mature during the year 1920. The grand total of utility maturities for the year is $196,296,800. The largest amounts of maturities come due in January and November.

Several abandonments of service were set to take place in San Diego, Cal., on Jan. 1.

In the last eighteen months the receivers of the Pittsburgh (Pa.) Railways have succeeded in paying just about one-third of the fixed charges of $5,153,673.

The net receipts of the Chicago (Ill.) Surface Lines for November under the 7-cent fare were $954,162.

There would appear to be no immediate prospect of a reduction of the fare on the Boston (Mass.) Elevated Railway from 10 cents.

It is reported that the valuation of the New York (N. Y.) Railways now nearing completion by Stone & Webster will show something like $140,000,000. At 1914 prices the value was $85,000,000.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Construction Program Begun

Detroit United Railway Makes Start Toward Carrying Out Its Recently Announced Plans

The Detroit (Mich.) United Ry. has placed orders for 10,000 tons of rails for its extensions and replacement plans, with the intention of completing, at the earliest possible moment, work already started.

CAR BUILDING PROGRAM

It is planned to continue operation of the Highland Park car shops during 1920 where car building operations will add many new motor and trail cars to the equipment of the city lines. In addition to this, $1,000,000 worth of equipment has been ordered for interurban lines.

That the limit of the company's available resources are being used to keep pace with the requirements of the traveling public and aid in the expansion and upbuilding of Detroit and adjacent communities served, is contended by the company officials.

Although details of the proposed plans for ultimately relieving congestion have not been announced, the company's engineers estimate that improvements necessary properly to care for the needs of Detroit in the way of surface lines and essential equipment, including cars, power and buildings, involves an expenditure of an amount exceeding $15,000,000. This improvement program which is so vital to Detroit's growth should be under way promptly, but is necessarily deferred until the company is put in a position to borrow the money upon some recognized and safe basis.

Among the various extensions begun in 1919, involving in all about 16 miles of track, the Stephenson line remains to be completed from Woodward Ave. along the Six Mile road and going north on or parallel to Oakland Ave.

IMPORTANT EXTENSIONS PLANS

One of the most important new extensions to be completed and placed in operation as soon as construction activities permit is the Twelfth St. extension of the Trumbull line to connect with the line on Oakman Ave. at Elmhurst Ave. This line when completed will serve a very important section of the city which is now without adequate service.

The St. Jean extension also remains to be completed, work having been started on the Harper Ave. end. This is a north and south line on the east side of Detroit, which will run from Jefferson Ave. along St. Jean Ave. to Shoemaker Ave., thence on Montclair and Harper Ave. to Gratiot Ave. This line will aid in the development of an important business and residential section of the city.

There was an unparalleled increase in the city's traffic beginning in the summer of 1919. Developments in certain sections of the city not adequately served by railway have added to traffic difficulties on the existing lines and expansion of new residential sections has been hindered by lack of service.

Oakland Wage Arbitration Begun

The hearing was begun on Dec. 19, in the arbitration of the demand of the platform men of the San Francisco-Oakland Terminal Rys., Oakland, Cal., for an eight-hour day and an increase in wages. The arbitration is in accordance with the terms under which the strike of last fall was settled. This strike was called on Oct. 1. It lasted ten days.

According to the testimony at the first session of the arbitration board, the strike cost the San Francisco-Oakland Terminal Rys. $400,000. Of the amount named $194,000 represented general expenses incident to the strike, including the care of men brought in to replace the strikers. The loss in revenues is placed at $210,000.

At the session on Dec. 20 the company represented that the deficit for the year would be $372,000. J. P. Porter, superintendent of transportation, declared the company had had no difficulty in getting men to work despite the complaint of the men that wages were too low and the hours too long. Since Oct. 11, the day the strike ended, and up to Dec. 12, the company received 842 applications from men wishing to go on the platform.

The general defense of the company is that the demands are impossible of fulfillment by it. The company contends that to grant the demands made by the men would cost $1,828,000 a year.

The men contend that the increased cost of living makes an increase in wages absolutely necessary. They base their demand for an eight-hour day upon the adoption of the eight-hour day by the Federal Government and by municipalities and for other forms of work.

Warren Olney, Jr., Associate Justice of the Supreme Court; Ralph Merritt, comptroller of the University of California, and former Food Supervisor, and E. C. Bradley, a former member of President Wilson's Industrial Conference, are sitting as a board of mediation, with Mr. Olney as the chairman.

Promise Resumption of Service

New York Commission Sanctions Plan for Restoring Railroad Facilities at Hastings

The Public Service Commission for the Second District of New York has decided that public necessity and convenience require the construction of the Hastings Ry.'s line. The commission has also approved the construction of the new electric railway under a local franchise granted on Nov. 20.

SERVICE ABANDONED LAST APRIL

The commission's order follows various steps taken to provide Hastings with electric railway service following the abandonment by the Yonkers Railroad of its Hastings line last April because of a restricted 5-cent fare.

Commissioner J. A. Kellogg, in a memorandum accompanying the order, speaking of lack of service to Hastings Heights and Uniontown, says:

> It is not to be wondered at that people who have located, purchased property, and perhaps have erected homes in the expectation of a continuance of a long-established transportation service, should be indignant and feel outraged at the cessation of that service. And it is to be hoped that their very natural desire and demand for transportation may be complied with at a not far distant date, when normal conditions are resumed.
>
> But the only present question is, whether this proposed limited strip of railroad serves the public convenience and necessity, so that the certificate of the commission should issue to that effect, and its permission be given to exercise franchises by local authorities.

The evidence, the commissioner says, shows about 3,800 people were carried daily on the former road, indicating a substantial demand for service. It is quite apparent, he continues, that a line which will serve public convenience so far as it is operated ought not to be denied the necessary certificate for the reason that it does not extend a sufficient distance to accommodate other people.

COMMISSION'S STATEMENT

The commission says further:

> It is to be regretted that the railroad company does not see fit to reinstate the entire line operated for so many years, as it is quite probable that with the present fares the burden of operation of the entire former line could be successfully borne. But if the new company does not see fit to undertake the operation of the more extended line, it should not be prevented from operating for the shorter distance. The operation may prove so profitable and pleasant that the company may shortly see its way clear to resume, with reasonable expectation of added gain, the operation in effect for many years, by the extension of the franchise applied for.
>
> It is unfortunate that the needs of this entire community cannot be served by proper transportation facilities, but it is hoped that a beginning will be made, in the exercise of the franchises here applied for, and that such franchise, at no distant date, will be extended to accommodate the entire community.

Illinois Traction System Wins Paving Case

Decision at Tilton Regarded as Having Possible Bearing on Similar Cases Elsewhere

In a case which came to trial on Dec. 4 in the Vermilion County Circuit Court, involving the right of a municipality to compel an interurban railway to pave between its tracks with concrete, the petition of the Village of Tilton, Ill., for mandamus was denied.

HISTORY OF CASE

Several years ago, the Danville, Urbana & Champaign Railway (Illinois Traction System), as successor to the Danville, Paxton & Northern Railroad, began operating through the Village of Tilton, under a franchise which among other things required the railroad to pave its right-of-way at the same time and in the same manner as the village improved the balance of the street by paving the same. Early in 1919 the Village of Tilton passed an ordinance whereby it was to pave the street for a distance of 7 ft. from each curb. Agreement was made with the Township of Danville for the Township to pave the street from a point 7 ft. from each curb line to within 1 ft. of each rail of the tracks of the Danville, Urbana & Champaign Railway. The railway was then notified to pave the space within its tracks and for 1 ft. on the outside of each rail. The specifications for the pavement by the Village of Tilton and the Township of Danville called for a concrete slab; approximately 7½ in. thick. No specifications were prepared by the Village or Township authorities as to the pavement to be laid by the railway.

The demand of the Village of Tilton upon the railway to pave was construed to mean, under its franchise, that the company was called upon to pave with 7½ in. of concrete. The demand was refused, and a petition for mandamus was filed in the Circuit Court of Vermilion County.

COMPANY ANSWERS COMPLAINT

The company filed its answer setting up the following defenses:

1. That the Village of Tilton was not improving the street, claiming that only a portion of the street was being paved by the village, and the balance by the Township of Danville.

2 That at the time of the passage of the ordinance under which the railroad was operating, Tilton was a country village of about 200 population, and at that time there was no law in Illinois authorizing the paving of streets in villages, except the statute relating to cities and villages, whereby streets might be paved by general taxation or by special assessment upon the abutting property owners; that at this time there was in the mutual contemplation of the parties, that when the village should reach sufficient population whereby a pavement should be laid because of the natural growth of the village, the traffic upon the railroad would be sufficient to warrant the paving of its tracks. It was also claimed that the so-called hard roads act under which a part of this pavement is being constructed was not then in existence or contemplation.

3. It was claimed that the railroad was not financially able to pay for the pavement, in that it was failing to earn enough money to pay its operating expenses, depreciation and other fixed charges.

4. It was claimed that to pave between the tracks of the company with concrete was impracticable.

5. It was claimed that the Public Utilities Commission had jurisdiction of the matter, and that the ability of the company to pay for this pavement and the right to issue securities for its payment should first be passed on by the Public Utilities Commission.

A demurrer to this answer was filed by the village. The court, in passing upon the demurrer, held:

1. That the allegation was not a defense which was made in the answer that the village was small when the ordinance was accepted, and it was in the contemplation of the parties that pavement would not be put in until the village was large enough to justify the company to construct the pavement by reason of increased traffic, and since that time the hard roads act had been passed by which part of this pavement had been constructed.

2. That the allegation was a good defense that the village was not constructing the pavement adjoining the track of the company.

3. That the allegation of want of funds and the jurisdiction of the Public Utilities Commisson was not a *prima facie* defense, but if the mandamus should issue and the commission ultimately refuse authority to issue securities, this would be an excuse for not complying with the writ of mandamus, and

4. That the allegation, if proved by the evidence, was a good defense that a concrete pavement was impracticable for the operation of the railroad.

COMPANY FINANCIALLY UNABLE TO PAY

Issues were finally joined, and the case came to trial on Dec. 4, in the Vermilion County Court before a jury. The principal evidence introduced by the company was as to its financial ability to pay for the pavement, and as to the practicability of the construction of a concrete pavement 7½ in. deep in these tracks. It was shown that the company was operating not only heavy suburban passenger cars over this track, but it was also hauling foreign freight cars, many of them 100,000-lb. capacity coal cars. It was also shown that a pavement of 7½ in. of concrete would not reach to the bottom of the ties, because the rails were 4½ in. high, and the ties 6 in., making a total of 10½ in.

If the pavement was constructed to within one-half inch of the top of the rail as required by the ordinance this would leave only a 4-in. slab of concrete on the top of every tie. It was also shown that the tremendous vibration involved in the operation of these heavy cars would, within a period of a few months, cause the concrete to break up and necessitate constant repairs; that it would be almost impossible to repair rail joints without destroying the pavement, and that while cars were in active operation, any repairs which might be made would never be satisfactory, because the concrete would go to pieces under the vibration before it could set. It was also shown by witnesses for the company that it was decidedly against the engineering practice of railroads to pave with concrete.

Even the witnesses for the village admitted that a pavement of concrete without a very substantial concrete ballast entirely underneath the ties would be impracticable.

Special interrogatories were submitted to the jury, and that body found as follows:

1. That the company was financially able to incur this expenditure.

2. That it was impracticable to lay a concrete pavement for tracks and operate over the same, and

3. That it would require frequent repairs on account of the concrete breaking up under the weight of the heavy interurban cars.

On Dec. 12 a motion for a new trial by the Village of Tilton was denied, and judgment entered on the verdict in bar of the action. This means that the petition of the Village of Tilton for mandamus is denied.

Buses for Broadway?

Since the board of directors of the Broadway Association made recommendations to improve traffic conditions on Broadway the transportation committee of the association has submitted the following three questions as a referendum to the members:

Are you in favor of a through line operated from Bowling Green to Kingsbridge for a single fare without a transfer?

Are you in favor of the continued use of the present type of green car on Broadway south of Forty-fourth St.?

Are you in favor of the removal of the street car tracks and the substitution of a modern bus line system operating on Broadway?

The committee points out the following facts:

1. The surface railway on Broadway is operated in two sections: one, the green car lines from Bowling Green to Broadway's intersection with Seventh Avenue at at Forty-fourth St. and, the other, the red car line from the intersection north to 130th St. A separate fare is charged on each line and no transfers between them.

2. South of Forty-fourth St. the green car line is operating a type of low platform cars with side entrance and exit through only one door at a time and has a seating capacity of about forty-nine persons.

3. Broadway south of Thirty-fourth St., is 43 ft. wide, designed and sufficient for six lanes of ordinary vehicular traffic, three lanes in each direction. The street is now occupied by two car tracks occupying 17 ft. of the width of the street from extreme outsides of cars. The street cars stop at nearly every corner to take on and let off passengers, who have to pass across the space reserved for two lanes of vehicular traffic in order to reach the sidewalk. The law requires all vehicular traffic in this section of Broadway to stop when the car stops until the passengers get on and off and the cars are ready to resume their headway.

Other important points touched on by the committee show that Broadway is the only street in Manhattan Island running from Bowling Green to Kingsbridge and is the logical thoroughfare for automobile traffic.

The committee further points out that tracks are not permitted on the finest streets of other cities and that modern motor buses in European cities and some American cities accommodate sixty passengers and could be used on Broadway. They move close to the sidewalk and other traffic could keep moving. In event of a breakdown they could be quickly removed.

The committee says that reliable information is that a bus line can be profitable on the entire length of Broadway on Manhattan for a single fare.

Commission Courts Investigation

New Jersey Body States Plainly Its Attitude on the Matter of Rates —Reviews Fare Case

The Board of Public Utility Commissioners of New Jersey has presented its report for the year recently ended. It is a clear-cut statement of the attitude of the body with respect to its own actions, the presentation of the board's position on the matter of rates being particularly forceful and to the point. The board feels that an investigation of the whole problem of public utility regulation by a commission of citizens in whose fairness and ability the public would have confidence would go far to clear up the misunderstandings which it thinks exist in the public mind. It recommends such an inquiry.

BOARD'S COMMENT ON CRITICISM

In discussing criticisms of rate advances by the public the commission made the following comment:

> It is a matter of regret that advances in charges of public utilities to meet increased operating cost and which under the circumstances it would have been unreasonable to deny have been misunderstood by many, and the important principles involved ignored in public discussion conducted in the heat and turmoil of political campaigns.
>
> There are but two methods by which public utility service can be supplied; one, where in the expectation of the protection of the law and the enjoyment of a reasonable profit capital is invested and public utilities are conducted as business concerns, subject to the regulation and restraint which because of their public nature it is reasonable and proper to impose; the other, requiring a departure from the principle of the regulated business concern and the substitution of municipal or public ownership.
>
> No matter how much the decision of the board may be misrepresented and misunderstood, or to what extent through misrepresentation and misunderstanding prejudice may be created, it cannot, unless it fails in the performance of its duty, permit this to influence its action.
>
> The performance of this duty requires, when conditions justify it, that rates should be reduced to prevent the exaction of more than a reasonable price for the service afforded. The reduction of rates naturally is far more popular than their increase. It is, therefore, much more agreeable to public officials to reduce rates when reasonable to do this.
>
> But increases in rates cannot, in the proper performance of public duty, be denied when they are justly due. Though the allowance of increases may result in misunderstanding and false charges of undue favoritism to corporate enterprises, the public officials upon whom the law imposes the duty of increasing rates when existing rates are insufficient, must perform this duty, disagreeable though it may be.
>
> It seems to us that in much of the recent discussion of the public utility question this fact is not appreciated. There are those who urge in effect that the efforts of a public utility commission should be directed, not to dealing fairly with the people and the utilities who serve them and to see that both are protected in their just rights, but to ascertaining that those who claim to speak for the public demand, and allow it without question or consideration of the effect upon the utility.
>
> Such a contention, if it is to shape the public utility policy of the State, can only lead to disaster. Its primary effect would be the widespread ruin of public utility enterprises. After this would come demoralization of service, inability to attract capital to provide for the continued development necessary to meet the requirements of growing communities, and a condition affecting the comfort and well being of the many thousands of our people to whom, under modern living conditions, the service afforded by public utilities is a necessity of existance.
>
> Rather than adopt any such policy, it would be far better not to continue the present plan to looking for companies in which private capital is invested for any form of public utility service, but provide as speedily as possible for public ownership and operation. The arguments that greater efficiency, more economical operation and a more satisfactory service can be obtained with private ownership, subject to public regulation, have no force if the serious problems it involves are not to be fairly considered and reasonably determined with justice to all; but are to be regarded as something to be juggled with to gain the applause of those who give no heed to their true significance and importance, and fail to appreciate the ultimate effect of ill-considered action.

The report indicates that electric railways, being the largest employers of labor among public utilities, have been particularly affected by wage increases. In 1914 the operating expenses and taxes of the electric railways were 66.2 per cent of the operating revenues. In 1918 they were 76.1 per cent. While increased travel and higher fares resulted in 1918 in increased operating revenues to the amount of $4,541,186 over 1914, the net return was $782,481 less than in that year, when fewer cars were in service and the investment of capital smaller.

Besides reviewing the work of the past year, including an historical sketch of the Public Service Railway rate case, the report contains a chapter devoted to a discussion of jitney competition, in which it is suggested that jitneys be subjected to proper regulation, a discussion of conditions compelling rate advances and comment by the commission upon the suggestion for an independent appraisal of public utilities as a means of determining rates.

Vote for Municipalization

At the municipal elections on Jan. 1, the ratepayers of Guelph, Ont., carried by a majority of five to one the by-law providing for the purchase of the Guelph Radial Railway on July 1 of this year. They also carried the by-law authorizing the issue of $855,235 of debentures, being Guelph's share of the hydro-radial line from Hamilton to Galt, to Preston, Elmira and Guelph. The majority was almost five to one.

By a majority of 956 the ratepayers of Galt, Ont., carried the by-law providing for the issue of debentures covering Galt's share of the proposed hydro-radial line from Hamilton to Galt and on to Guelph.

The by-law providing for the taking over of the lighting plant of the street railway at Windsor, Ont., was carried by a majority of 1,400.

The hydro-radial by-law guaranteeing $630,000 as Hamilton's share of the line to Guelph to be built by the Hydro-Radial Commission was carried by a majority of nearly 2,000.

Sir Adam Beck, chairman of the Hydro Commission, has been seriously ill in England with pneumonia. He is now reported to be somewhat improved. A. B. Lucas is acting chairman in the absence of Sir Adam.

The claim of the commission against the Dominion Government for about $1,250,000 has been referred to the Dominion power board.

"Social Function of Engineer"

Lectures to Be Given by Prof. Marx—Other Courses at New School for Social Research

The New School for Social Research of New York has arranged for a series of weekly lectures on "The Social Function of the Engineer," to begin on Feb. 2, and be given each Tuesday evening thereafter for twelve weeks at the school, 465 West Twenty-third St., New York. The course will be conducted by Guido H. Marx, professor of mechanical engineering at Leland Stanford University.

The theory upon which the course is based is that the production and distribution of goods is now fundamentally an engineering as well as social problem. The engineer's function is to insure the full use and unimpeded operation of the material resources and industrial equipment of the nation, with a view to secure a larger volume of production and a more adequate distribution of the output. The purpose of the course will be to reach a common understanding of the existing industrial and social problem.

The New School of Social Research at which this course will be given was founded last year by a group of men who believed that there was educational need for an institution of this kind. Its purpose is to supply instruction of a "post-graduate" character, although an academic degree is not required for admission. Each student is assumed to be pursuing his particular studies for their own sake for his own aims, so there is no prescribed courses of study or fixed curriculum. There is also no grant of degrees.

The courses given last year related particularly to the so-called "human sciences," such as history, economics, psychology and social and political science.

Abandonment Put Off

Public Service Commissioner Lewis Nixon of New York City on Jan. 6 made public correspondence between himself and Adrian H. Larkin, counsel to the electric railways on Staten Island, in which Mr. Nixon requested the company not to stop service in Richmond before Jan. 19.

Mr. Larkin has agreed to recommend to the company that no notice concerning the proposed cessation of operation shall be posted before Jan. 16, and that the notice, when posted, shall provide that discontinuance of service shall not take place earlier than Jan. 19.

Commissioner Nixon points out in his letter to Mr. Larkin that such postponement of cessation of operation will give opportunity to the committee appointed by Commissioner Nixon on Dec. 29, to make recommendations to the Board of Estimate and for the Board to act upon such recommendations if it desires. The companies had previously agreed to refrain from closing down before Jan. 10.

News Notes

Planning to Enter Cleveland.—It is rumored in Akron, Ohio, that the Northern Ohio Traction & Light Co. will enter Cleveland over a private right-of-way, in the event that the Cleveland Union Terminals Co. is finally defeated. The inference is that connection will be made with the right-of-way of the Nickel Plate Railroad at some point.

Story in Pictures.—Toledo Railways & Light Co., Toledo, Ohio, recently published an attractive pamphlet with this title, descriptive of its new office building in Toledo. Views are shown of the showrooms and employees' quarters, etc., as well as of the power station, substation, principal carhouses and illustrations of some of the company's activities.

Wage Award Payments Made.—Payment was made by the Northampton (Mass.) Street Ry. on Dec. 24, last, of back pay to June 1. This was in accordance with the decision of the State Board of Arbitration, which rendered a finding recently. The old rates for trainmen were from 35 to 40 cents an hour. The new rates are from 44 to 54 cents an hour.

Jamaica Carmen Strike.—The conductors and motormen employed by the West India Electric Co., Ltd., which operates the electric railway systems in Kingston, Jamaica, went on strike for higher wages on Dec. 26. Under the terms of the franchise of the company the right is reserved to the government to take over and manage the affairs of the company if service is not restored within a specified time.

Contests Air Brake Ordinance.—The Peoria (Ill.) Ry. has taken first steps to test the validity of the city ordinance demanding that airbrakes be placed on all cars operating in that city. The company has filed ten cases to the Circuit Court of Appeals. Prosecutions were started by City Attorney Harry Reyl under the ordinance of Sept. 27, 1917, which required that all street cars operated in the city be equipped with airbrakes.

Program of Bureau of Standards.—As a part of its program for the next fiscal year the Bureau of Standards, Washington, D. C., will undertake an investigation of the standards of practice and the methods of measurement of public utilities, including electric railways. An appropriation of $200,000 is available for carrying on the work. The immediate direction of the inquiry will be placed in the hands of an electrical engineer who will be paid a salary of $4,200.

Mid-Crosstown Transit to Be Discussed.—Transit Construction Commissioner John H. Delany has called a hearing for Jan. 20 at which consideration will be given to petitions and proposals for readjusting, redistributing or diverting rapid transit passenger traffic in the central section of Manhattan. These proposals are several in number, and include suggestions for the construction of a moving platform under Forty-second St., Manhattan; extension of Queensboro subway west to Eighth Ave., under Forty-second St.; a change in the route of the Queensboro subway through Forty-first St. instead of Forty-second St., west of Park Ave.; a subway loop through Forty-second St. and Thirty-fourth St., and certain north and south avenues, and a proposal for a local service connection between the subways on the East and on the West sides of the city.

New Jersey Board Considers Criticism Unjust.—The Board of Public Utility Commissioners of New Jersey has expressed its gratification that the complaint of Montclair against the commission in the Public Service Ry. zone case was legally and judicially disposed of by Acting Governor W. N. Runyon. The board regrets, however, that the Acting Governor "should have so unfairly abused the power of his office by indulgence in an unjust criticism of the personnel of the board, using the proceedings before him as an excuse for so doing. As noted in the ELECTRIC RAILWAY JOURNAL for Jan. 3, page 68, Montclair officials demanded that the commission be ousted from office. The Acting Governor dismissed the charges of wrongdoing by the commission, but said that in his opinion the public had lost confidence in the commission.

Public Telephones on Transit Lines.—Forms of agreement for the immediate installation of telephone booths on stations of elevated and subway lines for the use of the traveling public, have been transmitted to officials of the Interborough Rapid Transit Co., the New York Municipal Railway Corporation and the New York Telephone Co., by Transit Construction Commissioner John H. Delaney. The form of agreement provides for the installation of as many booths as may be necessary at each of the 517 rapid transit stations in the several boroughs. The booths will be located along the platforms adjacent to the operating tracks. All telephones will be of the coin slot type. The telephone company will pay to the operating roads as rental, 10 per cent on the first 50 cents received, 5 per cent additional on the next 25 cents, and 20 per cent on all receipts above $1 per diem.

Report Satisfactory Construction Progress. — A report showing that many of the large subway contracts in New York City will be completed and ready for operation next spring and summer, has been submitted to Governor Smith by Transit Construction Commissioner Delaney with jurisdiction in New York City. The report deals with the entire subject of rapid transit construction which, it says, has progressed satisfactorily despite serious conditions for the last two years. Mr. Delaney declares he has been confronted with a difficult problem in obtaining the necessary unskilled labor and that the materials market not only has been uncertain, but is becoming more acute every day. He said, that while these conditions make an accurate forecast impossible, the indications are that the large contracts now under way will be completed and ready for operation. He then outlined the probable opening dates for various branches of the new lines. These are very largely of interest only to residents of the city of New York.

Bus Rights Forfeited.—The De Luxe Transportation Company discontinued the operation of motor buses between San José and Oakland, Cal., on Oct. 1 without the consent of the Railroad Commission of California. On Dec. 10 the commission denied the De Luxe Company authority to transfer its permit to other operators who had offered $2,500 for it. The commission's ruling says: "Equipment could have been procured from other sources or by the lease of cars, and the public, who were entitled to service, could have obtained transportation. The obligation to render service to the traveling public between Oakland and San José was not complied with. The commission expects and will require transportation companies fully to discharge their obligations to the public in accordance with schedule filings and other regulations of the commission and suspension of service without the consent of the Railroad Commission will be regarded as a relinquishment of any operative rights which have been conferred by the commission."

Plan to Connect Municipal and Private Line.—Charles S. Butts, superintendent of the St. Louis Free Bridge, who recently asked the Aluminum Ore Company about the feasibility of connecting the proposed municipal bridge line and the railway of the Southern Traction Co., has been told by C. B. Fox, general manager of the company, that until the Southern Traction is out of the hands of the Federal Court he cannot discuss its plans. The road was sold a short while ago to the Aluminum Ore interest, after C. D. Mepham, St. Louis promoter, had failed on the second payment for the road. He had purchased it from the receiver in September. Superintendent Butts had planned to connect with the Southern Traction in order to reach Fourth and Broadway, East St. Louis, with the municipal line and to establish a downtown loop in St. Louis for the Southern Traction. Mr. Fox said that the Aluminum Ore Co. had bought the road for the purpose of bringing coal into East St. Louis for its own use and that he hardly thought the company would use the free bridge under the present ordinance.

Financial and Corporate

Reorganization Modified

Oakland, Antioch & Eastern Plan Again Changed With Approval of California Commission

In an amended application filed on Dec. 22 by the reorganization committee of the Oakland-Antioch Ry., the California Railroad Commission is asked to modify furthed its order in the proceedings. It is now proposed that the bondholders of the Oakland, Antioch & Eastern Ry., Oakland & Antioch Ry. and San Ramon Valley R.R. exchange their bonds for common and preferred stock of the new company.

BASIS OF EXCHANGE

In exchange for such bonds, they are to receive 7 per cent preferred stock in an amount equal to 20 per cent of the bonds deposited under the reorganization plan and common stock in an amount equal to 100 per cent of the bonds so deposited. In brief, a person owning or holding a $1,000 bond would receive under the reorganization plan, as now proposed, $1,000 of common and $200 of 7 per cent preferred stock in exchange therefor. Under the terms of the original plan of reorganization, a person owning a $1,000 bond would have received $600 of common stock, $200 of 6 per cent preferred stock and $200 of bonds.

The reorganization committee asks that the new company be permitted to issue approximately $6,550,000 of common stock and $1,330,000 of preferred stock, making a total of $7,880,000. In addition, the commission is asked to authorize the new company to execute a mortgage securing the payment of $3,000,000 of bonds and permit the new company to issue forthwith under such mortgage not to exceed $900,000 of 6 per cent serial bonds for the purpose of securing moneys necessary to pay off prior liens, pay off non-assenting bondholders, provide working capital, pay such reorganization expenses as may not be paid otherwise and to pay cost of extensions, additions and betterments. The $900,000 of bonds, if issued, will constitute a first lien upon the properties now owned by the Oakland, Antioch & Eastern Ry., Oakland & Antioch Ry. and San Ramon Valley R.R. At a former hearing, it was reported that about $6,500,000 had been invested in the properties of these companies.

On June 26, 1919, the Railroad Commission authorized the corporation which might acquire the properties of the Oakland, Antioch & Eastern Ry., Oakland & Antioch Ry. and San Ramon Valley R.R. to issue not exceeding $1,950,000 of first mortgage bonds bearing interest at not more than 6 per cent and not exceeding $1,330,000 of 6 per cent preferred stock and $4,000,000 of common stock.

The reorganization plan contemplated that all of the stock and not exceeding $1,330,000 of the bonds would be exchanged for outstanding bonds and indebtedness of the Oakland, Antioch & Eastern Ry., Oakland & Antioch Ry. and San Ramon Valley R.R. It was estimated that after the exchange of the stocks and bonds of the new company for bonds and indebtedness of the old company, there would be available for sale at least $620,000 of the new company's bonds.

The reorganization committee found it impossible to market the bonds, and it therefore, on Nov. 12 asked the commission to modify its decision of June 26 so as to permit the new company to issue not exceeding $4,000,000 of common, not exceeding $1,330,000 of 6 preferred stock, and not exceeding $2,100,000 of bonds. The request of the company was granted on Nov. 19. The principal change introduced by the amendment to the reorganization plan was the proposed issue of a five-year 7 per cent bond instead of a twenty-year bond bearing interest at not more than 6 per cent per annum, and providing for the sale of $770,000 instead of $620,000 of bonds.

London Lines Reported Sold

It was reported from London on Jan. 3 that Speyer Brothers have sold their interests in the London Electric Rys. to Solly Joel, of Barnato Brothers, for £500,000. The Speyers became interested in London traction when the late Charles T. Yerkes undertook the electrification of the old steam underground railway and construction of several additional subway lines. He obtained considerable quantities of American capital to finance his schemes through the Speyer Brothers, of whose London house Sir Edgar Speyer, baronet, was head. Sir Edgar put through in 1912 a merger of the underground railways and the London General Omnibus Co. He was chairman of a group of companies until May, 1915, when he took up his residence in America. One of the press dispatches dealing with the sale says that special interest is taken in the sale of the Speyer holdings, as it comes on the eve of the application by the underground company to Parliament for authority to double its fares.

At the office of Speyer & Co. in New York inquirers were referred to Sir Edgar Speyer at his home in New York. Efforts to reach Sir Edgar himself were unavailing.

Valuation Elements Decided

"Going Value" Must Be Taken As Element of Valuation, Says State Supreme Court

The jurisdiction of the Public Utilities Commission in the fixing of rates for service, and the affirmation of "going value" as an element of valuation which must be included, are two questions which have been apparently definitely settled by two recent unanimous decisions of the Supreme Court of Illinois. The two decisions in point had to do with the Quincy traction case and the Springfield gas case. These two decisions are believed to clarify many points of controversy in the regulation of public utility companies and are thus considered of far-reaching importance.

CASES REVIEWED

In the Quincy traction case decision referred to in the ELECTRIC RAILWAY JOURNAL for Dec. 27, page 1,064 and Jan. 3, page 74, the court holds unequivocally that the powers of the Public Utilities Commission supersede all of the rate-regulating powers ever granted to municipalities in the State of Illinois. So called "contract ordinances" or other forms of rate contracts between municipalities and utility companies are of no avail, the court states further, because municipal authorities in Illinois have never been clothed with power to make binding contracts fixing rates for a definite term of years. Without this specific and definite power, municipalities could not make binding contracts under the general rate-regulating powers delegated to them by the Legislature prior to creation of the Public Utilities Commission. The net result is that the Public Utilities Commission has full power to change any public utility service rate in Illinois hitherto fixed by the local authorities.

"GOING VALUE" ALWAYS PRESENT

The principal feature of the Springfield gas case decision was the statement by the court that "going value" is always present, and is one of the elements that *must* be taken into account in the valuation of a public utility. The decision of the court goes on to discuss at length the elements to be considered in fixing rates, and makes it a prime duty of the Public Utilities Commission to see that rates are "just and reasonable." It explains that because a rate is not confiscatory, does not necessarily mean that it is just and reasonable.

The decision reads:

> The real test of the justice and reasonableness of any rate seems to be that it should be as low as possible, and yet sufficient to induce the investment of capital in the business, and its continuance therein. An unwise administration of regulatory laws will drive capital from this field and bring on public calamity by causing the utilities to cease to function. It is equally important to the public and to the utility that the rates established be just and reasonable. A just and reasonable rate, therefore, is necessarily a question of sound business judgement rather than one of legal formula, and must often be tentative since exact results cannot be foretold.

In other words, it would seem to be the court's reasoning that the Public Utilities Commission should allow a utility company some latitude in its rates for meeting contingencies such as the fluctuating costs of material and labor, changing conditions affecting its business, etc., rather than tie it hand and foot to arbitary standards. The court goes on to emphasize this point by stating that "the commission cannot substitute its own business discretion or judgment for that of the directors of the corporation."

$80,466,100 in Maturities

About 40 Per Cent of Grand Total of $196,296,800 Utility Maturities in 1920 Fall to Electric Railways

While the number of public utility securities falling due in 1920 is unusually large, the aggregate is only $196,296,800 against $261,887,600 in 1919 and $210,500,000 in 1918, according to the *Wall Street Journal.* During 1919 public utility bonds called in advance of maturity aggregated $5,108,000. A feature of 1920 maturities is the large number of short-term obligations falling due.

Owing to tight money and other restrictions during the war period, utility corporations did not find it advantageous to issue long term bonds and were obliged to resort to short term notes to tide them over abnormal times. Should money become easier in 1920 doubtless many of the maturing obligations will be refunded with long term issues.

Below is given in detail, as compiled by Dow, Jones & Co., the various electric railway issues of more than $200,000 maturing in 1920, in the order of their due date:

January		
Tol. Traction, Lt. & P. 2-yr.	7	$10,500,000
Manchester Trac. Lt. & P. notes	6	1,500,000
United Light & Rys. notes	6	1,500,000
Little Rock Ry. & Elec. notes	6	600,000
New Bed., Middleboro & B. St. R.	5	325,000
Lincoln Traction 1st	5	250,000
Lorain Street Ry. 3-yr. notes	6	200,000
Republic Ry. & Light 2-yr. notes	6	1,500,000
Total		$16,375,000
February		
Georgia Ry. & Pwr. 2½-yr. notes	6	$2,500,000
Richland Co. notes	7	759,000
Saginaw Valley Traction 1st	5	670,000
Washington Water P. 1-yr. notes	6	2,900,000
Total		$6,820,000
March		
United Nat. Utilities 3-yr. notes	6	$1,800,000
Worcester Consol. St. Ry. deb.	4½	700,000
Maumee Val. Rys. & Lt. 1st	4½	500,000
Tol. & Maumee Val. Ry. 1st	5	300,000
Total		$3,300,000
April		
Joplin & Pittsburgh Ry. gen.	6	$1,050,000
Lexington & Boston St. Ry. 1st	4½	500,000
Det. & Lake St. Clair Ry. 1st	5	390,000
Wichita R.R. & Light 1st	5	300,000
Total		$2,240,000
May		
Milwaukee E. R. & L. 2-yr. notes	7	$2,000,000
St. Louis R.R. 1st	4½	1,948,000
United Lt. & Rys. ser. A notes	6	1,500,000
Sou. Ohio Trac. 1st cons	5	1,350,000
Canton-Massillon El. Ry. 1st	5	840,000
Dayton Trac. 1st extended	5	250,000
Prospect Park & C. I. inc	6	250,000
Total		$8,138,000
June		
Tenna. Ry. Lt. & Pwr. notes	7	$2,500,000
Monongahela Val. Tr. 1-yr. notes	6	2,000,000
Det., Roch. R. & L. Orion Ry. 1st	5	1,100,000
Chattanooga Ry. & Lt. notes	7	750,000
Total		$6,350,000
July		
Columbus Ry. P. & L. 2-yr. notes	7	$2,500,000
Middle West Utilities 3-yr. notes	6	1,000,000
C. North Shore & M. ser. notes	6	360,000
Houghton County St. Ry. 1st	5	267,000
St. Francois County R.R.	5	250,000
Aurora, Plainfield & J. Ry. notes	6	200,000
Buff. Lock, & R. Ry. 2nd	6	200,000
Total		$4,777,000
August		
Inter. Traction 3-yr. notes	6	$2,000,000
West End St. Ry. debs	7	1,581,000
Gr. Rap. Hol. & L. M. R. Ry. 1st	5	1,475,000
Cleve. Elyria & West 1st	5	1,073,000
El Paso Electric 3-yr. notes	6	300,000
Cleve. & Elyria E. Ry. 1st ext.	5	200,000
Ch., Nor. Sh. & Mil. 1-yr. notes	6	600,000
Total		$7,229,000
September		
Middle West Utilities 3-yr. notes	6	$1,000,000
Chicago & West Towns Ry. 1st	7	750,000
Ohio Traction notes	6	350,000
United Rys. of St. L. rec. ctfs	6	2,300,000
Total		$4,400,000
October		
Tol. Fostoria & Find. Ry. 1st	5	$385,000
Total		$385,000
November		
Mah. & Shenango Ry. & L. cons A	5	$11,200,000
Scranton Ry. general	5	1,000,000
Middle W. Util. 3-yr. notes	6	782,100
Hagerstown & F. Ry. notes	6	550,000
Ma. & Shenango Ry. & L. cons B	6	550,000
Empire S. R. R. C. 3-yr. notes	6	350,000
Total		$14,432,100
December		
Portland Ry. Lt. & P. notes	7	$2,500,000
United Lt. & Rys. 1-yr. notes	7	1,500,000
Toronto Ry. 2-yr. notes	6	1,000,000
Ark. Valley Ry. Lt. & Pwr. notes	7	350,000
Brockton & Plymouth St. Ry. 1st	4½	260,000
Citizens El. St. Ry. 1st	5	230,000
Ottumwa Ry. & Light notes	5	200,000
Total		$6,040,000

Bonds and notes maturing in January	$16,375,000
Bonds and notes maturing in February	6,820,000
Bonds and notes maturing in March	3,300,000
Bonds and notes maturing in April	2,240,000
Bonds and notes maturing in May	8,138,000
Bonds and notes maturing in June	6,350,000
Bonds and notes maturing in July	4,777,000
Bonds and notes maturing in August	7,229,000
Bonds and notes maturing in September	4,400,000
Bonds and notes maturing in October	385,000
Bonds and notes maturing in November	14,432,100
Bonds and notes maturing in December	6,040,000
Total electric railway maturities	$80,466,100
Grant total public utility issues maturing in 1920	$196,296,800

Abandonments in San Diego

Read G. Dilworth, general counsel for the San Diego (Cal.) Electric Ry., notified the Council on Dec. 23 of the company's intention Jan. 1 to suspend operation of cars on the following lines:

Route No. 13—From Fourth and Spruce Sts. to Third and Broadway.

Route No. 8—From Twenty-fifth and F Sts. to Arctic and F Sts., thence to Arctic and Broadway; thence to State and Broadway; thence to State and F.

Point Loma line—On the loop between rington St. with Tennyson St. and the approximately the intersection of Warintersection of DeFoe with Santa Cruz Ave.

One-Third of Charges Paid

Testimony So Shows In Suit Brought Against Pittsburgh Railways by Philadelphia Company

The receivers for the Pittsburgh (Pa.) Rys., in the past eighteen months they have been in control of the company, have paid $1,738,936 on the fixed charges of the company, or just about one-third of the $5,153,673, made up mostly of bond interests, rentals and interest on notes. The figures were submitted by J. A. Meade, auditor for the company, in a hearing before the United States District Court on the action of the Philadelphia Co., parent company of the traction system, which seeks to recover $1,272,452 that had been advanced on behalf of the traction company.

COMPANY ENTITLED TO RELIEF

Attorneys for the Philadelphia Co. urged upon the court that the Philadelphia Co. was entitled to relief through the funds in the hands of the receivers, who are using the property upon which the parent company is meeting fixed charges. Attorneys for the city of Pittsburgh and for certain of the active subsidiary companies in the traction system, argued that the fact that the Philadelphia Co., through guarantees it gave at the formation of the traction system, was forced to pay certain fixed charges did not constitute any reason why the receivers should be made to reimburse the Philadelphia Co. to the disadvantage of less favored creditors; further, they said, this action of the parent concern was being opposed by guaranteed as well as non-guaranteed creditors.

The receivers' books, according to Mr. Meade, showed the following situation on Dec. 1:

	Paid	Unpaid
Bond interest	$1,126,430	*$2,100,660
Rentals (for use of underlying companies)	611,774	*784,947
Interest on various notes	732	539,131
Total	$1,738,936	$3,153,737

*Philadelphia Co. claims to have paid $1,272,452 on these two items.

Attorneys for the Consolidated Traction Co., one of the subsidiaries, brought out in cross-examination of Mr. Meade that the receivers had $2,237,000 in the bank at the close of business on Dec. 23, but counsel for the receivers immediately explained that this was only an apparent and not an actual balance. During the examination of the auditor, the attorneys drew this explanation:

> That cash is like a man's pay envelope before he begins to pay the bills. We get our money in cash daily and pay it out at intervals. Out of that $2,237,000, we must pay between now and the first of the year, $900,000 more of the month's operating expenses, $100,000 on pre-receivership supply bills, and on Jan. 1 we pay the State $250,000 in taxes, a total of $1,250,000, leaving $1,000,000, roughly, for working capital. Out of $1,000,000 we must meet accruing items. This will take the entire $1,000,000.

Judge C. P. Orr asked attorneys for briefs. He will announce his decision later.

Appraisal of Memphis Street Railway

Study of Full Report Shows Unanimity of Opinion as to Basis of Valuation with Exception of Superseded Property Value and Method of Figuring Interest on Development Cost

On page 70 of our issue of Jan. 3 appeared a reference to the report of Albert S. Richey, who represented the Railroad & Public Utilities Commission of Tennessee in the appraisal of the Memphis (Tenn.) Street Ry. The full report together with statements by J. H. Perkins, representing the receivers of the company, and Ross W. Harris, representing the city, wherein they differ is now available and enables the publication of exact figures.

All of these representatives agreed not only on the entire inventory and unit costs but also on the moot questions of amounts to be allowed for ommisions and contingencies, engineering and superintendence, franchise costs, law expenditures, interest, injuries and damages, taxes during construction, miscellaneous construction items including promoter's reward, cost of financing and working capital.

Using the commission's appraiser's figures as a basis the only real differences between the appraisals of the three engineers are, first: Mr. Perkins compounded his interest in figuring development cost, and second, Mr. Harris reduced the amount of the investment allowed by ommitting superseded property to the extent of nearly $700,000, this resulting in wiping out the "Development Cost" item, for it becomes zero at the end of twelve years. However, the treatment of development cost by both Messrs. Harris and Richey were exactly the same, so far as the method of its determination was concerned.

SUMMARY OF APPRAISAL

Acct. No.	Item	
501	Engineering and superintendence (6% of 502-542)	$428,872
502–542	Cost of physical property	7,147,873
545	Procurement of franchises (0.25% of 502-542)	17,870
546	Law expenditures (0.5% of 502-542)	35,739
547	Interest during construction [4% of (501-546) + 548]	307,359
548	Injuries and damages (0.75% of 502-542)	53,609
549	Taxes prior to operation [0.35% of (501-546) + 548]	26,894
550	Miscellaneous:	
	(a) Costs prior to construction [5.25% of (501-546) + 548]	403,408
	(b) Construction expenditures [2% of (501-546) + 548]	153,679
(X)	Working capital, including materials and supplies	330,000
(Y)	Cost of financing [4.5% of (501-550) + X]	400,739
(Z)	Development cost	787,579
	Total, excluding superseded property	$10,093,621
	Superseded property	1,930,544
	Total valuation	$12,024,165

With regard to depreciation, which Mr. Harris terms "functional supersession," all seemed to agree on the fundamentals laid down, namely, that no deduction should be made.

PHYSICAL PROPERTY

The basis used in making the appraisal was the original or historical cost of the property as of July 1, 1919, and in general the principles outlined by the Massachusetts Public Service Commission in the Middlesex & Boston Street Ry. rate case (2 Mass. P. S. C. Rep. 107) were followed.

By agreement, between the three parties of interested engineers, an inventory was made by the company's representative, but under the joint and constant supervision of the three appraisers. A count was made of the various items of physical property in existence July 1, 1919, and classified according to the I. C. C. classification of road and equipment accounts. In many cases it was possible to list the items by actual inspection, while other items, such as the elements entering into track construction had to be listed from the company's records and then checked partly by inspection or through records of the City's Engineer's Office.

Information as to real estate owned was obtained from the deeds, and the prices put upon the various pieces was wherever ascertainable, the actual price paid. No allowance whatever was made for real estate valued at $205,227, donated to the company. Where actual records were unattainable, values were fixed by a real estate appraiser selected by agreement between the receivers of the company and the commission's engineer. The total real estate value so assigned, however, was only $8,702.

Labor quantities and unit prices were, so far as possible, taken from the company's records, otherwise estimates prepared by the company's employees after being checked by the experience of the appraising engineers, were used.

Unit prices, including cost of freight and handling, taken from the company's records as for the time of installation, were assigned to each item in the inventory. Average prices were used only for cases of large quantities of a similar type of material such as cross-ties. To offset the probability that some parts of the items of tools and office furniture had been paid out of operating expense an arbitrary deduction of 10 per cent was made from the appraised value of all property listed under such accounts.

Due recognition was also given to probable ommissions from inventory and to unavoidable construction losses, contingencies and to piecemeal construction. By agreement among the appraisers arbitrary additions ranging from 1 per cent on "Special Track Work" to 10 per cent on "Grading," "Roadway Machinery and Tools" and "Crossings, Fences and Signs" were allowed on all unit costs. The accompanying summary shows that the total cost of physical property as determined by the inventory together with percentages used for calculating the overhead costs.

DEVELOPMENT COST

"Development Cost" which is defined as the uncompensated cost incurred to bring the plant to a self supporting basis was held to be a logical sequel to "interest during construction," and entirely separate and distinct from "going concern value" and "franchise value," which items are rarely considered in a rate making appraisal. In determining the amount applicable to this item the property additions and renewal and replacement reserve were tabulated by years from 1892 to 1919. The amount of working capital for the various years, however, fixed at $330,000 for 1919, was calculated retrogressively as proportionate to the yearly operating expense. The amount invested in the property, as determined in the appraisal, including the allowance for superseded property, but exclusive of any allowance for development cost, fixed the value of the property as of 1919, and from which the value for each year back to 1892 was calculated.

To determine the yearly percentage return the net yearly income applicable to interest and dividends was applied on the value of the property. Taking 7 per cent as being a fair return, the yearly deficit or credit both singly and cumulative was determined for the first 10 years of electric operation. This cumulative deficit or "Development Cost," as it was termed, amounted to $787,579.

SUPERSEDED PROPERTY

The cost of superseded property was included under the theory that such property had either become obsolete or discarded through progress in the art or had become inadequate or rendered useless before the termination of its useful life and such property not having been amortized through income was entitled to a return. The early superseded property was therefore listed and cost prices assigned either from the company's records or by estimates. The company's records which were unusually complete were used entirely after 1905. Allowances were also made for salvage value and deductions on account of credits from the renewal and replacement reserve wherever possible.

The total amount found to be invested in superseded property, after deducting the present balance in the renewal and replacement reserve was $2,596,487. Of this amount, however, $665,943 represents cost of property, superseded prior to electrification in 1893, which Prof. Richey recommends be deducted in arriving at the proper allowance for superseded property. Of the amount—$1,930,544—over 90 per cent is represented by property superseded since 1905. Prof. Richey also holds that inasmuch as the company has never had more than a fair return, which might have enabled it to amortize such property, that the net cost of superseded property since Jan. 1, 1893, as above, either be included in the cost of property entitled to a return or that the company be permitted to establish a suspense account and charge it to operating expense distributed on a period of ten to fifteen years.

DEPRECIATION

No allowance was made by the Commission's engineer either for actual depreciation or theoretical accrued depreciation, as Prof. Richey, after a careful inspection, was convinced that the property was nearly, if not quite, in a condition of 100 per cent operating efficiency, especially considering the difficulties in securing proper labor and material during the past two or three years. He contended that so long as the property was in such a state that no deduction should be made from the original cost in arriving at rate base, and further if no more than a fair return had been paid on the amount invested in the property, no deduction should be made for depreciation in any event.

Thursday, January 15 has been set by the commission for a hearing on this matter, and so far as the reports of the three appraising engineers are concerned, they have only two matters to decide, the amount to be allowed for "superseded property" and the question as to whether or not interest should be compounded in figuring development cost.

Providence Holders Confer

The general committee of security holders attempting to bring about a settlement of the railway situation in Providence met on Dec. 30. There were present on behalf of the bondholders of the United Traction & Electric Company, Philip L. Spalding and S. O. Metcalf; on behalf of the bondholders of the Rhode Island Suburban Ry., Cornelius F. Sweetland and Colonel H. Martin Brown; representing the United Traction & Electric Co. stockholders, Michael F. Dooley and Frederick S. Peck. Colonel Frank W. Matteson was present unofficially representing the New York, New Haven & Hartford R.R.

A plan was submitted by the bondholders of the United Traction & Electric Co. and a general discussion followed. According to unofficial reports sentiment was developed of earnest endeavor to get together on some plan with which to go before the Legislature. No decision was arrived at because the various subcommittees had to report back to their main bodies. It is said that these subcommittees will be immediately called together and that the entire group will meet again on Jan. 7.

All claims against the Rhode Island Company are listed and classified and recommendations as to priority in their payment made in a report filed by the receivers in the Superior Court. With this report was filed a receivers' inventory, as of Oct. 31, 1919, bringing up to date the inventory made by Bacon, Ford & Davis in 1916. The report on claims, made in pursuance of a court decree of March 10, groups total claims of $10,764,542, into eleven schedules, on some of which the receivers make recommendations regarding priority of liquidation.

Chicago Receipts Increase

Following the issuance of the 6-cent fare order, L. A. Busby, president, gave to the commission a report on earnings, expenses, traffic and wages for the Chicago Surface Lines for the month of November. This showed an increase over November, 1918, of $1,500,698 in gross earnings, and $1,081,074 in operating expenses, leaving net residue receipts of $954,162. Of this amount the companies' share was $786,991. Compared with a normal period, November, 1916, there was a decrease of $65,689. Had the renewal fund been carried at 8 per cent of gross instead of 5.74 per cent, the decrease would have been $164,312.

Revenue passengers, compared with November, 1918, showed a material increase due to the influenza epidemic of last year. The figures were 61,876,455, as against 56,363,005. The average fare per passenger, including free and transfer, was 3.97 cents, compared with 2.86 cents.

Total operating wages for the month amounted to $2,002,435, or 46 per cent of the gross receipts, an increase of $652,336 over November, 1918. Endeavoring to comply with the agreement to have 60 per cent of the runs on an eight-hour basis by Jan. 1, the companies had completed fifty-two of the new time tables, or 40 per cent of the whole, by the end of November. When this work has been finished 2,200 additional men will be needed to operate the cars. The full cost of bonus time and overtime will not be known for a month or so.

Increase in Receipts of Boston Elevated

The Boston (Mass.) Elevated Ry.'s receipts for the three days preceding Christmas reached a high mark in the history of this company. The gross collections for the three days exceeded $100,000 a day. While these figures are abnormal, the general increase even for normal conditions is such as to cover the costs of service, including dividends, which amount to about $88,000 a day.

It is improbable that the favorable balance will result in a reduction of the 10-cent fare in the near future as the outstanding loan of $4,000,000 obtained from the State, together with a $1,000,000 reserve fund has been used up and the law requires that this deficit must be removed before the fare can be lowered.

Maine Line Reorganized

Lewiston, Augusta & Waterville Street Railway Has Been Succeeded by Androscoggin & Kennebec Railway

The report has been confirmed which appeared in the ELECTRIC RAILWAY JOURNAL for Jan. 3, page 73, that the Androscoggin & Kennebec Ry. has succeeded the Lewiston, Augusta & Waterville Street Ry., the property of which was sold under foreclosure some time ago. In fact, the Androscoggin & Kennebeck Ry. took possession of the property on Oct. 1.

RECEIVERS APPOINTED IN 1918

The Lewiston, Augusta & Waterville Street Ry. was petitioned into receivership upon a creditor's bill brought by the Cumberland County Power & Light Co., Cumberland, Maine, on Dec. 16, 1918, and William H. Newell and Alfred Sweeney, were appointed receivers.

On July 1, 1919, the Old Colony Trust Co., Boston, Mass., trustee of the first and refunding mortgage 5 per cent bonds of the Lewiston, Augusta & Waterville Street Ry. foreclosed under the provisions of the mortgage.

The property was sold at public auction on Sept. 5, 1919, by a special master appointed by the court and was bid in by a committee representing the bondholders of the Lewiston, Augusta & Waterville Street Ry.

BRANCH DISCONTINUED

The receivers of the Lewiston, Augusta & Waterville Street Ry. had endeavored to be relieved of the operation of three branch lines, namely, the Augusta-Winthrop, Augusta-Togus, and the East Auburn-Turner lines. The first two lines were covered by an underlying mortgage, and on account of the protest by the holders of the securities, the discontinuance of the lines could not be effected. The East Auburn-Turner line, however, was under the mortgage of the Lewiston, Augusta & Waterville Street Ry. only, and it was sold as a separate parcel and bid in without the franchises. This line, therefore, has not been operated since Oct. 1.

COMPANY'S STATEMENT OF NEW CAPITALIZATION

The Lewiston, Augusta & Waterville Street Ry. had outstanding capital stock of $3,000,000 and bonded debt of $3,659,000. The successor company, the Androscoggin & Kennebec Ry., has outstanding $3,176,700 of stock, and $1,345,000 of bonds, or capital liabilities totaling $4,521,700.

In consequence of the discontinuance of operation of the so-called Turner line, the mileage figure of the electric railway property as at present operated is slightly less than that of the predecessor. The mileage of the Androscoggin & Kennebec Ry. is 157.165 miles, whereas the mileage of the original property as operated by the Lewiston, Augusta & Waterville Street Ry. was 165.909 miles.

Financial News Notes

Kansas City Director Resigns.—R. J. Dunham, vice-president of Armour & Company, has resigned as a director of the Kansas City (Mo.) Railways.

Application to Foreclose Granted.—The applications made to the court to abrogate leases of the Shore Line Electric Ry., Norwick, Conn., made with the Connecticut Co., and to foreclose the Shore Line property, referred to in the ELECTRIC RAILWAY JOURNAL for Jan. 3, page 70, have been granted by Judge Warner.

Car Trust Certificates Authorized.—The Board of Public Utility Commissioners has granted permission to the Morris County Traction Co., Morristown, N. J., to issue $58,000 of car trust certificates for the purpose of making part payment on fourteen one-man cars. The board has also authorized the company to dispose of ten old cars.

January Coupon Not Paid.—The committee on securities of the New York Stock Exchange has ruled that the New Orleans Railway & Light Co.'s general mortgage 4½ per cent bonds, due 1935, be quoted ex the July 1, 1919, coupon on Jan. 5. Hereafter said bonds must continue to be dealt in flat. It was announced that the coupon due on Jan. 1, 1920, would not be paid on that date.

Cleveland Dividend Increase Approved.—The City Council of Cleveland, Ohio, on Dec. 29 formally granted the Cleveland Ry. the right to increase the dividend rate on its stock from 6 per cent to 7 per cent in accordance with the recommendations of the arbitration board reviewed at length in the ELECTRIC RAILWAY JOURNAL for Jan. 3, page 71. The vote was eighteen to eight to amend the Tayler service-at-cost franchise grant to this effect.

Kansas City-Western Ordered Sold.—The Kansas City-Western Ry., known as the Leavenworth interurban line, has been ordered sold on Feb. 16 by Federal Judge John C. Pollock. The sale will be held by William Holmes, master in chancery. The order of the court was in answer to a plea in behalf of bondholders filed by the Guaranty Trust Co., New York, trustee, under a mortgage securing bonds issued by the company.

Operation Authorized.—The Public Service Commission for the Second District of New York has authorized operation and maintenance by the Erie County Traction Corporation of the former Buffalo Southern Ry. and it has also approved exercise of franchises of the former corporation. The road has been in operation for several years and the Erie company acquired it at foreclosure sale. Chairman Charles B. Hill, who heard the company's petition, says continued operation of the road is necessary and convenient for the public.

Operation Continued With Subsidy.—The bondholders' committee of the Ocean City (N. J.) Electric Ry. has agreed to continue operating the road for the present under the agreement entered into last fall, the city paying $100 a month and the board of education a like sum a month to the company in order that the children might thus be conveyed to the schoolhouses. The city will later hold a special election to determine the matter of transportation for residents and visitors during the coming spring and summer.

Let the City Do It.—J. W. Shartel, general manager of the Oklahoma Railway, was recently quoted as saying: "If the citizens of Oklahoma City can run the railway at a profit, I wish to heaven they'd take the line and do it." Mr. Shartel, however, pointed out that this was his official view only. Personally he does not believe that a city-owned railway system could be made to pay. As a citizen he would vote against such a move Neither does he anticipate that if the question went to a vote the people would actually favor city ownership.

Reorganization Securities Authorized.—The Erie County Traction Corporation has been authorized by the Public Service Commission, for the Second District of New York, to execute a mortgage on its property, the former Buffalo Southern Ry., to secure its first mortgage bonds and to issue under the mortgage $100,000 in 6 per cent fifty year or Series A bonds and $150,000 in twenty-five year Series C income bonds. The company is also authorized to issue $450,000 in common capital stock. The securities authorized, or their proceeds, $700,000, are to be paid to the purchasers, representing bondholders, at the foreclosure sale of the former Buffalo Southern Ry. for the railway, compensation for the amount which the purchasers bid at the sale, to pay receivers' debts and reorganization expenses.

Sale of Huntington Road Approved.—The sale of the property of the Huntington (N. Y.) R.R. by Receiver Wallace E. J. Collins to William A. Dempsey has been confirmed by Supreme Court Justice Faber. Following the sale, to which reference was made in the ELECTRIC RAILWAY JOURNAL for Jan. 3, page 72, opposition developed to the confirmation of the transaction. On this point the court ruled in substance that the best interests of the creditors and stockholders of the company were apparently conserved by the sale and that the court was not concerned with the disposition of the property by the purchaser after confirmation. The objection was that the property or at least some of it might not be continued in operation. Justice Faber said that this question of convenience to the residents was not before the court.

Court Approves Accident Settlements.—An order of the United States District Court, authorizes the payment of approximately $40,000 in judgments against the Memphis (Tenn.) Street Ry. at a discount of 25 per cent. The judgments represent, principally, verdicts against the company for personal injuries received by a number of plaintiffs in damage suits. A statement says: "This amount does not include all outstanding claims against the company, nor does it represent the total indebtedness of the concern. It only represents the sum to be paid in settlement of claims in damage suits which were decided against the company. This means that all verdicts for damages granted plaintiffs in suits against the company prior to the time the court order became effective, will be paid by the receivers on a basis of 75 per cent of the amount named in the verdict or judgment."

Appraisal Nearing Completion. — Stone & Webster practically have finished their appraisal of the physical valuation of the lines of the New York (N. Y.) Rys. Although only approximate figures are available at this time, it is declared the report will show that the physical valuation of the railway in 1914 was in the neighborhood of $85,000,000, and in 1919, based on reproduction and replacement of all the elements entering into the physical composition of the system, is, in round figures, $140,000,000. This enhancement in value makes allowance for depreciation of rails and equipment, but does not take into account the former value of the special franchises—$16,000,000—on which the corporation has been paying taxes as a going concern. The enhancement represents what it would cost to replace the physical factors of the system on the present-day basis of high prices for labor and materials.

Assistant in Receivership Case.—An order entered into the United States District Court by Senior Circuit Judge Walter H. Sanborn, reassigning Judge D. P. Dyer to serve as assistant to Judge Charles B. Faris, will relieve Judge Dyer of the duties of handling the receivership suit affecting the United Rys. of St. Louis. The receivership suit is thereby transferred to the jurisdiction of Judge Faris, in as much as the order authorizes Judge Dyer to handle all cases but equity cases, under which classification the United Railways suit comes. All orders for expenditures and approval of monthly reports of Receiver Wells have been made in the past by Judge Dyer. He appointed Mr. Wells receiver on April 12, 1919. Since that time all expenditures and reports have been submitted to him for approval. The reports were first submitted to Judge Henry Lamm, special master, who acts upon them and then sends his recommendations on to Judge Dyer. The final approval, however, rested with Judge Dyer.

Traffic and Transportation

City Lines Need Increase

San Francisco Municipal System Must Have Higher Fares to Continue Paying Present Wages

The Municipal Ry. of San Francisco, Cal., will be obliged to raise its fare in the near future if it is to continue to pay the wages now in effect on its lines. This fact was brought out at the meeting of the Board of Supervisors on Dec. 29, when the question of securing funds to meet the deficit incident to the present wage-scale came up for consideration.

Payment of the present wages is resulting in a deficit which must be made up either from the depreciation fund or from increased revenue, it was shown at the meeting. Each month the board by resolution has appropriated more than $11,000 from the depreciation fund to make possible the $5 daily wage paid to platform men. It is felt that this deficit cannot continue to be met in this fashion, and that the only solution is an increase in fare.

The matter was brought to a head when Supervisor Power asked that the board devise a proper method for securing the money, declaring that the depreciation fund could not be used for this purpose. In urging the necessity of securing funds from some other source, Mr. Power said:

> This is a haphazard method of financing. There is no use fooling ourselves. If we keep on doing this it will not be long before the depreciation fund is exhausted and we will find ourselves in a sorry predicament. Any taxpayer could prevent this being done, as it is against the law.

The Supervisors did not enter into a discussion concerning increased fare, but voted to have the judiciary committee devise a new method of securing the necessary funds rather than take them from the depreciation fund. It is reported that the depreciation fund consists of $667,886 invested in bonds and $411,131 in cash with $147,894 in the injury insurance reserve.

If the fare is raised on the city-owned lines, an increase in the rate charged by the United Railroads of San Francisco will be in order. It is felt that the charging of different rates by the two companies would turn much of the traffic to the privately-owned lines. City ownership of the entire electric railway system of San Francisco is seen by some as the best way out of the difficulty. This attitude is taken by the San Francisco *Chronicle*, which said editorially on Dec. 31:

> The municipal railroads are no longer paying thir way and cannot be made to pay it except by raising their fares. Raising the fares tends to reduce traffic for short distances, which are the money-making fares on all street railroads. To raise the fares on the municipal roads and not permit it on the competing roads would turn all competitive traffic to the cheaper lines. And the competitors, if authorized, may conclude that it is more profitable to get the increased traffic drawn from the high-fare lines than to raise their fares to correspond. Probably, however, they will raise their fares.
>
> As was inevitable the politicians whom we elect to manage our business do not dare to face the issue squarely. They have been boasting that under municipal management the 5-cent fare could be continued indefinitely. They are afraid of the people if they raise the fares.
>
> Under municipal ownership, managed by politicians, the roads are inevitably run to pay the highest possible wages to the largest possible number while maintaining low rates of fare—possible or impossible. Foreseeing all this the *Chronicle*, while the question was open, opposed municipal ownership.
>
> When the people decided otherwise the question was closed and the *Chronicle*, now that we have the roads, desires them to be operated in the best manner possible and to earn all the money they can for the municipal treasury. Since we have started the city should own the entire system operating in the city. We must make the best of the bargain.
>
> Afraid to raise the fares the Supervisors, regardless of law, have been making up deficits in operation from the depreciation fund. That means that a few years hence the people must be taxed for replacements which that fund was created to pay for. It was shocking financing, the result cowardice.
>
> There is but one way to make the Municipal lines pay their way. * * * And we may as well face it.

Louisville Asks Seven Cents

The officials of the Louisville (Ky.) Ry. have notified Mayor Smith that, unless the company is granted an increase in fare to 7 cents with a 1-cent charge for each transfer, the company may be forced into receivership in the near future. To reduce operating expenses the directors may decide to discontinue service on one or more of the cross-town lines. The abandonment of these lines is considered to be the alternative to a fare increase.

The company's plight was made known at a conference between Mayor Smith and three directors of the Louisville Ry. on Dec. 30. It was estimated at the conference that a raise of fare from 5 cents to 7 cents, with an additional cent for every transfer issued, would increase the company's revenue 15 per cent. This alone will not save the company, it was declared by some of those present, the point being made that the service must be improved to a point where the company may gain the good will of the public.

The recent strike of the car employees cost the company, it was said, $500,000. No account of the strike is to be taken by those endeavoring to ascertain whether it is imperative to grant the company the right to increase fares. As a result the period during which the strike was on is to be eliminated entirely from the calculations to be made. A question arose during the conference as to whether the poor showing made by the company in November and December was due to after-results of the strike, or whether it represented a natural falling off in business.

Formal Applications Filed

New York Companies Ask Board of Estimate for Conference with View to Fare Increase

Three of New York City's traction corporations now in the hands of receivers on Jan. 7 formally applied for permission to raise their fares. The requests took the form of applications to the Board of Estimate from Lindley M. Garrison, receiver for the Brooklyn Rapid Transit Co.; Job E. Hedges, receiver for the New York Rys., and James R. Sheffield, trustee of the Interborough Consolidated Corp., for a public hearing to consider a plan for the temporary relief of the companies.

Each of the receivers in his application for relief outlined the trying conditions under which the companies are operating and pointed out the fact that unless more revenue is obtained immediately disintegration of the city's transit system is inevitable.

In the case of the Brooklyn Rapid Transit Co., Mr. Garrison declared that complete suspension of the company's elevated, surface and subway lines is threatened. The plans followed closely the proposals made by Judge Julius M. Mayer, published in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 3, page 75.

Meanwhile the Board of Estimate has undertaken an investigation of the transit situation on its own account. The board took action at the instance of Controller Craig, who on Dec. 30 submitted a plan for the solution of the companies' difficulties. The board's action in deciding to conduct an independent inquiry was referred to briefly in the last issue of this paper.

Comptroller Craig's plan was drawn up along the lines of that suggested several months ago by Public Service Commissioner Lewis Nixon, who advocated a single operating company for the entire city, and the plan of Construction Commissioner John H. Delaney, which provided for eventual city ownership and operation.

Comptroller Craig's plan is for the city to take over all of the securities outstanding against the traction properties, adjust them to fit the precise amount represented by the physical values of the plants used in operating the lines, issue some form of certificate which will operate as a first lien upon the properties and take precedence even of the wages of employees, and then to set aside certain amounts of money each year to retire the certificates or whatever other form of security the city issues.

Both Mr. Delaney and Mr. Craig are in disagreement with the statement of Federal Judge Mayer that there was no way in which the city could get possession of the lines without the outlay of a large amount of money, for both of their plans provide for the immediate transfer of the securities to the city and for the costs to be met out of operating income and not at once out of the city treasury.

Baltimore Fares Again Advance

Commission Authorizes Seven-Cent Straight Fare, Following Company's Urgent Plea—Former Rate Insufficient

A straight 7-cent fare became effective in Baltimore, Md., on Jan. 1. The increase was authorized by the State Public Service Commission on Dec. 30, after it had heard the plea of the United Rys. & Electric Co. for a return greater than that provided by the rate of 7 cents cash with four tokens for 25 cents which had been in effect since Oct. 1, 1919. The straight 7-cent fare is expected to continue during 1920.

The commission announced its decision immediately after the conclusion of the hearing. The company had applied for a flat 7-cent fare on the ground that it could not re-establish its credit on the 6.5 rate. The hearing which was held on Dec. 30 occupied the entire day. On the same evening the commission announced that the company's plea had been granted.

This is the third occasion on which the commission has authorized the company to raise its fare. On Oct. 1, 1918, the rate was increased from 5 cents to 6 cents. A year later the fare was advanced to 7 cents cash, the ticket rate being placed at 6.5 cents. The hearing held on Dec. 30 was in reality a continuation of the case heard by the commission last October, so that the commissioners were thoroughly familiar with the results which had been obtained during the past three months.

COMPANY RUNNING BEHIND

At the hearing on Dec. 30 the company produced figures to show that it was running behind the estimates of earnings applicable to surplus, on which the 6.5-cent rate was adopted. It presented evidence proving that, instead of having $1,000,000 net return at the end of one year of operation at a 6.5-cent fare, its books would show an actual deficit. The commission in fixing the rate last fall, had decided that the company was entitled to $1,000,000 in net return. The only witness for the company was President Emmons, who took the stand after a statement by Edwin G. Baetjer, of counsel for the company, as to the results of the operations under the 6.5-cent fare, and of the additional financial burdens placed on the company by the increase in the municipal tax rate, the increased cost of coal and other materials and the increased cost of securing money which the company requires.

Joseph C. Goldsmith, counsel for the city, made no objection to the increase in the fare. He stated, however, that he thought the company ought not to be allowed to accumulate a depreciation reserve, in view of the necessity of reconstructing a large part of the road, but that the money ordinarily applicable to depreciation reserve ought to be used at once to make good depreciation that already has occurred. This, Mr. Baetjer stated, was the intention of the company.

At the conclusion of the hearing, Chairman Reifsnider and Commissioner Legg stated that in view of all the features of the case, they thought it might be better to grant the company the amount of fare it asked for in order that its credit might be re-established, and to hold it to a strict accounting, both as to revenues and service, than to cut the figure a fraction of a cent and face the possibility of the company again coming before the commission with a request for an increase. The entire commission felt that it was preferable that the matter be settled promptly so that the public, as well as the company, would know where it stood, than to have the mater hanging fire even for a day.

MR. EMMONS TESTIFIES

The commission showed some sympathy with the problems with which President Emmons, the new executive of the company, is confronted, and gave every indication of a willingness to give him the opportunity to make good. In commenting upon the commission's award, Mr. Emmons said:

> It is now up to the company to make good, and to convince the people that they are getting the full value of their money in the service the company gives them. We hope to improve the service in a number of directions, and this improvement will be just as rapid as we can make it. The full effect of these improvements cannot be felt until we are able to complete some rather extensive reconstruction work, but we intend to push this work just as fast as it is possible for us to do so.

In the course of the hearing considerable time was devoted to the discussion of depreciation. Mr. Emmons said that the repairs made last year were no more than should ordinarily have been made; that there were about 26 miles of track that would have to be reconstructed, and, even allowing that the life of the track would be twenty years, with more than 400 miles of track in the company's system, about 21 miles would have to be renewed every year. Then, if the life of a car were put at twenty years, it would mean the purchase of 100 new cars a year, and these two items alone would mean $2,260,000 a year.

Figures were shown to indicate that the charges for maintenance and depreciation in Baltimore were lower than in most other cities. In the previous hearing John E. Zimmerman, the company's agent, maintained that the company ought to be allowed for depreciation 3 per cent and for maintenance 9 per cent of gross revenues, whereas Mr. Emmons said that he thought the company could get along on between 9 and 10 per cent for both depreciation and maintenance

Under the 7-cent fare it is expected that the company will earn a surplus of something more than $1,000,000, which the commission and the company officials figure is necessary to the maintenance of the company's credit.

Muscatine Relents

City Walked for Six Weeks Before Public Forced Authorities to Grant Relief to Railway

The 7-cent fare went into effect on Jan. 5, in Muscatine, Ia., on the lines of the Clinton, Davenport & Muscatine Ry., which operates the city system there in connection with an interurban line from Muscatine to Clinton, Ia. The increase, approximately a 40 per cent raise, was voted at a special election of the Muscatine electorate on nearly a four to one basis on Dec. 23. The total vote was: Yes, 1,933, No, 530.

The fare increase was in the form of a franchise amendment. It carried by large majorities in every ward in the city,. even in the socialist wards which have been the seat of hot opposition to the company in months past.

On Jan. 2 the Council passed the new ordinance on third and final reading. The new rates are in effect until June 1, 1921.

The increase is not to a flat 7-cent basis. A workingman's ticket similar to the one formerly in use is also allowed. These tickets are sold in books fifty for $2 or at a 4-cent rate. These tickets are good between the hours of 5 to 8 a.m. and 5 to 7 p.m. The old workingman's rate was fifty tickets for $1.50. The former straight fare was 5 cents.

No charge is made for transfers under the new ordinance as was formerly the case. Children under six years when accompanied by an adult ride free and between the ages of six and twelve years pay a 4-cent fare.

The special election showed a change in the attitude of the public toward the company that is extremely interesting in present day railway transportation. From Aug. 1, 1919, until a few weeks before the election the Muscatine city authorities had fought the company at every turn. Business interests had favored a fare increase, but had not been strong enough to make their wishes felt.

Transportation on the railway stopped on Aug. 1 when the men went on strike on the entire Tri-city Railway System. Other communities on this system, Davenport, Rock Island, Moline and East Moline, promised a 7-cent scale on Aug. 6 and transportation was resumed in those cities. But in Muscatine the city authorities fought the company until foreclosure on unpaid notes of the Clinton, Davenport & Muscatine Railway held by the Tri-City Railway was threatened. Muscatine then agreed to call a special election and service was resumed after suspension for six weeks.

The public more than made good its pledge. The company made no efforts to push the rate increase through. Civic interests united for the work. Men's and women's clubs, church organizations, civic organizations, lodges and business interests united to back the increased fare provided for in the new ordinance.

A strong advertising campaign was carried on by these civic bodies in the press and in motion picture houses. Public addresses were made by leading business men. The company threw open its books for inspection and audit by city authorities. There was not a high official of the company in the city on the day the vote was cast. Passing of the amended franchise was celebrated as a city victory.

B. J. Denman, president of the company, voices official satisfaction in the following statement:

> We are gratified at the change of public opinion toward traction companies. The increased fare will not bring us a profit, but it will enable us to about break even with increased expense of labor and materials. An adverse vote would have forced us to discontinue service in Muscatine. We are pleased to continue that service and take it as an especially hopeful sign that the increased fare ordinance was carried by a large popular majority with our company keeping its hands off and city-wide interests backing the increase in the spirit of public policy.

Frank T. Hulswitt, president of the United Light & Railways Co., of which the Clinton, Davenport & Muscatine Railway Co. is a subsidiary, likewise commented on the Muscatine vote as a sign of a change in the attitude of municipalities toward public service corporations.

The section of the ordinance of 1905 fixing fares which has been repealed read as follows:

> Sec. 17. The said company shall have power to establish such rates of fare for the transmission of passengers over their road as they may deem proper and expedient; provided, however, that the charge for carrying one person from one terminus of the entire line to any other terminus thereof, including the right of transfer, shall not exceed five (5) cents, excepting that the said company shall issue in booklets of fifty (50) tickets, with rights of transfer good on any car between the hours of 5 and 8 a.m. and between the hours of 5 and 7 p.m. and shall not charge more than 3 cents per fare or $1.50 for said booklet. Children under six (6) years of age, accompanied by an adult, shall be carried free. Children from six to twelve years of age shall be carried for a fare of 3 cents.

In the place of Sec. 17 the Council has ordained as follows:

> The said company shall have power to establish such rates of fare for the carriage of passengers as it may deem proper. It is provided, however, that the charge for carrying one person from the terminus of any line in the city of Muscatine to the terminus of any other line therein, including the right of transfer, shall not exceed the sum of seven (7) cents. It is further provided that the said company shall issue booklets containing fifty (50) tickets each, with rights of transfer, to be sold for not more than two dollars ($2) for each booklet, which tickets shall be good for the passage of the individual owner of the booklet upon any car of the company between the hours of 5 a.m. and 8 a.m., and between the hours of 5 p.m. and 7 p.m., said tickets not to be good unless detached from the booklet in the presence of the motorman. Children under the age of six (6) years, when accompanied by an adult, shall be carried free. Children of the age from six to twelve years shall be carried for four (4) cents, or two children of such age for seven (7) cents.
>
> Sec. 3. It is understood that the rates of fare fixed and permitted by this ordinance relate only to the ordinary street cars of the company operated upon the lines within the city of Muscatine, and not to the interurban cars of the Clinton, Davenport & Muscatine Ry. when operated within the said city.
>
> Sec. 4. The rates of fare provided for in this ordinance shall be in force and effect from and after its passage and adoption by the City Council of the city of Muscatine, its publication as required by law and its acceptance by the company and shall continue in force and effect until the first day of June, 1921.
>
> Sec. 5. From and after the first day of June, 1921, during the life of the franchise under which the company operates, the rates of fare to be charged and collected by the said company, shall be as in this section provided:
>
> The said company shall have power to establish such rates of fare for the transmission of passengers over its road as it may deem proper and expedient; provided, however, that the charge for carrying one person from one terminus of the entire line to any other terminus thereof, including the right of transfer, shall not exceed five (5) cents, excepting that the said company shall issue in booklets of fifty (50) tickets, with rights of transfer good on any car between the hours of 5 and 8 a.m., and between the hours of 5 and 7 p.m., and shall not charge more than 3 cents per fare, or $1.50 for said booklet. Children under the age of six (6) years, when accompanied by an adult, shall be carried free. Children from six to twelve years of age shall be carried for a fare of 3 cents.

Washington Wants More

Company Asks Straight Seven-Cent Fare — Running Behind More Than $366,000 a Year

The Washington Railway & Electric Co., Washington, D. C., has filed an application with the Public Utilities Commission of the District of Columbia for a straight 7-cent fare and an additional charge of 2 cents for transfers. Despite the fact that the company was granted an increase in fare on Nov. 1, 1919, it is maintained that that increase does not allow the company to earn 6 per cent on its investment.

In the petition filed with the commission, it was pointed out that when the fare was fixed at four tickets for 25 cents or 7 cents cash, the company needed $850,000 a year in additional revenue to pay a fair return on its property. After two months at the increased fare, the petition states, it is apparent that the increased revenues are falling far short of the estimates of the commission.

The attention of the commission is called to the following facts: that the sale of 2-cent intercompany transfers has fallen off 29 per cent since Nov. 1; that the number of pay passengers has fallen off 6.8 per cent; and that only 9.8 per cent of the total passengers pay the 7-cent cash fare as compared with an estimate of 13.3 per cent made by the commission.

The petition says in part:

> During the months of November and December, during which latter month the traffic was unusually heavy on account of the Christmas holidays, total passenger earnings within the District of Columbia have amounted to an average of $14,109.11 per day, as compared with an average in October, 1919, of $12,785.57 per day. This is a daily increase of $1,323.54, equal to 10.3 per cent. If this increase were to continue throughout the year it would amount to $483,092, which is $366,908 less than the $850,000 increase which the commission stated was necessary in order for us to earn a 6 per cent return on their valuation.

Officials of the Capital Traction Co. said they would not ask for an increase in fare unless they were directed to do so by the commission.

A Straphanger's Philosophy

This Editor Likes to Ride, Calls the Electric Car His Club, and Says So

The ideal straphanger has been found. His name is William L. Wilder. He lives in Pueblo, Col. Incidentally, he edits the Pueblo *Chieftain*. Unlike most editors, he thinks a daily newspaper has other functions than that of berating the local electric railway. He believes that the motorman, the conductor and even the general manager are human beings. He really enjoys his daily trips in the cars of the Arkansas Valley Railway, Light & Power Company. He wouldn't think of riding in a jitney. He even says these things in his newspaper.

CAR AN "ELECTRIC CLUB"

The fare in Pueblo was recently raised to 6 cents. Mr. Wilder, instead of taking the occasion to harangue his fellow Puebloans on the iniquities of the local management, Wall Street and the capitalistic system in general, devoted a whole column in the *Chieftain* to telling them that the life of a straphanger might be worse, after all. He called the electric car his club, and the other riders his fellow members. Here are some of his thoughts about this trolley-club:

> Sure, I belong. In my share of the course of human events I have been a joiner many times, but my most satisfactory experience in that line was when I entered the Ancient, Honorable, Imperial and Democratic Consolidated Order of the Sixcenters. It is a large order in more senses than one.
>
> Anybody can get in, for we are not at all exclusive. Anybody who stays out has nobody to blame but himself, and I really feel sorry for the outsiders who shut themselves out of our society and miss all the pleasant companionship and associations of our lodge and club room.
>
> Oh, yes; we have an elegant club room, electrically warmed and lighted, well furnished, well ventilated, artistically decorated with pictures and a library of universal knowledge equal to the best. And the surprising thing is that our club room is movable, so that we go from place to place according to our pleasures and necessities, quite in the fashion of the magic carpet of the Arabian Nights. Honest, we do.
>
> Our attendents, or rather our club officers, for we follow the democratic plan of giving the chief honors to those who do the most service, are in uniform. The Captain, or Outside Sentinel, is constantly on guard at the door and admits us upon payment of the regular dues of one white and yellow chip. To save bookkeeping, dues are payable upon every entrance and thus no members are in arrears. * * *
>
> Within the clubroom democratic comfort and simplicity are the rule. We talk, argue, exchange friendly salutations, remark sagely upon the state of the weather, discuss the news of the day, or educate ourselves by absorbing the information that is contained in our library that is displayed openly for our convenient study. Therein we are advised, commanded or entreated to do all, or nearly all the things that are necessary to the successful conduct of our daily affairs. * * *
>
> Some of the best people of the city belong to the Sixcenters, in fact all of them do, I believe. The dinner pail degree members are there in large numbers, particularly at certain times of the day, and I sure wish that all I write had as much good sense and Americanism in it as some of the talks I have heard from these brothers of our lodge in the 6-cent clubhouse. * * *
>
> To and fro throughout the day and far into the night, the moving clubhouses of our order go, bearing the work and the pleasure, the griefs and the joys, the successes and the failures of our city. They have their part in all that makes life worth living, in all that makes life worth losing. I pity the man or the woman that doesn't ride in the street cars.

Transportation News Notes

Six Cents in Houghton.—The Michigan Public Utilities Commission on Dec. 23 authorized the Houghton County Traction Co., Houghton, to charge 6-cent fares for a ride in each zone. The former rate was 5 cents per zone.

Suspends Increase on Ohio Line.—The Public Utilities Commission of Ohio has suspended a schedule of the Scioto Valley Traction Co., Columbus, Ohio, under which the latter proposed to increase fares on Jan. 1. The new rates are suspended pending further hearings before the commission.

Ten Cents in Tacoma.—The State Public Service Commission has notified the city authorities of Tacoma, Wash., that 10-cent fares will go into effect on the lines of the Tacoma Ry. & Power Co. on Jan. 18. The increase will be made pending successful protest to the commission. The present fare is 7 cents.

Would Charge Seven Cents in Morristown.—The Morris County Traction Co., Morristown, N. J., has applied to the State Board of Public Utility Commissioners for permission to raise its fare from 6 cents to 7 cents. The company asks that the 3-cent fare for school children be increased to 3.5 cents. It proposes to put the new schedule into effect on Feb. 1.

Asks Six Cents in Sandusky.—The Lake Shore Electric Ry., Cleveland, Ohio, has applied to the City Commission of Sandusky, Ohio, for permission to charge 6-cent fares on its lines in that city. The present fare is 5 cents, with six tickets for 25 cents and free transfers. The company proposes to sell five tickets for 25 cents and to charge 1 cent for each transfer.

Trenton Wants Buses.—The City Commission of Trenton, N. J., has taken under consideration the proposition of allowing jitney buses to operate through the streets of Trenton. Since the Trenton & Mercer County Traction Corp. was granted permission to increase the fare to 7 cents, several applications have been received by the commission for licenses.

No Charge Allowed for Transfers.—The Public Service Commission for the Second District of New York has denied the application of the New York State Rys. for permission to charge 2 cents for transfers in Rochester. The commission held that under the decision of the Court of Appeals in the Quinby case, the commission could not grant the relief desired by the company.

Eight Cents in Aurora and Elgin.—The Public Utilities Commission of Illinois has authorized the Aurora, Elgin & Chicago R.R. to charge 8-cent cash fares in Elgin and Aurora. Tickets will be sold at the rate of seven for 50 cents and fifteen for $1. The present rate of 6 cents has been in effect for a number of months. The company is considering placing forty one-man cars in operation in Elgin.

No Fare Advance in Cincinnati.—Owing to the fact that the Cincinnati Traction Co. was able to secure a $2,500,000 loan for the liquidation of its deficit, fares in Cincinnati did not advance on Jan. 1. The company had announced that, unless the loan were secured, fares would advance from 7 cents to 7.5 cents on that date. The company operates under a cost-of-service franchise providing for the automatic adjustment of fares.

Rehearing on Milwaukee Fares.—Judge E. Ray Stevens of the Dane County Circuit Court has ordered the Wisconsin Railroad Commission to reconsider its recent order under which it permitted the Milwaukee Electric Ry. & Light Co. to raise its fare from 5 cents to 7 cents. The city of Milwaukee had appealed to the court from the commission's order on the ground that the company had earned more than the 7.5 per cent allowed by the commission.

Seven Cents in Clarkston.—Seven-cent cash fares went into effect on the lines of the Lewiston-Clarkston Transit Co., Clarkston, Wash., on Jan. 1 under authority of the Public Utilities Commission of Idaho and the Public Service Commission of Washington. Tickets are sold at the rate of four for 25 cents. The former fare was 5 cents. Coincidentally with the fare increase, the employees of the company received a wage advance of 12.5 per cent.

Rate Increase Suspended.—Increased rates which the New York State Railways, Syracuse, N.Y., proposed as effective on its Mohawk Valley line, with corresponding increases on its Utica-Syracuse line, on Jan. 11 have been ordered suspended for thirty days by the Public Service Commission, Second District, under complaints by the village authorities of Herkimer and Frankfort. Investigation of the new tariff will be made by the commission.

Special Car Service in Seattle.—To relieve railway congestion in the north end business district at Seattle, Wash., Superintendent of Municipal Street Railways, Thomas F. Murphine, has started a system of special cars to accommodate the traffic from some of the larger business houses in that portion of the city during the rush hours. The purpose of the scheme is to permit passengers to obtain seats during the rush hours without having to walk to the south end of the city, where most of the railway lines have a terminus.

City Fights Asheville Increase.—By order of the Corporation Commission of North Carolina the appeal of the city of Asheville from the commission's ruling granting the Asheville Power & Light Co. a fare increase will be tried before the Superior Court in Madison County on Feb. 23. The commission authorized the company to raise fares from 5 cents to 6 cents several months ago. The city of Asheville opposed the granting of the increase and appealed the case to the courts.

Seeks to Compel Free Rides for Firemen.—The City Council of Seattle, Wash., has instructed Corporation Counsel Walter F. Meier, to institute legal proceedings against the Seattle & Rainier Valley Railway to compel the company to permit city firemen and policemen in uniform to ride on its cars without fare. The railway, with the consent of the State Public Service Commission, recently placed in effect a new tariff on transfers, at the same time announcing that city firemen and patrolmen would not longer be carried free. Fire Chief Stetson entered a protest with the City Council, and Corporation Counsel Meier advised that the city take steps in court to force the company to carry out the terms of its franchise, which provided for certain free rides.

Higher Fare Urged for Dallas.—Higher fares for the Dallas (Tex.) Railway are proposed by D. E. Waggoner, president of the Security National Bank of Dallas, after an exhaustive study of the financial condition of this and other traction properties in this country. Mr. Waggoner's announcement of his stand was the result of recent negotiations in Dallas for the building of the Masten Street extension of the Dallas Railway, in the course of which J. F. Strickland, president of the Dallas Railway, said that the money for this extension must come from Dallas, as it was impossible for the company to borrow additional money for betterments or extensions. The lines in Dallas are operated under service-at-cost. They have accumulated a deficit in the authorized return of $430,713 in twenty-five months.

North Carolina Commission Sustained.—In an opinion handed down on Dec. 27 the Supreme Court of North Carolina ruled that the State Corporation Commission has authority to grant fare increases in spite of limitations imposed by municipal franchise agreements. The opinion affirmed a decision of Judge Adams in the Mecklenburg County Superior Court, which sustained the commission's action in authorizing the Southern Public Utilities Co. to raise fares in Charlotte. The commission allowed the company to raise its fares from 5 cents to 7 cents more than a year ago. The Supreme Court holds that no contract between municipal governments and public service corporations is to be allowed to interfere with the fixing of a just rate of compensation for the service rendered by such corporations. The commission, which has been invested by the Legislature with recognized power of regulation, may fix such rates in spite of long contracts advantageous to either the public or the corporation.

Personal Mention

Mr. Connette Resigns

Retires from Buffalo Company After Securing Fare Increase and Otherwise Improving the Relations of International Railway

E. G. Connette has tendered his resignation to the board of directors of the International Railway, Buffalo, N. Y., to become effective at their pleasure. In the first place, Mr. Connette's services are required by other interests to which he will devote his time. Moreover, the foreclosure and sale by the bondholders' protective committee of the International Traction Co. has eliminated the stockholders of the traction company of which he was also president and Mr. Connette felt that the committee of bondholders should have the opportunity, without embarrassment, to make any change desired in the management. Mr. Connette retires after the restoration of the resources of the International Ry., depleted by war conditions, and with the property in good condition.

Mr. Connette is president of the United Gas & Electric Corporation and the United Gas & Electric Engineering Corporation and is an officer of other companies. After a short career in railroad work he entered street railway service prior to 1890 and has been engaged in that and allied lines ever since, with a record of achievement in successful operation known to the entire industry.

Like all other electric railways the International was hard hit by the war. The surplus earned in 1916 was $1,395,633, which was the largest of any year. The war came on, and the price of labor and material advanced so that the increased cost of these two items amounted to approximately $2,500,000. This left the railway short about $1,000,000 per annum to meet its bond interest. A supreme effort was made by the management to restore the company's resources and avoid bankruptcy. An appeal was made to the Public Service Commission for an increase of rates in Buffalo, but the commission claimed lack of jurisdiction on account of the decision of the Court of Appeals in the Quinby case, without the consent of the Mayor and Council. On June 14, 1918, the Mayor and Council passed an ordinance granting a 6-cent fare on condition that a demand for increased wages should be met in order to avoid a general strike. After the wages were increased, the court decided that this ordinance increasing the fare was subject to a referendum under the city charter. An election was held on Aug. 20, 1918, when the action of the Mayor and Council was repudiated. The company then appealed to the courts as the last source of relief, and a favorable decision was handed down by the Court of Appeals on July 15, 1919, giving the Public Service Commission jurisdiction. The rate case was immediately presented to the commission, and on Nov. 20, 1919, an order was made increasing the rate of fare in the city of Buffalo to 7 cents. The rates of fare on the interurban lines have also been substantially increased.

Mr. Connette has been president of the company at Buffalo for six years. During that period there has been expended for new cars, new tracks and power equipment $7,436,495 and the gross earnings of the company have increased during that period from $6,393,794 to $9,453,287. Moreover, the relations of the company with the public and with its employees are satisfactory.

F. D. Aiken has resigned as president of the City & Suburban Railroad, Brunswick, Ga.

F. M. Ames has resigned as superintendent of railways of the Northwestern Ohio Ry. & Power Co., Toledo, Ohio.

John W. Colton has resigned as executive assistant of the Connecticut Co., New Haven, Conn., to become editor of the Hartford *Times*.

A. L. Horton, employed by the Monongahela Valley Traction Company, Fairmont, W. Va., as a motorman, conductor and in other capacities for seven years, has been made assistant superintendent of transportation of the Clarksburg division. Mr. Horton was chosen for the position because of the unusually good record he has made during his service with the company. He succeeds Howard Hurst, who takes another position with the company.

Jacob W. Gerke, superintendent of maintenance of the New York & Queens County Ry., Long Island City, N. Y., has resigned to accept a position in the engineering department of the Texas Co. Mr. Gerke, who joined the New York & Queens County Ry. five years ago, acted also as superintendent of equipment for the Long Island Electric Ry. and the New York & Long Island Traction Co. He has been connected with the electric railway business for more than twenty years. He was formerly master mechanic of the Wilmington & Philadelphia Traction Co. and the Southern Pennsylvania Traction Co.

Col. Albert T. Perkins, general manager for Rolla Wells, receiver for the United Railways, St. Louis, Mo., has been awarded the decoration of Companion of the Order of St. Michael and St. George in recognition of service while attached to the British Army during the war. Colonel Perkins, who served for twenty months in France as an officer of the United States Army, has already received the Distinguished Service Medal for "exceptionally distinguished and meritorious service." When he commanded the Eighth Engineers in 1917, his regiment served in Flanders with the British Army. Later he acted as director of combat railways for the American Expeditionary Forces.

Edward A. Maher, Jr., vice-president and general manager of the Third Avenue Ry., New York, N. Y., has resigned and will resume the practice of law. It is not probable that a successor will be chosen to Mr. Maher, who will retain his connection with the company through its legal department. He has been connected with the operating department of the company since 1913, when he was appointed assistant general manager. On the retirement of his father, Edward Maher, Sr., as general manager of the system in 1917, he succeeded to that position. He was elected president of the New York Electric Railway Association in June, 1919. A biography and a portrait of Mr. Maher were published in the issue of ELECTRIC RAILWAY JOURNAL for June 14, 1919, page 1195.

W. C. Kline, engineer of construction of the Western Maryland Railroad, Baltimore, Md., has resigned to accept the position of chief engineer of the Monongahela Valley Traction Company, Fairmont, W. Va. Mr. Kline assumed his new duties on Dec. 1, succeeding D. H. Blanks, who has been appointed manager of railways. He was graduated from Lehigh University in 1905 with the degree of civil engineer. During the next two years he was employed with the engineering department of the Pennsylvania Railroad in constructing the East River tunnels at New York. In 1908 he was engaged in construction work for the Western Pacific Railroad in Nevada, later serving the Southern Pacific Railroad in the same capacity. In 1910 he joined the Western Maryland Railroad, serving successively as resident engineer, division engineer, and engineer of construction.

Sir Albert Stanley, chairman of the London (England) underground companies, has been created a baron by King George in recognition of his services to the British government during the war. Baron Stanley was made president of the Board of Trade in the Lloyd George cabinet in 1917, but resigned some time ago on account of ill health. Although an Englishman by birth, he was an American by naturalization, and began his electric railway career in the United States. From office boy for the Detroit City R.R. in the horse-car days, he rose to be general superintendent of the Detroit United Ry. In 1903 he accepted the position of assistant general manager of the railway department of the Public Service Corporation of New Jersey. He subsequently became general manager of the corporation, resigning in 1907 to assume the general managership of the Underground Electric Rys. Co. of London, England.

Changes in Brooklyn Rapid Transit Personnel

General Manager Menden's Duties Extended—Col. A. R. Piper Promoted—C. L. Crabbs Heads Reorganized Way and Structure Department

As the work of construction in connection with the new lines of the New York (N. Y.) Municipal Railway Corp. is decreasing, while at the same time the maintenance of these lines and those of other associated companies of the Brooklyn Rapid Transit System has increased considerably, a number of changes in the personnel of its engineering organization have been found necessary.

William S. Menden, whose appointment as general manager was announced last October, will have charge of all maintenance and operating details in addition to those of new construction, which previously occupied his entire attention. C. L. Crabbs has been appointed chief engineer of way and structure, and in addition to his maintenance duties will now take charge of the construction work of the New York Municipal Ry. Corp.

In the reorganization of the way and structure department, the direct supervision will be divided among five engineers, who will report to Mr. Crabbs. H. J. Kolb has been appointed assistant chief engineer of way and structure, and in addition to his duties in connection with the new construction carried on by the New York Municipal Railway Corp., will be connected with maintenance details.

R. C. Johnson, signal engineer, will handle the operation and maintenance of both the signal system and the telephone system of the company, in addition to the work of new signal installations, of which he formerly had charge.

Colonel A. R. Piper is appointed assistant general manager in charge of the employment, welfare and medical bureaus, with such other duties as may be assigned to him from time to time. He will continue to act as president of the South Brooklyn Ry., and superintendent of freight.

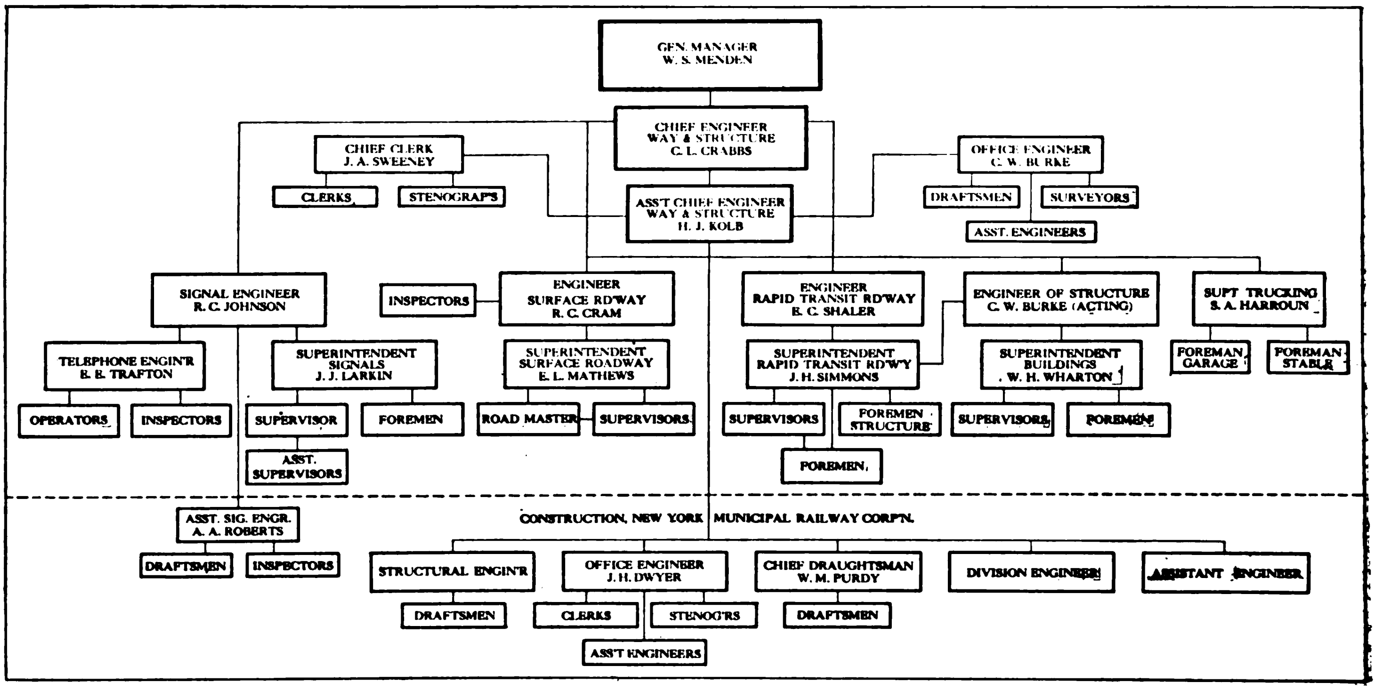
O. J. Covell, former secretary to Colonel Timothy S. Williams, is appointed assistant to the general manager.

William S. Menden, who now as general manager assumes direct charge of all operation, maintenance and construction work, came to the Brooklyn Rapid Transit Co. as chief engineer in 1904. In 1907 he was appointed general superintendent and chief engineer, and in 1908 assistant general manager and chief engineer for the company. At the time that the dual rapid transit contracts were entered into between the city and the New York Municipal Railway Corp., Mr. Menden was appointed chief engineer of the latter, and assumed direct charge of the enormous amount of work necessary to carry out the contracts. Mr. Menden was appointed assistant general manager for the receiver of the Brooklyn Rapid Transit Co. in June, 1919, and general manager in October last. He is a graduate of Rose Polytechnic Institute at Terre Haute, Ind., where he received his degree in 1891. Before being connected with the Brooklyn Rapid Transit System he was chief engineer of the Metropolitan West Side Ry., Chicago, Ill.

Colonel A. R. Piper, who becomes assistant general manager, has performed the duties of superintendent of employment during the past year. He was born at Fort Wadsworth, Staten Island, in 1865. A graduate of West Point, he retired in 1899 from active service after spending ten years in the regular army. In 1904 he was made general superintendent of the American Ry. Traffic Co., a subsidiary of the Brooklyn Rapid Transit Co. He subsequently became president of the South Brooklyn Ry. and general freight agent of the Brooklyn Rapid Transit System. Called to active service in April, 1917, with the rank of captain, he was later promoted to lieutenant-colonel in the quartermasters' corps and had command of the New York depot of the corps.

C. L. Crabbs has been connected with the Brooklyn Rapid Transit Co. since 1906 and has occupied the positions of principal assistant engineer and engineer of way and structure during that time. He is a graduate of the University of Illinois, from which he received the degree of B.S. in civil engineering in 1890. He was connected with the Metropolitan West Side Elevated Ry., Chicago, for four years, having charge of engineering location and later of the design of track and special construction, and some features of the equipment. From 1896 to 1900 Mr. Crabbs was with the city of Chicago in charge of the construction of water tunnels and sewers. From 1900 to 1906 he had engineering supervision of production in factory work.

H. J. Kolb has been connected with the engineering department of the Brooklyn Rapid Transit System since May, 1904. It was at that time that the Brooklyn Rapid Transit Co. started a program of rehabilitation and reconstruction of its rapid transit and surface lines and also the construction of


GEN. MANAGER W. S. MENDEN
CHIEF ENGINEER WAY & STRUCTURE C. L. CRABBS
CHIEF CLERK J. A. SWEENEY
CLERKS
STENOGRAP'S
ASS'T CHIEF ENGINEER WAY & STRUCTURE H. J. KOLB
OFFICE ENGINEER C. W. BURKE
DRAFTSMEN
SURVEYORS
ASST. ENGINEERS
SIGNAL ENGINEER R. C. JOHNSON
INSPECTORS
ENGINEER SURFACE RD'WAY R. C. CRAM
ENGINEER RAPID TRANSIT RD'WAY B. C. SHALER
ENGINEER OF STRUCTURE C. W. BURKE (ACTING)
SUPT TRUCKING S. A. HARROUN
TELEPHONE ENGIN'R B. B. TRAFTON
SUPERINTENDENT SIGNALS J. J. LARKIN
SUPERINTENDENT SURFACE ROADWAY E. L. MATHEWS
SUPERINTENDENT RAPID TRANSIT RD'WY J. H. SIMMONS
SUPERINTENDENT BUILDINGS W. H. WHARTON
FOREMAN GARAGE
FOREMAN STABLE
OPERATORS
INSPECTORS
SUPERVISOR
FOREMEN
ROAD MASTER
SUPERVISORS
SUPERVISORS
FOREMEN STRUCTURE
SUPERVISORS
FOREMEN
ASST. SUPERVISORS
FOREMEN
CONSTRUCTION, NEW YORK MUNICIPAL RAILWAY CORP'N.
ASST. SIG. ENGR. A. A. ROBERTS
DRAFTSMEN
INSPECTORS
STRUCTURAL ENGIN'R
OFFICE ENGINEER J. H. DWYER
CHIEF DRAUGHTSMAN W. M. PURDY
DIVISION ENGINEER
ASSISTANT ENGINEER
DRAFTSMEN
CLERKS
STENOG'RS
DRAFTSMEN
ASS'T ENGINEERS

ORGANIZATION CHART, B. R. T. WAY AND STRUCTURE DEPARTMENT additional yards, shops, inspection facilities, carhouses and sub-power stations for the various lines and Mr. Kolb had charge of the engineering work in connection with these improvements in addition to some maintenance of way matters.

In March, 1913, he was appointed engineer of design of the New York Municipal Railway Corp. and had direct charge of all engineering and design in connection with the carrying out of the construction work of the New York Municipal Railway Corp. In June, 1919, he was appointed engineer of construction in charge of engineering design and construction, reporting directly to the assistant general manager.

Mr. Kolb received his technical education in the Massachusetts Institute of Technology and his first engineering work was in connection with electric railway properties in the vicinity of Boston. He was later connected with the maintenance-of-way department of the New York, New Haven & Hartford R.R. at Boston; was resident engineer of construction of the Kansas City, Mexico & Orient Ry., Chihuahua, Mexico, and for two years was with the Pennsylvania Steel Co. in charge of engineering details in connection with the extension of its plant and railroad yard facilities at Steelton, Pa. For two years prior to May, 1904, he was employed as a designing engineer by the New York Central R.R. on the design of the engineering and track arrangement of the Grand Central Terminal improvements.

R. C. Johnson, signal engineer, received his education at the University of Pittsburgh, where he obtained the degree of M.E. in 1899. After graduation and until 1905 he was connected with the Union Switch & Signal Co., first at its plant in Swissvale, Pa., and later in the New York office. From 1905 to 1906 he was signal engineer of the Tidewater Ry., which has since been made into the Virginian Ry. From 1906 to May, 1913, Mr. Johnson was assistant signal engineer of the New York Central electrified zone, which position he left to assume that of signal engineer for the New York Municipal Railway Corp.

C. E. Calder, vice-president of the Dallas (Tex.) Railway, recently discussed the electric railway problem before the Open Forum of Dallas.

C. H. Jones has been appointed general agent for the Pacific Electric Railway, Los Angeles, Cal., and will make his headquarters at San Bernardino.

S. Errickson has been elected secretary and treasurer of the Philadelphia & Western Railway, Upper Darby, Pa., to succeed Gerald Holsman, resigned.

Dwight C. Peck has been appointed claim agent of the Shore Line Electric Railway, Norwich, Conn. Mr. Peck succeeds Robert G. Staplin, resigned.

Morgan T. Donnelly has been appointed Third Deputy Public Service Commissioner of the First District of New York. Mr. Donnelly was formerly a member of the State Assembly.

Frederick Huff, who has been connected with the Eastern Massachusetts Street Ry. for the past eighteen years, has been appointed superintendent and purchasing agent of the Laconia (N. H.) Street Ry.

John H. O'Brien, former Fire Commissioner and Commissioner of the Water Department of New York City, has been named Chief Transit Inspector of the Public Service Commission for the First District of New York.

Eugene O. Hill has succeeded C. M. Durell as superintendent of the Biddeford & Saco R.R., Biddeford, Me. Mr. Hill has been in the employ of the company for the last nineteen years. He was a conductor prior to his appointment to his present position.

C. M. Durell, superintendent of the Biddeford & Saco R.R., Biddeford, Me., has resigned. Mr. Durell, who entered the company's employ as a conductor in 1892, subsequently became foreman of the repair department. In 1912 he was appointed superintendent.

W. L. Davis, auditor of the Lehigh Valley Transit Company and its affiliated companies with offices at Allentown, Pa., has been appointed to a similar position with the Lehigh Valley Light & Power Co. and its affiliated companies, retaining his connection with the railway system.

James T. Grady has been appointed director of publicity of the Brooklyn (N. Y.) City R.R., recently separated from the rest of the Brooklyn Rapid Transit System. Mr. Grady is director of the department of public information at Columbia University. For about eight years he was connected with the New York *Tribune* occupying various editorial posts, including those of night city editor, telegraph editor, head of the copy desk, war editor and manager of the Tribune News Service. For three years Mr. Grady was a member of the teaching staff of the Columbia School of Journalism, and in 1918 resigned from the *Tibune* staff to succeed the late Prof. Franklin Matthews, long a conspicuous figure on the New York *Sun* and later of the New York *Times*. Soon after the establishment of the department of public information at Columbia, Mr. Grady became its head. Mr. Grady has served as marine editor of the New York *Journal of Commerce*, and as telegraph and state editor of the Hartford *Post*. He also has been in the New England service of the Associated Press, and has been connected in an executive, business and reportorial capacity with newspapers in the East and West. Mr. Grady is a native of Winsted, Conn. He was educated at Harvard College and Columbia Law School. He also studied at Trinity College, Hartford. He is a member of Alpha Delta Phi, the American Academy of Political Science, as publicity representative of which he is known to railway men, and of numerous clubs.

Obituary

George Weston Dead

George Weston, president of Weston & Co., consulting engineers for Philadelphia (Pa.) Rapid Transit Co., and a noted electric railway engineer, died in Philadelphia on the morning of Jan. 7, from acute indigestion. Mr. Weston was fifty-five years old. He had been connected with the transportation industry for the past thirty-two years.

Mr. Weston was a native of Kalamazoo, Mich. He received his training in civil engineering by private instruction and entered engineering work in 1880 on the Missouri, Kansas & Texas Ry. Two years later he resigned to take up mercantile pursuit, but in 1885 returned to the engineering field, serving with the construction corps of the Gulf, Colorado & Santa Fe R.R. He left this employment in 1887 to enter the employ of Charles T. Yerkes in Chicago, where he had charge of the construction of a number of cable lines. Later he built 75 miles of line for the Chicago Street Ry.

In 1896 he resigned to become associated with Naugle, Holcomb & Co., constructing engineers. He was in charge of the construction of the Suburban Railroad of Chicago until 1898, when he was made general manager of the company. He next had charge of the Tennessee Central R.R., on the completion of which in 1901 he resigned from the company to engage in consulting engineering practice with his brother, Charles V. Weston.

Upon the creation of the Board of Supervising Engineers at Chicago in 1907, Mr. Weston was made assistant chief engineer. The following year he became a member of the Board of Supervising Engineers to represent the city of Chicago, and later became engineer for the board, retaining that position until January, 1919.

Mr. Weston was a man of many friends, whom he won to him both by his engaging personality and his ability as an engineer. Recently he had been giving his special attention to the question of valuation of electric railway properties, delivering a paper on that subject at the last convention of the American Electric Railway Association. He was a member of the American Society of Civil Engineers, the Engineers Institute of Electrical Engineers, Western Society of Engineers, Chicago Engineers Club, Engineers Club of New York City, and the American Electric Railway Association.

Robert Sealy, for more than forty years secretary and treasurer of the old Broadway R.R., one of the first horse car lines in Brooklyn, N. Y., died on Jan. 5 at his home, in Brooklyn. He retired twenty-five years ago.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Heavy Purchasing of Steel Rails

Tonnage May Exceed 400,000—250,000 Tons Contracted For—Detroit United Ry. Orders 10,000 Tons

Rollings will commence at once on orders totalling 250,000 tons of steel rail practically all of which has been placed in the Chicago district by the steam railroads . Additional rollings by both steam and electric roads may bring the total tonnage about the 400,000 mark.

One electric, the Detroit United, has already placed an order for 10,000 tons of rail and it is expected that many other orders will be placed shortly. Electric railway purchases of steel rails during the past few years have fallen off gradually until for 1919, the estimated tonnage is less than 30,000. With the above order for electric railway rails and others that will be placed during the first or second quarter, last year's mark no doubt will be exceeded.

During November, the railroads sent out inquiries for large quantities of track supplies in order that they should be well taken care of in case of being returned Jan. 1, 1920. The mills at that time would not accept the business unless guaranteed by the Railroad Administration that the purchases would be honored. According to latest reports, the Railroad Administration has made verbal agreements to honor railroad purchases made during the closing weeks of government control.

This business is the first of what is expected to make rollings for 1920 the largest that the industry has known in the past five or six years.

Bituminous Coal Output Increases

Production Rapidly Getting Back to Normal—Operators Expect to Obtain Higher Prices

Reports from different parts of the United States are to the effect that for the past several weeks full service has been resumed on practically all railways which were forced to curtail operation during the recent coal strike on account of shortage of stocks. For the past three weeks heavy shipments of coal have been literally scattered over the country to fill up the empty bins, reservoirs and yards and to a considerable degree, for replenishing surplus stocks.

According to the report of the United States Geographical Survey the production of bituminous coal was at 70 per cent of normal on Dec. 15. The situation continued to improve throughout the week ended Dec. 20, the output for the week as a whole amounting to 86.4 per cent of normal. For the week ended Dec. 27, the output was 85.5 per cent of normal, the slight drop being caused by the Christmas holiday. The trend of production during the period of the strike ranged from 29.6 per cent of normal in the first week, Nov. 2, to 48 per cent of normal in the week ended Dec. 13.

PRODUCTION QUICKLY RECOVERS AFTER MINERS GO BACK TO WORK

Total output (including lignite and coal coked) in the week ended Dec. 20 was 10,501,000 net tons. The average during the four weeks immediately preceding the strike, which may be regarded as normal, was 12,089,000 tons.

Compared with the week before, the output showed an increase of 4,631,000 tons, or 80 per cent. The recovery is the more significant when it is realized that in a single week the bituminous industry climbed from the depression of the strike period to a level of production higher than that of any week from mid-January to mid-August of the past year. Indeed, unless later returns cause a downward revision of the estimates, the curve of 1919 production has again crossed that of 1918. The recovery was made possible by a general resumption of work in the field which had been shut down by the strike.

Shortly after the strike was ended, the coal operators protested vigorously against the plan accepted by the mine workers' officials at Indianapolis. The operators claim that higher prices will be necessary to meet expenses under the new conditions and that the miners having violated once the wage contract approved by the government and scheduled to run until April 1, this year, will again be left free to violate any other contract that may be made to take its place.

Switchboard Instrument Sales Steadily Increasing

Sales for 1919 Expected to Surpass Those of 1918—Favorable Market in 1920 Foreseen for Switchboard Instruments—Labor Conditions Show Much Improvement

Although a few reports by representative manufacturers of electrical switchboard instruments show that 1919 sales will be as much as 20 per cent below those of 1918, most manufacturers expect their sales to be well over those of 1918, and in one case even 100 per cent. One factor which would tend to keep down the volume of present sales is the effect which the labor situation might have on business. Increased labor troubles during the month of December and a possibility of their continuance during the early part of 1920 would act as a damper and keep 1919 sales from going much over those of the previous year.

Current sales are reported on the increase and show general improvement over the early part of the year. The current sales of one manufacturer are the largest of that factory. The month of October was reported as the record month in its experience.

Shipments as a whole are growing longer, and although a low range has been set at two weeks, manufacturers are as high as two months. Not only is the excess work in hand a contributing cause to slow shipments, which are far from normal in certain cases, but deliveries of material from the outside are slow and also help delay the finished product. In one case shipments are reasonable, but productive facilities are being rapidly loaded up for the remainder of the present year and part of next year.

INCREASING COSTS MAY FORCE HIGHER PRICES LATER

There have been no recent advances in price, except in a few spots to make complete the adjustments started some time ago. There seems to be a very convenient answer to the price question in that prices may go upward, but no definite basis for any increase has been reported. Of course, increasing costs must inevitably force a higher level of prices, but no time for increasing costs has been set as far as is known at the present writing.

Manufacturers as a whole regard the 1920 outlook as very favorable, although in one case it is not expected that sales will be increased until public utilities again come into the buying market. Unless labor conditions disturb business, a prosperous year is expected in 1920. In this connection other manufacturers are of the opinion that labor unrest is very much improved and that projects now delayed will be rushed to completion without fear of interruption, which should result in a considerable amount of business within the near future.

General Electric Expanding in Supply Field

Company Has Leased Excess Capacity To Care for Demands, Which Are Growing at Rate of $10,000,000

In order to keep pace with the growth in the electrical industry, without in all cases consuming the time required to construct new plants and train new organizations, the General Electric Co. has in several instances taken advantage of opportunities to acquire under lease existing supply concerns with excess capacity, with options to purchase at some later date. The company's financial statements of the last ten years show that its sales have grown at the rate of $10,000,000 a year at least. Therefore, if the company is to fulfill the ordinary demands of its customers, factory facilities to provide for such increase must be procured on practically an annual schedule.

ADDITIONAL SPACE NEEDED

In reply to questions asked recently by one of our representatives, one of the officials of the General Electric Co. said: "The General Electric Co., like all progressive electrical manufacturers, will continue to expand. That is natural and inevitable. Besides, balancing out certain large plants and increasing others, it will probably establish unincorporated units in new locations. In certain cases, however, particularly in the supply field, considerable time will be saved, when our customers are making unusual demands on us, if we can purchase outright or negotiate, at least, for some going business of good reputation and with surplus capacity. Such arrangements may also include the right to purchase the plant at the end of five years or longer. In this way will we be in a position to give service to our customers quickly, without waiting to train an organization and establish volume and economical production.

"That is all there is to the recent acquisitions by the company. They do not, in the amounts involved, constitute a very large proportion of our average annual outlays for new facilities."

SEVERAL WORKING PLANTS ACQUIRED

In accordance with these plans the company is now negotiating a lease with the D. & W. Fuse Co. of Providence, R. I., with provisions for purchase at the end of ten years. The last concern the company leased was that of the rigid conduit business of the American Conduit Manufacturing Co. A few months prior to that the business of the Trumbull Electric Manufacturing Co. was taken over under contract. Recently the company announced that it will erect a new branch factory in Decatur, Ind., the second one in the Central West, the other being at Fort Wayne. It has also purchased the Symington Co.'s plant in Rochester, N. Y., which will be utilized for the manufacture of small motors.

Rolling Stock

Salina (Kan.) Street Ry. expects to purchase one new car during 1920.

Wichita Falls (Kan.) Traction Co. proposes during 1920 to purchase five Birney safety cars.

Lewiston-Clarkston Transit Co., Clarkston, Wash., is contemplating the purchase of one or two new cars during the year.

Eastern Wisconsin Electric Co., Grand Rapids, Mich., expects during the year to purchase eight safety cars for use in Fond Du Lac, Wis.

Sandusky, Norwalk & Mansfield Electric Ry. and the **Plymouth & Shelby Traction Co., Norwalk, Ohio,** are planning to purchase gasoline cars, both for passenger service and for freight service.

Recent Incorporations

Hazard, Ky. — B. P. Wooten and others are planning an electric railway system in Hazard, also lines to Lothair, Glowmar, Hardbulry, Domino and near-by points.

Track and Roadway

Pasadena (Cal.) Municipal Railway.—The City Commission of Pasadena has directed the city engineer to make a survey for the proposed Pasadena Municipal Ry. between Pasadena and Los Angeles.

Seattle (Wash.) Municipal Street Railway.—The line of the Seattle Municipal Street Railway to Alki Point, is to be double-tracked between Luna Park and the Stockade Hotel at 63rd Avenue, S. W. The work will cost about $35,000, and will include about 150 tons of 60-lb. rails, to be laid on the 8,575 feet of new trackage.

San Diego (Cal.) Electric Railway.—The San Diego Electric railway has been granted permission by the City Council to change its tracks so that changes in service ordered by the State Railway Commission may be made. The Fourth and Third St. lines will be abandoned from Spruce Street to Broadway, these cars being sent across by a new track to be built to the Fifth St. line. The company will abandon the K Street line from Sixteenth St. to Twenty-fifth St.

Kentucky Traction & Terminal Company, Lexington, Ky.—The Kentucky Traction & Terminal Co. plans to extend its lines from Winchester to Irvine, a distance of sixteen miles.

United Railways & Electric Company, Baltimore, Md.—The United Railways & Electric Co. is preparing to reroute its lines with a view to the eventual development of a complete rapid transit system in the city of Baltimore.

United Railways of St. Louis, St. Louis, Mo.—A bill has been introduced in the Board of Alderman of St. Louis, Mo., permitting the United Rys. to tear up the tracks it has at present on Washington Ave., between Leffingwell and Compton Aves., Compton Ave., between Washington Ave. and Lucas Ave. and Garrison Ave., between Washington and Lucas Aves., and to relay them along Leffingwell Ave. from a connection with the present tracks of the company on Washington Ave. at Jefferson Ave. This bill is in connection with the widening of Washington Ave., between Jefferson and Grand Aves.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—The Omaha, Lincoln & Beatrice Ry. is extending its lines to Havelock, a distance of nearly 3 miles.

Brooklyn (N. Y.) Rapid Transit Company.—Transit Construction Commissioner John H. Delaney of the Public Service Commission, First District, has submitted to Lindley M. Garrison, receiver for the Brooklyn (N. Y.) Rapid Transit Co., a form of agreement for connecting the Fulton St. elevated line in Brooklyn with the subway route at Ashland Place, and for a subway and tube from central Brooklyn to City Hall, Manhattan. The proposed route would remove rapid transit traffic from the Brooklyn Bridge and would make unnecessary the contemplated strengthening of the bridge at a cost of $9,000,000.

Interborough (N. Y.) Rapid Transit Company.—Borough President Michael F. Loughman of Manhattan has obtained permission from the Board of Estimate of New York City to open negotiations with the Interborough Rapid Transit Company for the removal of the elevated spur through Forty-second Street from the Third Avenue elevated railroad to the Grand Central Station.

Power Houses, Shops and Buildings

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—The Omaha, Lincoln & Beatrice Ry. has let a contract for the construction of a concrete carhouse to contain offices, shops and an employees' club room.

Trade Notes

Eastern Texas Electric Co., Beaumont, Tex., will purchase during the year one 42-in. boring mill.

Grand River Valley Ry., Colorado Springs, Col., plans to purchase a welding machine.

Moose Jaw (Ontario) Electric Ry., Ltd., expects to convert all of its cars to safety cars.

Lykins Valley Ry., Williamstown, Pa., expects to purchase some new motors during the year.

United Rys., St. Louis, Mo., expects to construct two additional automatic sub-stations during the year.

Carbon Transit Co., Mauch Chunk, Pa., plans during the year to increase the stack on one Sterling boiler.

Arkansas Valley Ry., Light & Power Co., Pueblo, Col., expects during 1920 to buy a stone crusher and mixer.

Manhattan Bridge Three Cent Line, New York, N. Y., has planned to put up 2 miles of overhead during the year.

Claremont (N. H.) Ry. plans to build during the year a new substation with two new 300-kw. rotary transformers.

Waterville, Fairfield & Oakland Ry., Waterville, Maine, expects to purchase during 1920 one motor-generator set.

St. Albans & Swanton Traction Co., St. Albans, Vt., has recently placed an order for a 300-kw. motor-generator set.

Rome Railway & Light Co., Rome, Ga., expects during the year to purchase $15,000 worth of transmission line.

Shore Line Electric Ry., Norwich, Conn., through its receiver, R. W. Perkins, expects to have some equipment for sale.

Wisconsin Public Service Co., Green Bay, Wis., is considering the purchase of equipment for one automatic substation.

Monongahela Valley Traction Co, Fairmont, W. Va., expects to equip an old shop at Fairmont with two new lathes.

Brockton & Plymouth Street Ry., Plymouth, Mass., expects during 1920 to purchase one wheel press and one lathe.

Pentaluma & Santa Rosa R R., Pentaluma, Cal., proposes during the year to purchase one 300-kw. automatic substation.

Springfield (Mo.) Traction Co. expects during the year to purchase a track grinder to be used with an electric welder.

South Side Elevated R.R., Chicago, Ill., expects to purchase one 36-in. heavy-duty engine lathe and one 24-in. crank shaper.

Mesaba Ry., Virginia, Minn., expects to purchase, during 1920, one electric welding outfit, one drill press, and one engine lathe.

Port Arthur (Ontario) Civic Ry., expects during 1920 to purchase an overhead equipment for 4½ miles of single-track extension.

Tiffin, Fostoria & Eastern Electric Ry., Tiffin, Ohio, are now considering the building of a new substation at Bascom, Ohio.

Evansville Suburban & Newburg Ry., Evansville, Ind., is contemplating the purchase of some standard gondola cars during 1920.

Fox & Illinois Union Ry., Yorkville, Ill., plans to purchase during 1920 one new substation and one electric shovel to work in ballast.

Interborough Rapid Transit Co., New York, N. Y., is contemplating the purchase and installation of the following: Cable and miscellaneous material, $200,000; substation material (not equipment), $45,000; power station material, $296,000. The total amount to be expended is $541,000.

Guy E. Tripp, chairman of the board of directors, Westinghouse Electric & Manufacturing Co., has been elected a director of the American International Corporation, to succeed J. Ogden Armour.

Hull Electric Co., Montreal, Que., Canada, has ordered 800/1200-kva., three-phase, 60-cycle, 11,000-volt-2200-volt transformers, together with switching apparatus and arresters for delivery in 1920.

E. Morton, Chicago, Ill., has organized a firm which will handle electric railway equipment and repair work, including armature windings, field windings, and miscellaneous repairs. Mr. Morton, who was formerly connected with the General Electric Co., will be located at 4744 West Chicago Ave.

Northern Texas Traction Co. and the **Tarrant County Traction Co., Fort Worth, Tex.,** expects to purchase during the year one automatic railway substation, three sets of double track block signals, one sanding machine, one air compressor, one shear and punch, one combination bolt and threading machine, and one armature banding machine.

The Lapp Insulator Company, Inc., Le Roy, N. Y., announces the appointment of S. H. Lanyon, 507 New Call Building, San Francisco, as its representative for the Pacific Coast; the Capital Electric Company, Salt Lake City, representative for the Salt Lake district, and the Butte Electric Supply Company, Butte, Mont., for the State of Montana.

Belden Manufacturing Co., Chicago, Ill., announces that J. P. Davis, purchasing agent of the company, has been elected president of the Purchasing Agents Association of Chicago. Mr. Davis was formerly assistant purchasing agent for the Standard Underground Cable Co., Pittsburgh, Pa., coming with the Belden Co. as purchasing agent in 1916.

Western Electric Company, New York, N. Y., has appointed W. F. Abely assistant manager of its Boston office. Mr. Abely is widely known in New England jobbing circles, having been in charge of sales at the company's offices in South Boston for a number of years and an active worker for the upbuilding of the electrical industry through its various commercial organizations.

R. D. Nuttall Co., Pittsburgh, Pa., effective Jan. 1, 1920, has changed its merchandising policy and under a new arrangement, the Westinghouse Electric & Manufacturing Co.'s salesmen throughout the United States will handle the railway and mine products of the company. All Nuttall industrial lines and other products, however, will be taken care of through the main office of the company at Pittsburgh.

Western Electric Co., New York, N. Y., announce the appointment of E. R. Morgan who will handle the steamship and the railroad business for New England territory from Boston, and William Lancaster who will look after Virginia and North Carolina territory from the Richmond house. R. D. Eves has been assigned to Kentucky, Tennessee, southern Indiana and southern Ohio and the western part of West Virginia, which will be handled from the Cincinnati office.

Roller-Smith Co., New York, N. Y., has appointed G. Lindstrom, works manager of its plant at Bethlehem, Pa. Mr. Lindstrom in 1906 received his M.E. degree from the Royal Institute of Technology, Stockholm, Sweden, and the E.E. degree in 1907. He has been chief engineer, successively, of the Ohio Sterling Co., Dayton, Ohio, and of the Electric Products Co., Cleveland, Ohio, and also production manager of the S.K.F. Ball Bearing Co., Hartford, Conn., and of the S.K.F. Ball Bearing Co., Gothenburg, Sweden.

Westinghouse Electric & Manufacturing Co., N. Y., announces that I. F. Baker, who for the past two years has been in the New York office of the Westinghouse Electric International Co., is now en route to Tokio, Japan, where he will act as special representative of the International Co. Mr. Baker entered the service of the Westinghouse Co. in 1908 and after finishing the graduate students course, remained in the resale and contract section of the sales department until 1913, when he was transferred to the foreign department.

American Steam Conveyor Corporation, Chicago, Ill., announces that the Atlas Machinery & Supply Co., a new sales organization located at 1416 Syndicate Trust Building, St. Louis, Mo., are now handling sales of the company's ash conveyor in the St. Louis territory. William H. Patton, recently returned after two years army service, will be in charge. Associated with Mr. Patton, are his brother, W. R. Patton, who has sold power plant equipment in the Central West for the past twenty years, and N. B. Stewart, who also has been in the power plant machinery business in St. Louis for twenty-five years. The acquaintanceship and experience of these men in the power plant field will assist the organization to give real service to the trade.

Chicago Pneumatic Tool Co., Chicago, Ill., reports good orders from its foreign agencies both in England and Germany. Orders booked during the month of October were in excess of any previous months since the armistice. During the war the German subsidiary was run under compulsory administration by the German government. This has now been abolished and the management is being transferred back to the Chicago Pneumatic Tool Co. through the Courts of Commerce, according to recent cable reports from the company's representative, now returning from Berlin. Reports show that the German company was well managed during the war and is now operating on a satisfactory basis. Arrangements have been made to materially increase the production capacity of the company.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 55 New York, Saturday, January 17, 1920 Number 3

Will the Screw Spike Replace the Cut Spike on Electric Railways?

A RAILROAD spike seems to be a comparatively insignificant part of a track structure. In spite of this seeming unimportance, the spike is now receiving a great deal of study in conjunction with all other details of what are usually considered minor track fastenings, such as tie plates, rail braces and track bolts. For years our railroads knew no other rail fastening than the so-called standard hookhead or cut spike. Within the last few years, however, the demand for better fastenings and greater permanency has led to experiments with, and adoption of, the screw spike.

This, at first, was hailed as the final solution of the spiking problem. Along with the steam roads, quite a few electric railways adopted it as standard. Nevertheless, a great many electric railway track engineers and not a few of their steam-road brethren have felt that the screw spike did not warrant its greater first cost. This view seems to be supported in the report of the Pennsylvania Railroad engineers covering extensive experiments with the comparative merits and maintenance costs of the two types of spikes, the results of which show that the screw spike is not only much greater in first cost but also greater in maintenance cost, than the cut spike, and less reliable as a permanent fastening. The chief trouble appears to be due to the fact that no satisfactory method has been found which permits the screw spike to obtain a firm hold in the tie, once it has been loosened.

One of the particular points advanced in favor of the screw spike has been its greater holding power or resistance to withdrawal, but experience with its use shows that it ultimately becomes entirely loose under continual raising action of the rail. Meanwhile, under similar circumstances, the cut spike will retain a considerable portion of its holding power.

In the electric railway field, a recent questionnaire covering the screw spike question, circulated by one of the large Eastern companies, resulted in replies the majority of which indicated that electric railway engineers have not found the use of the screw spike justifiable for ordinary electric railway conditions either in private right-of-way or in paved streets. Here it may be noted that the screw spike is not used either in the New York subways or upon the elevated roads, except under certain conditions at stations and other special locations.

We are inclined to the belief that the cut spike will continue as the standard rail fastening for electric railways, but attention is called to the point that recent experiments made at the civil engineering laboratories of Columbia University indicate the value of preboring holes in the ties to receive the spikes. The crushing and bunching of the wood fibers is thus materially reduced and the elasticity of the fibers, upon which the resistance to withdrawal partly depends, is retained to a far greater degree and over a longer period. It should also be noted that preboring should be done before creosoting or other treatment is applied. Attention is again called to the desirability of making new comparative tests of standard cut spikes made with the regular chisel point and with the Goldie or diamond point. The latter should prove the better of the two because its shape should lessen the crushing and bunching of the wood fibers, due to its better cutting action, and it is believed that the Goldie point will insure the best results when driven in prebored holes. Upon occasion it may be necessary to resort to double spiking in order to reduce the load which each spike must sustain in resisting withdrawal, and it will be found advisable to give close attention to such details if the most effective use of the cut spike is to be obtained.

Rail-Wear Limits and Economics of Rail Renewals

THE era of appraisals and valuations through which we are passing calls attention to the need for careful consideration of the economics of rail renewal. In the issue of this paper for July 31, 1915, we presented an extended study of this matter prepared by E. M. Haas, and in commenting editorially thereon emphasized the fact that the demands of scientific management together with the magnitude of the investment in rails warranted special attention to the economics of the subject. That it was then having some attention by engineers was attested by the editorial correspondence which followed. Since 1915 much water has flowed under the bridge, and many properties have been subjected to receiverships, with attendant valuations and appraisals. When the owners of a property which was formerly leased find it necessary to resume the management, an appraisal is usually in order. The owners want to know what the lessor has done with the money and in what condition the tracks have been kept. About the first thing that their engineers do is to go out and look at the rails. Here the importance of track records comes into play, but in the final analysis it is the condition of the rails and their probable future life that is used as a basis for future financial operations as well as in passing judgment upon previous management.

The article on rail wear and its causes by R. C. Cram, in this issue is timely because it presents a comprehensive review of the subject, and we wish again to point out the need of authoritative data upon which the economics of rail wear may be based. There are no standards which have so far been established in approaching the various phases of a track appraisal; each engineer seems to have his own. This may or may not be detrimental to a property which is being valued. There is little question that a general fixed wear limit for rails of each general type may be established. This may have no appreciable effect upon a total valuation of a property, but it will serve as a definite basis for the determination of depreciation. Of course, each property will be governed by local conditions, and the general limits would be applied thereto. Further, if depreciation is based, as it generally must be, upon head wear alone, there should be some rational unit which, as W. F. Graves has suggested, ought to be in terms of tons per square inch of head area worn or lost. This unit would recognize the traffic carried and account for the item of variation in car and vehicular traffic density.

It would undoubtedly be a long step in advance, if the American Electric Railway Association would give this subject the attention which it deserves. It perhaps could well be taken up by joint committee action of the Accountants' and Engineering Associations.

When Is a Contract Not a Contract?

IN LAST week's issue of this paper we pointed out and commented upon a few of the high spots in the discussion of Edwin Gruhl's paper on labor contracts, read at the Cleveland meeting of the American Electric Railway Association. The subject is so big and so vital to the continuance of the electric railway business that it will be very unfortunate if this discussion does not lead to some definite progress toward the solution of this most important question.

A fundamental element of the labor problem, we believe, was summed up in the statement of Mr. Gruhl that "The complement of collective bargaining is collective responsibility." A contract should be entered into with full recognition of the rights and duties of both parties. Both should be made equally responsible and be subject to penalties for disregard of obligations. This can be best brought about through the incorporation of unions. Knowing the attitude of organized labor toward such action we cannot arouse ourselves to enthusiasm over suggestions for universal unionization of electric railway workers.

The fact that a variety of opinions was revealed in the discussion of Mr. Gruhl's paper at the mid-year meeting may be traced, we think, to despair of reaching an ideal rather than to prejudice against collective bargaining per se. Many companies already are parties to contracts negotiated by the Amalgamated Association. From sad experience most of them have learned that such agreements are held sacred only while they serve the interests of the employees. Some of these companies have found benefits in dealing with an organized body. They would not oppose Mr. Gruhl's plea for "equality and responsibility of both parties," for the right on the part of labor to a living wage and to hours which do not undermine health; nor would they object to provision for making arbitration compulsory and for penalizing the party who disregards the terms of a contract or the findings of an arbitrator. But such conditions do not now exist.

We have in mind a large railway property which holds as a souvenir of the past a contract signed by the leaders of the employees' union, fixing a certain wage scale for a term of three years. That agreement still has some six months to run. But it actually ceased "to run" some time ago. The men have since secured two increases in the wage scale, one through the influence of the War Labor Board and another through a strike, so that the hourly rate is now 66 per cent higher than that originally agreed to. Not only that, but the employees were able to force changes in working conditions and hours of labor which added seriously to the burden of the company.

Conceding the justice of giving employees additional compensation, regardless of contracts, when cost of living advances, we can see no less equity in Mr. Gruhl's suggested provision to adjust wages downward when circumstances are the reverse. We wonder, however, how such a "give and take" proposal would appeal to employees' organizations which have been "fed up" with an exaggerated sense of their power?

"A street railway must supply service when and as demanded," said Mr. Gruhl, who referred to the railway industry as one in which the whistle never blows. This statement was made apropos of employees' demands for an eight-hour day and penalties for overtime. The unions are now pointing to the eight-hour day as an accomplished fact on at least one street railway system. It is true that the larger percentage of runs on the property in question have been placed on a straight eight-hour basis and that there is a penalty for overtime work. It is equally true that the company they refer to has found the change in hours very costly, and the revenues to pay the bills will have to come from those who use the cars.

Employees who can see no goal but the satisfaction of their extremest demands may take the attitude of "we should worry about the public," but there is a probability of their overstepping the bounds of reasonableness. In that event they may find that there is something to "worry" about in the impression made on those who make it possible to keep the cars running.

A Friend in Need at Washington

SENATOR HARDING of Ohio made an address before the mid-winter banquet of the American Electric Railway Association at Cleveland last week upon which he should be congratulated and in which the men of the industry should find reassurance. He deserved the generous applause given him for two reasons. In the first place, his thoughts were addressed to the particular audience before him, contrary to a common habit of men in public life who often make the occasion of a public dinner an opportunity to express their views on general topics rather than on those in which their audience is especially interested. In the second place, Senator Harding's address was particularly valuable because it displayed a thorough and sound understanding of the fundamental aspects of the great transportation industry and the problems with which it is wrestling.

The pronouncements of the Senator were of such significance that we have published elsewhere in this issue a large part of his address verbatim—in fact, practically all that related to electric railway matters. It is evident from what he said that the industry has at least one staunch friend in Washington. It did our hearts good to hear him openly express himself favorable to giving "big business" as well as labor a square deal. And we believe he meant whole-heartedly what he said in his address about the electric railways, and how splendidly they had responded to the nation's needs and how seriously and unjustly they had been penalized. We believe it because he spoke from a carefully prepared written speech, apologizing for so doing with the remark:

"The American public is becoming very exacting of its public officials and candidates. It is insisting on comparing what one says today with what he does tomorrow."

Then there is further reason for reassurance to the industry in the senator's remarks about the conditions and problems of the street railways. The successful man in public office is too wily to talk against the opinion prevalent among his constituents. His language may be expected rather to reflect the crystallized or crystallizing public sentiment. If this is true, then Senator Harding's address bespeaks again the gradual favorable change in public attitude toward the electric railways which we have several times recently stated was surely taking place. We cannot see other than a splendid improvement in the general conditions in the electric railway industry during the present year. Things are looking up.

Coal-Handling Facilities of Special Importance Now

ALMOST every new power station embodies some different coal-handling scheme, depending, first, on the layout of the station, the amount of land available and its position, the topography of the ground, etc., and, second, on the judgment of the designing engineer as to what character of equipment will best serve the plant, balancing the initial cost against the ultimate usefulness. The scheme described in this week's issue, which is being installed at the Cos Cob station of the New Haven Railroad, is unique and in some respects an experiment. If it works out right, and the trials made thus far seem to indicate that it will, it will provide a means of very rapid handling of the coal and require five to seven men from barge to stoker, including firing, depending on the load being carried and whether coal is being delivered to storage or to the concrete bunkers. The speed with which coal can be unloaded from barges is due largely to an auxiliary boom conveyor on the revolving gantry, as this makes it possible to deliver coal at the point desired without any movement of any heavy structure, except at very infrequent intervals. The scheme has the advantage, also, that there is provision for receiving coal by rail as well as water and that a large part of the same coal facilities are used in either case, thus keeping the cost of the reserve system at a minimum. The rail coal is more simply handled into the station than the barge coal, but the latter has a lesser transportation charge to offset the more complicated handling, and coal by rail cannot be delivered to the storage pile with present equipment.

A recent Australian plant likewise embodies an unusual coal system, and one which provides ample duplication of handling facilities to insure continuity of supply, and yet involves an investment seemingly quite small, although actual cost figures are not available. Coal delivered by rail is dumped in a track receiving hopper, from which it passes through a crusher and is then delivered to any one of three conveyors. Two of these carry the coal up to the double row of bunkers over the firing aisle. The third carries it up onto a structure extending across a storage area and dumps it at any point along the length. This conveyor continues on to the end of the structure and down and back through a tunnel underneath the structure, to the starting point. If it is desired to take coal from storage, it is drawn by gravity through chutes along the bottom of the storage area which discharge onto this same bucket conveyor on its return passage through the tunnel. At the power station, an arrangement dumps the coal from this conveyor so that it is delivered to the other two conveyors leading up to the overhead bunkers. Should this storage pile conveyor fail, a traveling crane and grab bucket mounted on the structure can be used to pick up coal from storage and drop it into a special hopper which discharges into the main receiving hopper. This scheme seems to be unusually simple.

Rapidity and cheapness of handling, duplication of facilities to a sufficient degree to insure against any possible shut-down, and an adequate shortage capacity, are the prime considerations in the coal-handling problem. These must be balanced, on the one hand, with the investment involved in different schemes, on the other.

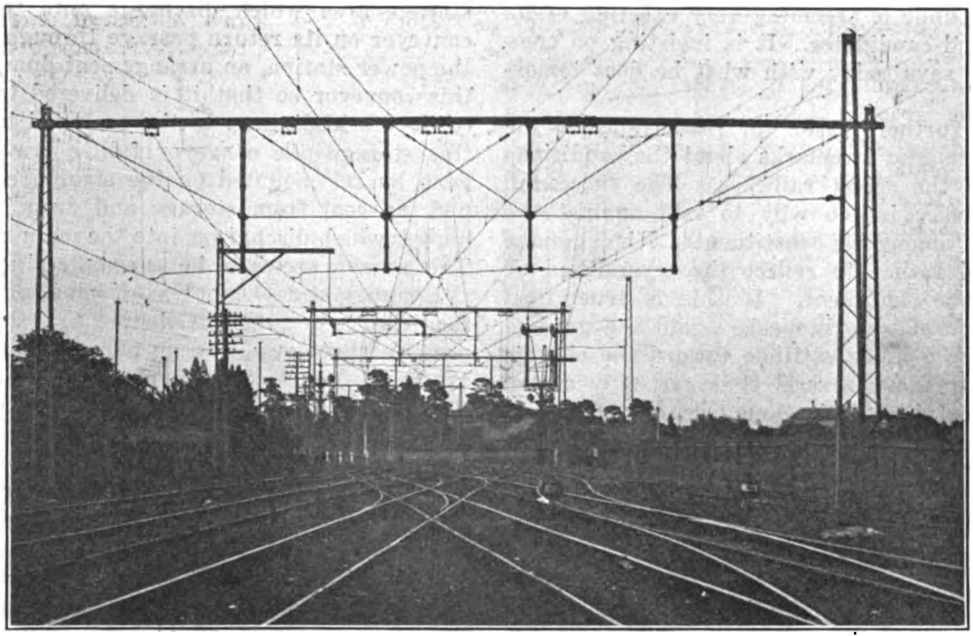
Storage capacity without adequate facilities for handling the coal to the storage and from there to the boiler room is exceedingly expensive, although an adequate reserve pile would be justified in the interest of continuity of service if it had to be handled in wheelbarrows by hand. But, of course, the prime interest is in coal machinery which has to do with the continuous every-day handling from car or barge into the boiler room. Coal is by far the principal commodity a station must handle and it involves the largest labor item. In coal handling, therefore, is one of the best opportunities for reducing power plant operating costs.

For Some, Time Is More Than Money

THERE was a time when riding habit was held to have some fairly definite mathematical relation to the size and growth of a community, but the advent of the automobile has thrown all of the old-time riding habit formulas into the discard. The automobile has taught us that a new and improved mode of locomotion profoundly modifies this habit because, for one thing, it is possible to do more riding in less time.

If the automobile does give this saving in time and a sense of better use of time, the question of expense for this class of transportation becomes subordinate. For that reason, comparisons of street car versus private automobile transportation costs are less effective than would otherwise be expected. The automobile owner knows perfectly well that even the cheapest kind of machine on tires costs more per mile than the street car. Ask him why he prefers the automobile and it will develop that the automobile is favored because it is ready whenever he is. In other words, availability rather than cost is the controlling factor. The only way to meet this argument is to endeavor to approximate this availability of the personally-owned machine. Obviously, this means headways which must be shorter than ten or fifteen minutes and, of course, such shorter headways are obtainable financially only with light, speedy one-man cars. If automobile competition is met in this way it ceases to be a bugaboo but rather a welcome means of stimulating the riding habit.

The man who owns a machine is the same man who no longer cares to walk a fraction of a mile. This is apparent from the fact that in towns where the increasing number of automobiles had seriously cut the car riding, the introduction of short-headway street railway service has led to a return or improvement of the pre-automobile riding index although the increase in the use of automobiles has gone on unabated.



OVERHEAD SPECIAL WORK CONSTRUCTION ON MELBOURNE SUBURBAN RAILWAYS

Melbourne Suburban Railways Electrified—II*

Interesting Details of the Overhead Construction for This Australian System—Copper Catenary and Contact Wires and Flexible Hangers Used—Horn-Gap-Sectionalizing Switches and Many Other Unusual Features

THE 1500-volt direct-current energy employed by the Melbourne Suburban Railways is transmitted to the motor coaches through overhead contact wires arranged on the simple catenary system. Over the main suburban tracks the normal construction consists of a 0.25 sq.in. hard-drawn grooved copper contact wire supported by flexible hangers at intervals of 15 ft., from a stranded hard-drawn copper cable of 0.25 sq.in. or 0.375-sq.in. cross-section. This gives an equivalent of 0.5-sq.in. section of copper over each track, there being no feeders other than the supporting catenary wire. The contact wire is connected at intervals of about 600 ft. to the catenary by means of flexible copper cable of 0.075 sq.in. cross-section.

The contact wire is automatically tensioned through a pulley system attached to cast-iron weights. This tensioning is arranged at both ends of the wire lengths, which are about 3000 ft. long. A tension of approximately 2500 lb. is thus retained in the contact wire. Movement due to temperature changes is free to take place on either side of an anchoring connection between the contact and catenary wires which is arranged at a distance of one-third and two-thirds respectively from the tensioning structures taken in the direction of normal train movement. The flexible hanger between contact and catenary wires consists of a bronze wire $\frac{3}{16}$-in. in diameter terminating in a single-bolt clamp at the catenary and connected to a 6-in. flexible chain. The latter is connected to a ring surrounding a brass bar varying in length from a maximum of 26 in. near the tensioning structure to a minimum of 8 in. near the point where the contact wire is anchored to the catenary. The brass bar is connected to the contact wire by means of two single-bolt clips. Throughout the anchoring span the flexible chain is connected direct to the contact wire.

Pull-off arms consisting of 1-in. diameter steel tubing are connected to the contact wire at each supporting structure and at the pull-off structures where such are employed. These arms are attached through double insulation brackets to the supporting and pull-off masts and retain the wire in a definite lateral position at the point of support. They are connected to the insulator brackets through joints which permit of vertical movement for flexibility and lateral movement to accommodate the travel of the contact wire due to temperature changes. Connection to the contact wire is made through a swivel clamp.

The catenary wire is carried on a bracket insulator giving double insulation to ground at each supporting structure. The center supporting insulator is of spool shape with a gun-metal collar between the catenary and the porcelain. The catenary is not clamped to the insulator but has an underloop consisting of the same cross-section running under the insulator and connected by means of two U-bolts to the catenary.

The catenary wire has a 10-ft. 9-in. sag at the center of a normal 300-ft. span at 60 deg. F., with a maximum tension of approximately 3200 lb. It is anchored at about 3000-ft. intervals.

The simple catenary system is arranged in a staggered formation between structures so as to give uniform wear on the pantograph collecting shoes. The normal contact wire height is 16 ft. 6 in. over the main suburban tracks at 70 deg. F. Over grade crossings, the wire is arranged at a minimum height of 18 ft. Under low overline bridges, which are numerous on the system, the wire is arranged at a minimum

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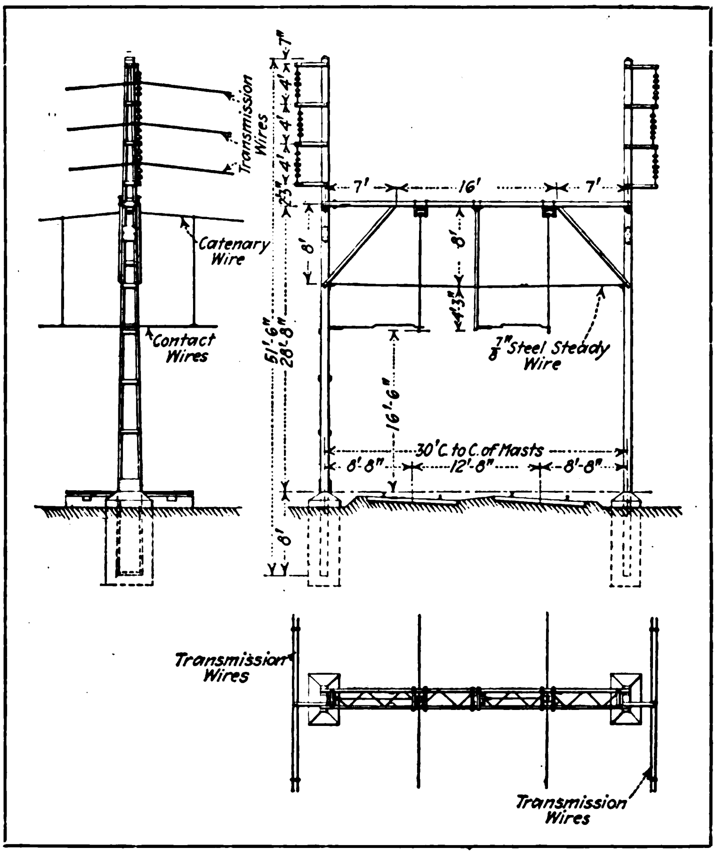
*For the first section of this article see issue published Dec. 13, 1919, page 902.



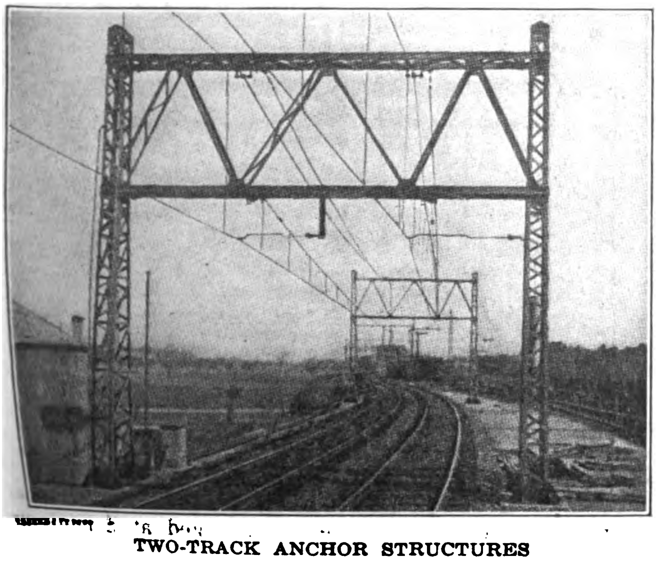
OVERHEAD CONSTRUCTION FOR TWO-TRACK LINE WITH HIGH TENSION WIRES CARRIED ON BRACKETS ABOVE

height of 14 ft. 6 in. from the rail level. The minimum clearance from main level to the lowest member of over-line bridges at points above the collecting surface of the pantograph is 15 ft. 6 in. This gives a vertical clearance of 12 in. between the contact wire collecting surface and the underside of the bridge. The maximum height of projecting ventilators on country rolling stock is 14 ft. 2 in. It would be possible with a rigid collecting skate or rigidly supported contact wire to retain the contact wire at an absolute minimum of 14 ft. 6 in. and at the same time retain 12 in. clearance between the grounded members of the bridge and the surface of the collecting device. The liability, however, of arcing with such rigid devices would be great and the wear and tear on the pantograph would also be excessive at high speeds. It was therefore decided to retain the flexible contact wire beneath low bridges, and practically maintain normal construction.

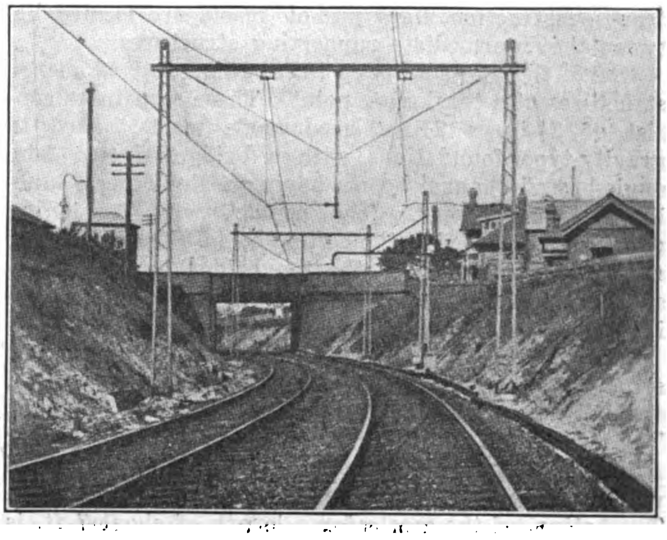
To obtain satisfactory alignment with such flexible construction and to insure that the pantograph with a normal upward pressure of between 25 and 30 lb. at a speed of 50 m.p.h. would not raise the contact wire more than 2 in., very careful grading of the contact wire to its minimum height of 14 ft. 6 in. beneath bridges was necessary. The maximum grade employed under these conditions is 1 ft. in 150 ft. Where possible this grade is increased to 1 ft. in 250 ft., and in special cases where the speed of trains is limited a grade of 1 ft. in 100 ft. is permitted.

On lines on which the operation of certain steam trains is continued, the catenary supporting insulators under the low bridges are arranged so as not to come in the direct blast of the steam locomotive exhaust. The arrangement of catenary supports under these conditions provides for the attachment of two standard catenary insulators, placed symmetrically at either side of the center line of track, at 9 ft. centers. A bent T-section which supports the catenary wire is attached to these insulators. These attachments are normally placed at about 15 ft. centers along the bridge.

The hanger connections between the catenary and contact wire are cut in lengths to give a level line at 70 deg. F. All hangers are measured and cut according to a special table which provides the necessary adjustments to allow for grading in the line where such takes place. The cut hangers with the necessary lengths of slider bars for the various spans are made up in the contractors' stores and erected in the field practically without any adjustment. This procedure has resulted in a well-aligned line which responds uniformly in vertical movement to changes of temperature. The result is to a large extent due to the fact that the catenary supporting wire is stressed well within its elastic limit. From measurements on wire which has gone through a few seasonal changes it is found that the catenary sags in hot weather to an extent expected



TWO-TRACK ANCHOR STRUCTURES



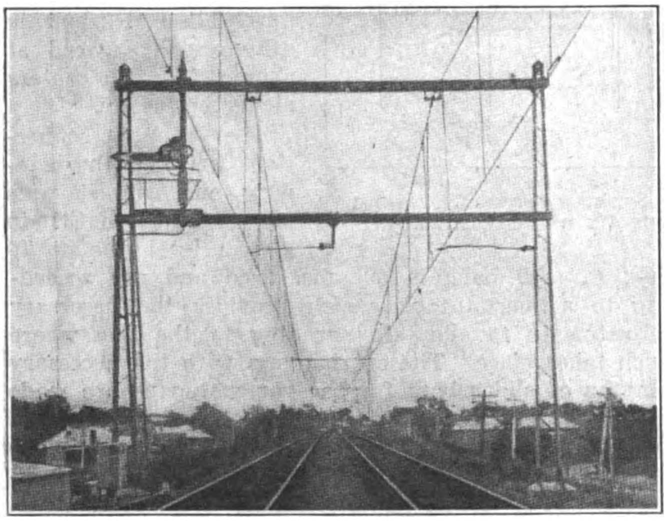
TWO-TRACK CURVE CONSTRUCTION

and returns to its original sag at lower temperatures. There seems to be no tendency for the wire to increase progressively in sag with the recurrence of high temperatures. The temperature limits experienced in the Melbourne district are between 27 deg. F. and 175 deg. F. sun temperature.

At tensioning points, other than at track terminal points, two terminating structures 180 ft. apart are employed. The wires in either direction overlap this 180-ft. span. The overlapping wires are arranged 15 in. apart horizontally, and for a distance of about 15 ft. on either side of the center of the overlapping span, the pantograph makes contact with both contact wires. From the center of this span each contact wire rises gradually to its automatic tensioning attachment, and the supporting catenaries are terminated on the tensioning structures at points vertically above the contact wires which they support.

SUPPORTING STRUCTURES

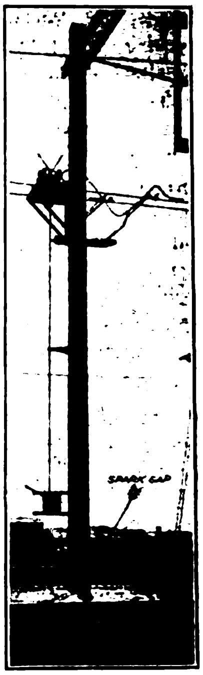
The supports for the simple catenary system consist of pairs of tensioning anchor structures situated approximately 3000 ft. apart with light intermediate structures spaced at 300-ft. intervals on tangent track and at lesser intervals on curved track to suit the radius of curve. On curve work with single and two-track construction, light pull-off masts are located between the intermediate supporting structures.



STANDARD INTERMEDIATE TWO-TRACK STRUCTURE ADAPTED TO CARRY SIGNALS

One of the views on page 137 shows a pair of anchor structures at a tensioning point. These structures consist of 3½-in. x 3½-in. laced angle masts bolted to gravity-type foundations with a bridge of two 6-in. angle-braced channel booms having a light angle bracing between booms. The contact wire tensioning pulleys are attached to the bottom boom. The catenaries are rigidly anchored to the top bridge boom. These anchor structures are designed to be capable of carrying signal semaphores.

The other view on page 137 shows the supporting structure on curve construction. It consists of two 6-in. channel masts with a 6-in. channel supporting bridge. The masts are formed from two 6-in. channels tapering from 2 ft. at the base to 9 in. at the top and laced with a center strip bracing of 2-in. x ½-in. flat bar. The bottom of the masts for a length of about 7 ft. is set in concrete side-bearing foundations. The bridge member is formed from two 6-in. channels 6 in. apart and laced with a center strip bracing of 2-in. x ½-in. flat bar. The bridge member is attached to the masts by means of clamping angles and its position on the masts is thus adjustable. A 4-in. channel vertical is placed in the center of the bridge and stayed with tie rods, which gives an independent pull-off for the inside track on curve construction.



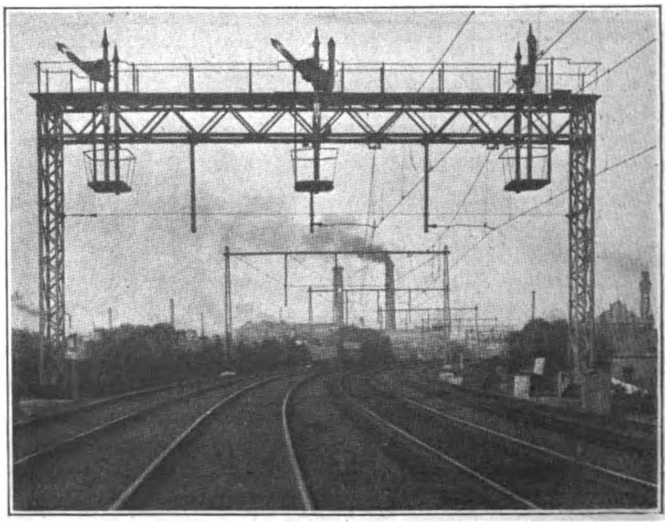
SIDING SECTIONING SWITCH IN POSITION AND SPARK GAP GROUNDING DEVICE

The view last mentioned also shows a pull-off mast situated between two intermediate structures. By means of the bent angle bracket an independent pull-off is obtained for the inside track. Structures similar to the foregoing are employed with four and six-track constructions.

All overhead equipment structures, signal bridges and overline road bridges to which line work is attached are bonded to the track rails through a paper spark gap. This consists of a piece of thin paper, 0.001 in., between two aluminum disks, one disk being in contact with the structure and the other connected by means of flexible copper cable run in trunking to the rail. The disks and paper are incased in a bronze cap bolted to the steel work through an insulated bolt with a rubber washer between the face of the steel work and the cap.

In the illustration showing a side view of this mast, the spark gap device is shown in position near its base.

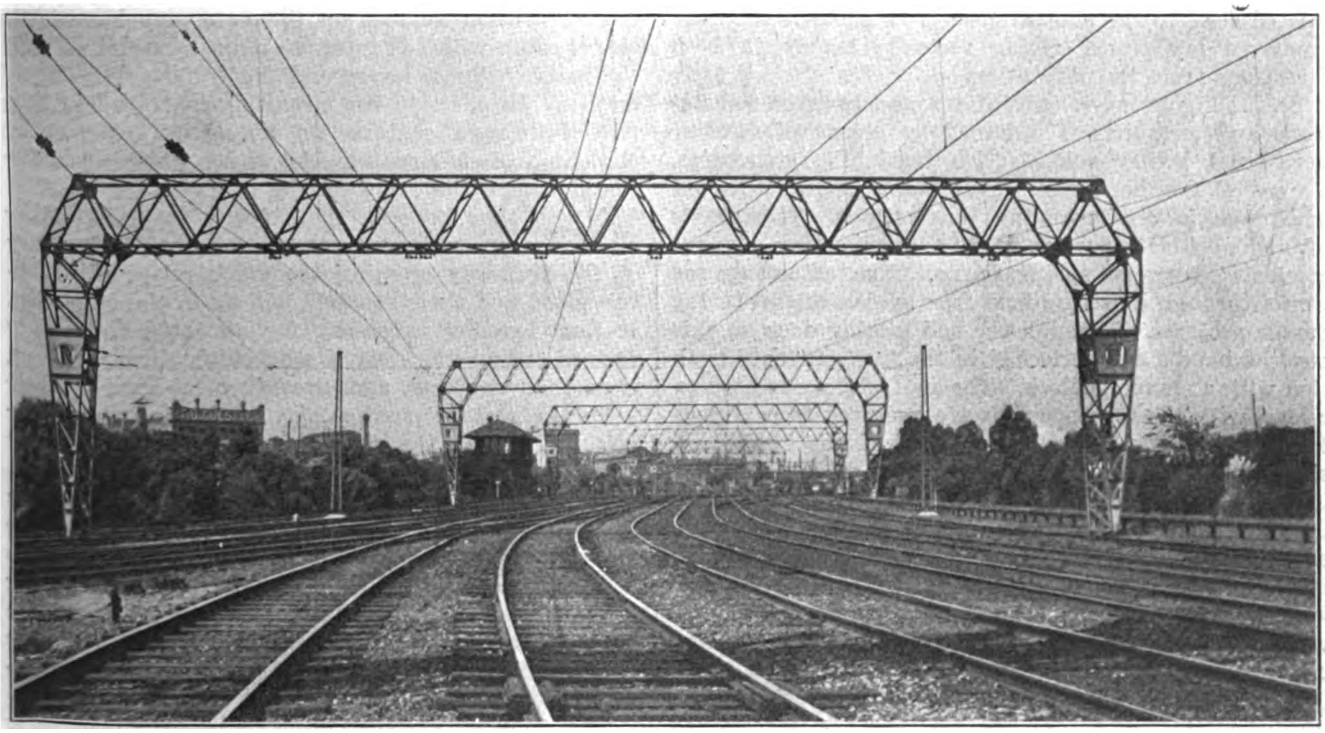
By means of this spark gap the structures are normally insulated from the rails, and the liability of unbalancing of the traction return current in the running rails due to leakage of current through imperfectly insulated structures is reduced to a minimum. This precaution is taken as it is necessary to limit the unbalancing of current through the impedance bonds connecting the track signal circuits which are operated by alternating current. If the insulation between the overhead wires and the supporting structures breaks



FOUR-TRACK COMBINED OVERHEAD AND SIGNAL STRUCTURES down, the spark gap is punctured and the structure is connected to the nearest rail, thus giving a comparatively low resistance return to the substation.

The standard intermediate structures have, where possible, been designed and adapted to carry single arm power operated signals. The additions to the structure consist of a second channel boom located about 8 ft. below the catenary supporting boom and a raked ladder built up from angle sections to give stiffness to the structure along the track. One of the views on page 138 shows a two-track overhead structure adapted to carry signals, another view shows a combined four-back signal and overhead equipment structure, and the view on this page shows five pin arch structures at North Melbourne junction.

These latter structures span up to 120 ft. and carry the overhead equipment load of thirteen tracks. They are also designed to carry a signal load of about 6 tons, distributed. These structures are built up of double 4-in. x 4-in. x ½-in. angle members with bracing varying from 3 in. x 3 in. x ⅜ in. to 2 in. x 2½ in. x $\frac{5}{16}$ in. The dimensions of these structures are 30 ft. to the underside of the boom from the rail level; bridge 7 ft. deep x 4 ft. wide; legs spread 6 ft. along the track at the rail level and 4 ft. wide at the bridge height. The 120-ft. span structures weigh 14 tons each.



PIN ARCH STRUCTURE USED FOR SUPPORTING THE OVERHEAD WHERE WIDE SPANS ARE NECESSARY

The illustration at the heading of this article gives a good idea of the overhead special work construction employed. It will be noted that no contact wires are crossed at the pantograph running level. The individual pull-off arms employed at the junctions permit of the employment of air sections between the various wires. At the center of the scissors crossing shown in this illustration, the two contact wires are held together by means of an insulating distance clamp. Excluding this distance clamp, which is installed in duplicate, each wire in the special work shown is independently held and capable of individual movement or adjustment.

Through extended junction work such as that at North Melbourne and at the approaches to Flinders Street viaduct where the contact wire takes many sharp turns to avoid crossing at the pantograph running level, no provision is made for the accumulative movement of the contact wire, and it is rigidly anchored. The flexibility of the numerous pull-offs act as automatic tensioning devices, and from actual tests it has been found that the variation in the tension of wire through such work due to temperature change is within reasonable limits and quite compatible with the good working of the line. Under these conditions it is possible to dispense with slider bars and to a large extent with individual pull offs; cross steady wires are connected through triangular clips to the contact wire. This type of construction is shown in the view of the 120-ft. span already mentioned.

The up and down tracks of all routes are electrically insulated from each other. All routes are as far as possible separately fed, the exception being when certain tracks are common to different routes. Through extended special work where trains cross through many different tracks in following their route, the overhead wires over a number of tracks are connected together and treated as one section.

Air section insulation is universally employed between track sections where the speed of trains exceeds 25 m.p.h. Over crossovers and leading-in tracks to sidings where train speed is restricted, the tracks are electrically insulated from each other by means of section insulators in the catenary and contact wires. Ordinary terminal strain insulators are employed in the catenary wire and continuous feed section insulators are inserted in the contact wire.

Porcelain continuous feed section insulators for 0.125-sq.in. contact wire are employed in siding and occasional crossover track. Side runners located on the sides of the insulator give a continuous feed to the collecting pantograph throughout the length of the insulator.

Wooden continuous feed section insulators for 0.25-sq.in. contact wire are frequently employed in crossover track work. Copper spring wings arranged on the side of the wood section give a continuous feed to the collecting pantograph throughout the length of the insulator. The end runners at the approach to the insulator consist of light U-shaped metal pieces about 3 ft. long surrounding and attached to the contact wire which terminates in a cone pinned to the insulator end casting.

The runners are hinged to the insulator end casting and are free to rise with the contact wire. Their function is gradually to transfer the pantograph contact from the flexible contact wire to the rigid surface of the insulator with as small a rate of change of grade as possible. The grade followed by the pantographs between the contact wire and the surface of the wood section is 1 ft. in 150 ft. The wood employed in these insulators is Australian hard seasoned tuart, which possesses good mechanical and electrical properties.

The catenary system is fed through cables coming direct from the substations to tensioning structures located close to the substations. Two cable feeders are employed per track, giving separate supply in both directions from the substation.

Sectioning between substations and between substations and terminals is obtained by means of outdoor horn-break switches located on tensioning structures. Views of the horn-break switch are shown to good advantage in accompanying illustrations. It consists of a double-blade switch with a quick-acting plunger connected between spring horns. The actuating rod works through a locking box, from which the operating handle projects. Through the end locking door on this box the handle can be locked in the "in" or "out" position with a simple padlock. The switches are located on a level with the top boom but are operated from a platform attached to the bottom boom of the tensioning structure.

The standard arrangement for sectioning two-track linework consists of five switches, one switch connecting each of the two directions of each track to a common bus, which has a paralleling switch capable of separating the two tracks. Sectioning points are located with reference to traffic requirements and the position of crossovers.

At junctions where many routes lead off from a limited number of tracks, the special work is sectioned at both ends, so as to limit as far as possible the effect of trouble which may occur on any one route. Sectioning points are employed on the outlying lines from 2 to 3 miles apart. Sections of line on two-track route fed from both ends have the up and down tracks normally paralleled at one point about midway between substations. Sections fed from one end only are normally paralleled at the terminals or non-fed end.

The suburban system is divided up into sections which extend between substations. These sections are divided into subsections which extend between sectioning points. Sidings and terminal tracks leading from subsections are divided into branch sections. All substation switches feeding sections are numbered the same as the sections which they feed. Subsection and branch section switches are numbered with reference to the section which they are on, and the subsection and branch section to which they are directly connected. Section paralleling switches are numbered with reference to the sections which they parallel and the subsections through which they are paralleled. By the foregoing system of numbering, each switch number gives particulars of the lines affected by the switch and, with a general knowledge of the location of sections, gives the approximate position of the switch.

The contact and trolley wires immediately over the crossing are all connected together but insulated beyond defined limits by air gaps in the case of the railway contact wires and section insulators in the case of the tramway trolley wires. There are two main circuit breaker type switches of the kind used in train equipment, mounted on the mast of the steel structure nearest to the signal box, one controlling the 500-volt supply for tramway operation, the other the 1500-volt supply for railway operation onto the special insulated crossing wires.

The 500-volt circuit breaker is fed through either or both tramway overhead lines and switches mounted in a box on the tramway pole nearest to the signal box. The control circuit is taken through contacts which are controlled by a relay of standard type used by the signal department, the relay being in turn controlled by the circuit breaker contact on the gate stop lever in the signal cabin which is interlocked in the usual way with the railway signal levers and the tramway signals and derails. In addition the circuit is controlled by being passed through contacts on the track relays on the signaling track circuits. All these contacts must be closed before the relay can be energized.

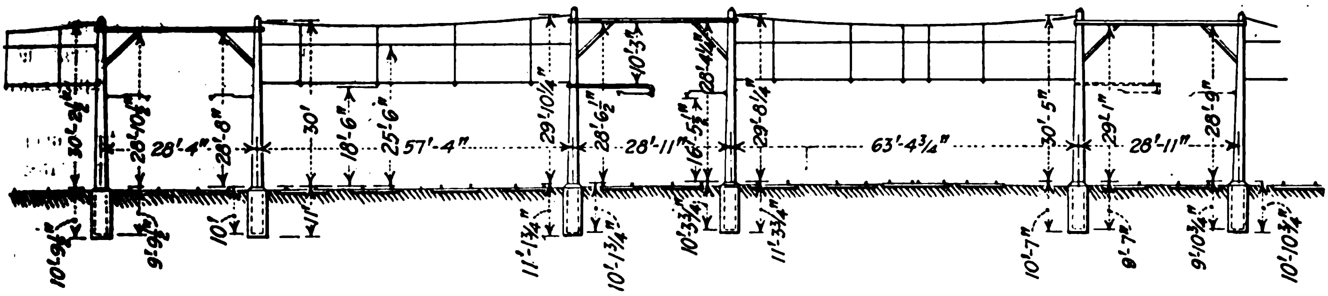
It will thus be seen that if any train is bridging either the up or down tracks in the immediate vicinity of the tramway crossing the track relays will be deenergized and their contacts will be in the off position. It then becomes necessary for all these tracks to be cleared, when the relays will automatically pick up, close their contacts, and, providing the gate stop lever is in the reverse position, *i.e.*, with the gates set for tramway traffic, the circuit for operating the 500-volt circuit breaker will be complete.

Should the gates be set for tramway traffic and a train run onto these particular track circuits before the pantograph reaches the point at which it parallels both the auxiliary and main contact wires, either one or the other of the relay contacts will drop off, and the 500-volt circuit breaker will automatically open. The power required to operate this circuit breaker is approximately 0.3 kw.

The 1500-volt circuit breaker is fed from one to the other of the main contact wires through a horn-break type manually operated switch, and is controlled by current stepped down in voltage through resistances from 1500 to 750 volts (on the train equipment this is taken care of by the dynamotor), the circuit being taken through contacts controlled by a relay. The relay is in turn controlled by the circuit breaker on the gate stop lever completed when the lever is normal to railway traffic.

In addition to the above interlocking, the circuit for controlling the 1500-volt circuit breaker is taken through an interlock on the 500-volt circuit breaker, the contacts of which are connected only when this circuit breaker is open. Similarly, the circuit controlling the 500-volt circuit breaker is completed through an interlock on the 1500-volt circuit breaker only when the latter circuit breaker is open.

Each circuit breaker is fitted with an overload device, the resetting of which is provided for by a locked-up switch. This feature will act as a protection so that,



SECTION ACROSS STORAGE YARD SHOWING OVERHEAD CROSS SPAN CONSTRUCTION

should a circuit be set up between the tramway and the railway wires, in spite of all precautions, it will be opened by these circuit breakers.

The circuit breaker overload coil operates a mechanical trip carrying the main solenoid circuit to be broken at the resetting solenoid contacts. The circuit breaker is not tripped, and therefore does not require resetting in case of no voltage, but only in case of overload or intentional tripping. However, it opens the circuit due to loss of current in the solenoid but picks up again when the supply is resumed.

Knife switches are provided in the connections between both circuit breakers and the crossing wires, so that service can be maintained on one system should the circuit breakers on the other system be under adjustment. A lamp indicator is provided in the signal cabin, so that signalmen will readily see if a circuit breaker is not responding to the operations of his levers or the gates. High-tension fuses are used in the control circuits where these enter the signal cabin, these fuses being installed in a relay box outside.

Automatic train stops are to be installed at a sufficient distance from the point at which the pantograph would parallel both auxiliary and main contact wires to stop a train if it passes a signal set against it before it reaches the point of paralleling the circuit breakers.

SIDING AND STORAGE TRACK OVERHEAD CONSTRUCTION

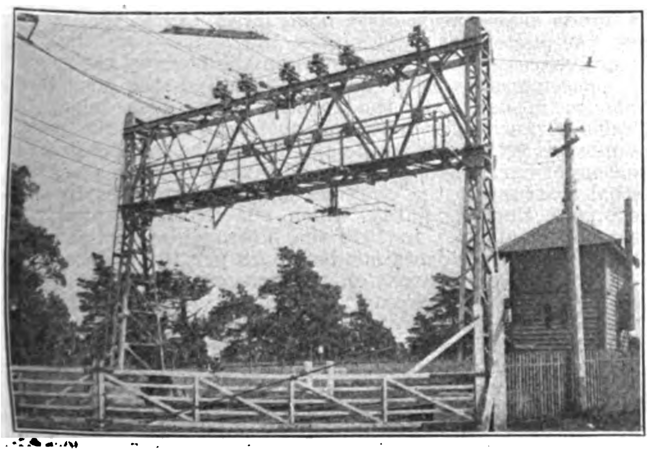
Catenary construction similar to main-line work but employing a 0.125 sq.in. hard-drawn grooved copper contact wire, and a 7/9 gage Siemens-Martin galvanized stranded steel catenary, is employed over siding tracks. The contact wire is not automatically tensioned so that the flexible hangers are connected directly to it.

Since the pantograph upward pressure is normally adjusted to deal with the speeds and current collection experienced with the 0.25-sq.in. contact wire over the main suburban lines, it tends to raise the smaller wire on siding work when the latter has a minimum tension at high temperatures, and in consequence a flexible chain connection is placed between the catenary and hanger wire, the latter being connected direct to the contact wire clip.

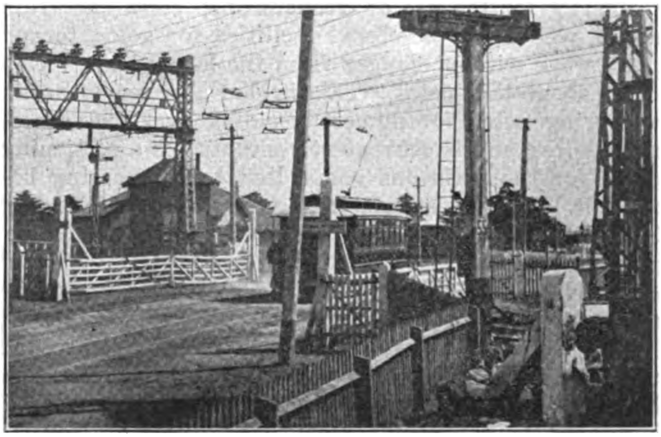
The steel catenary is arranged with a normal sag of 8 ft. 9 in. at 60 deg. F., giving a maximum tension of 1500 lb. The 0.125 sq.in. contact wire is strung to give a maximum tension of about 2400 lb. As far as possible a height of 18 ft. from rail level is maintained for the contact wire over siding tracks. This height is not always possible, due to the presence of low overline bridges and the necessity of grading down to main-line work where the normal height is 16 ft. 6 in.

At outlying terminals where the number of siding tracks is small, common supporting structures similar to the light intermediate structures already described are employed over the siding and main suburban lines. In the Flinders Street yard, where the suburban rolling stock is stored, cleaned and inspected, the sidings comprise about 30 miles of single track. This extensive yard has six two-track main side tracks passing through it. Between these are groups of from five to twelve storage tracks. The sidings in any one group store trains for the lines on either side of it. The overhead construction used here is shown above.

The catenaries over the storage tracks are supported by cross-span cables 19/10 gage hard steel, spanning between the main side tracks, which have independent supporting structures. The cross-span cable is strained to 7000 lb., and the independent supporting structures are capable of temporarily anchoring this span, although under normal conditions the tension on either side of these structures is balanced, the cross span being anchored to the extreme outside structures by either anchor guys, or self-supporting anchor masts where



OUTDOOR HORN SECTIONING SWITCHES, MOUNTED ON TENSIONING STRUCTURE



INSULATORS AND SPECIAL CROSSING FITTINGS AT INTERSECTION WITH TRAMWAY there is no space for guys. The intermediate cross-span supporting masts between sidings are balanced and not capable of anchoring the cross-span cables.

The independent structures consist of 8-in. channel center strip laced masts set in concrete side-bearing foundations and braced to a 6-in. channel center strip laced bridge. The intermediate supports are built up masts of 3-in. x 3-in. x ⅜-in. angle set in concrete.

CARHOUSE LINE CONSTRUCTION

Nine tracks through the inspection bay of the Jolimont repair shops have overhead contact wires. Catenary construction is employed with the supporting insulators attached direct to the roof members at intervals of about 20 ft. The trolley wire is arranged at a height of 17 ft. 6 in. from the top of the rail.

Two 6-in. channels are arranged on either side of the doors and held on brackets attached to the building piers located between tracks. Bolts going through the piers connect the channels together, and this releases all tension from the piers when the tensions due to the contact wires which are anchored to these channels are equal. Wood section insulators are placed between the contact wires and the terminating channels. A small crank with two arms at 90 deg. is attached to the grounded end of one of the contact wire terminating insulators. On the second insulator, shaped jaws are arranged to receive the longer arm of the crank. Operation of the roll door through the usual chain arrangement then operates the double crank to either the "in" or "out" position by the bottom angle of the door coming in contact with the longer crank arm. This arrangement provides a smooth path for the pantograph in passing over the grounded insulator section.

SIDING SECTIONING

At outlying sidings, the overhead wires are insulated from the main lines by means of section insulators already referred to. Switches similar to those employed for main-line sectioning are used for feeding these sidings. They are erected on the most convenient structure and operated through a locking box situated near the base of the supporting mast. An illustration on page 138 shows such a siding switch in position.

At Flinders Street yard, where numerous sidings are used for daily inspection and cleaning purposes, special attention has been paid to the question of sectioning. At the west end of these sidings, at the approach to the Flinders Street terminus, a bridge is erected over the suburban and siding tracks with ladders leading down to the various groups of sidings. This bridge is primarily for the use of cleaners, inspectors and train crews, who are thus offered facilities for going to and from work without danger from the heavy train movement about this point. This bridge also serves as an anchoring point for numerous siding overhead equipment wires, and is conveniently situated as a sectioning point for the main-line and siding tracks passing beneath it. All switches controlling the sidings in Flinders Street yard are located on this bridge. For sectioning purposes a small section of the bridge 4 in. wide is screened off, and all operating and switch locking boxes are located in this section.

This article was abstracted from a very full account of the installation written by E. P. Grove of Merz & McLellan, consulting engineers, London, which appeared in the Australian *Commonwealth Engineer* of Nov. 1, 1918. The full installation was only recently completed.

Status of Transportation in London

IN A LECTURE delivered recently before the Institution of Civil Engineers, of Great Britain, H. H. Gordon discussed some aspects of Metropolitan road and rail transit. An abstract of this lecture is given editorially by the *Electrical Review*, London, from which the following extracts are given. Owing to restrictions on publication by the Institution it is not practicable to abstract the paper directly.

One of the most striking points that he brings out is the enormous and never-ceasing growth of traffic on the London streets. In the decade ending in 1913 underground traffic increased by 170,000,000 passengers, and surface traffic by no less than 870,000,000! "Even where motor traffic largely predominates there has been no real decrease in road congestion, and in the central area of London it is found uneconomical to employ motor delivery vans. The carrying capacity of the highway has been, and remains, taxed to the uttermost." We may point out that in the central area of London there are no tramways; hence the tramcar is guiltless of producing congestion in this region. There are numerous underground railways serving this area, but, as the author shows, no relief to surface traffic is gained by adding tubes. Before the Central London Railway was opened, 390 horse omnibuses passed along Oxford Street per hour, while in 1913, at times when the Central London Railway was packed to repletion, 517 motor-omnibuses, with 70 per cent greater accommodation than in 1895, were unable to cope with the demand made upon them. The same phenomenon has been observed abroad. "Surface traction always grows more rapidly than any underground system," and "congestion on the highway will continue to be a problem unless the solution to it be found on the surface of the streets."

Mr. Gordon points out that the laxity of control over the traffic, by permitting many flagrant abuses, results in the inefficient utilization of the carrying capacity of the highway. On London Bridge, for example, where there are no standing vehicles to obstruct the way and no crossings, even at the hour of maximum intensity of traffic, the efficiency observed was only 41 per cent. Much could be done to ease the congestion if vehicle drivers could be induced to "keep in line."

The author discusses the question of street crossings, and shows that they should be rectangular; but he has no radical remedy for the delay due to the necessity of traffic regulation, except the drastic one of viaducts or subways, and we cannot say that his modification of the "gyratory system" ("Booth's circus") offers much hope of adoption. "In 1902 all traffic was animal driven; in 1914, 83 per cent was power driven," and it is to the power of rapid acceleration and retardation that he attributes the saving of the situation, aggravated by the doubling of the traffic in the interim.

As to the "flexibility" of motor traction, which enables traffic to deviate from congested routes, the author discusses its merits in detail, and dismisses it with the faintest praise. As he points out, when the road is free from congestion, flexibility is not required; when the road is congested, flexibility cannot be availed of, for the motor vehicles cannot maneuver. He disagrees, for stated reasons, with the estimate of the Traffic Branch of the Board of Trade as to the relative obstructiveness of the tramcar and the motor-bus, and makes the sound point that obstructiveness should be assessed on the basis of the number of passengers carried, and not that of the number of vehicles in use. On the former basis, even taking the Traffic Branch's estimate of obstructiveness, the motor-omnibus is seen to be, in the aggregate, the most obstructive passenger-carrying vehicle on the road.[*] Moreover, as a lethal instrument the omnibus is easily first—partly as a result of that flexibility which enables it to appear at unexpected places. In 1918 the Metropolitan police stated that the fatal accidents numbered 2.8 per 100 tramcars and 6.75 per 100 omnibuses; on the passenger basis, the relative figures would become 2.8 for the tramcar and 15.5 for the omnibus. The very fact that omnibuses leave the fast-traffic line to load or unload at the curb, for which much is claimed by the advocates, materially adds to their obstructiveness, as was pointed out by the Advisory Board of Engineers of the Royal Commission on London Traffic.

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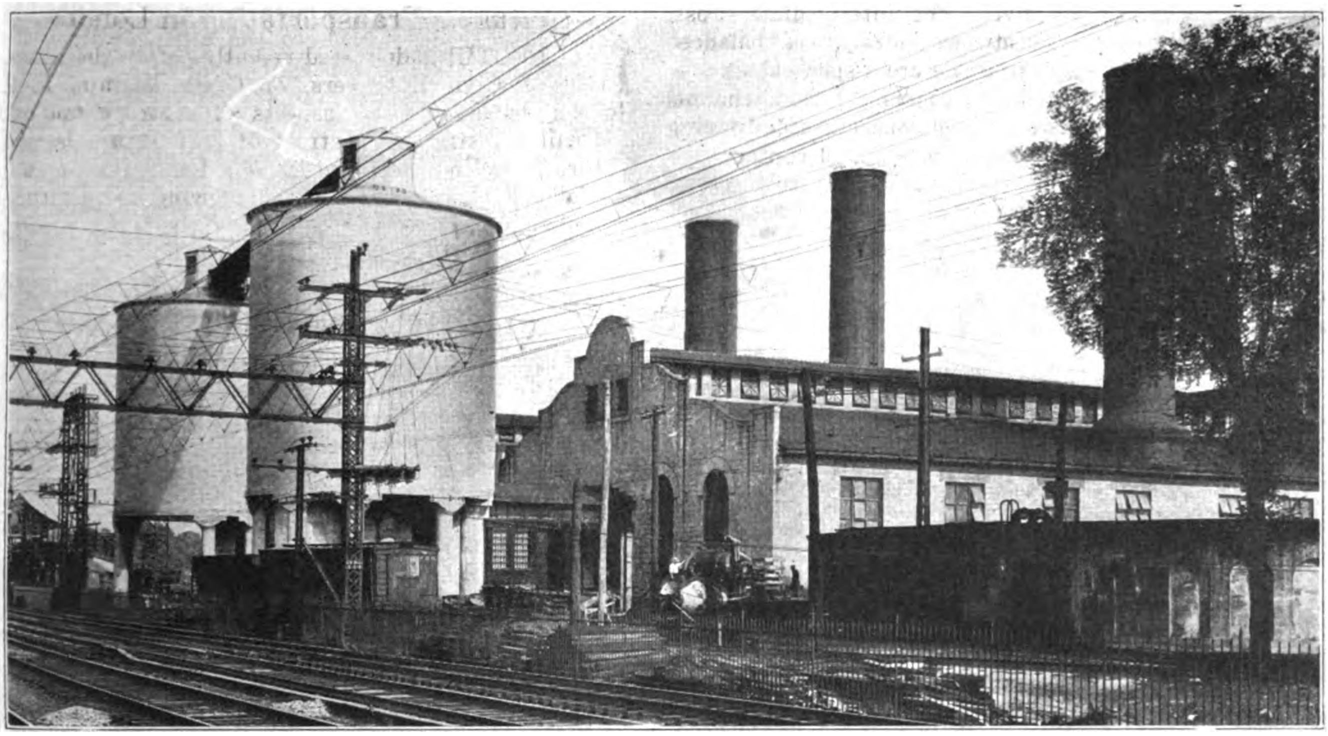
[*] The official "factors of obstruction" are, for the tramcar 9 and for the omnibus 4; as 230 buses would be required to replace 100 tramcars (in fine weather—far more in wet weather) the aggregate obstructiveness of the omnibus is 2.3 × 4 = 9.2.



TWO CYLINDRICAL CONCRETE COAL BUNKERS, ONE FOR EACH BOILER ROOM, VIEWED FROM ACROSS THE RIGHT-OF-WAY

Improved Coal-Handling Facilities at Cos Cob

New Haven Railroad Installs "Silo" Storage Bunkers, Conveyors and Accessories at Its Well-Known Power Plant in Connecticut Which Supplies Energy to the Electrified Zone Between New York and New Haven

THE severe winter of 1918 acted as a spur to many power generating companies to enlarge their coal storage facilities as a means of insuring themselves against any possible failure of the transportation systems. During this memorable winter, not one but many an operator was on several occasions within a few hours of exhausting all available coal and there were even some shutdowns. It was this unprecedented condition which caused the officials of the New York, New Haven & Hartford R.R. to lay plans at once for amplifying the coal-handling facilities of the Cos Cob (Conn.) generating station which supplies a large portion of the energy for the New York-New Haven electrified division.

Accordingly, Gibbs & Hill, consulting engineers of New York City, were given the task of working out and installing a suitable plan, and the result includes many interesting features.

ORIGINAL FACILITIES INADEQUATE

The Cos Cob power station is a plant of 28,000 kw. capacity, having a twenty-four-hour coal consumption rate of from 350 to 450 tons. It is laid out in a long turbine room with two boiler-room wings extending out from the north side. Normally, all coal is received by tidewater shipments from Perth Amboy. The coal used is mostly run-of-mine Pennsylvania bituminous fuel. With the original coal-handling equipment, the coal has been picked up from the barges with a grab-bucket hoist, dumped into a crusher tower, and carried in cars over an inclined railroad from the crusher to the overhead bunkers in the two boiler rooms. These overhead bunkers furnished a storage capacity in the plant of 150 tons for each boiler room.

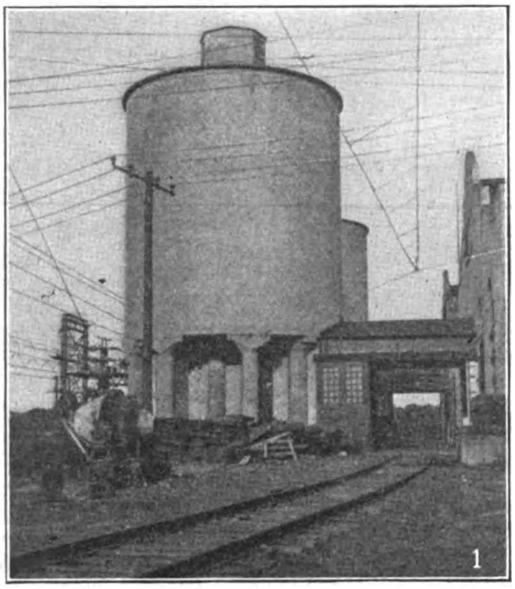
What little coal has been received by rail in the past has been dumped into two track hoppers, one at the end of either boiler room. These hoppers have a capacity of about 50 tons each and are equipped with a crusher from which the coal is delivered by bucket conveyor to the overhead bunkers.

With this original coal-handling arrangement, it is seen that practically the only provision for reserve coal supply was that afforded by barges held alongside the dock in the river. This served the purpose with reasonable safety until the unprecedented conditions of the 1918 winter made it impossible to receive coal by barge for many days at a time. As the supply by rail was likewise uncertain, the need for adequate storage facilities on the ground became obviously imperative.

The plans contemplate an extensive remodeling of the coal-handling and storage facilities for the future, the part of which now completed and herein described will give an addition of 2,000 tons capacity to the powerhouse storage bunkers. Later it is proposed to provide a storage and handling plant near the power house to be used in conjunction with the new bunkers.

Just beyond the end of each boiler room a cylindrical concrete storage bunker has been erected and supported on concrete columns with a clearance of 19 ft. from the boiler-room floor level to the top of the bunker. An extension of the firing aisle in each boiler room was provided to a point directly beneath the bunkers, the overhead trackway for the double weighing lorry system being extended through a doorway made in the wall of each. Thus the lorries can be run underneath the bunkers and filled by gravity through the bottom gates, then return down the firing aisle to deliver the coal in known quantity to the several stokers.

The standard-gage side track which formerly served the two auxiliary track hoppers was extended out onto a wooden trestle and over a new track hopper which discharges into a crusher of 150 tons per hour capacity. Coal dumped into this hopper passes through the crusher and is discharged onto a 24-in. belt conveyor which is driven at the rate of 400 ft. per minute by a 50-hp. squirrel-cage motor. This belt rises at an angle of 16 deg. with the horizontal, and delivers the coal at an elevation of 97 ft. into the cupola at the top of the first concrete bunker. In this first cupola a sort of butterfly valve is provided which, when set in one position discharges the coal from the main conveyor into the first bunker, and when thrown to the other position, discharges onto another conveyor running between this first bunker and the cupola of the second bunker. This conveyor between bunkers is also a 24-in. belt, which is driven by a 10-hp. squirrel-cage motor mounted with its starting box in the cupola of the second bunker. This belt between bunkers is 112 ft. long between centers, while the main belt from the crusher to the first bunker is 330 ft. long between centers.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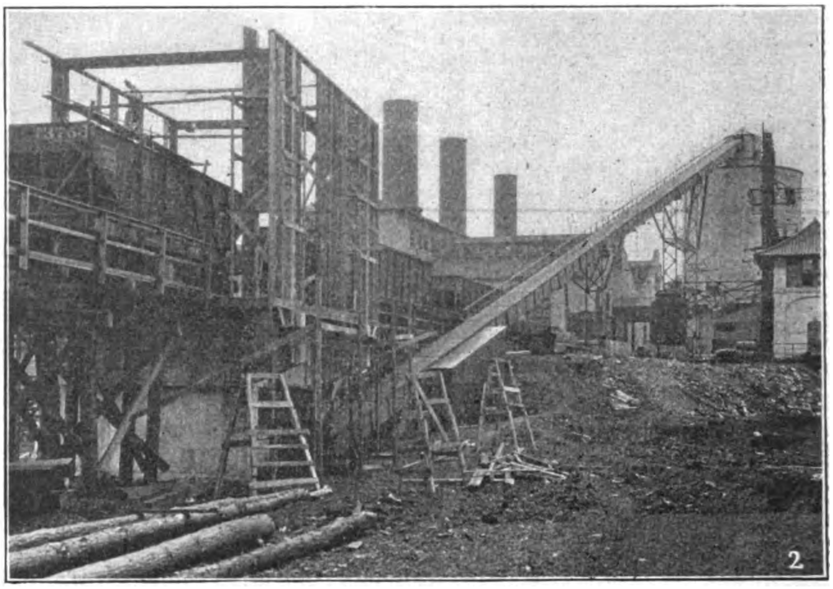
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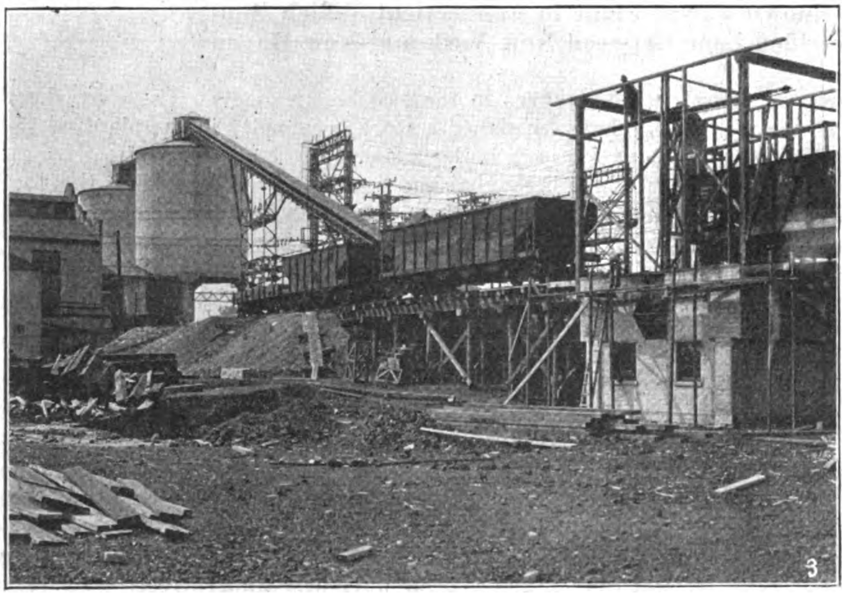
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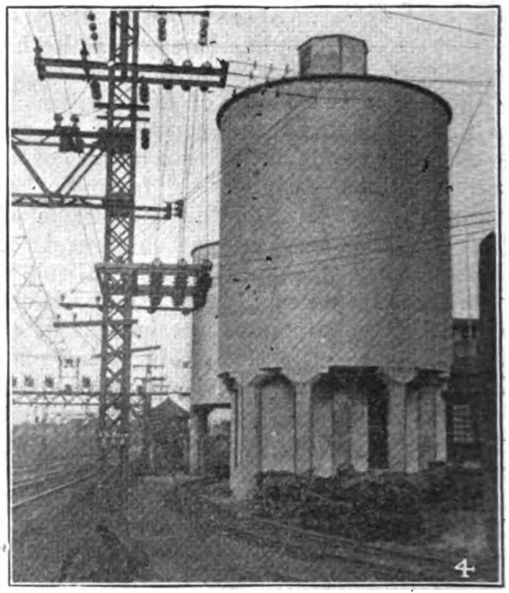
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IMPROVED COAL-HANDLING EQUIPMENT AND STORAGE BUNKERS

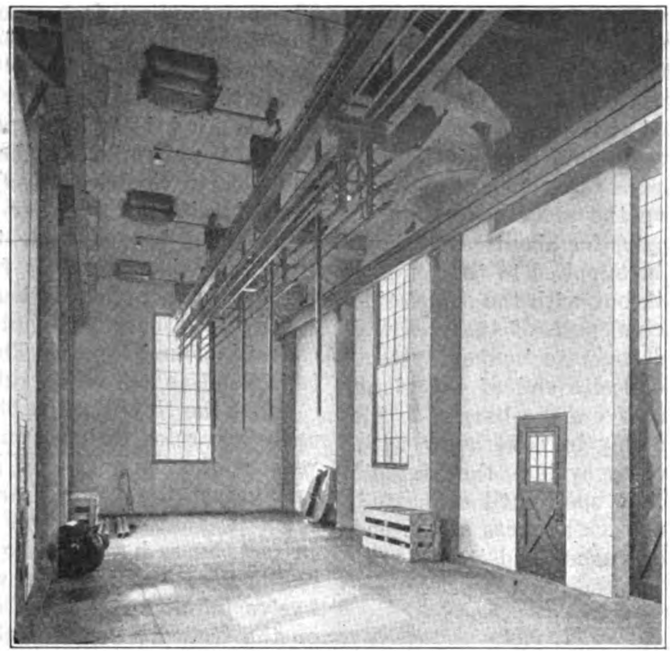
No. 1. Main side track serving, originally, the auxiliary track hopper at each boiler room and now extended to serve the new hopper and crusher plant—Roof construction to protect the lorry track extends over the track to the bunkers.

No. 2. Crusher house, belt conveyor, motor house, conveyors and bunkers viewed from the northwest.

No. 3. Concrete bunkers, inclined belt conveyor, trestle and crusher plant at the foot of the conveyor viewed from the northeast.

No. 4. An auxiliary side track for shifting empties, passes underneath the first bunker—Character of bunker construction clearly shown.

Two of the accompanying illustrations show side views of the conveyor structure and the concrete bunkers. The concrete crusher plant is seen at the foot of the conveyor and beneath the trestle. The Mead-Morrison crusher installed here is driven by a 40-hp. wound-rotor motor, and the starting box for this motor as well as the one for the main belt conveyor is mounted in this crusher house. The motor driving the main belt conveyor is, however installed in a separate small housing underneath the conveyor structure, as seen to the right of the crusher house in another picture. The energy supply line to the motor in the second bunker cupola which drives the conveyor between bunkers is carried through a knife switch in the crusher house, so that this motor can be stopped at any time from the crusher plant. It cannot be started, however, except from the cupola of the second bunker. In the operation of this equipment, it is necessary to keep one man up on the the conveyor structure and in the two bunker cupolas so that he is available for controlling this motor and taking care of the distribution of coal between the two bunkers.



THE BOTTOM OF ONE OF THE CONCRETE BUNKERS SHOWING THE SIX DUPLEX GATES AND OPERATING LEVERS, AND THE LORRY RUNWAYS

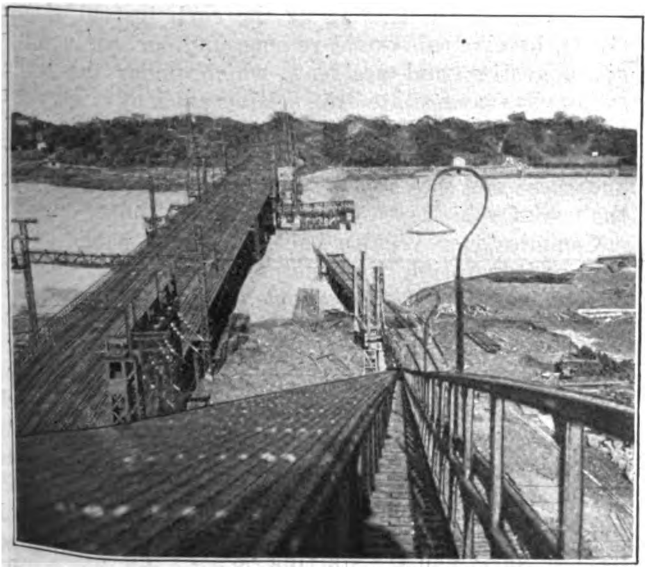
This entire conveyor system, together with the design of the concrete bunkers in connection with the conveyor, was furnished by the Robins Conveying Belt Company, and all electrical equipment is of Westinghouse manufacture. The conveyors are supported on steel structure and are covered over the top and the north side by corrugated sheet iron, while the southern side is left open to facilitate inspection. A walkway and railing extend along this side of the conveyor.

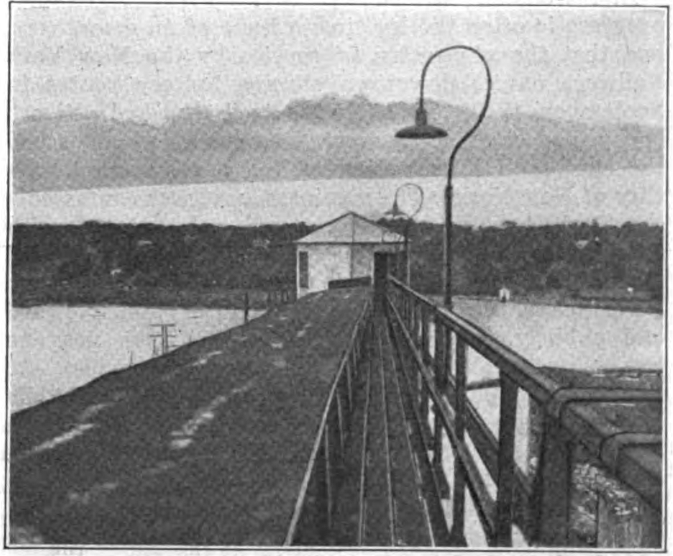
CONSTRUCTION OF THE CONCRETE BUNKERS

While these "silo" type concrete cylindrical storage bunkers have been used in two or three instances before in connection with the coaling of locomotives by the Erie Railroad, it is believed that this is the first installation of the kind for use in conjunction with a generating station. The Cos Cob bunkers are, however, much larger than those constructed heretofore for the Erie. The cylindrical tanks measure inside 40 ft. in diameter and 46 ft. high. They are supported on concrete columns, of which the outer ones are 2 ft. 6 in. in diameter and the inner ones 3 ft. The cupolas in which the conveyors discharge into hoppers are octagonal in shape and 12 ft. 6 in. in diameter with walls 8 ft. high and a peak 11 ft. high. The walls of the cupolas and those of the tanks are 11 in. thick and are reinforced by steel hoops and vertical steel rods, the latter serving as vertical ties and also as supports for jacking up the forms during construction. The bottoms of the bunkers are of mushroom slab construction and are hoppered in all directions from the openings in the bottom.

In the second bunker there are six 20-in. square openings equipped with C. W. Hunt Company duplex gates; but in the first bunker there are only four of these openings, it having been necessary to dispense with two of them in order to extend a new track underneath the bunker. This additional side track was necessary in order to facilitate the shifting of coal cars, and there was not sufficient space between the power station and the main right-of-way to build this track under the bunker. The manner in which the bunker spans this track is seen in one of the figures.

The bunkers are of monolithic construction, and through the use of movable forms the walls were poured in eight days, with two eleven-hour shifts of men a day. Both bunkers were poured simultaneously from a central tower with a spout extending to each bunker.





AT LEFT, LOOKING DOWN THE INCLINED CONVEYOR STRUCTURE—THE TRESTLE OVER THE CRUSHER IS SEEN AT THE RIGHT AND THE MAIN RIGHT-OF-WAY AT THE LEFT. AT RIGHT, THE CONVEYOR STRUCTURE BETWEEN BUNKERS, SHOWING THE MANNER IN WHICH COMMUNICATION BETWEEN CUPOLAS IS AFFORDED

The use of concrete rather than steel for these bunkers was determined partly because of the extreme difficulty of getting steel during the war when they were built, and partly because the concrete structure involved a less cost as compared with steel at the war prices.

The completion of the conveyor and concrete bunker system adds 2,000 tons of storage capacity to the plant. This alone is sufficient to keep the plant operating, in case of failure of the coal supply, for about seven days. At the present time coal can be supplied to this bunker system only as received by rail, but with the completion of the entire layout the principal path of the coal will be through this conveyor and concrete bunker system. The inclined railway at the opposite end of the plant, which is now handling the coal from the barges to the overhead bunkers, will presumably be done away with. In case of failure of the conveyor system, the contents of the two bunkers can be drawn upon until exhausted, and there still remain the two track hoppers at the end of each boiler room, with the crusher and bucket conveyor system to the overhead bunkers, to fall back upon, coal being supplied by rail.

Buses in Passenger Transportation

Motor Bus Operation in New York and Chicago Is Outlined at the Highway Transport Conference in New York

AMONG the features of the motor truck show in New York last week were meetings of the Highway Transport Conference at which subjects pertaining to the sale and utilization of motor trucks were discussed. At one of these meetings the advantages of passenger bus operation were described by Grover A. Whalen, Commissioner of Plant and Structures, New York City, who is now superintending the operation of some hundred or more buses under private operation through the streets of the boroughs of Manhattan and Brooklyn. This operation has been referred to frequently in our news columns since its inauguration, some six months ago. Many of Mr. Whalen's conclusions, however, were attacked by Harold B. Weaver, vice-president of the Chicago Motorbus Company, in the resulting discussion.

MR. WHALEN THINKS BUS WILL SUPPLANT TROLLEY

In introducing his subject, Mr. Whalen stated that progress is often the legitimate issue of an emergency, and that the suspension of service by the New York Railways on its downtown storage battery routes in September, 1919, together with its "stand and deliver" policy, had created the emergency out of which issued the successful introduction of the bus system in the City of New York. The bus introduced was confessedly a makeshift, being privately owned and operated, with cars such as could be picked up on short notice, and with their operation under municipal supervision; nevertheless, they blazed the way for the publicly owned and publicly operated bus that is to solve not one but many problems of the congested metropolis. At the present time ten routes, covering 25 miles of public highways, are being operated with 170 buses, on a 5-cent fare but without transfers between connecting routes.

Commissioner Whalen said that since Sept. 21, 1919, the date the first buses were put into operation, a mass of experience had been acquired, out of which certain definite conclusions had been formulated and proved. The outstanding fact among these is that the motor bus is more economical than the street car, the fundamental reason being that the only capital charge is for the bus and garage. The average capital charge of this kind is $22,800 per mile of route as against $503,374 per mile of the New York Railways. In addition, in electric railway operation, the tracks must be maintained and power must be transmitted to the cars. The bus system, therefore, has an economic advantage that makes it futile for the trolley to hope to stagger on under its heavy overhead burdens, and a system that cuts the capital required to so great an extent is bound to win. The second economic advantage is that buses can be operated solely by one man.

What the New York public is now infinitely concerned with is service rather than capital charge, and in this respect, the commissioner said, the bus not only stands up against the trolley car but it literally runs away from it, that is, it gives better and quicker service. In fact, buses have cut the running time between given points from 20 to 50 per cent so that from five to twelve minutes are saved on a twenty-five-minute ride on the trolley. Some of the apparent reasons for this are that motor buses are not blockaded when the car ahead is in trouble, for should a bus break down, the next bus can swing up alongside, take the passengers off the disabled vehicle, and go on its way. In case streets are closed to traffic due to accidents, fires, parades or otherwise, it is possible, with bus operation, to route them around such obstructions.

The operation of the street car on fixed routes, he further held, is the basic cause of rapidly increasing congestion in the highways, and the cost to the people in loss of time and in the slow movement of merchandise amounts to millions. The traffic has to accommodate itself to the trolley car, and the trolley is in turn impeded by the traffic owing to the fixity of its own course. In contrast with this rigid, unaccommodating system, motor-bus operation is flexible, as it adjusts itself to the traffic, swings around a slower vehicle, is not impeded and does not impede. Instead of hindering traffic, it speeds it up. Again, the motor bus requires no tracks. This would permit the city to keep its streets in better order at less cost and would reduce the wear and tear on other vehicles and diminish the number of accidents.

Loading and unloading at the curb instead of mid-street, he claimed, would remove another serious cause of congestion and accident, which under the trolley system has necessitated the setting aside of safety zones in the streets. With the trolley system eliminated and buses in operation, such zones would not be needed, and these spaces would be restored to the roadway for the use of vehicles.

Commissioner Whalen believed, under public ownership and operation, that motor-bus operation would be doubly profitable to the people. It would preserve to them transportation for a 5-cent fare, thus saving the extra cents charged for transfers and the nickels for longer hauls demanded by the traction interests for service over their slower and uneconomic lines. Such a bus service would. moreover, earn profit for the city and thus supply funds for needed municipal purposes which would otherwise have to be provided by taxes.

To demonstrate this point, Mr. Whalen gave estimated figures, quoted in the Jan. 3 issue, page 70, indicating that the operation of 100 buses would yield a profit of $137,532 to the city annually. It was evident, he stated, from these facts that the motor bus offered the answer to the higher fare propaganda and that, instead of higher fares on the trolleys, a more profitable and better service could be rendered by the motor bus at a 5-cent fare.

In concluding his remarks, Commissioner Whalen emphatically said that the trolley car can be relegated to the limbo of discarded things and that the motor bus is the vehicle best adapted to the requirements of surface transportation in cities. Further, that the solution of the transit problem in Manhattan would resolve itself into the subways and elevated lines carrying long-haul north and south-bound traffic, with the buses carrying people crosstown and limited distances north and south.

BUS OPERATOR GIVES OPPOSITE VIEW

In speaking of motor bus operation in Chicago, Mr. Weaver explained that at the present time double-deck buses similar to those on Fifth Avenue, New York, were being operated on one of the boulevards and were not competing with the trolley cars for traffic on the highways that they serve. It was impossible, he believed, to replace street cars with motor buses, at the investment quoted by Mr. Whalen. The estimate for operation was also wrong, inasmuch as the trolleys, prior to their suspension, had failed to earn 40 cents per mile. Then, too, the estimate for 100 miles per day per bus was too high. In general, it can be said that it costs twice as much to carry a passenger in a motor bus as in a trolley car, even though the investment called for is considerably less. Both forms of transportation competing with one another cannot live in the same city. One or the other must go to the wall. Considering the investment now in the street cars which was made in an honest endeavor to serve the communities with the best form of transportation, Mr. Weaver believed that these investors should have the first opportunity to substitute motor buses for street cars.

He believed, also, that buses having a seating capacity of twenty-four or so passengers would not be able to do the work, and stated that at the present time his company was designing a bus capable of seating sixty passengers. To make the business profitable and to handle rush-hour traffic properly, buses must have a capacity of at least sixty passengers; otherwise it would be impossible to get enough vehicles over the streets to handle the traffic. Even at that, it is doubtful if buses can solve the rush-hour problem, and he cited conditions existing in London where the buses have only seating capacity of thirty-four passengers and it is impossible to handle the traffic offered.

Buses of this size demand two men, for one man cannot drive a bus having more than thirty seats, collect the fares and hold the schedule laid down. It is also, of course, obvious that it is impossible to hold men all day for only forty-five minutes or an hour's work during the evening rush hour. To insure a sufficient number of crews to take care of the peak load it would be necessary to guarantee the men at least a minimum day's pay.

Attention was also called by Mr. Weaver to the bus service being operated in Newark. Although this service does not pretend to take care of all the city's transportation, it simply takes the cream of the traffic, leaving the longer and expensive hauls for the trolley company to handle.

Purchasing Track Spikes Under Specifications

The Benefit Derived from Having a Reasonable Specification on Which to Purchase Track Spikes Is Great and the Cost of Inspection to Insure Proper Compliance Is Small

BY HOWARD H. GEORGE
Assistant Engineer Public Service Railway of New Jersey

ELECTRIC railway companies in a great many cases, especially on the smaller properties, have given only minor consideration to the question of purchasing track material under definite specifications. This is due principally to the fact that the size of many roads has not warranted their maintaining an engineering organization necessary for the drawing up of such specifications and the following up of the inspections necessary. The specifications included in the *Engineering Manual* of the A. E. R. A. are followed by most small roads, but such track materials as spikes, bolts, nut locks, etc., have not as yet been incorporated in the manual. Large steam roads and the larger electric railway companies of this country long ago realized the necessity of having their own specifications. Unfortunately, the needs of the heavy traffic found on steam roads imposes certain requirements in their specifications which are not necessary for ordinary electric railways. Should these specifications be used by the latter, the cost of manufacturing would be higher than is justified.

The benefits derived from purchasing track materials under definite and reasonable specifications are obvious to most railway officials. The small cost of inspection necessary to insure that the terms of the specifications are lived up to is more than offset by the advantages obtained. Some of the advantages to be secured are uniformity of materials and the standardization of design which results, since the specifications naturally involve design as well as the material that enters into their manufacture.

SPIKES SHOULD PRESERVE THE ELASTICITY OF WOOD FIBER

In connection with the design and manufacture of spikes, some recent tests made in the civil engineering testing laboratories of Columbia University and given in their bulletin No. 1, dated September, 1919, are of interest. These state that "when a spike is driven into a tie, the fibers of the wood are forced downward and press simultaneously outward. The ultimate resistance to withdrawal that is actually developed by spikes depends

Steel and Iron Track Spikes

1. Material:

If steel, it shall be made by the open-hearth or other approved process. If necessary, the spikes may be heat treated to secure the desired physical properties.

If of iron, the iron shall be double refined, tough and fibrous and uniform in character and quality throughout. It shall be thoroughly welded in rolling and be free from cracks, flaws, blisters and other surface defects. If necessary the spikes may be heat treated to secure the desired physical properties.

The chemical properties of the steel in the finished spike shall conform to the following limits for phosphorus and sulphur.

Phosphorus—not over 0.05 per cent.
Sulphur—not over 0.05 per cent.

2. Physical Properties and Tests:

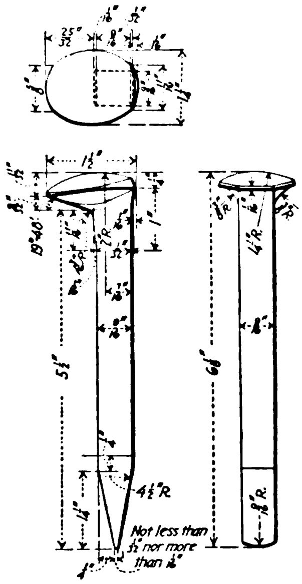
The steel shall conform to the following requirements:

(*a*) Ultimate strength, not less than 55,000 lb. per square inch.
(*b*) Elastic limit, not less than 50 per cent of the ultimate strength.
(*c*) Elongation, not less than 20 per cent in 2 in.
(*d*) Reduction of area, not less than 40 per cent.
(*e*) The finished spike, when bent back on itself through 180 deg. and hammered down, shall show no signs of fracture.
(*f*) When the head of the spike is bent backward cold it shall show no sign of fracture.
(*g*) When the body of the spike is twisted cold one and one-half turns, it shall show no signs of fracture.

The iron shall conform to the following requirements:

(*a*) Ultimate strength, not less than 50,000 lb. per square inch.
(*b*) Elastic limit, not less than 50 per cent of the ultimate strength.
(*c*) Elongation, not less than 18 per cent in 2 in., with the fracture wholly fibrous.
(*d*) Reduction of area not less than 25 per cent.
(*e*) The finished spike, when bent cold through 180 deg. with a radius of not more than 3/8-in., must show no signs of fracture. When nicked specimens are bent cold, the fracture must be entirely fibrous.
(*f*) When the head of the spike is bent backward cold it shall show no signs of fracture.

In either case, a sufficient number of tests shall be made to satisfy the railway company's inspector that the material meets the specifications in every respect, and he shall have the privilege of selecting the specimen to be tested.



STANDARD SPIKE

3. Workmanship and Finish:

The form and dimensions of both the steel and iron spikes shall conform to the drawings submitted by the railway company and forming a part of these specifications, subject to the following permissible variations:

(*a*) The thickness shall not vary more than 1/32 in. from the dimensions shown.
(*b*) The length shall not vary more than 1/8 in. over or under that shown on the drawing.
(*c*) The thickness of the head shall not vary more than 1/16 in. from the dimensions shown.
(*d*) The angle of the hook shall not vary more than 1 deg. from that shown on the drawing.
(*e*) The thickness at the driving edge shall not be less than 1/32 in. nor more than 1/16 in. as shown on the drawing.
(*f*) The spikes must be neatly formed and have well-shaped heads. They must have clean and even surfaces, and shall be free from burrs and rough edges.

4. Inspection:

When required, the manufacturer shall furnish the railway company's engineer or his representative with samples of the spikes from a preliminary rolling before proceeding with the filling of the order, and shall give sufficient notice in advance of the date when they will be ready for inspection.

The railway company's inspector shall have a free entry at all times, while the work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered.

The inspection shall be made at the mill and the manufacturer shall afford the railway company's inspector, free of cost, all reasonable facilities to satisfy himself that the spikes are being furnished in accordance with these specifications. The tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

Two sample pieces of the finished product shall be selected by the railway company's inspector from each lot of 100 kegs, and if both specimens meet the requirements of the specification the lot will be accepted, but if both fail the lot will be rejected. If one of the test pieces fails a third test piece shall be selected from the same lot and tested. If it meets the requirements of the specifications the lot will be accepted, but if it fails the lot will be rejected.

If, after shipment, any spikes are found to be defective, due to material or manufacture, they may be rejected.

5. Marking and Shipping:

When the spikes are shipped they shall be packed in good serviceable kegs of 200 lb. each. All kegs must be plainly marked as to material, size of spikes, and name of manufacturer and must bear a shipping tag containing name and address of the consignee.

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somewhat upon the elastic strength of wood fibers, but much more upon the friction of the bunched and distorted fibers upon each other and the surface of the spike." This resistance is less where the fibers are badly torn, as results from the edges of the spike being burred and imperfectly formed and from the cutting edge of the spike having not been properly formed in manufacture. Therefore, in a spike fastening every effort should be made to preserve as far as possible the elasticity of the wood fiber.

A few years ago the writer was assigned the task of revising existing specifications and preparing such additional specifications for track material as were required on the property of the Public Service Railway of New Jersey. At that time considerable trouble was being experienced due to the heads of spikes breaking off when driven. This trouble resulted from manufacturing imperfections in the spikes. These specifications which were prepared with a great deal of care and study will no doubt be of considerable interest and value to many smaller roads buying this class of material. In their preparation, co-operation was had with various manufacturers in order to insure against imposing unreasonable requirements. Careful study was also given to the question of our own needs, so as to eliminate as far as possible all unnecessary requirements and thus keep the expense and difficulties of manufacture down to a minimum. The specifications for track spikes are given herewith and they differ from the usual specifications in that they cover both steel and iron spikes. In order to secure reasonably prompt delivery this was found desirable, as frequently it is necessary to place orders with firms who do not manufacture steel spikes. Under previous specifications where steel only was specified, such manufacturers were barred from bidding. In order to obtain the material the company frequently found that it was absolutely necessary to purchase from manufacturers of iron spikes. Such purchases were formerly made without the protection of specifications, and in the revised specification this condition is eliminated.

The argument has sometimes been advanced that in order to insure compliance with the terms of specification on the smaller railway properties, the cost of inspection is too great to warrant adopting this method of purchase. In the case of railway spikes we have found that actual inspection cost is not more than 10 cents per keg of 200 lb., and this service is worth a great deal more to the purchaser than its actual cost by preventing the shipment of defective work from the mill. The details of design included in the accompanying specifications are not held up as a criterion or as something recommended for general adoption as standard. They do, however, represent our best judgment as to our own requirements and their use during a period of several years has shown them to be entirely satisfactory and they should be of advantage to other companies.

What Makes the Rails Wear Out?

The Author Gives a Résumé of the Many Agencies Which Cause Rail Wear — Car Traffic Is Not Wholly Responsible — Vehicles Take a Large Toll From the Rail Heads

By R. C. CRAM
Engineer Surface Roadway, Brooklyn Rapid Transit Company

RAIL wear is a subject which has a continued interest for the electric railway maintenance engineer. In view of the importance attaching to the matter it is surprising that more effort has not been directed toward obtaining accurate data upon which to base estimates as to ultimate life, wearing values, depreciation and rail economies generally. If such information has been gathered for individual cases very little has appeared in the technical press although it may be stated that the American Railway Engineering Association has paid a great amount of attention to the study of rails for steam road service and has gathered many data which are equally valuable in the study of rails used in electric railway service. The committee on way matters of the American Electric Railway Engineering Association was unable to develop any data which had much scientific value in 1914 when it reported upon the subject of alloyed steel rails. Since that time no activity has been displayed by the committee in reference to the subject of rail wear. In view of this and because of the many appraisals and valuations now being made, it seems worth while to reassemble some of the available information.

Rail wear is a shortened term for loss of section which may be caused by many different agencies. A number of these do not act upon rails in private right-of-way, while they greatly assist wear upon rails in streets. In short, location has a very distinct influence upon the kind and rate of wear. That upon rails in private right-of-way is almost wholly due to abrasion

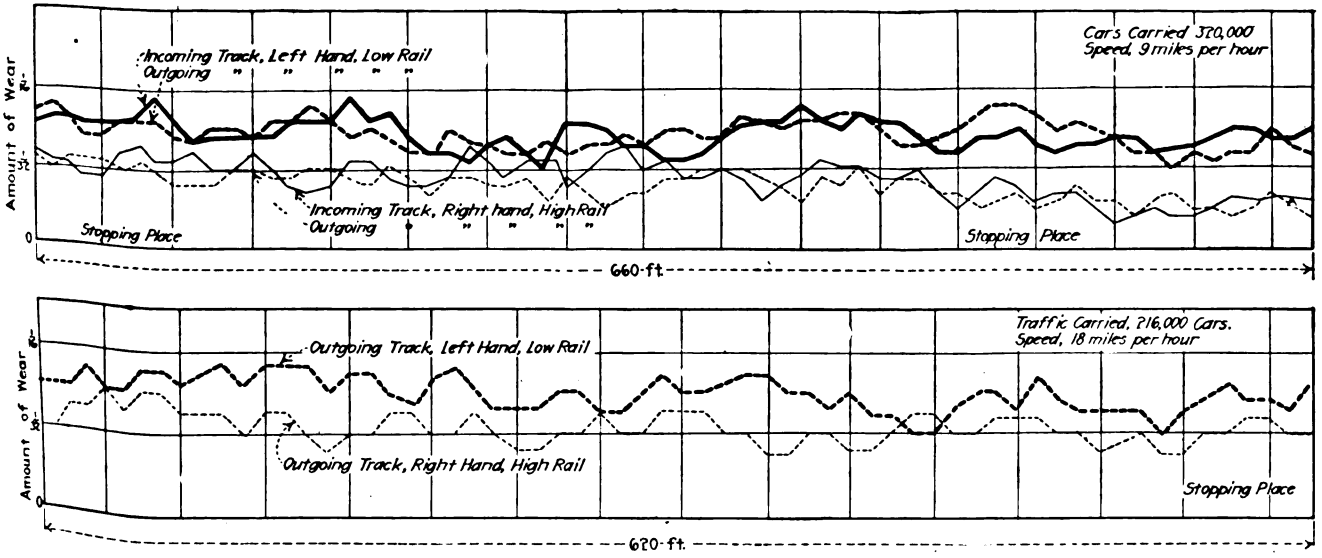


FIG. 1—RATE OF RAIL WEAR ON COMPARATIVELY NEW TRACKS. AT TOP, IN SERVICE FOUR YEARS; AT BOTTOM, IN SERVICE THREE YEARS. (Wear is given in fractions of one inch.)

from car traffic, while in streets wear is also produced by vehicular traffic, corrosion, use of sand and corrugation. The last-named, since it requires grinding, causes a serious loss of section which must be classed as wear.

The difference in level of ¼ to ½ in. between the inner and outer rails found in tracks on some roads, where an attempt is made to conform the tracks to the crown of the street, will produce an excessive wear in the lower rail. Hence this agency must be present in any track which is seriously "out of surface," with low "centers" or "quarters." The methods of manufacture and composition of rails have a considerable effect upon their wearing qualities.

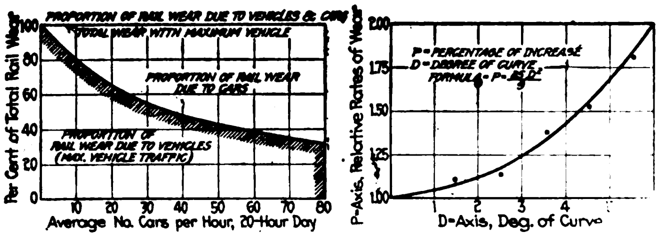


FIG. 2—AT LEFT, RAIL WEAR FROM VEHICULAR TRAFFIC. AT RIGHT, RELATION BETWEEN WEAR OF RAIL ON STRAIGHT LINE AND UPON CURVES

To sum up, the wear of electric railway rails in streets is dependent upon operating speed, weight of equipment, density of car traffic, amount of vehicular traffic, use of brakes, frequency of stops, grades encountered, general alignment with respect to curvature, design of rails, design of wheels, upkeep of wheels, use of sand, cleanliness of streets, and manufacture and composition of rails. Of the foregoing, it is apparent that most of the items are so variable that only those of rail design, wheel design, composition and maintenance are subject to reasonable control.

CAR SPEED AFFECTS RAIL WEAR

The only reliable data which the writer has seen, proving that speed of cars has a definite effect in increasing the rate of wear are those given by R. B. Holt, of Leeds, England, as indicated in the diagrams shown in Fig. 1, on page 149, where it is shown that a traffic of 216,000 cars at a speed of 18 m.p.h. produced substantially the same wear in three years as a traffic of 320,000 cars at a speed of 9 m.p.h. caused in four years. It is assumed that the same types of equipment and rails were used by Mr. Holt in preparing these data. Another interesting fact stated by Mr. Holt is that, as a rule, the wear on rails in a single-track line is seldom greater, and is *frequently less*, than that in a double-track line, notwithstanding the fact that the single track carries double traffic and generally at higher speeds. This is shown in Figs. 11 and 12, page 153.

Mr. Holt suggests that this paradox may be due to the reversal of direction of traffic, which tends to neutralize cold-rolling actions in the surface of the rail head. However, it may also be due in part to a change in location of wheel loads. A pertinent question to ask at this point is: "Has anyone found corrugation in groove or tram girder rails on single-track lines?"

That vehicular traffic plays a big part in the wear of rails is seldom realized. Measurements taken in Chicago by the Board of Supervising Engineers, Chicago Traction, showed that rails which had never had a car over them but were subjected to heavy vehicular traffic were worn on the head to the extent of 5 per cent of their total wearing value in a period of forty months. On lines carrying a car traffic of forty cars per twenty-hour day the vehicular wear may be one-half of the total wear, thus reducing the rail life of the 129-lb. groove girder rail by that amount. On a short section of track with heavy car traffic but with no vehicular traffic, the rate of wear was no greater than upon a line having only one-half the car traffic but with heavy vehicular traffic. The heavy vehicular traffic in Chicago, as noted in the report of the Engineering Association committee on way matters for 1915, was about 300 vehicles per hour, with 38 per cent upon the track area. The committee's report is worth study in connection with the matter of wear due to vehicular traffic.

The diagram shown in Fig. 2 clearly sets forth the results of the Chicago investigation. Similar results are reported by Mr. Holt, as will be seen from Fig. 10, page 153, reproduced from his book on "Tramway Track Construction and Maintenance." The rail there shown sustained vehicular traffic for six years with no car traffic whatever.

The effect of density of car traffic is also shown in the Chicago diagram and confirms common knowledge of rails which have been in service twenty-five years or more under light service on systems where rails in other parts of the system wear out in fifteen years or less.

The effect that varying weights of cars have on rail wear has not been shown so well in any published data but it must be conceded that car weights have a definite influence upon the rate of wear. In an article in the ELECTRIC RAILWAY JOURNAL for Dec. 13, 1919, upon a change from heavy to light cars recently made on the Cincinnati, Lawrenceburg & Aurora Electric Street R.R., the decrease in annual track maintenance cost is shown to be about 18 per cent, but this may have been influenced by the use, in part, of a new location away from streets and probably some new track. The data may be inconclusive but they show the tendency clearly. It is possible,

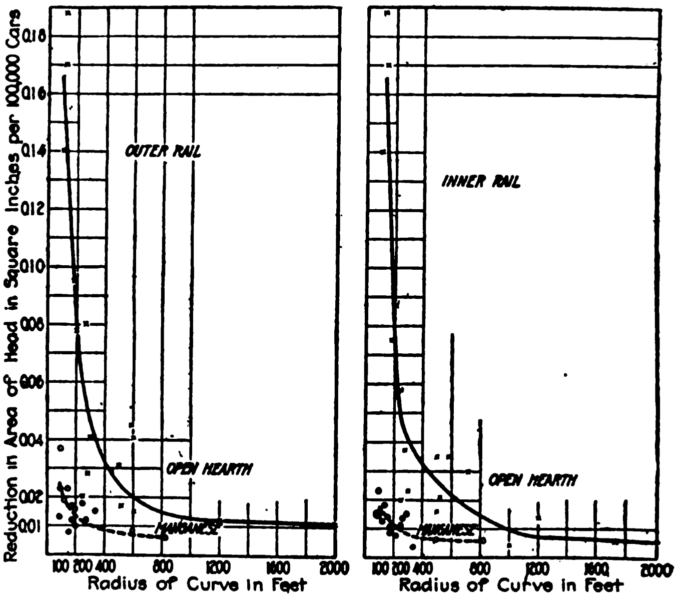


FIG. 3—GRAPHS OF COMPARATIVE WEAR OF OPEN HEARTH AND MANGANESE STEEL RAILS ON CURVES

however, that a frequent service with light-weight cars may cause as much wear as a less frequent service with much heavier cars.

WEAR DUE TO CAR WHEELS

There is no question as to the influence of car wheels and their condition upon rail wear. Wheels which are allowed to exceed their proper wear and contour limits cause uneven bearing upon rail heads, localizing the loads, and causing extrusion of metal and side cutting of grooves. Excessively sharp or deep flanges are trouble makers. Wheels improperly paired or "out of round" contribute their share, and it is well known that flat wheels are provocative of damage in several directions. Improper mounting upon axles will cause excessive side wear of heads and grooves. Some of these wears are shown in the figures on page 153.

While there has been some discussion of the subject of comparative wear of rails due to different composition of metal in the wheels, there seem to be few data available from which to draw conclusions. There are several reasons for the belief that chilled cast-iron wheels must wear the rails in a different manner and in greater or lesser degree than rolled steel wheels. It is a subject which should have careful study at the hands of appropriate committees of the American Electric Railway Engineering Association.

The use of sand in bad weather, while it aids traction, also increases rail wear; it would hardly be effective otherwise. That sand helps to wear rails is proven by the results where on some roads it is used on the inner rail only. This rail almost invariably shows the greater wear. W. C. Willard, in his book "Maintenance of Way and Structures," states that in steam road service the use of sand about doubles the wear under a given traffic.

The general alignment of tracks with respect to curvature also has a marked influence upon rail wear. It is only necessary to point out that sharp curves will wear out in from three to six years, while adjacent tangent tracks will last for fifteen years under the same service.

The effect of curvature upon the rate of wear is clearly shown in the diagrams in Fig. 3, indicating comparative wear of open-hearth and manganese curves on the Chicago Elevated Rys. This diagram is reproduced from the ELECTRIC RAILWAY JOURNAL for Oct. 19, 1918.

Comparative wear of curves and tangent track is being studied by the committee on economics of railway location of the American Railway Engineering Association. The diagram on page 150 was compiled from records of a 164-mile division of a steam road and covers rail renewals on tangent and curved track for a period of thirty-one years. The report of that committee for 1919 states that the average rail wear on curves thus indicated is increased about 100 per cent over that for straight rail, for a 6-deg. curve and 25 per cent for a 3-deg. curve, or approximately as the square of the degrees of curve.

THE FIELD FOR ALLOY STEELS

The use of special alloy-steels has been tried by both steam and electric railways as a means of securing greater life for rails in curves with varying results but the consensus of opinion seems to be that their use is not generally warranted for ordinary street service when cost differences are taken into account. In certain special cases, as in subways, on elevated roads or in other locations where the radius of the curves is very short and where the renewal work is difficult and of very high cost, some alloy steels may be warranted. In general a special alloy steel can only be justified on a cost basis, when the life of the alloy steel is three or more times that of ordinary open-hearth steel. An instance of justified use of manganese steel in such conditions was that of the first rail of this kind installed in the Boston subway near the Park St. Station in 1902, where an 82-ft. radius curve of ordinary bessemer rail steel lasted only forty-four days. Manganese was substituted and lasted over six years, or over fifty-two times as long.

The article by H. W. Roberts in the ELECTRIC RAILWAY JOURNAL for Oct. 19, 1918, on "Relative Life of Manganese and Open-Hearth Rail on Curves," describes tests on very sharp-radius curves on the Chicago Elevated Rys. It is stated that 100-ft. radius manganese curves lasted eighty-four months where open-hearth rails lasted but ten months. It is also stated that the comparisons were based upon the amount of car traffic sustained under cars having an average weight of 25 tons.

The monograph by H. M. Steward in the report of the committee on way matters for 1908 gives some interesting data on wear of different steels in curves on the Boston Elevated Railway. An instance of unjustified use of manganese in surface track curves is at the Brooklyn end of the Brooklyn Bridge. Here a manganese curve of about 150-ft. radius lasted four years. It cost over $1,300. A similar curve of ordinary open-hearth girder rail installed as a renewal of the manganese curve and costing only $460 lasted five years, and in renewing this curve in 1919 a heavier guard rail was used which will undoubtedly last at least seven years.

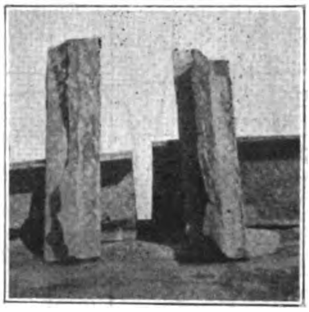


FIG. 4—WHAT CORROSION DOES TO RAILS

Similar experiences and comparative costs have been developed by steam road engineers in experiments of the same nature. (See 1918 *Proceedings* of the American Railway Engineering Association.)

LACK OF PROPER DRAINAGE MAY CAUSE CORROSION

Corrosion causes a loss of section which is usually classed under the head of wear. It is not very prevalent upon steam roads, where it is caused mainly by brine drippings. In electric railway service in streets, corrosion may be caused by soils, proximity to salt water, lack of good bonding and even lack of good under drainage. The U. S. Bureau of Standards has made important tests which indicate that ballast conditions have a marked influence upon the form of corrosion known as electrolysis. Results of some of these tests are given by E. R. Shepard in the ELECTRIC RAILWAY JOURNAL for Jan. 25, 1919.

Corrosion or electrolysis often causes the serious loss of metal in the rail base known as spike cutting. The edges of rail bases on old rails which were originally 5 in. wide will be found after some years to have an effective width of but 4 in. or less. This loss of base section often renders impossible the further use of the rails. Similar weakening of webs will render tie rods ineffective. An increase in thickness of the webs and of rail bases at the edges to provide against such losses appears necessary. Some badly corroded rails are shown in the figure on page 151. These were taken from tracks lying very close to tide water and only 2 or 3 ft. above high-tide level. R. B. Holt relates similar experiences as having occurred in England, and states that on one line the life of rails exposed to sea winds was five years less than upon other parts of the same line not so exposed. He also calls attention to corrosion resulting from dilute solutions of sulphates of iron in water flowing over rails located near coal piles. The writer agrees with Mr. Holt that more importance should attach to the question of corrosion and its effect in causing loss of section.

The effect of grades upon rail wear is clearly indicated in Fig. 5, taken from Mr. Holt's book previously referred to. He states that the rate of wear increases with the steepness of the gradient and that wear is more pronounced at or near compulsory stopping places where the effect of the application of brakes is brought out.

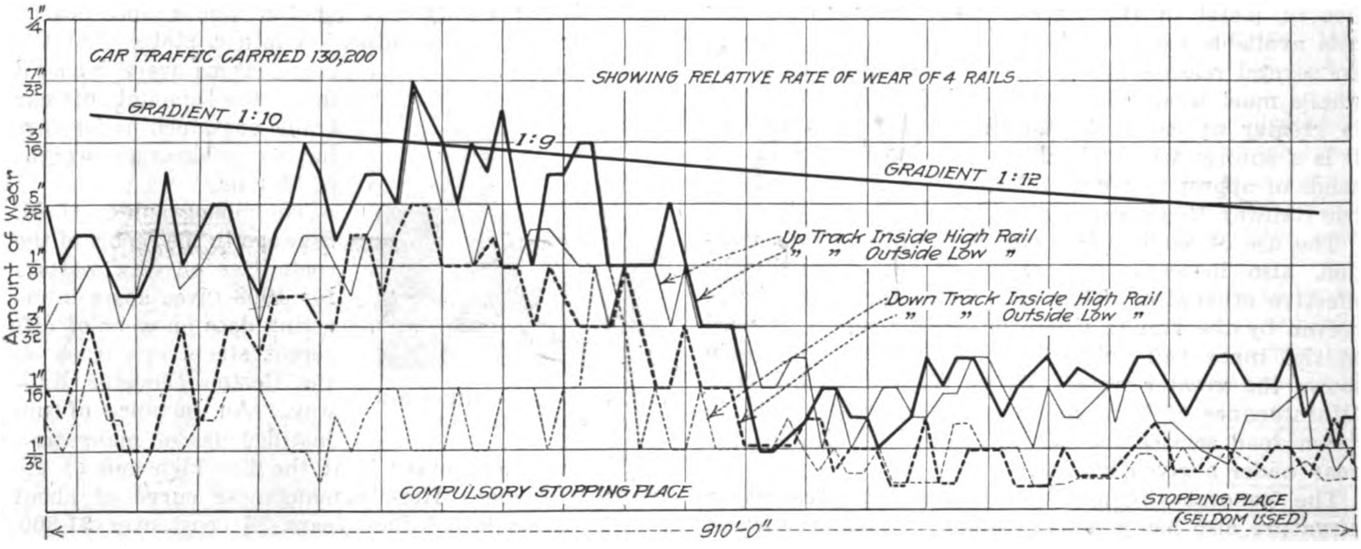


FIG. 5—EXAMPLES OF WEAR ON STEEP GRADIENTS

CORRUGATION TAKES ITS TOLL

We are all more or less familiar with the peculiar form of wear known as corrugation. The greatest loss of metal due to this is caused by grinding the rails to remove the corrugated metal. That the trouble is both serious and costly may be appreciated. The Brooklyn Rapid Transit System expends about $16,000 annually for the removal of corrugation and would have to spend more if an attempt was made to remove all traces of it and keep it down as fast as it appears. To date no adequate remedy or preventive has been found for this trouble, and a special attempt should be made to determine its cause. Once determined the remedy should be an easy matter.

Rails are removed from open tracks largely because of wear or breakage. It is believed that comparatively few electric railways have had occasion as yet to renew main-line rails except for breakage in such tracks where rails weighing 70 lb. per yard or over were used in original construction. Of course this is not true in heavy service subways and elevated lines. On steam roads, when rails are removed from tangent tracks for head wear they are usually suitable for service in branch lines or in yards. On the other hand, in street railway service the rails are frequently unfit for further use when removed.

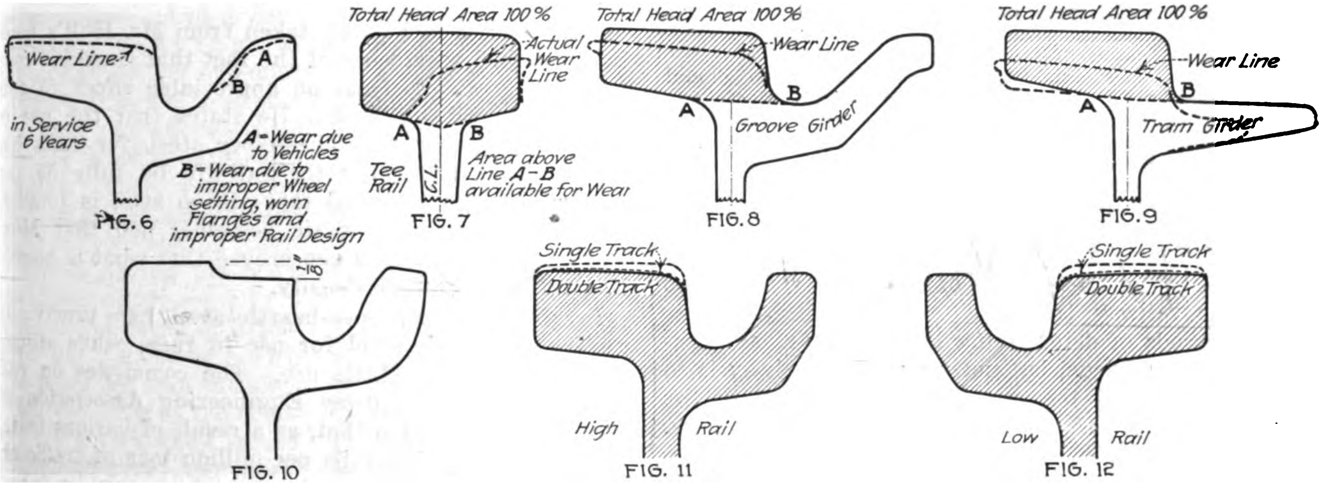
This is especially true of girder groove, tram girder and girder guard rails. Rails are often removed from streets before their ultimate life is reached because of the need for renewal to accommodate city street improvement projects, where it would be folly in many cases to leave rails in place for one or two more years of life where a ten- or fifteen-year pavement is to be installed. Untold losses have been caused by such conditions but the recent development of new maintenance methods has assisted maintenance engineers in keeping rails in service which, in the past, would have gone to the scrap heap.

When all the factors affecting wear are considered, there is reason to believe that the life of the joint, as a prime factor in determining the rail life, has been over-emphasized. Joint failures may have been the principal cause for rail renewals twenty years ago but modern joints, particularly of the several welded types, bid fair to outwear the rail. It is certain that the joint of today has become an item of little importance in its influence upon either wear or life of rails in streets.

The question: "What is the life of rails?" has been, and still is, a puzzle which is unsolved. It is impossible to answer it with much accuracy either on a theoretical or practical basis. All of the factors affecting wear heretofore mentioned prevent this. A rail may be worn out as far as its safe use in main lines is concerned and yet there may be plenty of wearing value left in it to permit its further use in branch lines, or in sidings and yards. It may be unsuited for continued use in a new pavement, but may still be used for repairs in other territory or for light service extensions.

The economics of rail wear, particularly in girder rails was the subject of an extended article by E. M. Haas in the ELECTRIC RAILWAY JOURNAL for July 31, 1915. That article gave many examples of wear, life and causes for removal of plain, tram and groove-girder rails. It also suggested a formula for testing the economy of using old rails in new or repavement work. That formula was based upon the assumption of arbitrary wear-life limits applied to head reduction. Unfortunately, as subsequent discussion showed, the question cannot be solved solely upon an economic basis because rail renewals, particularly in streets, depend upon many influences other than rail conditions.

In certain situations, such as upon elevated roads or in subways, the provision for safety no doubt warrants the assumption and use of an arbitrary wear life or head reduction limit, based upon some percentage of the total head area. This is done on the Boston Elevated Ry., where 85-lb. A. S. C. E. rails are arbitrarily renewed when 35 to 50 per cent of the head area has disappeared. It would be interesting to know just what tonnage or wheelage produces this wear. Meanwhile, the curved rail wear of open-hearth rails on the Chicago Elevated Rys., previously mentioned, showed a reduction of head area of 38 per cent for rails of 80-lb. A. S. C. E. section at the time of maximum wear or removal, while the rate of wear under equipment averaging 50,000 lb. per car varied from about 0.01 sq.in. per 100,000 cars on a 2,000-ft. radius curve to about 0.165 sq.in. per 100,000 cars on a 100-ft. radius curve. (See diagram, Fig. 3.)



COMPARISON OF WEAR ON DOUBLE AND SINGLE-TRACK RAILS

Fig. 6—Wears due to car traffic, rail design, wheel wear, and vehicular traffic.

Fig. 7—Method of indicating total railhead areas available for wear.

Fig. 8—Wear on groove girder rail.

Fig. 9—Wear on tram girder rail.

Fig. 10—Head of rail worn by street traffic alone.

Fig. 11—Comparison of wear on double and single-track high rail, total number of cars, 430,000.

Fig. 12—Comparison of wear on single and double-track low rail, total number of cars, 430,000.

In street work, especially for tangent tracks, we have very little published data available. W. F. Graves, in discussing Mr. Haas' article, said in the ELECTRIC RAILWAY JOURNAL for Oct. 23, 1915, that measurements he had observed indicated that a tonnage of 1,760,000 had been moved for each $\frac{1}{64}$ in. vertical wear. The particular section and chemical composition were not given. From this wear he suggested that under the same conditions the ultimate economical life of the rail in question might be reached when 70,000,000 tons had been carried, or an equivalent of $\frac{5}{8}$ in. vertical wear and a 40 per cent head area reduction. Mr. Graves expressed the opinion that 35 per cent reduction in head area might be set as a fair average wear limit.

The writer, in reporting upon Mr. Moxham's experiments, in the ELECTRIC RAILWAY JOURNAL for Jan. 26, 1918, gave a wear table showing an average vertical wear per year of $\frac{1}{64}$ in. in tram-girder rails for a service of twenty-two years. The average reduction in area was 28 per cent. The estimated tonnage which produced a wear of $\frac{1}{64}$ in. was 2,217,000. Present observations indicate that the rail will carry a total of from 70,000,000 to 80,000,000 tons before renewal is necessary. These rails were of bessemer steel with carbon ranging from 0.28 to 0.59 per cent.

Mr. Holt's diagrams, shown in Fig. 1, indicate a vertical wear rate of about $\frac{1}{64}$ in. per year as an average, although they show in addition a somewhat increased rate of wear due to car speeds. The writer has also observed rates as high as $\frac{1}{32}$ in. per year on heavy-traffic low-speed lines in very congested territory, where the car traffic practically excludes vehicular traffic. In connection with such data it is almost impossible to measure the influence of the combination of deep-worn wheel flanges riding upon the trams or upon the floors or sides of narrow grooves. Such conditions must save considerable head wear at the expense of wheels, trams and grooves.

It is somewhat difficult to set what may be termed the total or available head area. It will vary with each rail section and a maximum percentage of reduction which may be safe for tracks in pavements might be unsafe for open tracks. It will also depend upon the manner in which the rail is worn, since the wear produced in curves is considerably different in contour and position from that found in straight track.

The area reduced by wear was found by the Lorain Steel Co. to vary from 11 to 69 per cent of the total head area in rails removed from streets in forty different locations and covering each of the three types of girder rail now in use. The ages varied from fourteen to twenty-one years. The average reduction was 32.98 per cent of the total head area.

As a step toward more careful study of the wear problem, some standard method should be settled upon for determining what area is available for reduction by wear. This should be established by each general type of rail and called the total head area or 100 per cent. Figs. 7, 8 and 9 indicate what the writer believes to be the generally prevailing method. Briefly, for plain girders the entire area above lines connecting the undersides of the head with the center line of the web may be used for the total head area. For tram girders the area above a line connecting the underside of the head with the top of the tram may be used. Similarly for groove girders the area above a line connecting the underside of the head with the bottom of the groove may be taken. It will be noted that the areas in trams or grooves are ignored. In actual service, the entire trams have disappeared without causing trouble and rails have remained in service in good pavement for some time thereafter.

The following conclusions were reached by Mr. Graves in discussing this subject in the ELECTRIC RAILWAY JOURNAL for Oct. 23, 1915:

> To determine a fixed percentage of head area to be used generally as the ultimate rail wear limit is impossible, as it is bound to vary with the head area, the weight and type of rail and the manner in which it is worn.
>
> Each section of rail and in fact each local situation will have a wear value of its own which should be determined accordingly from the observed rate and manner of wear.
>
> The rate of rail wear and the ultimate wear limit should be known or considered in terms of wheel or tonnage movements, and the future wear value in years determined from this.
>
> As a basis to determine rail depreciation it seems quite reasonable that a general fixed wear limit might be established, even though it may not have any appreciable effect on total valuation. The average of depreciated rail is a comparatively small item in the appraisal of track construction; the substructure presents a much more expensive and complicated problem.
>
> It seems scarcely logical that track depreciation should be considered in an assumed basis of a certain percentage per annum. The more scientific way, it seems to me, would be to consider it in recognition of traffic carried, or in terms of ton or wheel movements per square inch of area worn, thus securing a common base or standard which may be applied generally to all properties notwithstanding their wide variation in traffic density.

These conclusions are important and the last two are very pertinent in these times of numberless valuations of electric railway tracks.

The methods of determining the rail wear vary considerably. A common, but not very accurate, way is to cut out a piece of the rail and compare it with the template drawing or a new piece, of the rail section. Several devices, called scribing machines are available, such as those described and shown in the ELECTRIC RAILWAY JOURNAL for Nov. 20, 1915, page 1042, May 12, 1917, page 876, March 22, 1919, page 592, and Dec. 20, 1919, page 1006.

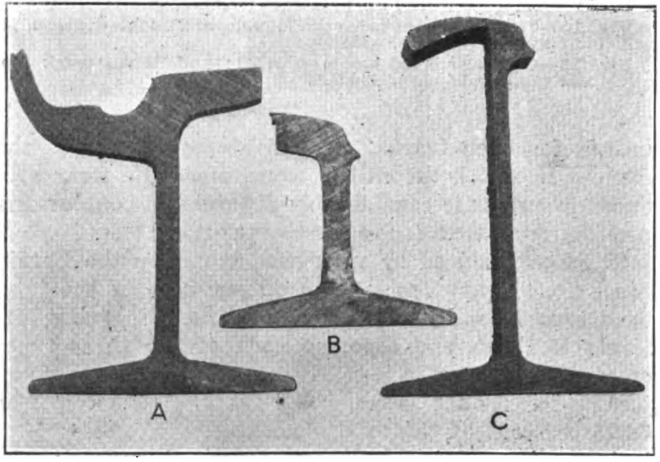


FIG. 13—EXAMPLES OF CURVED RAILS REMOVED FOR WEAR

A—7-in. girder guard rail. B—80-lb. A. S. C. E. outer rail. C—9-in. tram girder rail

While much has been written upon the subject of the influence of different steels used in rail manufacture, upon the rate of wear, we have very little published data covering this matter as it affects street railway rails. Comparisons of manganese, bessemer, nickel and open-hearth steels in curves have occasionally appeared but similar comparisons affecting tangent tracks are wanting. There is a need for carefully prepared data of this character. Meanwhile, through experiments being conducted with silicon steel in Great Britain we have some very definite information, proving that composition does influence wear. Mr. Moxham endeavored to prove this in his Brooklyn experiments and his early conclusions tended to show a vast difference in rate of wear upon "hard" and "soft" steel but the writer's recent discussion of that experiment tended to show that it was somewhat inconclusive.

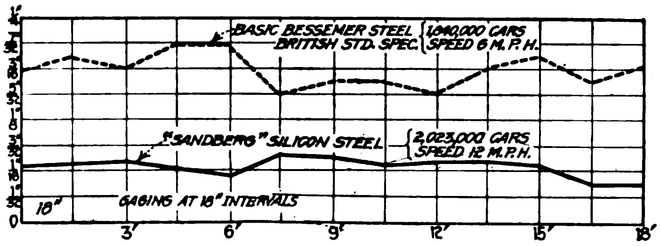


FIG. 14—COMPARATIVE WEAR OF RAILS

The diagram in Fig. 14, taken from Mr. Holt's book, gives conclusive evidence of the fact that chemical composition of rail steel has an appreciable effect in controlling the rate of wear. He states that the use of silicon steel, in place of bessemer steel, for rails has the effect of increasing the rail-life by fully 33 per cent. It should be noted that silicon steel is tougher and more dense than basic bessemer and that Moxham's experiments long ago proved that what is needed is a steel of greater density.

In this country, open-hearth steel has practically replaced bessemer steel for use in rails, while silicon steel has had very little use. The committee on rail of the American Railway Engineering Association in its 1918 report stated that, as a result of various tests, the abrasion of high rails per million tons of traffic on curves of 8 or 9 deg. or less could roughly be taken as follows: Manganese, 0.004 sq.in.; open-hearth, 0.012 sq.in.; bessemer 0.02 sq.in. In other words, the abrasion of open-hearth is about three times that of manganese, while that of bessemer is about five times. Conditions varied greatly and the nature of rolling equipment had an influence upon the results obtained in the tests.

INFLUENCE OF DESIGN UPON WEAR

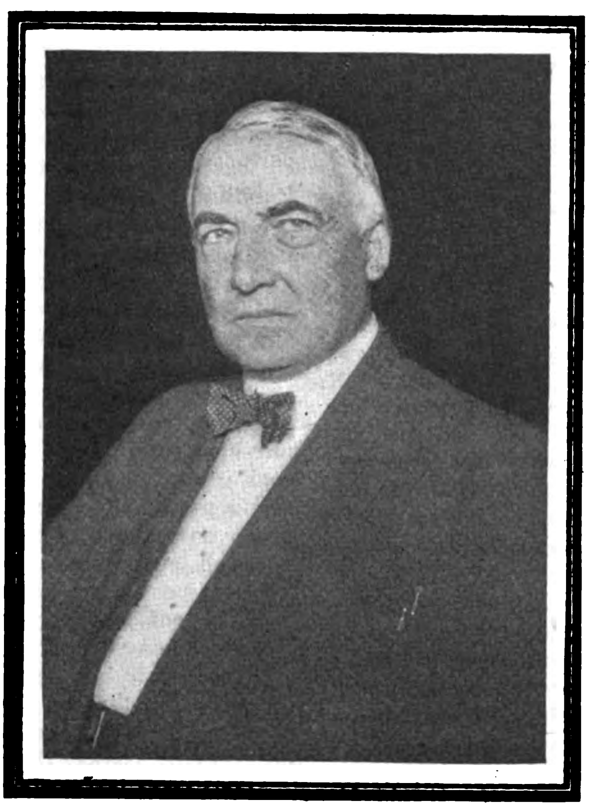
Two important details of design have had a large influence upon rail wear. These are the flat or plane head and the position of the gage line with respect to the center line of the web. Recent designs have increased the distance of the gage line from the center of the web so that the wheel load may be more nearly central over the web, thus reducing distortion of the head due to eccentric load. The plane head has been changed to a curved one with beneficial results, in that the extrusion of metal at the gage line fillet with consequent loss of metal has been eliminated and a much wider range of contact between wheel and rail has been secured, thus decreasing wear from concentration of load. The curved head design has not prevented corrugation, although it has greatly delayed the time of its first appearance. Where corrugation would appear in five days on plane head rails, it takes two or more years for it to appear on curved head rails. There are a number of other details of design and several details of manufacture which have an influence upon rail wear but space will not permit an extended discussion of them.

The Plight of the Electric Railways

No Industry Has Been Worse Penalized by the War Than the Electric Railways, in Spite of the Value of Their Services and Their Loyal Devotion — Problems of Capital and Labor Also Analyzed

By Warren G. Harding
United States Senator from Ohio

THERE were great compensations in the world war. Finding ourselves as an American people was one. Discovering the American soul was another, and I tell you, my countrymen, no matter how inestimable the cost, no matter how extensive the sacrifice, it was worth everything it cost to find the soul and spirit of the American Republic. There were rewards of service, quite varied, some inadequate and some excessive. And I have no hesitancy in saying that America has not yet extended the reward it ought to extend to the men who offered their all on the altar of American patriotism. There were also some very severe and wholly undeserved penalties on patriotic service during the war period, and which are still applied in its feverish aftermath. But I know of none worse penalized than the electric railway lines of the country. We know they served with splendid zeal and sacrificing devotion. They were as necessary to the stupendous tasks of preparation for war as powder is to the loaded shell.



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Warren G. Harding
United States Senator from Ohio

Transportation of workers was the key to intensified endeavor. We drew on their transportation energies and taxed their capacities, and criticised their insufficiencies, though no one foresaw, and none foreseeing could have prepared for, the strain which came upon them. I encountered some of the reflected anxieties of the varied branches of government concerned in war preparation. The country little noted it, but the transportation of the workmen at home was no less important than transportation of our men across the sea and on the field of conflict.

Let it be recorded that the electric railways responded with every ounce of energy and played the big part of a big factor in doing big things for the nation. The natural inference was that they shared in the award for service. They sustained the heavy burden, and not only have they had no reward, as was given so generously in many instances to big and little business, but were penalized worse than aliens suspected of aiding the enemy.

Perhaps the sentiment of the country against the street railways and the electric railway service was not intended. I rather think it was unmindfulness. Maybe there was political play, local if not federal, inspired by selfish aims. It is a curious phase of human nature that the people in the populous centers hail transportation lines as the supreme blessing, encourage their construction and celebrate their completion, and then growl about them ever after. Rarely does anybody utter appreciation, though genius and efficiency are nowhere more marked in good service, and no one seems to think of their essential character until traffic is suspended. Then watch the change in the atmospheric conditions.

It was this demand for uninterrupted service in spite of wage disputes that led the federal government to impose the supreme outrage of the war on those who struggled in the highest fidelity. Let us assume it was unintentional; we know it was brutally inconsiderate. Let us not direct our criticism at the awards of the War Labor Board. That body yielded to the flood-tide of war demands which was irresistible. The shocking thing was that the federal government, with limitless assumption of power, should command doubled expense accounts and remain deaf to all appeals for the means of meeting them absolutely. It is all right to cry out against Bolshevist seizures in contempt for all property rights, but they had justifying example in the ruin of electric railway property by the war administration in this country, which thought rightfully of the human forces employed in their operation but ignored the rights of solvent existence of the properties they operated. Statutes may have been deficient, but the power to command expenditure implied the power to permit to earn, else it ought not to have been exercised, and it is the shame of the republic that one was ordered and the other ignored.

Let us not go back to the crimes of exploitation and frenzied finance. All that has been established and properly criticised and fully condemned. Here was a five-billion dollar public service enterprise, accommodating fifteen billions of passengers a year. Its continued operation was a necessity in peace or war but vitally necessary to war production. Congress itself called for much expenditure for additional construction involving millions, notably in the congested centers of productivity in the East. The government fixed the cost of operation, fixed the price of supplies and maintenance and prescribed the service to be performed. It exercised the power to increase burdens, but had no power, or having had it, no inclination to help in meeting these burdens.

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*Abstract of address at banquet of American Electric Railway Association, Cleveland, Jan. 8, 1920.

Sixty-two companies with 6,000 miles of railway surrendered to receiverships before the conscience of municipal authority awakened to the ruin wrought in neglected federal fairness. A thousand miles more were utterly abandoned, dismantled and junked. Perhaps some were the lines of dreams, for there are such promoted for the profit of building, rather than builded for a profit in operation. Some were poor streaks over the right-of-way of hope. I know whereof I speak. In our newspaper office, in fancied expansion of the city we were always boosting, we used to project an electric highway of commerce every winter, and now and then one or two of them took to the ties in the good old summertime. Nevertheless, one-sixth of all the lines in the country are abandoned or imperiled, and what greater proportion is hanging on with more courage than faith has not been revealed.

The blight was of federal origin, while municipality or community looked on in indifference, and that is scant tribute to its most intimate public service. Let us believe it to be a public sentiment resentful of abuses or blunted by war-time prejudices. Surely it was not the conscience of square dealing in America. In effecting the restoration, we must wipe out the contributing causes and make sure from this time on that honest investment in honest public service shall receive an honest return for that public service. The capital which seeks to render a necessary public service merits a square deal and it must have it.

MUNICIPAL OWNERSHIP NOT THE SOLUTION

I doubt the solution that lies in public ownership. It is well established that public ownership merely ignores the pennies in the pocket of the people to draw the dollar from an impersonal public treasury. We are not yet ready for the Deficits Lines, Consolidated. Surely the American people will make—and is making—the coming readjustment. The government which tolerates its own ruin of business will soon come to paralysis for itself.

Old-time values are out of harmony in a new era of money's changed measurements. Stable financing, righteous earnings and just returns must be based on a proper charge for a service rendered. A reference has been made to the 3-cent standard of fare. The nickel is no longer the standard of riding value, because it passed as maximum when it ceased to be minimum, and lost its relationship when custom recut the luncheon pie.

I believe in strictest regulation without conflicting authority because all public utilities must yield to the voice of public interest. But the same power that protects the public must protect the public servant, whether that servant is capital or the workman who operates the utility.

Destroyed credits must be restored, and flexible scales of charges must be provided, so that a public may pay justly for that which it demands. The exploitation of ten or twenty years ago justifies no failure in good faith today. The public which is served has an obligation no less than that of those who serve it.

If I have read aright, full 75 per cent of the cost of operation goes to wages. The men deserve to be well paid. I think it is fair to say that most of the increased awards the public has approved. But the public ought to pay precisely as it approves, because justice is not a favor to one, it is the right of all involved. Electric railway service is first of all essential to the great body of workers and the one great agency of relieving congested centers. There may come supersession to the enterprises in which you are engaged, but transportation in some form must ever be provided.

That leads me to a digression from the line of thought I have been following. I venture to offer it here.

HOW LABOR COULD GET THE OWNERS' VIEWPOINT

I have wondered sometimes that labor leadership, possessing unquestioned capacity and very great power, has not turned to a really constructive plan of labor's very own capitalistic control of some of our most essential enterprises. It ought to be reasonably possible without turning to the public treasury and without invoking class privilege. If it did nothing more than give to our labor forces the owner's viewpoint, it would at least contribute that much toward better understanding.

Let us assume that the working forces in any particular industry believe in their control and wish for ownership. It is logically possible, by a perfectly lawful and very practical method. For example, there are approximately 300,000 electric railway employees in the United States. I will assume that they are organized and have the machinery for collective undertakings. Suppose they contributed $100 each in one year to a purchase fund. The first year they could put $30,000,000 cash into any system selected. In ten years, not counting a profit, they could invest $300,000,000 cash, and, under normal conditions, they could double the purchase through legitimate bonding, and thus own one-ninth of all the lines in the United States. A very considerable acquirement for ten years, would it not be?

But we may venture into another field of service. The desire already has been expressed to operate and profit in operating the steam railroad lines. Two millions of men are banded together in federated railway unions. Let them assess themselves $100 per annum and $200,000,000 in cash are available the first year. In ten years of continued investment the sum reaches $2,000,000,000, enough to own one-eighth of the railway transportation of the whole country. No small achievement for ten years, when capital has been three-quarters of a century developing and constructing the entire American system.

SAVING IS SAFER AND SURER THAN SEIZURE

These things are very possible. Labor has not reckoned its financial power, because it has concentrated on collective bargaining and has overlooked collective ownership. I know it will be answered that the assessment proposed is impossible; that the pay envelope will not stand the strain. Very well, cut it in half, and the figures are still colossal. However, the $100 does not equal the tithing of olden or modern times when applied to any group, and, barring illness or adversity—which have proved the possibility—it can be met with only moderate sacrifice and denial. These things, sacrifice and denial, mark the pathway of all great acquirement in this world. Thrift points the way, denial strengthens resolution, and possession is the reward.

I do not know that such a constructive plan will always be successful. I doubt if it will be accepted, but the means are available in the fullness of employment; and if always successful, I do not know that it will abolish all conflict. But it will transform the so-called laboring classes to the capitalistic class, and the very processes of attainment will add to the sturdiness of citizenship. In collective power it is as easy to own mines or railways as it is to buy "flivvers," if only capable leadership is turned to constructive endeavor. But in any event, my countrymen, let us have the gospel preached that saving is safer and surer than seizure.

INDUSTRIAL PROBLEMS DEMAND A PEACEFUL SETTLEMENT

This problem of labor's participation must have that riveted thought which will bring solution. It has the world on the anxious seat today. I do not fear a Russianized republic because this is intelligent, law-abiding America, where government is still too virile to be either cruel or craven, and if it is corrupt it ought to fail, and if craven will speedily fail.

A new order has dawned, and it is folly to ignore it. Its problems are pressing and they must be solved. If any portion of American citizens want to commune with its co-operation, let them have it under the law. If any body of men covet capitalistic possession, let them acquire it under the law. I have indicated the possibility. If there must be industrial conflict, we must find a means of settlement under the law. It is a poor civilization which finds itself menaced by disputes and contrives no way of peaceful adjustment. What avails it to seek a compact among nations to end international conflict, if we cannot make a league of citizenship to end industrial warfare at our very doors.

The swinging pendulum marks reversed conditions, and the cycles of changed relationships are ever recurring, but it matters not what influence is temporarily potent, it is as harmful to destroy capital as it is hateful to enslave labor. Both factors are necessary to the people's good fortune, and both must be safeguarded to maintain American eminence. Let me say in passing, neither of them alone ever achieved a thing, and both of them together never wrought a success without calling in the third party whom you men here tonight represent: namely, genius and management, working with labor and capital in any given pursuit.

ANTI-STRIKE LEGISLATION DESIRABLE

The Senate recently voted to prohibit the strike in the public transportation service, holding that the service of the people transcended any interest engaged therein. In the very same act, in highest consideration for every workman engaged in the service, it provided a responsible governmental tribunal to adjust all labor grievances and award full justice. The lower House has not agreed, but it ought, and every American might well urge that agreement, because it safeguards the public and guarantees the workman the fullness of his due, with a government seal on every sacred pledge, and if the government itself cannot bestow justice, there is not any human agency that will.

Let no man believe this to be an abridgement of his Constitutional liberty. No citizen will be denied the privilege of quitting his employment while freedom endures. It does not interfere with collective bargaining in the railway service but provides a tribunal of adjustment where collective negotiation fails. It is one thing to quit a public service and quite another to combine to paralyze that service at measureless cost, discomfort, and suffering to the public.

And let no other man construe this as an assault on unionism or collective bargaining in private enterprise and competitive pursuits. Unionism has proved its benefits, and unionism will abide. It is a logical and necessary agency to rend the human selfishness which dates from old enslavement days, the same selfishness which yields to necessity where it ought to bestow for justice's sake.

Labor unionism, however, has a higher goal than mere swelling of pay envelopes. Pyramided wages mean mounting cost of living, and nothing then avails from the increase of pay. The value of the medium of pay is lessened and there is bulk without abundance. The balance between the sum earned and the sum paid out to live is still the index of prosperity, and a competence is and always will be rated by the purchasing power which it possesses.

SIMPLE LIVING THE WAY TO RESTORATION

Confessedly, it is difficult to get normal when the whole social and economic system is out of plumb, due to war's anxieties and excesses. The fever and fervor of the war time have impaired our capacity for consistency. We grieve about profiteering, yet we invite it by our extravagance. We solemnly protest the high cost of living and then cheerfully boost it higher by the indulgence of high living—much the highest of the high tides of inconsiderate expenditure. We protest about taxes and then heedlessly demand new governmental functions which send the high cost of government soaring still higher. In these days, pennies are punk, nickles a nuisance, and fifty dollar bills have dropped into the contempt of familiarity, when a ten once reigned in supreme exclusiveness.

We make necessities of luxuries in the busy world, and, mark you, spend more for movies than we do for education. We expended a billion dollars last year for our amusements, and drank seven million dollars worth of pop, nut sundaes, pineapple temptations, and other lawful and sugared concoctions; yet we complain that the sugar grower doesn't raise more cane. We are exceeding the speed limit in this country in forty ways and ought to slow down to safety. It would be fine to get normal and sane without the pinch of necessity to restore dulled senses.

This is not pessimism. The heart of the American people is right, but we need to do some sober thinking. No extravagant nation ever maintained its health, strength or conscience. No extravagant nation ever endured since the world began. Extravagance of the people and extravagance of the government go hand in hand, until the burdens of taxes become a hindrance and oppression. It was simple living which made possible the miracle of American development and accomplishment, and simple living will lead to restoration out of war's ruin. There is no other way.

America has matters of vastly greater concern than its foreign relations. It little matters what we propose to covenant. The American conscience must be our guide and we shall discharge a great nation's obligations to humanity and civilization without meddling abroad or neglecting vital affairs at home. We seek no isolation, we avoid no responsibility, we dodge no duty. But with a fluxed civilization, our first concern is crystallization in conformity to American ideals and the supremacy of law, the reign of justice, and continued progress in our republic, whose greatest influence in the world comes from the worth of a real American example.

Shop, Track and Line

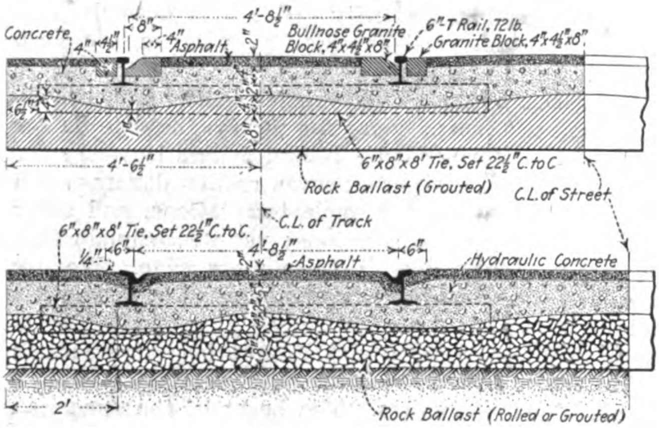
These Articles and Ideas Are From Men on the Job Who Find Special Applications and New Methods an Incentive for Greater Effort. If You Have Something Good Pass It Along

Asphalt Paving Laid Without Granite Blocks Alongside Rails

Pacific Electric Railway Is Omitting Granite Paving Blocks from Alongside Its Girder and T-Rails in Paved-Street Construction

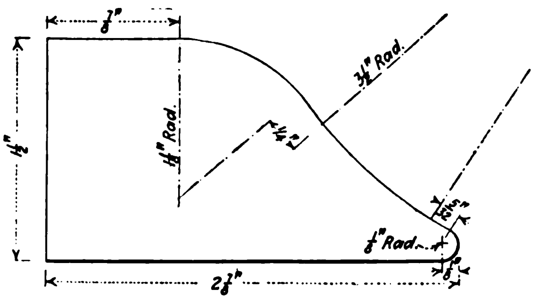
By Clifford A. Elliott
Cost Engineer Pacific Electric Railway, Los Angeles, Cal.

FOR the past seven years the Pacific Electric Railway has been omitting granite paving blocks from alongside the rails of its tracks laid with 7-in. 127-lb. grooved girder rails in paved streets. Street paving along tracks in Los Angeles is governed by ordinance requirements. The Board of Public Works, however, granted permission to omit the granite blocks on some streets where there was no heavy truck travel. In granting this permission the board required a guarantee from the company to use diligence and care in placing the asphalt wearing surface securely beneath and about the grooved sections of the rails. It also specified that the pavement be thoroughly tamped, rolled and ironed in place to guard against the working of the surface away from the rail.



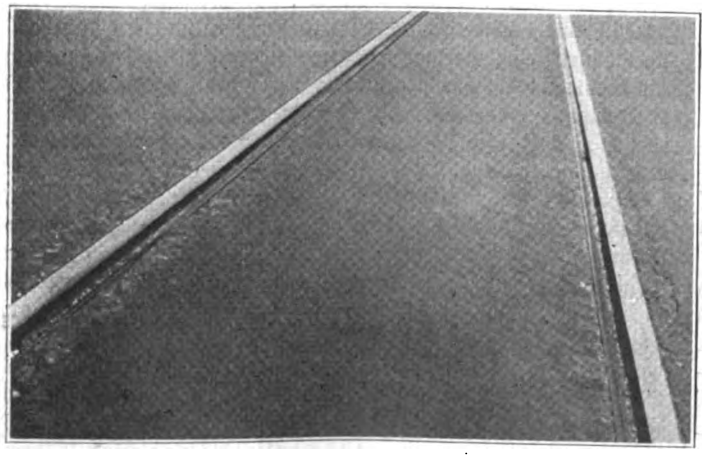
PAVING GIRDER AND T-RAIL TRACK WITH AN ASPHALT SURFACE WITHOUT PAVING BLOCKS ALONG THE EDGE OF RAILS

This type of construction has proved very satisfactory and the omission of the blocks apparently results in a better construction than that previously used. There is also a material reduction in the cost of repairing. The use of this continuous type pavement gives a rigid construction which adheres firmly to the rail, whereas pavement constructed with units of asphalt and blocks soon shows signs of disintegration and unevenness from the tendency to buckle or sag. These conditions require frequent repaving, and the cost for such maintenance easily exceeds the cost of maintaining pavement of the continuous type by at least 50 per cent. With the advent of the automobile there is less necessity for placing blocks along the edge of rails which previously were considered necessary to aid the vehicular travel across the tracks.

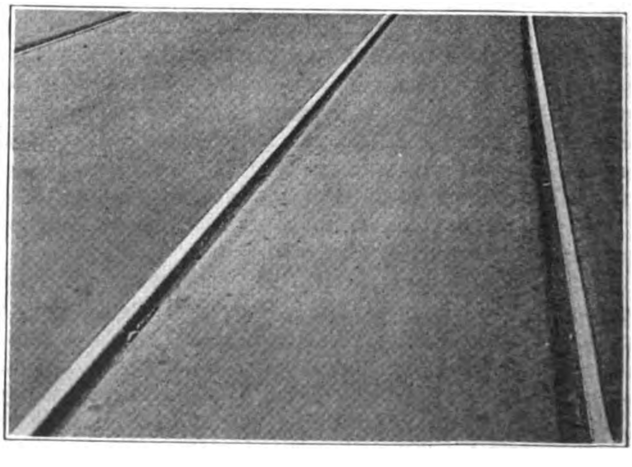


SECTION OF TEMPLATE USED TO GIVE GROOVE FOR WHEEL FLANGES

The Penisular R.R. of San José, Cal., which is one of the lines associated with the Pacific Electric system, undertook the construction of its tracks on two of the most heavily traveled thoroughfares in San José. In 1916 and 1918 6-in., 72-lb. T-rail was installed with a concrete face and Topeka wearing surface on one street, while on the other street a sheet asphalt surface was laid on the concrete. In both cases, the



SECTION OF ROADBED IN PAVED STREET WITH GIRDER RAIL



SECTION OF ROADBED IN PAVED STREET WITH T-RAIL AND BLOCKS paving blocks alongside of the rails were omitted. The construction proved entirely satisfactory and at present the surfaces are still quite even.

With this type of construction, in order to obtain a uniform groove in the pavement surface for the tread of car wheels a special template is used. A cross-section of this is shown herewith. The templates are made of the hardest timber which it is possible to obtain, and the usual length employed is 14 ft. to 16 ft. After the hot paving compound is spread in and around the rails, and crowned approximately ¼ in., the template is put in place. As the steam roller passes over this the excess asphalt is forced away, thus giving the desired groove in the pavement next to the inside edge of the rail. Due to the heavy action of the roller on the template, and the effect of heat and moisture from the hot asphalt, the unprotected template has a tendency to warp and the rounded edges wear away quickly. This trouble was overcome by grooving out the two side surfaces and screwing an angle-iron shield on them to strengthen the weak points. This construction of the template is protected by patent rights and is used by the company on a royalty basis.

Home-Made Armature-Bearing Press

Hydro-Pneumatic Press Built in the Shops of the Newport News Company Has Proved a Labor and Time Saver

By N. E. Drexler
Chief Engineer, Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

The bearing press shown in the accompanying illustration was constructed in the shops of the Newport News & Hampton Railway, Gas & Electric Company for pressing armature bearings in and out of their housings. This press is of the hydro-pneumatic type. Water was used in conjunction with air for two reasons: first, because air alone at our shop pressure of 100 lb. per square inch did not furnish sufficient pressure to start all bearings, and second, when the bearings were once started, they shot out with such speed as to endanger the workmen. When the pressure obtained by using the shop air pressure is not sufficient to start a bearing, the necessary additional pressure is obtained by use of a hand pump which is shown at *C* in the illustration. A maximum force of 15 tons on the ram can be obtained when the hand pump is used.

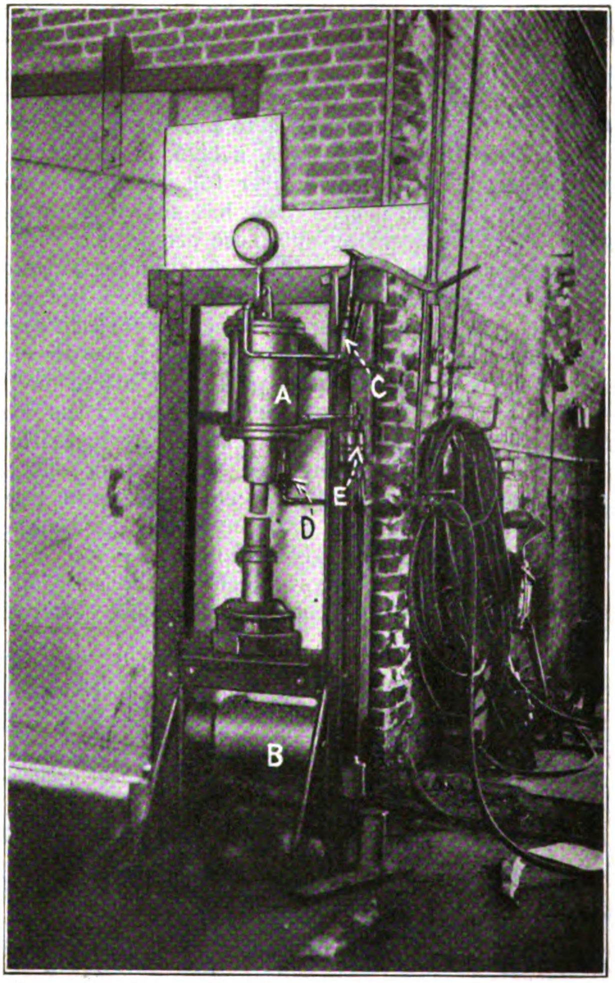
Press Consists of Five Essential Parts

There are five essential parts to the apparatus as constructed: (1) An 8-in. brake cylinder fitted with a cast-iron piston 3 in. thick, and a piston rod 2½ in. in diameter. This is shown at *A* in the illustration. (2) A water reservoir, consisting of an old 8-in. brake cylinder with pistons removed and the open end capped over, shown at *B*. (3) A motorman's valve for applying the shop air pressure, shown at *E*. (4) The hand pump mentioned above, shown at *C*. (5) A cutoff cock and release valve indicated at *D*.

The cast-iron piston is supplied with packing leathers on both sides on account of the pressure being applied at both top and bottom in the course of a complete operation. Any tank of sufficient strength to stand the pressure is suitable for the water reservoir.

To press out a bearing, air pressure is applied to the water in the reservoir by means of the motorman's valve. The air pressure drives the water through a pipe into the top of the cylinder, putting pressure on the top of the piston. If the pressure applied to the ram is not sufficient to move the bearing, the motorman's valve is set on lap position, and the hand pump is used to furnish additional pressure.

To force the piston back to its original position the motorman's valve is placed in release position, thus releasing the air pressure in the reservoir. The cutoff cock shown at *D* in the illustration is then opened, permitting air to enter the cylinder under the piston, thus pushing it up and forcing the water back into the reservoir. A release valve set at 5 lb. is placed between the cutoff cock and the cylinder to release the air pressure on the bottom of the piston when the next bearing is being pressed out. To prevent freezing during cold weather alcohol is added to the water.



HOME-MADE ARMATURE-BEARING PRESS

2,000-Kva. Spot-Welding Machine

The General Electric Company, Schenectady, N. Y., recently built and tested one of the largest spot-welding machines ever constructed. The capacity of this machine is 100,000 amp. at 20 volts and it is capable of exerting a hydraulic pressure aggregating 36 tons at the electrodes. The engineers working on the welder conducted a series of experiments using plates from ¼ in. to 3 in. thick and demonstrated that satisfactory spot welds can be produced within this range.

Solutions of Compound Curve Problems

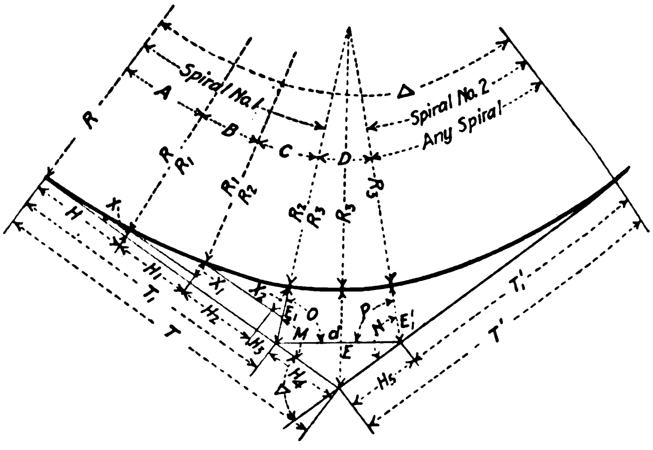
The Author Describes Some Methods Used by the Engineering Corps of the New York State Railways Taken from Their Book of Instruction

By L. R. Brown
Office and Field Engineer, New York State Railways, Rochester, N. Y.

SOME solutions of problems relating to the laying out of compound curves for track work have been given in several of the previous issues of the ELECTRIC RAILWAY JOURNAL. One of the problems most frequently met is that involving spirals made up of many radii. Of course, anyone with a knowledge of trigonometry can solve these problems, but there are often simple methods that save much time. In order to provide a systematic arrangement of these solutions, a book of instructions has been arranged by the writer for use of the engineering corps. The use of these has shown a big saving in time when working out these problems.

The first solution shown is for finding the tangents and external of any compound curve when the radii and angles are given. In appearance this method seems rather long and somewhat laborious, but in the arrangement of the various formulas particular attention has been paid to the selection and arrangement of the equations so that they may be easily solved by logarithms. This solution gives co-ordinates for staking out the curves and can be used with any combination of standard spiral when the total angle and the distances T and E of the spirals are known.

The second illustration shows the solution of the same problems, but gives a much easier and



METHOD OF FINDING TANGENTS AND EXTERNAL WITH RADII AND ANGLES OF ANY COMPOUND CURVE GIVEN

$X = R \text{ vers } A$, or $= 2R \sin^2 \frac{A}{2}$, or

$= R \tan \frac{A}{2} \sin A$

$H = R \sin A$

$X_1 = 2R_1 \sin \frac{B}{2} \sin \left(A + \frac{B}{2}\right)$

$H_1 = 2R_1 \sin \frac{B}{2} \cos \left(A + \frac{B}{2}\right)$

$X_2 = 2R_2 \sin \frac{C}{2} \sin \left(A + B + \frac{C}{2}\right)$

$H_2 = 2R_2 \sin \frac{C}{2} \cos \left(A + B + \frac{C}{2}\right)$

$E_1 = (X + X_1 + X_2) \div \cos (A + B + C)$

$H_3 = (X + X_1 + X_2) \tan (A + B + C)$

$T_1 = H + H_1 + H_2 + H_3$

Then use same solution for Spiral No. 2

$\frac{1}{2}(O + P) = 90° - \frac{1}{2} D$

$\text{Tan } \frac{1}{2}(P - O) =$

$\frac{(R_3 + F_1) - (R_3 + E'_1)}{(R_3 + E_1) + (R_3 + E'_1)} \tan \frac{1}{2}(P + O)$

$P = \frac{1}{2}(P + O) + \frac{1}{2}(P - O)$

$O = \frac{1}{2}(P + O) - \frac{1}{2}(P - O)$

$d = \frac{(R_3 + F_1) \sin D}{\sin P}$

$N = 90° +$ angle of Spiral No. 2

$M = 90° + A + B + C$

$H_4 = \frac{d \sin (V - P)}{\sin \Delta}$

$H_5 = \frac{d \sin (M - O)}{\sin \Delta}$

$R_3 + E = \sqrt{(R_3 + E_1)^2 + H_4^2 -}$

$\overline{2(R_3 + E_1) H_4 \cos M}$*

$T = T_1 + H_4$

$T' = T'_1 + H_5$

$E = (R_3 + E) - R_3$

If Spiral No. 1 is the same as Spiral No. 2

Then

$$H_4 = \frac{\sin \frac{D}{2} (R_3 + E_1)}{\cos \left(A + B + C + \frac{D}{2}\right)}$$

$$R_3 + E = \frac{\cos (A + B + C) (R_3 + E_1)}{\cos \left(A + B + C + \frac{D}{2}\right)}$$

And $H_4 = H_5$

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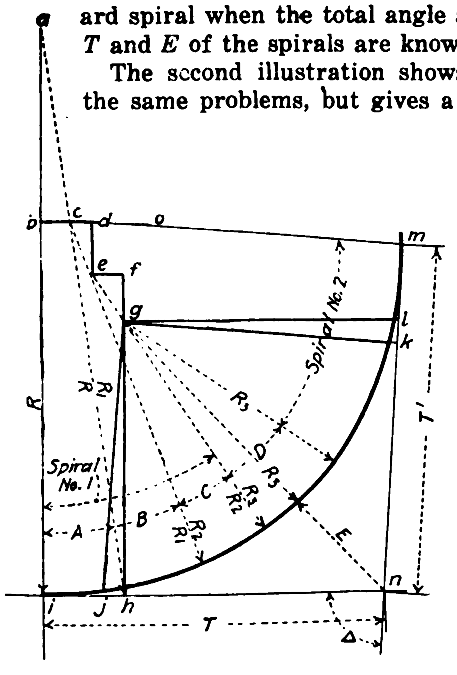
*Note that this is a continuation of the expression under the radical sign above.



Given radii and angles of any compound curve. Find tangents and external.

Draw bc, cd, ef and gl parallel to T, de, fg and gh parallel to R, gj parallel to T_1 and gk parallel to mo

$bc = (R - R_1) \sin A$, $cd = (R_1 - R_2) \sin (A + B)$, $ef = (R_2 - R_3) \sin (A + B + C)$

$ab = (R - R_1) \cos A$, $de = (R_1 - R_2) \cos (A + B)$, $fg = (R_2 - R_3) \cos (A + B + C)$

$gh = R - (ab + de + fg)$, $ih = bd + ef$

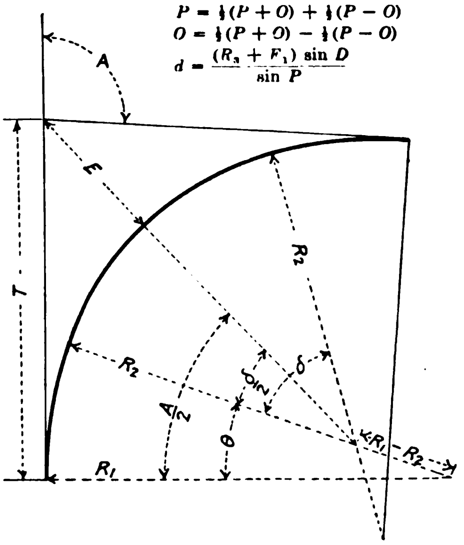
$jh = gh \tan (90° - \Delta)$

Similarily from Spiral No. 2 find gk and kl

$T = gl + ih - jh$

$T' = jg + km - kl$

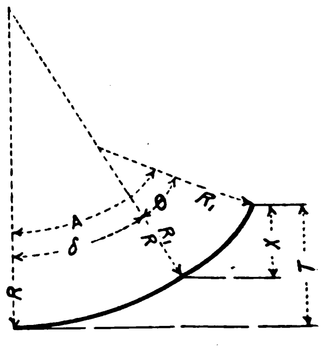
$E = \sqrt{\overline{gh}^2 + \overline{hn}^2} - R_3$



Given R_1, R_2, A, δ and θ. Find tangent and external

$$T = R_1 \tan \frac{A}{2} - \frac{\sin \frac{\delta}{2} (R_1 - R_2)}{\cos \frac{A}{2}} \qquad (1)$$

$$E = \left(\frac{T - (R_1 - R_2) \sin \theta}{\sin \frac{A}{2}}\right) - R_2 \qquad (2)$$



Given R, R_1, δ, X. Find θ

$\text{Cos } (\delta + \theta) = \cos \delta - \frac{X}{R_1}$.

$\theta = (\delta + \theta) - \delta \qquad (1)$

Given T, R, R_1 and A, find δ and θ

$A = \delta + \theta$

$$\text{Sin } \frac{\delta}{2} = \sqrt{\frac{T - 2R_1 \sin^2 \frac{A}{2}}{2R - 2R_1}}$$

$A - \delta = \theta \qquad (2)$

Given T, R, A, δ and θ, find R_1

$$R_1 = \frac{T - 2R \sin^2 \frac{\delta}{2}}{2 \sin^2 \frac{A}{2} - 2 \sin^2 \frac{\delta}{2}} \qquad (3)$$

SOLUTION OF SEVERAL COMPOUND CURVE PROBLEMS. LEFT—FIND TANGENTS AND EXTERNAL OF ANY COMPOUND CURVE WITH RADII AND ANGLES GIVEN. CENTER—GIVEN R_1 R_2 A, δ AND θ. FIND TANGENT AND EXTERNAL. RIGHT—GIVEN R, R_1, δ, X. FIND θ

quicker method of computing the tangent distances and external of a compound curve made up of several radii.

In a symmetrical compound curve of three radii the solution is much simplified. This is shown in the third illustration.

Another problem that frequently occurs is that illustrated in the fourth solution. This problem arises when the devil strip is changed at a branch-off, or when a switch and mate are changed for a pair of another radius.

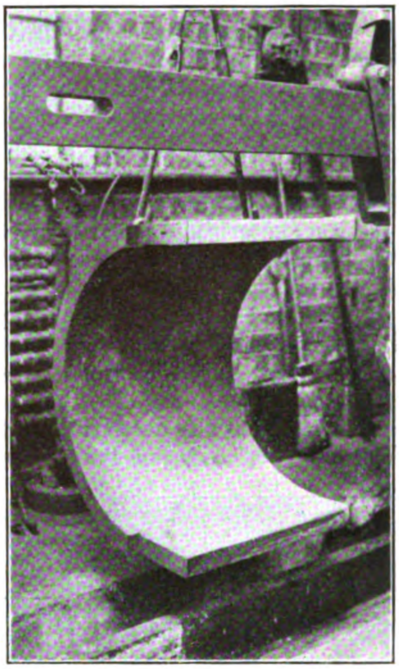
The trigonometric derivations of the various formulas shown will be gladly furnished to anyone desiring them.

Wheel Pressing Made a One-Man Operation

Development of Several Mechanical Devices in Tri-City Railway Shop Permits Work to Be Easily Accomplished by Single Operator

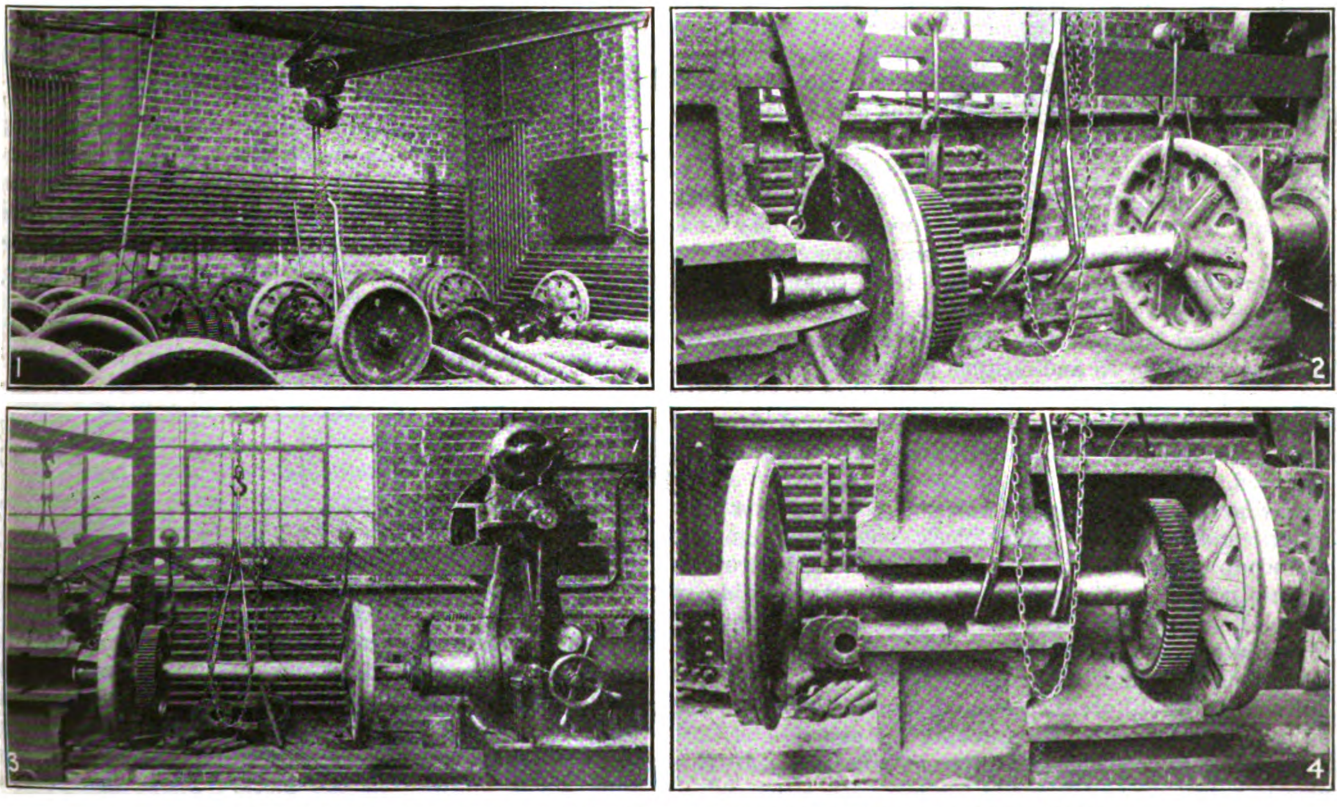
IN THE Rock Island shops of the Tri-City Railway, Davenport, Iowa, the process of pressing wheels on and off the axle has been so simplified that the entire work can be quickly and easily accomplished by one man with practically no lifting and with little skill. The secret of this is the development of several mechanical devices which virtually perform the work of the operator. One end of the inspection shop, devoted entirely to this purpose, is equipped with every form of labor-saving device which would seem advantageous to the operation. These devices were designed and built by Master Mechanic John Sutherland and his staff.

The old wheels to be pressed off are brought in on a track along one side of the room and those ready for reinstallation are placed on any adjoining track. These two tracks and the 300-ton Niles-Bement wheel press are served by a 3-ton crane. This was made by the company with the exception of a Triplex 2-ton chain block. The horizontal arm is an 8-in. I-beam 11 ft. long, and the vertical support which extends from floor to ceiling is a built-up I-beam constructed from four 3½-in. x 3-in. angles and an 8½-in. plate. The arm is trussed to the support by tie rods and the support revolves freely on a ball-and-socket foundation. A four-wheel carriage travels on the horizontal arm and suports the chain block as shown in one of the accompanying illustrations.



THE COLLAR FOR PRESSING THE WHEEL OFF OVER THE GEAR IS A LARGE SEMI-CIRCULAR CASTING

The double-arm hook which is used in picking up a pair of wheels is constructed of ½-in. x 1½-in. material. As first constructed each arm was a single bar but this was later reinforced by welding on an additional bar. This hook holds a pair of wheels steady without danger



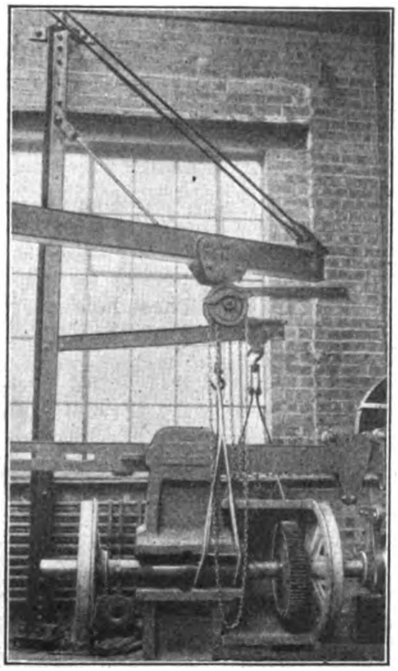
METHODS AND DEVICES FOR PRESSING WHEELS BY ONE-MAN OPERATION

No. 1—Wheels are lifted from tracks to press by 300-ton crane and special arm hook.
No. 2—The small collar block automatically adjusts itself.
No. 3—When everything is ready the big wheel press quickly does the rest.
No. 4—The large collar fits over the gear and snugly against the sliding head.

of slipping as often occurs if two separate hooks are used. The shape of the bend also greatly facilitates placing the axle in the sliding head of the press when a wheel is to be pressed off and does not necessitate the removal of the hook.

When a pair of wheels is to be pressed on the axle, the latter with the wheels is swung into position in the press. The original axle hooks have been removed from the beam and have been replaced by two rollers as shown in the illustrations. These are cut from the end of an old axle and prove more flexible in operation than the original hooks as they can be rolled out of the way when not in use. A pair of hooks with turnbuckles for vertical adjustment suspend the axle from the rollers.

A collar block is used between the sliding head and the wheel. This block is a truncated-cone-shaped shell casting with an outside diameter of 12 in. at one end and 9½ in. at the other end. The metal is 2 in. thick and the block is 10 in. long. By means of large screweyes the block is suspended from hooks and springs attached to a rolling carriage on the beam. The bolt in the lower corner of the rolling carriage passes through a square segment free to revolve. The springs are attached to a flat bar which rests on this segment. By this means the collar block automatically adjusts itself horizontally. The collar block weighs approximately 75 lb. When all adjustments have been made, which really takes less time than the explanation, the press is started up and from 40 to 50 tons will usually press a wheel into position. Some interurban wheels require as much as 75 and 80 tons pressure to seat them. When one wheel is in place the axle is raised by the chain block, swung to one side, revolved end for end, dropped back into the axle hooks and the same operation is repeated.


BOTH CRANES WORK TOGETHER AND OFF COMES THE WHEEL WITH THE GEAR UNDISTURBED

If wheels are to be pressed off the axle, the axle hook rollers and the small collar-block roller carriage are moved up on the beam and the sliding head is brought up into position. The axle is swung into the opening in the sliding head with the lifting hook still in position. It would be a simple matter to press off the wheel opposite the gear end with the same collar block described but something different is needed to press off the wheel on the gear end without disturbing the gear.

For pressing off wheels a different collar is used. This also is a casting and is made for use with either 36-in. or 33-in. wheels. The casting is 2 in. thick on the edge and 8 in. back from the edge this thickness is reduced to ¾ in. The outside diameter is 34 in. and the collar forms approximately a half cylinder. It is suggested that an improvement in design would be to increase the bearing surface against the wheel by continuing the circle on that side about 9 in. on each end tapering back to the present end at a point about half the width.

The side of the collar which bears against the sliding head is cut out to fit snugly and the sliding head is also grooved out to give a true vertical bearing. The width of the collar block is 24½ in. and 23 in. where cut out at top and bottom respectively and the collar weighs 450 lb.

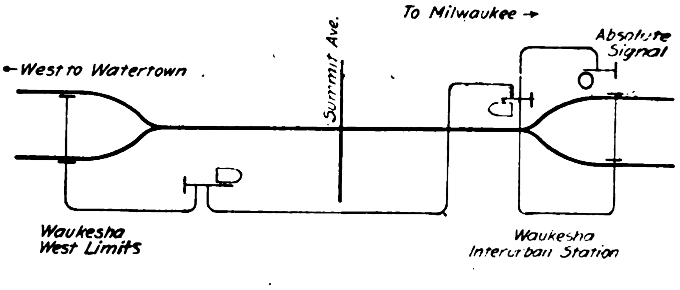
The large collar block is suspended by hooks with turn-buckles for vertical adjustment from a small crane constructed for that purpose only. The horizontal arm is a 6-in. I-beam 6 ft. long attached to a vertical support consisting of two 6-in. x 3½-in. angles bolted back to back. The arm is also trussed to the support by a tie rod. The horizontal support is free to revolve and the collar is suspended from a four-wheel carriage on the arm. When the collar is not in use it can be moved back out of the way. Careful figuring was necessary to keep the large and small cranes from interfering with each other when the wheels were being pressed off.

When the collar block is in position between the sliding head and the wheel the press is started up and from 80 to 100 tons pressure will usually unseat a wheel. With some interurban wheels as high as 300 tons pressure is necessary. This collar block, although designed to press wheels off over the gear, is used on both ends and not over 2 per cent wheel breakages result. With the devices described above pressing wheels on and off easily becomes a one-man job, the heaviest lifting which is ever necessary being the 75-lb. collar block used in pressing the wheels on.

Milwaukee Company Installs Signals

Installation Permits Through Traffic in Summer and Traffic Half-way in the Block and then Back in Winter

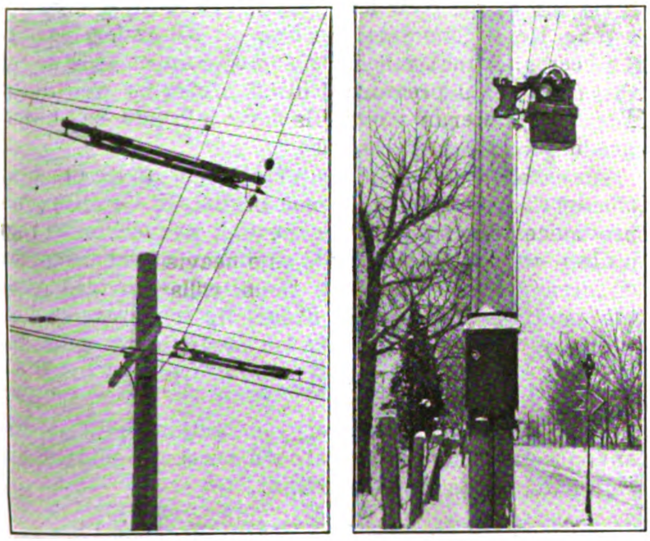
A PIECE of single track approximately one mile long extending between double track ends from Waukesha interurban station to Waukesha west limits has recently been equipped with Nachod type C D signals by the Milwaukee Electric Railway and Light Co. As a summer resort is located somewhat further west, the traffic through this block during the summer season is quite heavy. In winter, however, the traffic is much lighter and, while hourly cars continue west to Watertown, the half-hourly cars proceed only to Summit avenue, about midway in the block. They then reverse and return to Milwaukee.



RECTIFIED LAYOUT OF SIGNAL BLOCKS

An accompanying illustration shows one of the signals on this line, mounted on a pole near the switch point and facing toward the double track. The two overhead trolley contactors shown are of the directional type and are placed about two spans ahead of each signal, so that the motorman after passing the trolley contactor will be able to see the change in signal indication that the passage of his car has caused.

The signal indications are normally dark or neutral. In taking the block a car passing under the trolley contactor throws the signal at the far end to "stop". This is indicated by a red disc and a red light, and blocks opposing movement. The motorman of the passing car is advised of the result of this operation by the "permissive" signal, a white light and a white disc, which appears in front of him. A following car coming to the signal at "permissive" may pass into the block under control. When the first car leaves the block at the other end the signal will still indicate that the block is occupied and also which way the car is moving therein and will not return to the "neutral" or "clear" indication until the second car has also left the block.



SIGNAL INSTALLATION AT WAUKESHA WEST LIMITS

The signal control is both car-counting and directional. As many as fifteen cars could follow through the block if necessary, all under signal protection. The control is such that each car movement into the block causes a positive rotation of the step-by-step switch and each movement out of the block a negative rotation. The signal shows "clear" only when the same number of cars have left the block as have entered it. This permissive operation at both ends of the block is that required for the summer schedule.

In winter, when alternate cars reverse in the middle of the block, it is necessary that the signal at the Milwaukee end should not give a "permissive" but an "absolute" indication in order to prevent a following movement. This is accomplished by an auxiliary hooded-light signal at that end of the block only. It is connected to show a red light whenever the block is taken from either end. This signal is mounted on a cast iron bracket located at the contactors, so that the outbound car in setting the block does not have to pass its own red signal. The permissive signal appears ahead of it as usual. This arrangement causes one end of the block to be changed to "absolute" while the other remains "permissive" and prevents following movements through the block in the direction of Watertown. In summer this extra signal is removed.

Using Old Rail for Ties

By A. G. Drury

Cincinnati, Ohio

A COMPANY owning a bridge crossing the Ohio River found it necessary to make certain repairs of its iron work, and at the same time to renew one street railway track on the abutments at each end, that is to say, a total of about 600 ft. of track had to be replaced. The old rail was so badly worn that it was out of the question ever to consider its further use for track.

The walls of the abutments were built of large blocks of stone, and the approach was of the usual comparatively easy grade prevalent in such work. The construction of the original track on these abutments was of the standard type rail, spiked to wood ties, supported by a concrete bed to the top of the ties, a sand cushion, and then granite paving.

In connection with the repair of the iron work on the bridge it was necessary to employ an oxy-acetylene flame for cutting such strips, girders, etc., as were removed. Inasmuch as wood ties were at that time rather hard to get and fairly expensive, it was decided to cut the old rail by means of the flame, drill the necessary holes and use it for ties.

The rail was cut in 7½-ft. lengths. Through the bottom flange of the rail and on both sides of the web, two pairs of ¾-inch holes were drilled. These holes were so spaced as to be flush with the sides of the bottom flange of the new rail, when it was laid on these ties at the gage used by the street railway.

The old wood ties were removed, and the holes left by them cleaned out, the old concrete between the wood ties being left intact. The new ties made of the rail were placed in these holes and clamped to the new rail by means of blocks of flat iron ½ in. thick by 2½ in. wide by 2½ in. long, with a ¾-in. hole in the center and with a rabbet cut in one end to lap over and clamp the bottom flanges of the new rail. These clamps were held to the ties and rails by ¾-in. bolts placed with their heads under the flange of the "tie rail," the stem reaching up through the ¾-in. holes in the "tie rail" and the clamp. The nut was then screwed on from the top. After each nut was screwed down as tight as possible it was spot welded to the bolt stem, to hold it fast.

The whole track work was then concreted in the regular manner up to the proper level for the granite paving.

Upon inquiry as to the cost of the job as compared to regular construction, the bridge superintendent replied that he had gotten off considerably cheaper. All the material, including the oxy-actylene torch, was right there on the job. The flame cut the rails in a very few minutes and, disregarding the technical advantages of specially built steel ties, this was considerably cheaper.

As to the comparative cost of wood tie construction, when the superintendent balanced the cost of this procedure with the cost of new wood ties bought in small quantities, hauled to the bridge (which incidentally was not a steam railroad bridge) and the labor of moving the old rail to some place until it could be sold at scrap-iron prices, the method used was seen to have cost less.

This is a specific case where special advantages prevailed and is therefore not offered as an invariable method of cutting reconstruction costs. However, certainly many street railway companies sometimes have cases where the conditions are such that the old rail can be used to advantage in this manner.

Letter to the Editors

Seated Load versus Standing Load in Car Weight Computation

NEW YORK, N. Y., Jan. 14, 1920.

To the Editors:

I was much interested in W. S. Adams' communication published in the ELECTRIC RAILWAY JOURNAL of Jan. 10, regarding a proper basis for comparing car weights. Mr. Adams suggested that a most satisfactory method would be to compute the pounds of car weight necessary to carry 1 lb. of passenger weight with the car carrying its maximum load.

Any basis used for comparing car weights should bear some definite relation to the load carried. A method of comparing the weight per passenger with the car carrying its maximum load would be very fine if the several car builders and others interested could agree on what should constitute the proper space per standing passenger. Human beings are highly compressible, and on many occasions the number of people who crowd into a car is far beyond the limits of safety, sanitation and decency.

The chief advantage of comparing car weights by the number of passenger seats which the car contains lies in the fact that this gives a definite quantity as a basis for comparison. In car design, maximum over-all capacity is not the basic object but rather the obtaining of maximum seating capacity during the hours of normal traffic and maximum standing room plus a reasonable proportion of seating capacity during rush hours.

Without in any manner wishing to belittle the usefulness of the safety car or to discredit the value for maximum loads carried let us consider what load would be necessary in order to carry 1 lb. of passenger for each pound of car weight as stated by Mr. Adams. If we consider the average weight of a person as 140 lb. and take Mr. Adams' figure of 15,000 lb. for a safety car it would require a load of 107 passengers to provide 1 lb. of passenger for each pound of car weight. If we consider the standard double-end Birney car with seats for thirty-two passengers this load would leave seventy-five passengers standing. The space available for standing in such a car is 64½ sq. ft., this would give 0.8 sq. ft. per passenger if there are seventy-five standing, or only one-half the space that is usually considered necessary.

In reviewing several studies that have been made of other car designs to determine a value for the standing load, I find the figures of 1½ sq. ft. per passenger with an allowance of 9 in. at longitudinal seats for knee room to be the one most generally used. If we use this basis for figuring the maximum load of a Birney car, we will obtain forty-three standing passengers and thirty-two seated passengers, or a total of seventy-five passengers as the maximum load.

Apparently even this number of passengers is greater than is desirable to handle on a safety car, as at the annual meeting of the Westinghouse electric railway representatives which was held in St. Louis, Mo., in June, 1919, the consensus of opinion was that sixty passengers represent a full practical passenger load for a safety car as at present constructed. In Kansas City the number of sixty passengers has been adopted as a maximum load and when this capacity is reached a "car full" sign is displayed.

Among considerations which have led to the popularity of the safety car with the public is its ability to provide quick and safe transportation with a great degree of comfort. While it may prove a forceful talking point, especially when comparing this type of car with automobile transportation, to say that the car will carry 1 lb. of load for each pound weight of the car, still, if car weights are to be compared on a basis of the maximum number of people carried, a certain definite load should be decided on for each type of car which will prove the most efficient for operation and not lead to criticism by the traveling public. C. W. SQUIER.

Manufacturers Entertain New England Street Railway Club

MORE than five hundred men attended the meeting of the New England Street Railway Club held at the Hotel Somerset, Boston, on Thursday, Jan. 15. The occasion that called for so large an attendance was the fifth annual manufacturers' night, as well as the burial of dear old "John Barleycorn" who has been a life-long member of the club.

An excellent vaudeville entertainment under the direction of Charles Record, Galena Signal Oil Company, was provided. George Denevan, Boston, was master of ceremonies, with William Fields chairman of the committee on arrangements. Among those who provided entertainment were J. Garfield Stone, Boston Elevated Railway, and Sailor Reilly, a Boston favorite now on Keith's circuit. Other professional talent furnished songs and dances.

The next manufacturers' entertainment, it was announced, would be held aboard an ocean-going steamship outside the three-mile limit.

A Story About Pay-Leave Fare Collection

'TIS an old saying that it makes a difference whose ox is gored. An example of this proverb will be found in the following conversation which took place not long ago in a pay-leave zone-fare town between a quick-lunch restaurant man and a railway employee.

"Say," said the restaurateur, "you fellows certainly have got a nerve to make people accept a zone-number ticket and hold on to it until they give it up with the cash to the conductor on leaving the car. That scheme makes me sore, believe me!"

"Too bad, too bad," murmured the railway man, "But look what I'm up against here. When I came in a fellow at the door made me take a luncheon check marked '10' to '$2.00.' Then every time I got another item on the bill of fare, I had to hand out my ticket to be punched for the purchases. And, of course, you're not going to let me out of your place before I pay as I leave, are you? Who's got the nerve now?"

"Well I'll be d——d," chortled the food purveyor, "if there were any drinks left in this burg they'd be on me. As there ain't, just take your pick of the cabbage patch," he added, as he pointed to the cigar case. With a grin, our railroad friend made a dive for the kind marked "Now 25 cents—we would not lower the quality so we had to raise the price," and disappeared into the rush hour.

Bulletin News Page

Summary of the Principal Happenings of the Industry of Current Interest Since the Last Issue of This Paper Was Published

PRINTED JANUARY 16, 1920

Another suspension of railway service has resulted in a city seeing the railway situation from the standpoint of walking to work. One day of this effected a cure.

The International Ry., Buffalo, N. Y., with the co-operation of the Buffalo, Lockport & Rochester Ry., has established through freight service between Buffalo and Syracuse.

Thirty Birney safety cars will be installed in Racine, Wis., by the Wisconsin Gas & Electric Co. at a cost of $300,000.

Electric railways can build up their traffic by capitalizing the riding-habit developed by jitney competition, according to an editorial in the Pittsburgh (Pa.) *Gazette-Times*.

The Eastern Massachusetts Street Ry. cut off service in Salem, Mass., on Jan. 14 owing to unrestricted jitney competition. The Quincy (Mass.) City Council has revoked the licenses of 111 jitney drivers.

In an eleventh-hour effort to supply itself with cash to meet its obligations the Interborough Rapid Transit Co. plans to dispose of real estate which it owns not absolutely necessary for the conduct of the road.

The Dallas (Tex.) Ry. has installed a bonus system under which employees with good records will receive 2 cents an hour extra for every hour worked. The system will be given a ninety-day trial and, if it proves successful, will be made permanent.

The New York State Rys. must have higher fares on its Rochester lines if it is to continue to operate in Rochester, according to a statement by James F. Hamilton, president of the company. Mr. Hamilton advocates the adoption of a service-at-cost plan on the lines.

The Northampton (Mass.) Street Ry. has raised its fares.

The New York Assembly has passed a resolution calling upon the Public Service Commissioner for the First District to submit to it recommendations for the solution of the traction situation in New York City.

The Port Jervis (N. Y.) Traction Co. has applied to the Port Jervis municipal authorities for an extension of the 7-cent fare now charged on its lines.

The city of Buffalo, N. Y., has applied to the Public Service Commission for the Second District for a rehearing on the commission's order permitting the International Ry. to charge 7-cent fares.

The Lincoln (Neb.) Traction Co. has raised its fare from 6 cents to 7 cents under authority of the State Railway Commission. The 7-cent fare will continue for a period of six months pending the fixing of a permanent rate.

The Board of Estimate of New York City has begun an investigation of the city's transit situation and will undertake to devise a plan for the companies' relief.

The prospects appear to be good for carrying out the San Francisco readjustment under the plan as recently modified.

Electric railway service was restored in Hastings, N. Y., on Jan. 9, after a lapse of many months, when the Hastings Ry. began operating the line from the Yonkers city line to the south end of the Hastings bridge.

The Middlesex Omnibus Co. has been incorporated at Trenton with an authorized capital of $2,000,000 to operate buses throughout the State of New Jersey.

The San Antonio (Tex.) Public Service Co. has raised the fare from the center of San Antonio to the city limits from 5 cents to 8 cents.

The cars of the Washington Water Power Co., Spokane, Wash., were involved in 25 per cent fewer accidents in 1919 than in 1918.

A committee of citizens of Glen Cove, N. Y., has voted to allow the Glen Cove R.R. to raise its fare from 5 cents to 7 cents.

Jay E. Mason has been appointed sales manager of the ELECTRIC RAILWAY JOURNAL.

The trend of the legislation in Massachusetts at the recent special session was toward the extension of direct financial aid to the electric railways.

The Council of Detroit has approved the plan of Mayor Couzens for the construction of a municipal railway at an immediate cost of $15,000,000.

Five million dollars is the sum suggested to be expended in building an initial subway for street cars in Cincinnati.

The jitneys of Massachusetts are making a fight for legislation in their behalf.

Jan. 15 was expected to be a very important day at Toledo, for it was on that date that the original time limit expired within which the two branches of the railway commission were to present street railway franchise plans.

A bill has been sent to Congress to permit the Capital Traction Co. and the Washington Railway & Electric Co. to consolidate. The sponsors of the measure look upon consolidation as a possible means to lower fares.

A merger of the Chicago City Ry. and the Chicago Rys. now operated as the Chicago Surface Lines, is said to be in prospect for the near future. In the event that this is not carried out it is said that changes will likely be made in the operating personnel.

The railway employees in Atlanta, Ga., are agitating for an increase in their wages. In this case another labor contract would appear to be a mere scrap of paper.

The plan of reorganization of the Fort Wayne & Northern Indiana Traction Co., Fort Wayne, Ind., recently sold under foreclosure, has been modified, as noted elsewhere in this issue.

A decision is expected very shortly from the Public Service Commission of Pennsylvania in the case involving the valuation of the property of the Pittsburgh Rys.

One hundred and fifty steam omnibuses have been removed from London, England. All the buses in that city are now operated by petrol (gasoline).

The Washington Railway & Electric Co., and the Capital Traction Co., Washington, D. C., have appealed from the finding of the Public Service Commission of the District of Columbia fixing the value of their properties for rate-making purposes.

The board has reported which was appointed to arbitrate the San Francisco-Oakland Terminal Ry. wage matter. The high points of the finding are a denial by the arbitrators of an eight-hour day, refusal to make retroactive the wage increase allowed because the men violated the agreement in striking last October, and comment as to the irresponsibility of labor.

Recent Happenings in Great Britain

Plan to Co-ordinate London Traffic Taking Definite Shape—All London Buses Gasoline Driven

(From Our Regular Correspondent)

There is at last a prospect of something definite being done to improve and co-ordinate means of local transit in London. In spite of numerous official inquiries and reports in the past, nothing in the way of a comprehensive scheme has ever been set on foot. It does not appear likely that meantime at least the proposal which experts have favored—namely the constitution of a London Traffic Board—will be carried out, because this year the Ministry of Transport, a fullfledged government department, has come into existence, and it is to have a general controlling influence over transportation in London as well as in the rest of the country.

STUDY OF METROPOLITAN TRAFFIC

As I mentioned in the last instalment of these notes, the new minister recently appointed an advisory committee to consider and advise on metropolitan traffic problems. This committee has now appointed a technical sub-committee of eighteen members, consisting of experts. This body will act as three sub-committees of six members each. The first is devoted to traffic regulations in general and definition of new powers required. The second deals with the improvement of existing street facilities and the provision of new facilities. The third considers passenger traffic in its technical and co-ordinated aspect. The relations of railways, tramways and omnibuses come within its view, as do the working out of development and unification schemes. The members of the sub-committees include expert officers belonging to the various classes of undertakings, both company and municipal. Probably it will not be until after the Minister of Transport has had before him full reports from these advisory bodies that the question will be decided whether it is now desirable to set up a special Traffic Board for London.

PRELIMINARY PROPOSALS READY

The first report of this advisory committee was published on Dec. 6, along with an announcement that the Minister of Transport was about to put its proposals into force at once. These proposals can only be regarded as preliminary. They make numerous changes in the fixed stopping places for tramcars and omnibuses with the object of facilitating the flow of street traffic. Experiments are to be carried out on certain routes in the way of reducing the stopping places for cars and omnibuses to four per mile.

Meanwhile the London County Council has been pushing matters in connection with its proposals for large extensions of the tramway system. Some little time ago the Council sent a deputation to interview the Parliamentary Secretary to the Ministry of Transport, and to ask the government to set up an independent *ad hoc* body to consider a full scheme of tramway development projected by the Council and to urge the suspension of Parliamentary standing orders so as to remove the veto of London borough councils on tramway proposals and thus allow such proposals to be considered on their merits by Parliamentary committees.

A report as to the deputation proceedings was issued in the middle of November. From this it appeared that the action of the ministry in appointing an advisory committee on London traffic largely met the Council's claim for an *ad hoc* authority. The deputation, however, strongly urged the removal of the borough councils' power of veto.

Sir Rhys Williams, the Parliamentary Secretary to the ministry, in his reply said the advisory committee would have before it the County Council's project for a comprehensive metropolitan tramway system. As to the suspension of Parliamentary standing orders, the ministry would feel considerable difficulty in intervening in view of the jealousy with which Parliament looked on any attempt to interfere with its procedure. He promised to lay the whole matter before the Minister of Transport. I may mention, in case any of your readers are not aware of the fact, that the power of veto by local authorities on tramway proposals has for many years been a leading cause of stagnation in development.

ELECTRIC SUPPLY BILL BEFORE HOUSE

In the latter port of October some important matters came before the House of Commons for decision in connection with the electricity (supply) bill, which seeks to make provision for a national electric power supply. In the past all government supervision (as far as it went) of electrical undertakings has been in the hands of the Board of Trade. The present bill confers further extensive powers on the board, but at the end of the measure was a clause transferring the powers of the board under the bill and under all other acts relating to electricity supply to the Ministry of Transport. The committee of the House of Commons which considered the bill deleted the clause in question. When the bill came back to the House on Nov. 20 the government moved the reinstatement of the clause, and though there was a good deal of opposition the motion was carried without a division. It was pointed out by members of the government that the Board of Trade was unfitted for and indeed incapable of the work of developing a great national power scheme, that the Ministry of Transport was fitted and was capable, and that it was necessary to have the scheme under the department, which was to develop transport so that the whole business would be co-ordinated and worked together.

In the end of November it was announced that the Ministry of Transport had appointed another expert committee. This one is to consider and report to the minister on the taxation of and regulations affecting road vehicles. This matter is of importance in the light of the competition of omnibuses with tramways.

STEAM OMNIBUS GONE

A good deal of interest to the owners of tramways centers in the question whether all road vehicles should be permanently obliged to carry rear lights. During the war and the time of darkened streets there was a temporary regulation of the sort, but some months ago as street lighting improved the requirement was withdrawn. At the time of the recent railway strike, when streets and highways were overloaded with traffic, the regulation was again imposed. There has been much opposition to the regulation, particularly on the part of cyclists, so the Ministry of Transport has appointed a committee to consider and report on all questions relating to lights to be carried on vehicles and as to lighting-up time.

The steam omnibus has disappeared from the streets of London after a long and gallant struggle. Working expenses have gone up, so that the company owning the vehicles, some 150 in number, was working at a serious loss. The directors accordingly decided to remove the buses to some other part of England where prospects seem more favorable. Probably that means lower expenses and higher fares than are associated with London street traffic. All London omnibuses are now of the petrol (gasoline) type, though some of them have an electric drive.

Arthur Neal, member of Parliament for the Hillsborough division of Sheffield, has been appointed Parliamentary Secretary to the Ministry of Transport in succession to Sir Rhys Williams, resigned. Mr. Neal has been in Parliament for only a year, but he has shown great ability. He took a prominent and useful part in the discussion of the transport and electricity bills, in the administration of which he will now have a part.

Some new appointments have recently been made to the London railways. J. P. Thomas has become assistant operating manager of the railways and the omnibuses; Captain A. Rozier has been appointed general superintendent of the omnibus company; J. Thornton has been appointed superintendent of the line for the railways. These gentlemen have hitherto held other positions in connection with the undertakings. It is estimated that the addition to the working expenses of the underground group caused by the adoption of an eight-hour day will amount to £700,000 per annum.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Subway Suggested

Plans Discussed to Relieve Downtown Congestion in Cincinnati—$5,000,000 Expenditure Proposed

An open meeting was held on Jan. 3 at the City Club of Cincinnati, Ohio, to discuss the projected plan of a street car subway under Fourth and Sixth Streets to relieve the downtown traffic congestion which has reached such a stage that some form of permanent relief must be worked out. S. Gale Lowrie, recently elected president of the club, presided. The speakers at the meeting were Reamy E. Field, originator of the subway plan; former Judge William A. Geoghegan, of the Rapid Transit Commission, and Walter A. Draper, vice-president of the Cincinnati Traction Company.

SUBWAY PLAN PRESENTED

Mr. Field presented his views of the building of a subway, based in part on information obtained in a conference with George G. Blackmore, Cincinnati engineer, who formerly was with the New York municipal engineering department, in which capacity he superintended the construction of a long section of the New York subway system. Mr. Field stated the main points of the plan as follows:

> The subway plan from Broadway to Central Avenue is an auxillary to the rapid transit loop, and is not designed to take away any convenience of the general public, but to add to them. It is not to be a rapid transit plan, in the sense rapid transit is ordinarily used, because it contemplates simply the taking of the street cars from the surface and placing them underground, leaving the streets entirely free for other traffic.
>
> The primary object is to help all people. It is entirely possible that the loop can be built for $5,000,000. The enhancement of the value of the property in the district covered by the loop would be sufficient to pay the interest at 5 per cent and provide a 2 per cent sinking fund on this. It would make a permanent business area and would permit the present area to be enlarged. The present tax value of $40,000,000 in four blocks would be increased tremendously by this plan.
>
> The traction company would use its present equipment, as it is being done in Boston and New York. Freight could be handled for the bigger stores after midnight in this subway, when traffic is slack. There would be ample room for two tracks and possibly four.
>
> The plan is feasible, practical, is not excessive in cost, would permit large improvements and certainly should be considered as plans for large corporations are considered. The automobile drivers, the pedestrians and the street car riders say that something must be done, and it has come to a point where everything should be boiled down to a concrete form and a definite start given to some kind of subway. The people are demanding it and it should devolve upon all clubs of the city to get behind it and give it a start.

Judge Geoghegan said that he personally thought the plan an excellent one, but that the Rapid Transit Commission had no authority to handle it, unless authority would be granted by the Legislature.

Mr. Draper proceeded to point out that according to the records of the traction company the congestion is continually growing worse, is adding to the cost of rides under the service-at-cost franchise held by the company, and is interfering to such an extent with running schedules on a few lines that the running schedules must repeatedly be lengthened. This will add to the operating costs. Elimination of the congestion will mean a clear saving of $350,000 a year to railway patrons, by making it possible to limit the number of cars now used. As temporary measures to help the conditions, Mr. Draper suggested the elimination of parking, keeping everything moving, and the use of skip stops.

Mr. Draper could not commit himself to a subway plan, since he had not had time to study the particular plan offered by Mr. Field, but he urged that the plan be given careful study to determine its possibilities. In addition, Mr. Draper expressed the willingness of the traction company to confer or advise in the making of any plan or criticise any completed plan that may be offered.

The developments of the meeting will be taken up by the board of governors of the club. It is expected that a special committee will be appointed to develop the ideas proposed by the various speakers.

A Disguised Jitney Bill

A bill authorizing towns and cities of the State of Massachusetts to operate street railways or motor vehicles for the transportation of passengers or freight has been filed in the House of Representatives. The terms of this bill provide that two or more adjacent cities or towns may combine for such a purpose, a transportation manager shall be elected jointly and extensions of the service shall reach to other municipalities if so desired.

The pith of this bill is a proposal to resume jitney service in areas where such service is now prohibited by local ordinances. The sponsor for the bill represents a district where the jitneys were recently disbarred, only after a stubborn contest. That efforts to continue service are under way is apparent from the introduction of such a measure. Whether it will receive approval is another question. It seems hardly probable that the reversal of the policy of permissible jitney competition will result.

Mr. Doherty Fights Delay

Makes Determined Stand for Presentation of Franchise Plan Within Court's Time Limit

The time limit set by the court for the presentation of the plans for the settlement ordinances for the Toledo Railways & Light Company was Jan. 15. For some time now evidence has been accumulating that neither the municipal ownership section of the commission nor the service-at-cost section will be ready to present tentative plans within the original time limit. Accordingly there has been considerable talk of an extension of time. The traction election was set for Feb. 17. Now it is advocated that the vote on the franchise proposals be put off until April 27, the date of the Presidential primaries.

MR. DOHERTY TIRED OF IT ALL

Mr. Doherty, operating the Toledo property, has reacted unfavorably to this. He is tired. Up to Jan. 8 he had not been convinced that an extension of time was necessary to complete the drafting of the settlement plans. He is reported to have said that he was forty-three years old when the negotiations were begun and that he was now forty-nine years old. He said he might reverse the figures and be ninety-four years old before an agreement was reached if the negotiators kept on extending the time. Mr. Doherty refused to say what course of action he would follow on Jan. 15, but he agreed to attend a meeting on that day with Federal Judge Killits, Mayor Schreiber, Law Director Martin, a subcommittee of the Council committee on railroads and telegraphs and members of the both branches of the franchise settlement commission.

M. O. BILL'S PROGRESS SLOW

The muncipal ownership section of the commission seems to be up against a stone wall. It is dependent apparently upon passage by the Legislature of the Broch bill, to confer upon cities the authority to issue general credit bonds to acquire transportation systems. If the Broch bill is not passed by the Legislature, the municipal ownership branch of the commission will try to put through an amendment to the rapid transit law to permit issuing municipal bonds for acquiring the system.

Aside from the work of phrasing parts of the ordinance, the service-at-cost section of the commission has worked through the main phases of the draft except the points of agreeing with Mr. Doherty on the valuation and rate of return and the question of maximum fare.

Relief for Massachusetts Companies

The Special Legislative Session Recently Concluded Enacted Several Measures Aiding Electric Railways

The special session of the Legislature of Massachusetts of 1919 was notable for the adoption of policies for the control and regulation of the electric railways and the passage of acts giving direct financial assistance to such companies. In another way, the session stands out in striking contrast. That is, with reference to the policy recommended by the special commission of recognition of the tri-partnership of control, operation and service. Expressed in another way it means recognition of the division of control, the division of labor and the public service.

MUCH VALUABLE LEGISLATION

In spite of the fact that certain bills of importance failed to pass the special session, it is doubtful if any other legislative body has succeeded in enacting measures of greater benefit to the railways or has devoted quite the intensive study to means for solving the problems confronted by the railway managers. All told, sixteen recommendations or bills were presented. Of these seven related to the Boston Elevated Railway, four to the Eastern Massachusetts Street Railway and five to all other railways. Of these, there were passed an act providing for the purchase of the Cambridge subway by the Commonwealth of Massachusetts; an act to provide for annual instead of quarterly changes in rate of fare by the Boston Elevated Railway; an act to provide for annual instead of semi-annual payments of deficits in cost of operation of the Boston Elevated Railway; an act authorizing cities and towns served by the Eastern Massachusetts Street Railway to contribute to the cost of service; an act to relieve street railways of the payment of certain taxes and assessments and other obligations; and an act to provide for the further regulation of so-called jitneys and motor-buses.

Briefly, the trend of legislative action was in the direction of direct financial relief, while bills for the fulfillment of labor obligations were lost.

ANTI-STRIKE EFFORT AGAIN

The anti-strike bill occupied the attention of the public in no small degree. Similar to the Cummins bill in certain respects, it emphasized the importance of establishing a plan for the maintenance of continuity of service by contract agreement and, moreover, brought to the attention of all the necessity of unity in action for labor as well as directorship in order that communities may be well served by the electric railways. The foothold gained in the public mind, that economic operation depends on co-operation and the fulfillment of labor obligations, will, it is believed, result in the enactment of some form of measure or contract agreement providing for the co-ordination vital under the present conditions of industrial unrest.

The passage of the relief measures provides an example of the willingness of the public to meet its obligations. One of the most important of these measures sanctions the purchase of the Cambridge subway by the State. The price to be paid for this structure is the actual cost to the Boston Elevated Railway under whose direction the tunnel was built. This cost is about $8,000,000, and with this amount obtained through sale, the Boston Elevated Railway will be able to develop its present system and meet emergency requirements.

It is of interest to state here that all tunnels and subways in the city of Boston are owned by the city with the single exception of the Cambridge subway, now the property of the Commonwealth. The lease of the latter to the Boston Elevated Railway at a rental of 4½ per cent will bring the total rental cost for subways up to about $1,875,000.

BILLS AFFECT BOSTON ELEVATED

Two other acts affecting the Boston Elevated Railway relate to the adjustment of fare schedules and the disbursements by the Commonwealth of deficits incurred in operation. The former act stabilizes the rate of fare by providing for tariff revisions yearly instead of quarterly. The latter act provides for the payment of deficits in annual installments instead of semi-annual and places these disbursements for the elevated railway on a procedure of handling similar to that for other State accounts.

Of extreme importance to the railways is the act providing for the increase of assessments for aid in meeting cost of operation from $1 per $1,000 of valuation to $2. The present deficit of the railways can only be met by such a measure. For the year 1918, this deficit for all companies amounted to $2,512,105 and the excise tax added approximately $280,000, bringing the total up to a considerable figure. The increase in assessment rate will provide an additional $2,322,384 revenue, a welcome relief from a hitherto perplexing problem.

Similar in its application as a relief measure is another act releasing the railways from the commutation tax and other obligations which have proved too heavy a burden in the past.

The passage of the jitney bill results in invaluable aid in the operation of electric transportation. This bill is in reality an indirect means of benefit. The bill requires the operators of jitneys or motor-buses to conform to the regulations of the governing boards of the municipalities, and thus puts the decision up to the community whether jitney or the electric railway shall prevail. In the light of the events of the last few months it is doubtful if any local authorities, now provided with the power, will deem it expedient to grant licenses or invite competition which will prove disastrous to the electric railways.

A survey of the legislative work accomplished cannot fail to evoke commendation for the special session of 1919. True, the measure to establish the obligation of labor failed of passage, but the issue of responsibility will undoubtedly be raised again.

Franchise Modified

Small Company in Vermont Secures Relief From Conditions Which Had Become Unduly Burdensome

Electric railway service has been restored in St. Albans, Vt., by the St. Albans & Swanton Traction Company. This was noted briefly in the ELECTRIC RAILWAY JOURNAL for Jan. 3. The circumstances of the suspension, which lasted a day, deserve more attention than it was possible to give to them in the previous item.

The company at St. Albans operates 13 miles of track. Its existence was never any too rosy, but with the coming of the war, attended by the general increase in prices, the conditions under which the railway was required to render service by its franchise from the city became so onerous that the company had to appeal to the city for relief. The tendency of municipalities to procrastinate asserted itself, with the company fast slipping toward ruin. Then came the shut down. This convinced the city that the case was a serious one and it promptly lessened the burdens of the company by modifying the terms of the franchise with respect to the service and paving requirements.

The original grant called for service every hour from 6:30 a.m. to 6:30 p.m. This was changed to service every hour and one-half. The original paving requirement was that the company pave and maintain the street between its tracks and 2 ft. on either side of them. Under the revision of this provision the company is relieved of its paving obligation until such time as the net earnings of the company equal or exceed 5 per cent of the value of the property arrived at by the Public Service Commission of the State except when the company itself digs up the street to repair its tracks, when a bond must be given to the city to cover the expense to the city. The section of the ordinance as modified covering this matter is as follows:

> That the said St. Albans & Swanton Traction Company shall not hereafter be compelled to do any street work in the city of St. Albans, nor pay for any street work in the city, except in case the St. Albans & Swanton Traction Company digs up a street to repair its tracks, in which case said St. Albans & Swanton Traction Company is to give a bond to pay back to the city of St. Albans, what the city expends in replacing the part of the street which it dug up, in as good condition as it was previous to digging it up; with this further provision, however, that when it shall be shown that the net earnings of the company equal or exceed 5 per cent of the value of the property, as arrived at by the Public Service Commission, the St. Albans & Swanton Traction Company shall bear that portion of the expense of the street work in said city of St. Albans as is provided for in Sec. 5 of the original franchise.

Enabling Legislation Needed

New York Commission in Annual Report, Makes Plea for Fair Play for Public Utilities

The need for enabling legislation which will endow the Public Service Commission for the First District of New York with powers sufficient to act effectively in the traction emergency in New York City is emphasized in the thirteenth annual report of the commission to the Legislature for the year ended Dec. 31, 1919.

The report reviews the reconstitution of the commission under chapters 520 and 263 of the laws of 1919, which substituted one commissioner, at a salary of $15,000 a year, for the five commissioners whose appointment was authorized by the original public service commission law. The commissioner is authorized to appoint three deputy commissioners at salaries of $7,500 a year each. The new laws divided the work of the commission and provided for the appointment by the Governor of a transit construction commissioner who was empowered to take over the rapid transit construction work of the old commission.

WANTS CONTROL OF FARES

On May 26, 1919, the Governor appointed John H. Delaney, then Commissioner of Plant and Structures of the City of New York, as transit construction commissioner. Since that time the regulatory and rapid transit work has proceeded under two separate and distinct organizations.

The report says:

> For years the street-car fare in New York City has been constant at 5 cents. The people have been educated to a flat fare, irrespective of distance. Since 1914, cost of operating has considerably advanced. The companies pay more—in many instances 100 per cent more—for materials, labor and all other elements. A subway motor car, which cost $12,500 five years ago, costs $25,000. A double-truck trolley car, which could then be bought for $6,000, costs $14,000. The ordinary laborer, who formerly received 20 cents an hour, is now getting upwards of 40 cents, and skilled labor receives a corresponding increase.
>
> There is no question that street railroads of the city need relief. It should come from such rates as would meet cost of service, provided the companies make corresponding concessions to the public. Measure of relief can be determined only by detailed investigation of each case.
>
> An advance in fare should be avoided if adequate service at present rates could be secured. A permanent increased rate should not be established, but a flexible rate adjusted automatically to cost of service, with such safeguards as will secure savings and reductions in cost as opportunity offers.

The commission has been unable to provide for adequate relief, and adds that the inevitable has happened in appointment of receivers for some lines and cessation of service on several smaller lines. Disintegration of large railway systems has begun, as a result of inability to obtain relief. On this point the commission says:

> If disintegration goes on to the end, New York City, in place of having these two large systems, will find itself indifferently served by dozens of smaller companies, each independent and operating within its restricted area for a 5-cent fare. This will increase cost of transportation to citizens, many of whom will be compelled to pay two and three fares.

With respect to the bus services established by the city to replace some of the railway lines that have suspended, the commission says that such services have been established without the consent of the commission. The commission is now inquiring into the legality of this move. Of the buses the commission says:

> In general there may be certain routes where bus lines would be of advantage, but the great problem is to lessen congestion rather than increase it. To establish bus lines as a matter of penalizing existing companies, simply penalizes the people.

The report says that if public service commissions are to continue they must at least have power to take steps to avoid the destruction of utilities regulated by them. On this point the commission says:

> Fuller and more definite powers should either be given the commission or regulatory powers be exercised by the municipality. At present, credit conditions, enabling legislation and long-term leases all forbid early adoption of municipal ownership and operation.
>
> Needs of the present and changes needed in future could best be secured if all transportation facilities could be placed under one management. While this may be difficult at present, it should be the solution to be sought.
>
> This commission has not wished to see fares increased in the interest of watered securities or excessive valuations. It does believe honest investments should be secured and such fares paid as will provide interest on investments—brought into full light of publicity—and cost of operation and full maintenance. Such cost-of-service fare should also pay interest on city bonds issued for rapid transit construction, so that such bonds may be freed from the debt limit.

Amended Terminal Ordinance Defeated

An amended ordinance giving the Cleveland (Ohio) Union Terminals Co. the right to proceed with the construction of its proposed depot facing the Public Square, without the participation of the Pennsylvania R.R., was defeated in City Council on Dec. 29. As the question was brought up as an emergency measure a two-thirds vote was requred. This ordinance was to take the place of one which expires on Jan. 6.

Only recently the Pennsylvania R.R. informed the company that it would not agree to use the new station, while all the other roads entering the city had approved the plan.

Mayor Harry L. Davis has called another meeting of the Council when it is believed the vote will be reconsidered. It is said that two of the members who voted against the measure have changed their minds and one of them will move a reconsideration. The newspapers are supporting the plan for a station facing the square and other influences are working, although several organizations of one kind or another are opposed to it. O. P. Van Sweringen, head of the Cleveland Union Terminals Co., has announced that the plan will be dropped unless an ordinance is passed at once.

The proposed depot is of interest to the interurban roads entering the city, as plans had been made to bring most of them in on private rights-of-way and they would also use the station. The interurban lines would use one level, while the steam roads would occupy another.

New System Approved

Council of Detroit Approves Mayor's Scheme—New Ford Cars May Be Used

The City Council of Detroit, Mich., meeting as a committee of the whole, has agreed unanimously to approve the $15,000,000 municipal railway plan presented by Mayor James Couzens. Final action will be taken immediately on the ordinance introduced by Councilman Castator, which provides for an election on April 5 on a bond issue to finance the program.

100 MILES OF NEW LINE PLANNED

The plan as outlined by the Mayor in a letter to the Council, includes building 100.75 miles of new track, purchasing 55.5 miles of existing track and obtaining cars and equipment to operate on the city lines, thus providing for an independent system. Immediate construction is aimed, of a unified independent system, self-sustaining and laid out on permanent lines, yet capable of being linked up with remaining privately-owned lines in part or in whole, if conditions warrant such an undertaking.

The Mayor's so-called formula for smoothing out the long standing snarls in Detroit's traffic system and affording the citizens their desired freedom from congestion at the heart of the city, is based upon the idea of raising the center of traffic from the unnatural position near the southern boundary of the city to the Grand Boulevard, and affording the long-suffering industrial population an opportunity to travel on frequent north, south, east and west crosstown lines rather than the antiquated "around the City Hall service." In order to move the hub of Detroit's traffic wheel, five big east and west crosstown lines will be provided.

The proposed lines have been grouped into three classes, A, B and C. If a favorable vote is cast by the people, the Mayor promises to have work started on class A the day after election. The lines included in this class should be completed within one year. The class A system provides for taking over 34.25 miles of lines built under the so-called day-to-day agreement in which the city has the right to purchase the lines at cost to the railway, less depreciation. This is estimated at about $40,000 per mile.

$7,000,000 FOR TRACK

In addition the Mayor would take over 21.25 miles on Woodward Avenue and that comprising the Fort Wayne & Belle Isle Ry., on which franchises have expired. Estimating the cost of these lines at $40,000 per mile aggregates a total of $2,220,000 for lines already built, while the 100.75 miles of proposed new track estimated at $70,000 per mile amounts to $7,052,500.

The remainder of the $15,000,000 estimate is divided between cars, trailers and carhouses, providing for 400 motor cars, 150 trailers, and carhouses and miscellaneous equipment at an estimated cost of $1,000,000.

The Mayor states that after investigating Henry Ford's street-car plans, he is hopeful of using the Ford gasoline-driven street cars on the city lines, making it unnecessary to install electrical equipment.

It is held that the city would not have to build the lines in their order named in the ordinance as classes A, B and C, in rotation. In case it is found advisable to change the program and build some class C lines before class A and B lines are completed, it can be done according to the opinions of the Corporation Counsel.

The several proposed crosstown lines will, it is believed, greatly relieve the congested downtown district and obviate the necessity for subway dips for some years to come, in as much as the crosstown lines will make it unnecessary for so many people to go down to the center of the city to get to either the east or west side.

Under the city charter the money to retire the proposed bonds and pay the interest will have to come out the fares, as will all other expenses incidental to the operation of the system, since the charter expressly forbids the placing on the tax roll of any expense for the operation of a transportation system.

The bond issue will bear interest at the rate of 4½ per cent. The plan calls for a sinking fund to retire the bonds at the rate of $500,000 annually, making the issue a thirty-year serial one.

The plan will have to receive a majority vote of three-fifths in its favor to be adopted.

Atlanta Men Ask Increase

The 1920 contract of the union carmen of the Atlanta system has been presented to the Georgia Railway & Power Co. While officials of the company will give out no information relative to the details of the contract, it has been learned that the men demand a 50 per cent increase in pay and a "closed shop."

An official of the company interviewed by the correspondent for the ELECTRIC RAILWAY JOURNAL would neither confirm nor deny the truth of the carmen's reported demands. One of the local daily papers published a statement, supposed to have emanated from an official source, to the effect that the company would refuse to grant a 50 per cent increase in pay and would not create the "closed shop."

When asked to make a statement with reference to the alleged failure of the men to keep the 1919 contract fully, officials of the company also declined to comment on this matter. The company is reported to have declared that the members of the union had failed to aid the company in its endeavors to promote public safety, and as a result damage claims against the company have increased during the past year.

Under the present contract the men are receiving 40 cents an hour. They are asking, it is said, 60 cents under the terms of the 1920 contract. The demands for higher pay are based on the increased cost of living.

Recommends Terminal Electrification at Atlanta

B. B. Turner, superintendent of electrical affairs of Atlanta, Ga., in his annual report for 1919, recommends to the City Council that when the railroads are returned by the government to the original owners steps be taken to force the railroads to use electricity in the operation of all their trains within the city limits. The report states:

> This can be brought about by the railroads themselves forming a terminal railroad to operate all trains within the city limits, the nine railroads that are here in the city owning the stock of the new terminal railway. While the first cost will be considerable, it will prove a splendid investment by reason of the low operating cost. Some of the railroads that have been changed over to electrical drive show a saving of more than 35 per cent in cost of operation.

News Notes

Calls Conference on Denver Wages.—The State Industrial Commission has taken jurisdiction over the controversy between Denver Tramway and its employees and ordered both company and union representatives to appear before it for a hearing on Jan. 12. This step is said to have been taken in an effort to avoid the threatened strike of the men over the question of wages. The holding of the hearing on Jan. 12 was dependent of course on the matter of the ability of the two parties to conclude an agreement before that date.

Damages Asked for Electrolysis.—The Greensboro Gas Co., Charleroi, Pa., has instituted proceedings against the Pittsburgh Rys. before the Public Service Commission of Pennsylvania, charging that for two years its gas mains have been damaged by electric current which reached the mains from the rails of the railway. The complaint asserts that the railway has not taken the proper steps to prevent such damage. An order from the commission forcing the railway to make the proper provisions is asked.

Increase at Lexington Accepted.—The trainmen in the employ of the Kentucky Traction & Terminal Co., Lexington, Ky, on Jan. 2, accepted an increase of 4 cents an hour in their pay, under the terms of the contract with the company signed some time ago. The union took up with the company about six weeks ago the matter of an increase to meet the advance in the cost of living and after full consideration on both sides the company agreed to increase pay of the men 4 cents an hour. The increase is retroactive to Dec. 25.

Effort to Avert Strike.—In an effort to conciliate differences between the management of the Columbia Railway, Gas & Electric Co., Columbia, S. C., and its motormen and conductors, the City Federation of Trade has appointed a committee to approach Governor Cooper and Mayor R. J. Blalock, of Columbia, and ask them to arbitrate a new contract with Edwin Robertson, president of the corporation. The motormen and conductors, their spokesmen declare, have asked Mr. Robertson to agree to an approximate increase of 15 cents an hour in the rate of pay and improvement in certain working conditions. They state that so far they have failed to get a satisfactory agreement.

New York Commission Protests Cummings Bill.—The Public Service Commission for the First District of New York has made strong representations to the conference committee of Congress against certain provisions of the Cummings bill for the restoration of the railroads to private ownership. These provisions seriously affect the rights of state commissions in the exercise of their regulatory powers over railroads. They provide for an appeal to the Interstate Commerce Commission from the decisions of state commissions directing the making of improvements which demand an expenditure of funds. Such provisions, if enacted into law, the commission feels would greatly delay the making of needed local improvements.

Indianapolis Asks Fair Play.—The Indianapolis (Ind.) Street Ry. has addressed an open letter to the people of that city, asking the pertinent question "What does the future hold for Indianapolis?" The company cites the fact that Indianapolis is destined to become a city of at least 500,000 people. It notes the many manufacturing establishments and the growing bank clearances and asks the people of the city if the railway will be assured fair and equitable treatment in its effort to give the public adequate local transportation service. The appeal is unusually well written. It occupied a full page space in a recent edition of the Indianapolis *News*. The appeal is written in the spirit of an honest corporation striving to give the best service possible to a rapidly growing population.

St. Catharines Would Take Over Its Railways.—In a meeting during which the whole question of the proposed extension of franchise of the Niagara-St. Catharines & Toronto Ry., St. Catharines, Ont., was again debated, the City Council on Jan. 9, one week after the visit of Sir Adam Beck, effectually disposed of the whole railway problem. The Council finally voted that the Hydro-Electric Power Commission and the Minister of Railways & Canals be requested to continue and complete without delay the negotiations for the acquisition of the railway by the hydro-radial systems, as requested by Sir Adam Beck. The Council also passed a by-law for the issuance of debentures to the amount of $668,539, which is the proportion of cost allotted to the city of St. Catharines in the hydro-radial scheme.

Financial and Corporate

Fort Wayne Plan Modified

Committees Representing the Security Holders Agree Upon Changes in Reorganization Plan

At meetings of the committee appointed under the Fort Wayne & Wabash Valley Traction Co. bondholders' protective agreement dated Sept. 12, 1917, and the committee appointed under the Fort Wayne & Northern Indiana Traction Co. bondholders' protective agreement dated Oct. 31, 1917, arrangements were made for the carrying out of the plan and agreement of re-organization declared operative by the committee headed by P. M. Chandler under date of Sept. 2, 1919, subject to the following revisions:

1. A settlement has been made with the protective committee of the Lafayette & Logansport Traction Co. bonds whereby the holders of $849,000 of these bonds will be entitled to receive the following allotment, when, if and as issued, of the securities of the new company, namely: 40 per cent in first mortgage bonds, 40 per cent in adjustment bonds and 20 per cent in preferred stock, this being in lieu of 25 per cent in first mortgage bonds, 25 per cent in adjustment bonds, 25 per cent in preferred stock and 25 per cent in common stock, provided in the plan.

AGREEMENT BEING NEGOTIATED

2. An agreement is being negotiated with the protective committee of the $275,000. Wabash River Traction Co. bonds by which the members will recommend to their depositors and bondholders the even exchange, par for par, of their bonds for first mortgage bonds of the new company, in lieu of 50 per cent in first mortgage bonds and 50 per cent in adjustment bonds provided in the plan.

3. Under the plan and agreement there were reserved $320,550 of first mortgage bonds for expenses, adjustments and contingencies. The settlement above referred to required the appropriation of $264,850 reserve bonds for these adjustments, leaving only $55,700 of said reserve bonds. In order to replace the bonds thus applied to these settlements and to make adequate provisions for expenses, contingencies or other adjustments, after careful estimate the committee determined that the new company shall have authority, with the approval of the Public Service Commission of Indiana, to issue $350,000 additional first mortgage bonds: any balance not so appropriated to remain in the treasury of the company.

4. The committee has also determined that in the organization of the new company there shall be reserved to it the right to create, under approval of the Public Service Commission of Indiana, at any future time, a preferred stock or other security, subordinate to the first mortgage bonds, but which shall be entitled to the payment of dividends or interest prior to the adjustment bonds and junior securities. as well as to priority over them in payment of the principal upon liquidation.

The adjustments just mentioned when fully carried out, will give the new company a continuous line of operation from Lafayette to Fort Wayne, will eliminate any opposition by these bondholders and will obviate a severance of the operating line between Wabash and Peru, and make the first mortgage of the new company a first lien on the entire line from Lafayette to Fort Wayne. The committee reserves the right to abandon any of these revisions in its discretion and proceed with the plan and agreement.

As explained in the ELECTRIC RAILWAY JOURNAL for Jan. 3, page 72, the property of the Fort Wayne & Northern Indiana Traction Co. was sold under foreclosure on Jan. 29 to the committee of security holders of the company headed by Mr. Chandler.

Plan to Rehabilitate Cincinnati & Columbus Line

At a meeting of business men of Cincinnati, Ohio, on Jan. 7, W. B. Sullivan, Dayton, Ohio, speaking for himself, and L. A. Petit and Rush E. Evans, all engineers, proposed a plan for financing the old Cincinnati & Columbus Traction Co., known as the Swing line, and save it from being junked.

He proposed that a company to be known as the Cincinnati & Eastern Ry. be organized with an authorized capital stock of $1,000,000, all common stock, and an authorized 6 per cent bond issue of the same amount. Only $450,000 of the bonds are to be issued just now, with a like amount of stock, $100 of the stock to go as a bonus with each $100 of the bonds. The engineers would receive $225,000 of the common stock as their compensation for handling the proposition.

Of the $450,000 received from the sale of bonds $300,000 would be used in purchasing the property from the Union Savings Bank & Trust Co., Cincinnati, which now owns it, and $150,000 would be used in rehabilitating the road and making necessary improvements for profitable operation under the direction of the Dayton engineers. Mr. Sullivan said an understanding had been reached with the bank. Mr. Petit wired from Columbus that the Public Utilities Commission had appproved the plan.

The work of securing subscriptions is in the hands of committees of twenty appointed by the Cincinnati Chamber of Commerce, the Business Men's Club, the Merchants' & Manufacturers' Association and the Retail Merchants' Association. They will cover Cincinnati and Norwood, while Hillsboro men will endeavor to have the patrons along the line between Hillsboro and Owensville, who subscribed $100,000 to the original Kroger proposition, re-subscribe to the bonds under the new plan.

It is said that many business men in Cincinnati favor the plan and will aid in putting it through. If successful, the plan will save the whole line between Norwood, a suburb of Cincinnati, and Hillsboro.

Final Valuation Hearing

City States Its Position With Respect to Value of Pittsburgh Railways for Rate-Making Purposes.

In the final argument of the city of Pittsburgh before the Pennsylvania Public Service Commission in support of the contention that the physical valuation of the Pittsburgh Rys. is only $48,000,000, C. K. Robinson, special city solicitor, declared that the railway earned from 7 to 12 per cent on its properties for a period of fifteen years beginning in 1902. The argument was intended to support the city's claim that superseded property items should not be included in the valuation. The engineers for the company have placed the property value at $70,000,000, in opposition to the city's claim of $48,000,000. The matter is of importance, for the valuation is to be made the basis of the future fares.

The city's argument ran in part as follows:

They (the exhibits) start with the formation of the Pittsburgh Rys. system on Jan. 1, 1902, and run to April 1, 1918. One exhibit shows (calculated on a 6 per cent return) on Jan. 1, 1902, a plant account of $27,239,348, an allowance for working capital of $1,441,400. This exhibit also shows that, at the end of 1902, the plant account was $29,369,697, the allowance for working capital $1,517,500, and the allowance for organization costs of companies having no physical properties, $390,945, making a total plant account of $30,170,917. The net corporate income for the year, deducting discarded property during the year, was $3,558,703, which left a surplus on a basis of 6 per cent return of $1,778,448.

The net receipts for the year 1902, were, therefore, sufficient to retire all superseded property in the year, and in addition thereto, amounted to a return of slightly less than 12 per cent upon the total investment.

For the year 1903, the net corporate income, after deducting superseded property, amounted to approximately 11 per cent upon the plant account for that year; for 1904, 10 per cent; for 1905, 10½ per cent; 1906, 11 per cent; 1907, 10 per cent; 1908, 9 per cent; 1909, 8½ per cent; from 1910 to 1914, the company shows earnings of less than 7 per cent; in 1915, 8½ per cent; and in 1916, about 8 per cent, on total investment in each of these years, including working capital and allowances for organization costs.

The exhibit shows that, on a 6 per cent non-compounded basis, there would be on April 1, 1918 (all superseded property having been written off out of earnings) a surplus of $13,372,080, and on a 6 per cent compounded basis there would have been a surplus of $31,166,047.

On a 7 per cent return on the investment, which has been agreed upon as the equitable return on whatever valuation the Public Service Commission may recognize in the traction system, the railway would now have a surplus of $4,052,739 on non-compounded interest, or $12,659,936 on compounded, had that rate of return been followed since the formation of the company, according to Mr. Robinson, who continues:

Instead of applying this surplus to depreciation, we find that the company not only paid out all of its earnings in dividends upon inflated securities, but actually attempted to make book payments on account of dividends in excess of earnings. This policy ultimately resulted in the readjustment and reorganization of 1918, and the writing off by the Philadelphia Co. of accumulated unearned and unpaid dividends of approximately $10,000,000, which item constitutes the principal element of alleged value in the $10,000,000 debenture bonds now held by the Philadelphia Co.

A decision from the commission is expected shortly.

Change in Control

Operating Agreement Between Chicago Surface Companies May Be Superseded by Complete Merger

A rumor persists that a change in the control of the Chicago (Ill.) Surface Lines will take place shortly after Feb. 1, the time of election of the directors of the board of operation. Under the present operating agreement between the several surface line companies, the directors of the Chicago Railways elect four of the members of the board of operation and the Chicago City Railway elect three.

MR. BLAIR MAY ASSUME CONTROL

This arrangement of things gives the Chicago Railways a majority of one. The directors of the board of operation and the officers are elected for a period of three years. Two three-year periods have passed under the agreement, during which time the City Railway interests have had charge of the operation of the properties under President L. A. Busby. The majority interests have been represented by Henry A. Blair, who has been the chairman of the board, but has had little to say about the conduct of the properties, since the operating responsibility has rested with the president, Mr. Busby.

The matter of a change in control is being generally discussed in La Salle Street, and it is understood it has been officially considered by the Chicago City Railway interests in their board meeting. The trend of discussion is that the majority interests will now take a turn at directing the affairs of the surface companies. Having had control of the properties since the organization of the Chicago Surface Lines six years ago, it is considered that the City Railway interests have had a fair opportunity to demonstrate the character of management which they have believed to be the most efficient and successful.

NEWSPAPERS PRESUME TO KNOW

The Chicago *Tribune* states that it has ceased to be a secret that it is proposed to bring to Chicago as president and head of the operating department, under new policies to be dominated by Henry A. Blair, one of the biggest electric railway operators in the country. It is also hinted that a complete merger of the two surface companies may result from the change in control and it is probable that a general plan will be presented to the city looking toward improvement in relations between the companies and the municipality. There will undoubtedly follow a complete reorganization of the operating department.

Valdosta Road Sold

Following a meeting of the directors of the Valdosta (Ga.) Street Railway, the sale of the railway to C. M. Killian, Valdosta, was announced. Transfer of the properties has been made to the new owner.

Mr. Killian has purchased all of the stock of the company, which was formerly owned by the estates of the late Eugene West, Jacksonville, Fla., and the late United States Senator William S. West, Valdosta. Owing to the fact that the estates of the former owners are located in different states the task of managing the property was an onerous one, and an offer to sell was made in order to permit the people of Valdosta to buy the property. No action was taken and finally Mr. Killian personally bought the stock himself. The original cost of the property was $90,000. The price paid by the new owner was not announced.

Mr. Killian said that he has made no plans regarding the property. The line has never proved a paying proposition. The physical properties include about 5 miles of track, wire and poles, together with about ten cars. The company's franchise still has about fifty years to run. It is thought that a local company will be organized to continue the operation of the line.

The Valdosta Street Railway has elected new officers as follows: C. M. Killian, president; Mrs. C. M. Killian, vice-president; C. E. Boswell, secretary and treasurer. W. E. French, secretary of the Valdosta Chamber of Commerce, has been appointed temporary superintendent. The directors of the company include C. M. Killian, Mrs. C. M. Killian, J. G. Crawford, O. H. Dykes and C. E. Boswell. The system will probably be improved during the coming year.

Deposit of Oakland Bonds Urged

An appeal to bondholders of the San Francisco-Oakland Terminal Ry., Oakland, Cal., to deposit their bonds immediately to expedite reorganization was issued on Dec. 23 by the committee in charge. The communication says:

> It is vital both to the public and to the company to settle once for all the status of this company.
>
> Either the company, as a public utility operating under private ownership, should be placed in a position to obtain new capital to serve the growing needs of the East Bay communities, or those communities should absorb the company by present purchase and municipal ownership of ultimately through adoption of a resettlement franchise.

The committee is planning to strengthen the company by creating a financial structure "that will enable the company to obtain new money from time to time by sale of new securities."

About $4,816,000 in matured bonds and bond sinking fund payments amounting to $1,806,384 are now in default. Bond interest amounting to $1,221,765 is in arrears, and the stockholders have received no dividends since 1912.

The members of the reorganization committee are: John S. Drum, George A. Batchelder, P. E. Bowles, Paul A. Sinsheimer, George Tourny, Herbert Fleishhacker, W. W. Garthwaite, J. F. Cariston, Gavin McNab and A. Crawford Greene.

Interborough's Heroic Resort

As an emergency measure to save the company going into the hands of a receiver, the Interborough Rapid Transit Company, New York, N. Y., has announced that all the unused real estate in New York City held by the company, valued at several million dollars, will be sold at public auction to the highest bidder in April. This real estate consists of both vacant and improved property covering all classes of realty, from buildings in the Grand Central Terminal zone to vacant lots in the Bronx, and valuable holdings in Long Island City.

Frank Hedley, president of the company, is quoted as follows:

> Speculation, which has been rife as to exactly how the Interborough Rapid Tranit Company managed to meet the Jan. 1 payment on its outstanding bonds, is answered in the announcement made that this obligation was met in part by pledging the real estate holdings of the company in the Boroughs of Manhattan, Bronx, and Queens not necessary for the operation of the road.
>
> The forthcoming sale of this property is a forced sale in the strictest sense of the term. The situation brought on by the war has compelled the Interborough to continue supplying rapid transit service at a fare established on pre-war conditions, and this has forced the company to dispose of these real estate assets in order that it may do all in its power to protect the interests of investors in its securities.
>
> But this does not settle the main problem. In the future we will have no such assets to pledge, to borrow on or to sell and there will be interest payments to be met next July; either that or receivership.
>
> The traction problem is so big that it will take time, study and probably legislation. But there is the existing emergency to meet. And that can be met only by an increased fare.
>
> The fact that we are going to sacrifice these valuable assets is sufficient answer to those who dodge the necessity behind our appeal for a higher fare. We certainly would not sell unless we deemed it our duty to protect the interests of people whose savings have been invested in good faith.
>
> We shall continue, to the best of our ability, and to the last trench, to protect these interests and the lives of our passengers.

Brooklyn City Stockholders Organize

The annual meeting of the stockholders of the Brooklyn (N. Y.) City Railroad was held on Jan. 12. The meeting was the first held by the stockholders since the Brooklyn City Lines were separated from the Brooklyn Rapid Transit on Oct. 19 last by order of the Federal Court.

Directors of the company to serve for the ensuing year were elected as follows: Frederick L. Allen, William H. Dykman, Richard L. Edwards, Crowell Hadden, Alfred R. Horr, Frank Lyman, Edwin P. Maynard, Henry F. Noyes, H. Hobart Porter, Dick S. Ramsay, Hiram R. Steele, James Timpson and Harold T. White.

There was a general discussion of the company's position and prospects. Particularly, there was an exchange of views as to bus operation by the city of New York and the steps which should be taken to protect the property of the Brooklyn City Railroad against the losses it was suffering in consequence of this competition.

San Francisco Reorganization Making Progress

More than 91 per cent of the holders of underlying bonds of the United Railroads, San Francisco, Cal., including The Market Street Cable 6s, Ferry & Cliffs 6s, Omnibus Cable 6s, and Sutter Street 5s, have agreed to exchange their underlying bonds for the new Market Street Railway five-year 6 per cent notes.

The last one of the financial institutions holding any of these underlying bonds has joined in the reorganization, and there remain outstanding but a few private holders, at least 50 per cent of whom are expected to deposit within the next ten days. This will bring more than $5,000,000 of the $5,200,000 of underlying bonds into the agreement which is an unusually high percentage considering that some of the underlying bonds are held abroad and about $28,000 of them have not been located.

Enough of the bonds having joined for the plan to become operative, steps will be taken to bring about the foreclosure of the mortgages.

In commenting on the situation, George A. Batchelder, who has been acting for the reorganization committee in the matter of securing deposit of securities, made a statement as follows:

> The committee of five bankers who created the plan performed an exceptional piece of work and deserve the hearty thanks of the security holders, and if the Oakland reorganization produces anywhere near as sound a plan there will be a second lot of very fortunate bondholders.
>
> I am permitted to say this, having had little or nothing to do with the United Railroads-Market Street Railways plan except to provide the security for the new 5-year notes, but I am on the Oakland Key Route reorganization committee.
>
> With this successful refinancing of the street car system on the very conservative basis of a funded debt on which the road is earning two and one-half times its fixed charges, San Francisco will have in the Market Street Railways a street car system which will compare more than favorably with any other in the United States.

Bill to Permit Washington Companies to Merge

The Commissioners of the District of Columbia, Jan. 9, 1920, sent to Congress a bill authorizing the merger of the Capital Traction Company and the Washington Railway & Electric Company, operating in Washington.

The bill as it was sent to Congress carries with it no power other than providing for the removal of the legal barriers to a merger of the systems. The bill also calls for a change in taxation of the railways, providing for a tax on the operating income of the road rather than on the gross receipts. It further provides that public utilities may finance extensions by additional stock issue, now taken care of by bond issues.

The measure provides that the present tax of 4 per cent on the gross receipts shall be repealed and a graduated tax upon the operating income in excess of 6 per cent on the fair value of the company's property be substituted.

The commissioners are of the opinion that a consolidation of the two lines would make it possible to establish a lower rate of fare.

Previous rumors of plans to consolidate the lines have been denied.

Common Stock Dividend Passed

The comparative consolidated earnings statement of the United Light & Railways Company, Grand Rapids, Mich., and subsidiary companies for the twelve months ended Oct. 31, follows:

	1919	1918
Gross earnings, all sources	$10,056,109	$9,024,302
Operating expenses, including maintenance, general, income and excess profits taxes	7,142,287	6,376,693
Net earnings	$ 2,913,822	$2,647,609
Interest on bonds and notes, subsidiary companies, due public	$ 721,911	$ 716,782
Dividends and earnings on prefered stocks, subsidiary companies, due public	170,762	170,864
Profit due minority stockholders	8,454	6,836
Balance	$ 2,012,694	$1,753,126
Interest on first and refunding 5% bonds, United Light & Railways Company	445,460	434,700
Balance	$ 1,567,234	$1,318,425
Interest on 6% five-year bond secured gold notes, United Light & Railways Company	90,000	96,947
Interest on 6% two and one-half-year bond secured gold notes, United Lt. & Rys. Co., Series "A"	90,000	78,769
Interest on 7% five-year bond secured gold notes, United Lt. & Rys. Co., Series "B"	102,656	9,247
Interest on ten-year 6% convertible gold debentures, United Light & Railways Co.	120,000	120,000
Interest on commercial loans, United Light & Railways Co.	40,366	47,027
Balance	$ 1,124,211	$ 966,433
Dividends on first preferred stock 6%	$ 605,619	$ 607,884
Surplus earnings	$ 518,592	$ 358 548

It was the sense of the board of directors of the company that pending (a) the working out of many questions involved in international commerce and finance, (b) the settlement of the financial and industrial problems of the United States, (c) the return of cheaper and more reasonable conditions, (d) the solution of and return to normal conditions of the coal supply, it was the part of wisdom to defer for the present, the declaration of dividends on the common stock of the company. The regular dividend of 1½ per cent on the preferred stock of the company was declared out of the surplus earnings of the company, payable on Jan. 2, 1920, to all preferred stockholders of record at the close of business on Dec. 15, 1919.

Financial News Notes

Service Resumed in Part.—The Berkshire Street Railway, Pittsfield, Mass., has resumed partial service to Hinsdale from Dalton.

Receiver for Rhode Island Suburban Railway.—Col. Harold J. Gross and B. J. Jackson have been appointed temporary receivers for the Rhode Island Suburban Railway, Providence, R. I., upon application of the Union Trust Company, Providence, R. I.

Appraisal of Shore Line Started.—Shepard B. Palmer, Norwick, and W. R. Dunham, Jr., New Haven, appointed by the court as appraisers of the Shore Line Electric Railway, Norwich, Conn., now in the hands of a receiver, have begun the work of appraisal of the property of the company.

Sues Boston Suburban Electric Companies.—James E. Clinton has brought suit in the Superior Court against James W. Smith et al, trustees of the Boston Suburban Electric Companies, Newtonville, Mass., to recover $1,000,000, representing principal and interest on 623 promissory notes for $1,000 each, which were due on Dec. 1, 1919.

Will Consolidate Subsidiaries.—The Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., which owns all except directors' qualifying shares of the common stock of the Michigan Light Company and Consumers' Power Company, which operate in Michigan, is making arrangements for consolidation of interest of the two latter companies.

Republic Notes Refunded.—The Republic Railway & Light Company, New York, N. Y., has sold to the First National Bank, Cleveland, Ohio, $1,444,000 of three-year 7 per cent guaranteed gold notes, the funds from which will be used to meet an equal amount of Republic Railway & Light Company two-year notes due on Jan. 15, 1920.

All Staten Island Will Walk.—The period of grace extended to the people of Staten Island by the electric railways operating there has expired and, there being no prospects of immediate relief for the lines from the public authorities, the Richmond Light & Railroad Co., and the Staten Island Midland R.R. announced on Jan. 16 that they would cease to operate on Jan. 20. The roads are owned largely by the estate of the late H. H. Rogers.

Receiver Authorized to Pay State.—An order was made in the United States District Court at Pittsburgh, Pa., on Jan. 5, authorizing the receivers of the Pittsburgh Rys. to pay $130,788. due the State of Pennsylvania for capital stock and corporate loan taxes of the railway and its underlying companies.

The order followed the filing of a petition by the receivers, informing the court that the Commonwealth had assessed the companies for taxes for 1918.

Abandonment Denied.—The Public ice Commission for the Second District Service Commission for the Second District of New York on Jan. 6 denied the petition of the Orange County Traction Company for approval of a declaration of abandonment of the Eagle Street line in Newburgh running from Liberty and Renwick Streets, through Renwick and Bridge Streets to the terminus of the line near Quassaic bridge, about 2,900 feet.

Local Service in Reno Is Discontinued.—The petition of the Reno, (Nev.) Traction Company asking permission of the Public Service Commission of Nevada to abandon its local service in Reno has been granted. It was planned to discontinue service on Jan. 15. Rails on the 4 miles of track in the local system will be torn up at once. The interurban service between Reno and Sparks will be continued. Several individuals seeking franchises for jitney operation have submitted propositions to the city.

Service Suspended in Saugus.—The Eastern Massachusetts Street Ry. has ceased operation on the Saugus-Lynn branch. To meet this emergency, jitney licenses have been granted and a bus line has been started between Saugus and the city of Lynn. The proposed fare will be 5 cents as compared with the former railway fare of 10 cents. The curtailment of service by the railway became necessary on account of the refusal of the municipalities served to contribute their proportionate share to the cost of expense in maintaining the roadbed.

Effort to Restore Buffalo Road to Local Control.—Efforts are being made by Chairman McDougal of the bondholders' committee of the International Railway, Buffalo, N. Y., to organize a corporation of Buffalo bankers and businessmen to purchase the railway and retain control of the property in Buffalo. It is believed this eventually will be done. The bondholders' committee is now making an inventory of the company's property and has asked the Mayor and other municipal authorities to join in the appraisal. This offer was rejected.

Monorail Financing Disapproved.—The Michigan Securities Commission, which examines very carefully into all security issues intended to be offered for subscription by the public, has refused to give unqualified approval to the request of the Monorail Company of America to issue $75,000 of securities. The money is wanted to hire engineers to investigate and report. The State Commission may, however, approve the issue after the company files a statement signed by those who have subscribed indicating that they know the money is to be used for securing engineering data and that the proposed system cannot be installed until an elevated or a subway is built for Detroit.

Against Municipal Ownership. — A committee comprising E. B. Bacon, Jersey City; Russell H. Nulty and S. B. Swan, Ocean City, N. J., met with the Ocean City Board of Trade and urged that the city not purchase the line of the Ocean City (N. J.) Electric Railroad. The committee did recommend, however, that the city make sure that the line is in operation next summer, asserting that the municipality had plenty of power to effect this, even though it be compelled to pay any deficit that might be incurred by the operation of the road. The road was conducted under an arrangement similiar to this last summer. The committee recommended the employment of an expert, such as Peter Witt. No action was taken on the report.

Extra Dividend on Bankers' Share.—In addition to the regular distribution on Feb. 2, 1920, of Cities Service Co. bankers' shares, which amounts to 45.8 cents, there will be an additional amount paid to bankers' shareholders on Feb. 2 by reason of the increase in the stock dividends on Cities Service common stock from 12 per cent to 15 per cent per annum. This addtional amount will be calculated on the market price of Cities Service common stock as it will be on Jan. 16, 1920, so that the exact amount thereof cannot be stated at the present time. At the price at which the last dividend stock was sold, it would amount to $40,800 or 10.2 cents per banker's share, making the total distribution on Feb. 2, 1920, approximately 56 cents per bankers' share. The exact figure will be announced shortly after Jan. 16, 1920.

Notice of Interest Payment.—Notice has been sent by Lee, Higginson & Co., Boston, Mass., to holders of certificates of deposit representing Boston & Northern Street Railway first mortgage refunding 4 per cent bonds, and old Colony Street Railway first mortgage refunding 4 per cent bonds, that the Jan. 1, 1920 installment of interest on the 4½ per cent refunding bonds and Oct. 1, 1919, installment of interest on 6 per cent refunding bonds of the Eastern Massachusetts Street Railway will be paid at the Boston Safe Deposit & Trust Company on or after Jan. 2, upon presentation of certificates of deposit. Certificates of deposits will be stamped as assenting to the plan of reorganization, if not already so stamped. It is expected that the new securities will be ready for delivery before the end of January. To avoid sending in certificates of deposit holders may, if they prefer, refrain from presenting certificates until the new bonds are ready for distribution.

Hearing in Chattanooga Case.—An order has been handed down in Federal Court at Knoxville, Tenn., in the case of the Commercial Trust Company, Philadelphia, Pa., vs. the Chattanooga Railway & Light Company et al. and the Maryland Trust Company vs. the Chattanooga Railway & Light Company fixing March 8 as the date for hearing arguments to sustain the bills in these consolidated causes as general creditor's proceedings. It has also been ordered by the court that authority be conferred upon and vested in the receivers to take such steps as may be necessary to ascertain what has been done with the stock and property of the Lookout Mountain Railway, which stock, it is alleged in the original bill, and in cross bills of the Commercial Trust Company, to have been converted as security for the bonds secured by the mortgage executed by the defendant railways company, to the Trust Company of North America, dated May 1, 1906.

Protests Washington Valuation.—Following the lead of the Capital Traction Company, Washington, D. C., the Washington Railway & Electric Company has filed in the District Supreme Court an appeal from the decision of the Public Utilities Commission fixing the value of the property. An injunction is also prayed to prevent the commission from using its valuation as a basis for fixing rates of fare or otherwise. Similar petitions and appeals were filed by the City & Suburban Railway and the Georgetown & Tenleytown Railway. Twenty-five grounds of dissatisfaction with the award of the commission are set forth in the petition of the Washington Railway & Electric Company. Among the complaints made by the company is that the findings were based on evidence never introduced into the record, but received by the commission in other proceedings. The commission made no effort to ascertain, it is charged, the fair value of the company's property at the time the award was made, as required by the utilities act.

Car Trust Certificates Offered.—Subject to prior sale or change in price Edward B. Smith & Company, Philadelphia, Pa., are offering for subscription on a 6½ per cent income basis $208,000 of J. G. Brill Company Birney safety equipment 6 per cent gold trust certificates, Trust No. 4, Series "A," issued under the "Philadelphia Plan." These Series "A" Certificates will be issued by the Fidelity Trust Company, trustee, and will be secured by assignment of a lease covering seventy-three Birney one-man safety cars, for which purchase money notes aggregating $372,925.73 of Lindley M. Garrison, federal receiver of the Nassau Electric Railroad, Brooklyn (N. Y.) Rapid Transit System have been deposited. These cars were acquired under lease by the receiver, on order of the court, and with the approval of the Public Service Commission of the State of New York. This issue of certificates represents approximately 50 per cent of the selling prices of these cars. The balance having been paid in cash (20 per cent) and by an issue of $129,000 Series "B" certificates which are deferred in lien. The safety cars for Brooklyn have now been in operation for some time. They have been described in detail previously in the ELECTRIC RAILWAY JOURNAL.

Traffic and Transportation

New York Inquiry Opens

Board of Estimate Plans Comprehensive Investigation of Companies' Condition—May Last Three Months

The Board of Estimate of New York City on Jan. 13 began an investigation of the city's traction situation with a view to arriving at a final settlement of the companies' problems. The board contemplates a thorough study of the companies' affairs, both past and present, and, owing to the great mass of data to be examined, the inquiry may last three months or longer.

The board's session on Jan. 13 was devoted to the preliminaries of organizing for the investigation. Charles L. Craig, City Comptroller, outlined its scope. It was announced that Corporation Counsel William P. Burr would conduct the inquiry. It had been the opinion of some of the members of the board that it would be better to have independent counsel in order to give a non-partisan aspect to the inquiry and to avoid any criticism of a "ready-made" decision, but at a meeting held on Jan. 13 in the Comptroller's office the majority decided in favor of Mr. Burr.

The board will begin the examination of witnesses at the next session, which will be held on Jan. 21. It is endowed with full powers to make a complete inquiry into all the records and books of the various companies, and subpœnas will be issued for witnesses who do not readily heed the board's request. As far as the traction lines in the hands of receivers are concerned, the representatives have already assured Mr. Craig that it will not be necessary to issue subpœnas; they are willing, they say, to show the investigators "all they have."

The inquiry will start at the beginning of the project to dig the old Fourth Avenue-Broadway subway and an effort will be made to ascertain exactly the amount of money invested in the road, and how much of the bond issues of the Interborough were actually used in the equipment and maintenance of the line. August Belmont, who was actively interested in the old subway, and who remained a director in the Interborough for many years, will be, it is believed, among the first witnesses to be called.

The board hopes eventually to fix a valuation on the companies' properties. For this purpose it will first examine their books with the object of obtaining the following information:

(a) The actual monetary investment for the equipment of the first subway under contract No. 1 by the contractor, John B. MacDonald, or by him and his assignees, and the Interborough Rapid Transit Company; that is, to ascertain the extent to which funds of the investing public supplemented moneys supplied by the City of New York for the construction and equipment of original subway under contract No. 1.

(b) The actual monetary investment of funds other than those supplied by the City of New York in the construction and equipment of the Brooklyn extension of the original subway under what is known as contract No. 2.

(c) The facts and circumstances in relation to the lease of the lines of the Manhattan Elevated Railroad Company by the Interborough Rapid Transit Company.

(d) The actual monetary investment in the existing surface lines in the Borough of Manhattan.

Bay State Jitneys Unchecked

The Eastern Massachusetts Street Ry. on Jan. 14 discontinued service on all its lines in Salem, Mass., owing to continued jitney competition in the Salem district. The City Council had previously passed an ordinance revoking jitney licenses, but, pending a referendum on Jan. 27 on the question, but no active steps were taken to enforce it. An appeal was taken to Governor Coolidge, who refused to intervene to stop the cutting-off of the service. The Salem City Council on Jan. 12 ordered the Mayor and the City Solicitor to apply to the courts for an injunction to restrain the trustees from cutting off the service. The city was unable to stay the trustees' action. The company took action in accordance with its policy of refusing to operate in the face of jitney competition.

Conforming to the request of the trustees of the Eastern Massachusetts Street Ry. that jitney competition be eliminated in the Quincy district, the city council has revoked the licenses of 111 jitney drivers. These jitneys have been operated in direct competition to the company lines and were subject to the new ordinance eliminating these conditions. Five other jitneys, run on the common hackney order, have been allowed to operate as they do not violate the terms of the ordinance.

The Quincy Chamber of Commerce has appointed a committee representing the various business interests of the city to co-operate with Manager McCormick in directing the Quincy division of the Eastern Massachusetts Street Ry. The appointment was made at the instance of the Public Trustees of the company in accordance with the "home-rule" policy which has been in effect for several months.

The company has announced reduced fares on several of its lines. The changes are as follows: Salem and Peabody districts, sixteen tickets for $1; Danvers and Marblehead districts, fourteen tickets for $1. Reduced rates are also established between Danvers and Peabody, Danvers and Beverly, and Salem and Danvers. Transfers are given with the payment of cash fares.

Rochester's Need Great

Company Lacks Funds for Replacement of Equipment—President Hamilton Urges Service-at-Cost

James F. Hamilton, president of the New York State Rys., in a statement issued recently, urged that the company be granted an immediate increase in fares on its Rochester lines. Mr. Hamilton declared that the company must secure additional revenue if it is to continue operation in Rochester. In his opinion, adoption of a service-at-cost plan offers the best solution of the company's difficulties.

Unless fares are raised the company can do nothing to improve service, said Mr. Hamilton. Complaints against the quality of the service are justified, in his opinion, but, at a 5-cent fare, the company is furnishing the best service of which it is capable. It has no funds available for replacements of track and renewing of equipment. In regard to the company's plight, Mr. Hamilton said:

> Complaints are gaining in volume against the service given by our company in this city. I can only state that no one regrets more than does the company that the service is not satisfactory. At the present time we are furnishing service at less than cost.
>
> It is only by means of extreme sacrifices and conservation that we have been able to continue operation. We have no money for replacements of track and renewing of equipment. Daily our position grows worse and will continue to do so unless we are allowed additional revenue.
>
> Patrons have the right to complain against the waits they suffer, the crowded cars and other ills of curtailed service, but we are powerless to remedy these conditions, as the service is positively the best we can give under present financial conditions. The dollar of today purchases only 47 cents' worth in material and labor. The nickel was worth 5 cents but now its value is less than 2.5 cents.
>
> If the nickel is enough now, it was too much five years ago, yet the company was able at that time to earn only a small return—about half of the legal interest rate—upon its investment. We have courted a fair investigation. We want only justice. Street railways in many cities are in a perilous condition. Relief has come to those in a great number of municipalities and I believe the extent of this relief is little realized in Rochester.

The statement then calls the attention of car-riders to the fact that relief has been granted to the traction lines in many other cities. It continues:

> Four hundred cities all over the United States and Canada have realized the necessity of allowing their traction companies adequate fares. Some cities have not granted relief enough. * * *
>
> Something must be done by municipalities to meet the serious conditions confronting traction companies. Only two courses are open—municipal ownership and operation, or granting private operators the right to fares which will provide good service at cost plus a reasonable return upon the investment. * * *
>
> No objection is being placed by street railway companies to the institution of city regulation. A city commission is exercising regulation over traction companies operating under private ownership with a service-at-cost plan would insure the public a square deal.
>
> Time for decision is at hand. The present status cannot continue. The future welfare of the city is imperilled. No one can fairly deny a public utility a just return upon its investment. The more the tracks and equipment of the company deteriorate, the more it will cost to restore the property to the basis Rochester needs and is entitled to.
>
> Rochester will never be Toledo-ized. Here it is service first which the public is demanding. I believe that the people of Rochester are willing to pay what good service costs in this day of high prices.

Seven Cents in Lincoln

Commission Allows Company Increase As Emergency Measure Pending Fixing of Permanent Rate

Seven-cent cash fares became effective on the lines of the Lincoln (Neb.) Traction Co. on Jan. 1. The advance from a 6-cent basis was made under authority of a recent order of the State Railway Commission, which sanctioned the increase in rates as an emergency measure. The new schedule will continue for a period of six months, pending the fixing of a permanent rate.

The commission ordered the company to sell four tokens for 25 cents. The fare between the suburban towns and the city of Lincoln was raised from 7 cents to 8 cents, or one token plus 1 cent. The company was also ordered to sell seven children's tickets for 25 cents and to continue the sale of these tickets in the suburban towns for use within the city of Lincoln.

PERMANENT RATE TO BE FIXED

This is the second fare increase on the company's system since Aug. 1, 1919. Following the refusal of the commission to permit the company to establish 6-cent fares in December, 1918, the latter applied to the federal court for an injunction to restrain the commission from enforcing rates which, it contended, were confiscatory. The court granted the petition for an injunction and authorized the company to install 6-cent fares pending final determination of the case.

The company, in asking the commission for a further increase, alleged that the maximum rates provided by the federal court, were insufficient for its requirements. During the months of January to July, 1919, inclusive the operating revenues failed to meet necessary expenditures by $34,425, and for the months of August, September and October, 1919, there was a similar shortage of $6,091, making a total deficit in the railway department of $40,516 for ten months.

NO DIVIDEND PAYMENTS

In allowing the increase in fares to 7 cents, the commission stipulated that, during the operation of the order, the company should pay no dividends on its common stock. It also decreed that no revenues earned during the life of the order should be used for the payment of such dividends. In explanation of this feature of its order, the commission said:

> The present application is for emergency fares, it being alleged by the company that the maximum fares provided in the order of the federal court are not sufficient to meet its requirements. It is apparent that the present proceedings do not involve the question of any stock issue, nor of dividends paid in the past. It is conceded by every one interested that it will take some time—perhaps as much as six months—to check the inventory and valuation and to hear and determine the issues in the case involving permanent fares, so the question immediately before the commission is whether or not there is an emergency requiring relief for the company during the time that will lapse before proper permanent fares can be determined. Nothing herein will be a precedent for determining the other causes. This is an emergency fare case and is wholly separate and distinct from the cause involving permanent fares.

The commission estimated that, under the most favorable circumstances, the 7-cent fare would add from $40,000 to $45,000 to the company's revenues. It is believed that with this added revenue, the company will be able to pay operating expenses and possibly have a small surplus for the settlement of its outstanding obligations. In dealing with the effect upon the company of increases in wages and other costs, the commission's order said:

> The commission finds from the evidence that on August 1, 1919, there was a general advance in the wages of the entire operating force of the company amounting to about $50,000 per year, and on Nov. 1, 1919, there was another increase amounting to about $8,000 per year. There has been a very heavy advance in the cost of fuel and fuel oil, the former having risen on an average of considerably more than $1 per ton, and the latter having gone from about $1.80 per barrel to $3.22 per barrel. Due to the general shortage of coal, made still more acute by the strike, the company has been compelled to install oil burners under more than one-half of its boilers, the coal consumption having been reduced from 125 tons to 50 tons per day.
>
> In order to safeguard its fuel supply the company entered into a contract while the strike was in progress, for oil for a six months period beginning Jan. 1, 1920, under which oil will cost $3.22 per barrel for the month of January, about $2.50 for February and March, with a gradual reduction during the months of April and May, and falling to $2.22 for the month of June. The secretary of the company, Mr. Shaw, testified that from his observations as to the relative costs of oil and coal he considered oil at $3.22 per barrel about equal to coal, such as the company customarily uses, at about $9 per ton. The actual increase in the cost of fuel for November, 1919, over its cost for Nevember, 1918, is (partly estimated) $7,628.77.
>
> The estimated increase for January, 1920, over December, 1919, is upwards of $9,000, and over December, 1918, nearly $17,000. Since the hearing in this case, the coal strike has been settled and doubtless the estimated expenses will be somewhat lessened, but there is no indication that there will be a radical reduction in fuel cost. What has been said of fuel is true of almost all other materials and supplies used by the company; there is nothing pointing to reduction in their prices.

New York Assembly for Fare Inquiry

The New York Assembly has passed a resolution calling on the Public Service Commissioner of the First District to report to the Legislature with recommendations relating to the solution of the traction fare problem. The resolution was adopted by the Assembly at its opening session on Jan. 7. It follows:

> Whereas, Governor Smith recommended the abolition of the five-headed public service commission of the first district and the appointment of a single regulatory commissioner assuring the Legislature of 1919 that this action would produce beneficial results to the acute transportation situation in New York City, and
>
> Whereas, The Legislature acquiesced into his recommendation, and
>
> Whereas, Such problem is becoming daily more acute and its speedy solution is of vital importance to the residents of the city of New York.
>
> Resolved, (if the Senate concur), that such commissioner is hereby requested to report to the Legislature the result of his investigation, whether it is possible for the traction company to render adequate service at the present fare, and any recommendations for the solution of the problem that he may deem proper and appropriate.

It is evident that the Assembly intends to go into the subject of increased fares for traction companies thoroughly with the idea of affording such necessary relief as will promote proper service and protect the interests of the operators. The resolution was passed unanimously in the Assembly.

Bonus System for Dallas

Experiment Extending Over Three Months in Rewards to Trainmen for Efficient Operation

The Dallas (Tex.) Ry. has started a bonus system for its employees as a means of encouraging efficiency. This announcement was made by Richard Meriwether, vice-president and general manager. The new plan provides for a bonus of 2 cents an hour for every hour worked during the month to be paid to those trainmen whose records during that period show no accidents charged against them or other charges of carelessness, inefficiency or negligence in performance of duty.

TRAINMEN MAY APPEAL

Mr. Meriwether said the efficiency bonus plan would be continued for a trial period of ninety days. If at the close of the ninety-day test period the plan is found to work successfully in encouraging carefulness and reducing accidents, it will be continued through the rest of the year and will become a feature of the company's permanent policy.

The superintendent of transportation is to determine if carelessness or inefficiency should be charged against any trainman in case of an accident. He is empowered to penalize trainmen by making them ineligible for bonus if he sees fit to do so. The superintendent of transportation will report the names of all trainmen who are entitled to the bonus pay, which will be distributed on the fifteenth of each succeeding month.

Appeals from the decision of the superintendent of transportation regarding those entitled to bonus allowance will be made to an efficiency board of five members. Of the five members three will be trainmen, elected by ballot from the trainmen at large; the claim agent of the company and one other company official to be selected by the president of the company. The trainmen will also elect three alternates as the members of the board are elected, and these alternates will serve whenever the regularly chosen members are unable to do so.

The efficiency board on the fifth of each month will hear and consider appeals from the decisions of the superintendent of transportation during the preceding month.

CHARGES AGAINST TRAINMEN

Charges that may be made against motormen include careless accidents, running ahead of time, talking to passengers while running, the use of tobacco while on duty, discourtesy to passengers, continual failure to make schedules without good reason, reporting late for duty, and failure to have proper route signs.

Charges that may be made against conductors include: careless step accidents and accidents to passengers inside the car, signaling to motorman to pass up passengers when there is still standing room in the car, and careless collection of fares.

Can Develop Traffic

Railways Should Capitalize Riding Habit Developed by Jitneys, Says Pittsburgh "Gazette-Times"

Electric railways operating in communities where the competition of motor vehicles is keen, can benefit by capitalizing the riding habit developed by the jitneys. This is the view expressed by the Pittsburgh (Pa.) *Gazette Times* in an editorial commenting upon the annual report of E. K. Morse, city transit commissioner. The report, in which Commissioner Morse urged that the Pittsburgh Railways return to a 5-cent fare within the city limits, was discussed at length in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 15, page 950.

The *Gazette-Times* points out that the jitneys, by charging a 5-cent fare, have popularized the idea of riding for short distances. It holds that the trolleys, by giving improved service at reasonable rates, can secure much of this short-haul traffic for themselves. In part the editorial says:

> The central thought in Transit Commissioner Morse's third annual report is that, through failure to provide adequately for the public need, the people of Pittsburgh are turning away from the facilities placed at their disposal, to the great hurt of the city. Chiefly he blames the transit system for changing the course of logical development and charges that the fare increases have given the people the walking habit, whereas the primary concern of the trolley managers should be to develop the riding habit. There can be no question that a combination of convenient service and reasonable rate of fare will encourage riding. Data furnished by the Pittsburgh Railways give proof of that. * * *
>
> But it is to be observed that the habit of riding short distances on motor cars for 5 cents leads to the people also making short journeys on the trolley cars. The "riding habit" is becoming fixed. We may be sure it would grow amazingly wherever it was encouraged.
>
> How to promote it in Pittsburgh is a problem of first importance. Mr. Morse's suggestions to this end are worthy of careful consideration. Certainly, if it is too late to change the plans that have been made for public improvements on a large scale it ought not to be impossible, in conjunction with them, to devise a fair system for correcting housing conditions and encouraging the people to make greater use of the trolleys.

Wants Seven-Cent Fare Continued

The Public Service Commission for the Second District of New York on Jan. 6 ratified a 7-cent fare by the Port Jervis Traction Co. for the first six days in January, pending local action on the company's request for an extension of a franchise amendment to permit further charge of 7 cents on the company's line.

The commission authorized a 7-cent fare on April 15 last until Dec. 31, the local authorities having waived a 5-cent fare provision during 1919. The traction company asked that the increased fare be permitted for a longer period and the outgoing Port Jervis administration continued the franchise amendment until Jan. 6 to permit the 7-cent fare question to be considered by the new Port Jervis administration, the town of Deer Park having extended the 7-cent fare period until March 10, 1920. It was shown on a recent hearing before Commissioner Thomas F. Fennell that the traction company had a net operating loss of $62.71 from May 1 until Dec. 17 last. The commission's order provides that all earnings from operation above operating expenses and taxes shall be expended on the railroad and equipment.

Further application will be made to the commission following action by Port Jervis authorities to whom the company has made application for a continuance of the 7-cent fare.

City Asks Rehearing of Buffalo Case

Mayor Buck of Buffalo, N. Y., has petitioned the Public Service Commission for the Second District, for a rehearing on the commission's order in the International Railway rate case, decided Nov. 20, 1919.

It is claimed by Mayor Buck that in 1898 the city, the Buffalo Traction Company, the Buffalo Railway and the Crosstown Street Railroad, predecessors of the International Railway, made an agreement for a 5-cent fare, with transfers over all roads treated as one and that the commission cannot change this agreement; that the franchise granted the Buffalo Traction Company in 1895 and amended in 1899, provides for a 5-cent fare with transfers to any other street surface road in Buffalo and that this franchise is not affected by the Milburn agreement.

It is also claimed the 1898 agreement and the Buffalo Traction Company's franchise of 1895 as amended, constitute contracts under the State and federal constitutions which the commission cannot change.

After the election at Buffalo on Aug. 20, 1918, when the action of the Mayor and Council in granting an increase in fare to the company was repudiated, the company appealed to the courts as the last source of relief. A favorable decision was handed down by the Court of Appeals on July 15, 1919, giving the Public Service Commission jurisdiction. The rate case was immediately presented to the commission, and on Nov. 20, 1919, an order was made increasing the rate of fare in Buffalo to 7 cents.

Six Cents in Worcester Zones

The Worcester (Mass.) Consolidated Street Ry. has raised fares in each of the two zones into which the city of Worcester is divided from 5 cents to 6 cents.

The increase was authorized by the State Department of Public Utilities after the company had shown that it was losing money under the 5-cent zone system which went into effect on Dec. 1. The 6-cent rate is temporary, the commission declining to establish a permanent rate pending labor hearings. No increase was granted to the company on its lines outside the city.

Prior to Dec. 1 last the fare was 7 cents with free transfers. Under the zone system the Worcester City Hall is the first point from which fares are computed.

Transportation News Notes

Two-Cent Transfer Charge Effective.—The Union Street Ry., New Bedford, Mass., has installed the fare schedule recently approved by the State Public Service Commission. The new rates provide for an initial 5-cent fare with a 2-cent charge for transfers.

Safety Cars for Racine.—The Wisconsin Gas & Electric Co. is planning to put thirty-three Birney cars in service in Racine, Wis., in conjunction with the present cars. The new equipment will represent an investment of $300,000, taking into consideration the necessary auxiliaries.

Higher Fares on Northampton Line.—The Northampton (Mass.) Street Ry. has installed a schedule of rates under which the cash fare between Northampton and Florence becomes 14 cents, and the ticket rate 10 cents. The fare between other points on the company's lines is increased proportionately.

Buffalo Paper Discontinued. — The International Ry., Buffalo, N. Y., has suspended the publication of the *Service Spot Light.* The little publication was issued weekly. Copies of it were placed in the "Take One" boxes installed in all of the company's cars. The editor of a local newspaper was editor of the publication.

One-Man Cars Authorized in Fort Smith.—The Fort Smith Light & Traction Co., Fort Smith, Ark., has been authorized by the State Corporation Commission to operate one-man cars on its lines. The commission has under advisement the company's petition for an increase in fare from 5 cents to 6 cents.

Through Buffalo-Syracuse Freight Service.—Through freight and express service between Buffalo and Syracuse for the convenience of shippers has been established by the International Ry., Buffalo, N. Y., with the co-operation of the Buffalo, Lockport & Rochester Ry. and connecting lines. Through cars are operated between the two cities.

Seven-Cent Fares in Glen Cove.—A citizens' committee appointed by the Mayor of Glen Cove, N. Y., to consider measures for the relief of the Glen Cove R.R., has decided to permit the company to raise its fare from 5 cents to 7 cents. The committee has voted against relinquishing control of the company's franchise to the Public Service Commission.

Wants Fare Hearing Postponed.—The city attorney of Augusta, Ga., has asked the State Railway Commission to postpone for sixty days the hearing on increased fares and light and power rates asked by the Augusta-Aiken Railway & Electric Corporation. A voluminous report was submitted by the company setting forth the reasons for increased rates. The city attorney asks sixty days in which to examine this report.

Favors Eight-Cent Fare.—The Public Utilities Commission of Illinois has continued until March 1 the present 7-cent fare of the Alton, Granite & St. Louis Traction Co. At a recent hearing before the commission the manager of the Alton Board of Trade urged that the company's petition for an 8-cent fare be granted. Speaking on behalf of the Board of Trade he declared an advance in fare to be preferable to a possible abandonment of service.

Fewer Accidents in Spokane.—The number of accidents in which the cars of the Washington Water-Power Co., Spokane, Wash., were involved, was 25 per cent in 1919 than in 1918, according to a recent statement by David L. Huntington, president of the company. The amount paid on damage claims was also considerably less in 1919 than in the previous year. Mr. Huntington attributes the decrease in accidents to the use of one-man safety cars on the company's lines.

Zone Plan Abandoned Temporarily.—The New York & Stamford Ry., Port Chester, N. Y., has temporarily abandoned the zone system under which it has been operating for several months. The company installed the zone plan, involving increases in fares, without the consent of the city of Greenwich, Conn. The Greenwich Chamber of Commerce declared the new system illegal, with the result that the company has reverted to the former 5-cent fare pending action by the Connecticut Public Utilities Commission.

Safety Cars for Reading.—The Reading Transit & Light Company, Reading, Pa., has added to its service in Reading three of the latest type one-man safety cars. The cars are being operated on the company's Sixth and Smith Streets line which extends through the thickly populated northwestern section of the city. Before putting the cars into regular service the operators were given a week's instruction. The company has been favored by the fullest co-operation on the part of patrons in obtaining from the new cars the fullest measure of service.

Asks Support of Car Riders.—The Indianapolis (Ind.) Street Ry. has addressed an open letter to the people of that city, asking the question, "What does the future hold for Indianapolis?" The company cites the fact that Indianapolis is destined to become a city of at least 500,000 people. It notes the many heavy manufacturing establishments and the growing bank clearances and asks the people of the city if the electric railway will be assured a fair and equitable treatment in its effort to give the public adequate transportation service. The appeal occupied a full page space in a recent edition of the Indianapolis *News*.

Heavy Travel on Texas Interurban.—Passenger travel on cars operated by the Texas Electric Ry., Dallas, Tex., during 1919 was the greatest in the history of the company, according to data compiled by the accounting department at Dallas. During the first eleven months of 1919, which period is covered in the accountant's report, 12,790,321 passengers were transported over the 250 miles of interurban lines maintained by the company touching seven cities of Texas. The total of car-miles for the period was 5,410,370. In addition to the passenger travel, the express traffic on the company's lines was unusually heavy.

Second Zone on San Antonio Lines.—Owing to the need of further increasing its revenue, the San Antonio (Tex.) Public Service Co. has established a second zone on several of its lines and has raised the fare for a ride from the center of the city to the city limits to 8 cents. The length of the inner zone is approximately 2.8 miles, beyond which an extra fare of 3 cents is collected. The company on Nov. 30, adopted a plan under which San Antonio was divided into two zones, with a 5-cent fare from the city limits to the center of the city, and a 10-cent fare for one across the city. In installing the extra 3-cent charge, the company stated that during the month of December its gross revenue had increased only 5 per cent.

New $2,000,000 Bus Company for Jersey.—The Middlesex Omnibus Co. has been chartered at Trenton with a capital of $2,000,000 to operate buses in all parts of the State of New Jersey. The concern is a consolidation of bus owners of New Brunswick, backed by New York interests, and will charge a flat rate of 5 cents. The stock of the corporation is divided into 200,000 shares, half of which are preferred stock and the remaining common. The shares have a par value of $10 each. The company will begin business with $1,000,000 actually paid in. The officers are: A. L. Allen, of New York, president; John Parker, vice-president; William G. Hovey, secretary; George S. Busch, treasurer.

Five-Cent Service in Hastings.—The Hastings (N. Y.) Railway, Inc., under its first tariff filed with the Public Service Commission, Second District, on Jan. 9 began operation of its road from the Yonkers city line through Warburton Ave. to the south end of the Hastings bridge. A 5-cent fare is provided. Hastings has been without street railroad facilities since early last year when the Yonkers Railroad abandoned its Hastings line following its inability to get local authorization for an increased fare. It maintained that a part of the Hastings system caused operation at a loss. After the line was abandoned the Hastings Ry. was formed and it is operating under a new franchise granted by the local authorities. A feature of the new franchise is that there are no restrictions as to the fare rate to be charged.

New Publications

Transactions of the American Society of Mechanical Engineers

Vol. 40, 1,207 pages. Published by the Society, 29 West Thirty-ninth St., New York City.

This volume contains the proceedings of the Worcester and New York meetings held during 1918. Among the papers of particular interest in the electric railway field are the following: Economical use of fuel; report on standardization of flanges and pipe sections; conservation of heat losses from pipes and boilers; chemical and physical control of boiler operation; factors in fuel economy in boiler plants; the large steam turbine, and the advantages of pressure and high superheat as affecting steam plant efficiency.

Advertising: Its Principles and Practice

By Tipper, Hotchkiss, Hollingworth and Parsons. Second Edition. Published by Ronald Press Co. Flexible leather binding. 579 pages.

A working manual for the advertising man and a textbook for the student, showing the economic relation of advertising to marketing. An effort has been made in this extensive and practical volume to combine all the separate arts and sciences that enter into the problems of advertising and marketing by considering the fundamentals of each with reference to all the others. It includes the economic, psychologic, technical and physical factors, together with the essential principles of artistic arrangement and English composition as applied to the construction of advertisements. All these features are summed up in the actual operation of an advertising campaign which is discussed in the last two chapters of the text.

War-Time Changes in Wages, September 1914—March 1919

Research Report No. 20, September, 1919, published by the National Industrial Conference Board, Boston, Mass. 128 pages.

This is a study of the increase in wages, both for piece workers and time workers, in eight manufacturing industries; namely, metal, cotton, wool, silk, boot and shoe, paper, rubber, and chemicals. The pamphlet is illustrated by diagrams and carries many tables. The figures indicate that with very few exceptions hourly earnings of male workers increased well over 80 per cent for the entire period covered. In the case of female workers, the percentage increases were on an average lower than those for men, but in the four industries which included a majority of all women reported upon they were frequently greater. The highest hourly rate for the male workers quoted are for stitchers in the boot and shoe trade, who on piecework earned 36.5 cents in September 1914 and 68.7 cents in March 1919.

Personal Mention

Sales Manager for This Paper

Jay E. Mason has been appointed sales manager of the ELECTRIC RAILWAY JOURNAL. He is a graduate of Purdue University, in civil engineering, class of 1914. In May, 1915, Mr. Mason joined the McGraw organization and served as head of the advertising copy service in Chicago until January, 1917. He then became assistant to the western manager of *Engineering News-Record*, a few months later succeeding to the managership. He left the *News-Record* in April, 1919, to become assistant sales manager and manager of field sales for the Blaw-Knox Company, Pittsburgh, Pa.

Ralph Newman has been appointed purchasing agent of the Eighth Avenue R.R., New York, N. Y., and will have full charge of inquiries and orders.

O. J. Shaw, secretary of the Lincoln (Neb.) Traction Co., has been appointed general manager of the company. Mr. Shaw will continue to act as secretary.

L. J. Noble has been appointed general superintendent of the electric, gas, and railway departments of the Fort Smith Light & Traction Co., Fort Smith, Ark.

George W. Geer, auditor of the Shore Line Electric Railway, Norwich, Conn., has resigned to take a position with the New York, Westchester & Boston Railroad, New York, N. Y.

Clarence K. Reed, general auditor of the Boston (Mass.) Elevated Railway, has tendered his resignation to take effect on Feb. 1. Mr. Reed plans to enter the employ of the People's Trust Company, Boston, Mass.

Arthur Kolste has been appointed superintendent of railways of the Eastern Wisconsin Electric Co., Sheboygan, Wis., succeeding Charles E. Warwick, resigned. Mr. Kolste was chief inspector for the company prior to his new appointment.

George W. Camp, superintendent of the Waterbury lines of the Connecticut Co., New Haven, Conn., has resigned. Mr. Camp joined the company twelve years ago as a conductor. No successor will be appointed, the position of superintendent of the company's Waterbury lines being abolished.

Bernard F. Weadock, attorney for the Detroit (Mich.) United Ry., resigned his connection with the company on Jan. 1 to take up the private practice of law. Mr. Weadock became attorney for the company in 1912. He was formerly on the staff of the corporation counsel of Detroit.

Charles E. Warwick, superintendent of railways of the Eastern Wisconsin Electric Co., Sheboygan, Wis., has resigned. Mr. Warwick, who has been in the public utility business for twenty-four years, was formerly superintendent of the Vicksburg Light & Traction Co., Vicksburg, Miss.

B. J. Megginson, superintendent of the Newport News & Hampton Railway, Gas & Electric Co., has resigned to become manager of the Frederick Road Park, Baltimore, Md., which is to be opened to the public about May 1. Mr. Megginson has been connected with the electric railway industry for fifteen years.

H. O. Allison, safety engineer of the Beaver Valley Traction Co., New Brighton, Pa., has been appointed chairman of the bulletin committee of the Electric Railway Section of the National Safety Council. The National Safety Council combines a bulletin service with its service going to members, the material for which will be assembled by Mr. Allison and the members of his committee.

Herbert A. Faulkner, formerly well-known in electric railway circles of the East as general passenger and advertising agent of the Bay State Street Ry., and secretary of the New England Street Railway Club, has been appointed advertising manager of the Moreland Motor Truck Company, Los Angeles, Cal. Mr. Faulkner will also have charge of the promotion of sales, and public relations work for the company.

L. D. Hall has been appointed superintendent of railways of the Northwestern Ohio Ry. & Power Co., Toledo, Ohio, succeeding F. M. Ames, resigned. Mr. Hall joined the company in June, 1919, soon after his return to the United States after serving for eighteen months in France as a first lieutenant in the 605th Engineers. He was formerly connected with the traffic department of the Toledo & Western Raliway.

Melvin W. Bridges has been appointed safety engineer of the Chicago (Ill.) Elevated R.R. Mr. Bridges entered the employ of the company as an assistant in the master mechanic's office of the South Side Elevated Ry. in 1909. At the time of the consolidation in 1911 he became clerk in the master mechanic's office of the present system. From March, 1917, until April, 1919, Mr. Bridges was in military service, acting as captain of Company F, 131st Infantry. He was wounded at Amiens in July, 1918.

Thomas H. Otley, superintendent of signals of the Brooklyn (N. Y.) Rapid Transit Co., has resigned. Mr. Otley obtained a leave of absence last May to visit his former home in England, and his resignation followed his decision to remain abroad for an indefinite period. He entered the employ of the company in 1905 as an electrical repair man, later being made foreman in the repair department. In 1906 he was advanced to the position of signal supervisor and was placed in direct charge of signal maintenance. In 1916 his title was changed to that of superintendent of signals.

George A. Deibert has been appointed to the newly-created position of superintendent of safety of the Georgia Railway & Power Co., Atlanta, Ga. While safety work is by no means a new inception on the part of the company, the creation of a department to carry on that work exclusively is a new departure. Mr. Deibert brings with him to the company many years of experience in railroad safety work. He was with the Atlantic Coast Lines for about twelve years and was appointed assistant supervisor of safety with the United States Railroad Administration in the Southern Region, shortly after the Government assumed control of the roads. Under Charles M. Anderson, regional director of safety, Mr. Deibert has gained wide experience in safety work that especially qualified him for his new duties.

Obituary

Albert Schmid, for many years chief engineer and later manager of the French Westinghouse Co., died in New York City recently. Born in Switzerland sixty-two years ago, he came to the United States in 1882 and became a citizen shortly afterward. Mr. Schmid associated himself with the Westinghouse Co. at the instance of the late George Westinghouse and was its first chief engineer and later became general superintendent. His skill in designing electrical apparatus contributed very largely to the early success of the alternating current electric system, and to railway apparatus.

J. E. Derrick, formerly general manager of the Oneonta, Cooperstown & Richfield Springs Ry., Oneonta, N. Y., died on Jan. 1 at Plainfield, N. J. Mr. Derrick entered railway work in 1893 as assistant superintendent of the Rutland (Vt.) Street Ry. Two years later he became superintendent of transportation of the Glens Falls, Sandy Hill & Fort Edward Street Ry., Glens Falls, N. Y. In 1899 he was appointed general manager of a railway and light company in Missouri. In the following year he returned to Glens Falls as general manager of the Hudson Valley Traction Co., becoming general manager of the Oneonta, Cooperstown & Richfield Springs Ry. four years later. He subsequently opened an office in New York City, as an expert public accountant.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Brass Market Now in a Flourishing Condition

Manufactures Absorbing Large Output—Prices Lower than Last Summer—Deliveries Fair

The influence of the cost of copper upon the price of brass is well illustrated by the course of the latter since midsummer, when advances in the cost of labor in the Naugatuck Valley of Connecticut failed to produce any considerable change in quotations to electrical manufacturers compared with the increases which accompanied the upward movement in copper. In a review of the conditions prevailing in the brass market published in the ELECTRIC RAILWAY JOURNAL, Sept. 6, 1919, page 506, it was pointed out that labor cost was a much less important factor in the price of brass than material cost. The following comparison of base prices of brass and brass products bears out this contention:

	Aug., 1919	Dec., 1919
Sheet metal:		
High brass	27¾	24¼
Low brass	30½	26¼
Wire:		
High brass	27¾	24¼
Low brass	30¼	26¼
Commercial bronze	33½	28
Rods:		
High brass	26¾	22¾
Low brass	31¼	27
Commercial bronze	33½	29
Brazed tubes:		
Brass	39	36
Copper and commercial bronze	44½	40¾
Copper:		
Sheets	33½	28½
In rolls	31¼	26¾
Drawn-copper shapes	30¼	25¾
Copper wire, bare, f.o.b. mill	26¾	22

These prices include delivery from the mills up to 50 cents per 100 lb. freight rates. They show that the reduction in the price of copper which has taken place since summer has been directly reflected in lower quotations by the brass manufacturers, while the wage scales, established in the Naugatuck Valley remain generally the same. Throughout the electrical industry there is a widespread opinion that copper is not likely to go lower in price for some time, and if advances occur at a rate which indicates a rising market, there will doubtless be a flood of new orders which will overtax the facilities of the brass mills and seriously extend deliveries.

At the present, however, the needs of electrical manufacturers appear to be well cared for; *i.e.*, in the case of those who have pursued a far-sighted policy with regard to orders. The brass mills carry few stocks of material suited to electrical manufacturing requirements.

Brass mills are running about ten hours per day now and in some cases at night. Raw copper is plentiful, and the base price in the ingot of about 19¼ cents at this writing may be contrasted with 24 cents last summer. Labor is not up to normal efficiency as yet. One of the larger mills is working about 50 per cent of its departments at night and has a total of 66,000,000 lb. of brass in process in its establishments. Europe has not as yet begun to purchase copper on a large scale from this country and cannot afford to do so at the current low rates of exchange.

Among the different brass mills deliveries vary considerably, but in general seamless tubing is quoted around thirty-five days; sheet metal, forty-five days; brass wire, thirty to fifty days; copper wire, thirty to forty days; screw shells and socket shells, sixty days. Price guarantees are being given for the first quarter of 1920. In sum, there appears no reason for disquiet as to the supply of brass unless a heavy increase in demand should suddenly arise. Considering scarcities in many other fields, the brass market is more favorably situated than is supposed to be the case, but there seems little prospect of lower prices or quicker deliveries for months to come.

South and Southwest Expected to Buy Heavily During 1920

Large Appropriations Being Set Aside for Year's Equipment and Supplies—Many Inquiries Out but Few Salesmen Approach This Territory

Heavy buying of rails, power equipment and supplies will be made shortly through the southeast, the south and southwest territory. Many inquiries are coming into the market for electric railway equipment on a large scale. For some time manufacturers and sales organizations, however, have not been very active in this territory, but now that large sums are being spent and very large appropriations are being arranged for 1920 expenditures, it is reasonable to expect that manufacturers and supply companies will be more active in the South, with the result that more business will undoubtedly be dug up than is now apparent.

Conditions are very encouraging all through these sections of the country. And those roads which have been progressive enough to install modern economies are doing very well. Also, the attitude of the public is improving to such an extent that it appears very hopeful in almost all communities that fare increases will be granted in the near future.

Many properties in the South prospered materially as a result of war business, and then as their business began to decline the oil boom and enormous crop of cotton and tobacco, with unheard of prices, have continued and increased the prosperity during the war so that it is reported it is practically unusual for a company not to be able to show at the present time 30 to 60 per cent increase in the number of car riders over a corresponding period last year. All through Texas especially conditions are very good. There is much activity and many extensions and connecting lines are planned, a fair percentage of which will be completed during the year.

In Birmingham and in New Orleans, two notable properties which are now in the hands of receivers, business conditions are good and are improving steadily. A great deal of money is being spent in building these properties up and both of them are in such condition that it will require a large amount of money to bring these properties back to their former physical condition.

POWER EQUIPMENT ACTIVE

Many of the properties in the South have already placed orders for power equipment or are in the market at the present time. The Jackson (Tenn.) Railway & Light Company has contracted with the Babcock & Wilcox Company for a 505 hp. Stirling boiler to be installed in February. The Savannah (Ga.) Electric Company will equip nine boilers, aggregating 4,300 hp., for burning oil. In addition to the above the New Orleans Railway & Light Company expects to be in the market shortly for a 15,000 kw. turbine with condenser auxiliaries, one 30,000 gal. fuel oil storage tank with pumps, piping, etc., and one 1,500 kw. 125-250 volt rotary for Edison d.c. system. Numerous changes in station cables, new cable to be installed in conduit and many miscellaneous repairs also will be made during the year. The United Railways of St. Louis have planned to build two automatic substations. Rome (Ga.) Railway & Light Company will add ten to fifteen thousand dollars to its transmission line, which represents a normal growth of the business. Capital Traction Company and Washington Maryland Railway Company, Washington, D. C., will be in the market for one 7,500-kw. turbine generator with accessories and one 2,000-kw. rotary converter and transformer now under order. These are to be installed in 1920. Northern Texas Traction Company and Tarrant County Traction Company, Fort Worth, Tex., will be in the market shortly for one automatic sub-station.

In addition to the above, many companies throughout Southern territory have made inquiries or are in the market for trolley wire, lead covered cable, hard-drawn wire, in addition to shop tools, machinery and track and roadway supplies of all kinds.

Generating and Distribution Equipment Far Behind

Automatic Substation Demand Heavy —Turbine Deliveries Ten to Twelve Months

Demands from all directions for railway substations and transformers, and especially for automatic substations, are the outstanding features of the new year in the generation and distribution market of the railway field.

Power equipment is far behind in production and deliveries are from several months to a year. Generators, rotaries and kindred machinery are not coming through in such volume as to lengthen appreciably their ordinary shipping dates. The lowest limit given is twelve weeks, and for larger and more special machines the time of filling an order goes up to ten months.

Since summer steam-turbine shipping dates have nearly doubled for one manufacturer. His summer date was rather below normal. However, it is taking from five to seven months to finish turbines in capacities under, say, 1,000 kw., and from ten to twelve months for the larger sizes. These dates are little above normal. The absence of capable labor is contributing factor with one producer. One manufacturer believes his average production is behind about 25 per cent. This would not seem far from a pretty fair estimate of all electrical machinery production.

Railway Motor Demands Improving

Deliveries Range from Three Months on Safety Car Type to Four Months on Heavier Motors

Probably the most important feature of the railway motor market at the present time is deliveries. While for some types shipments are virtually normal, for others such as the heavier motors shipping dates have lengthened considerably.

Railway motors, the demand for which has been extremely light, can be delivered in good quantity in from three to four months. Most of the business received has been on motors for safety cars which although fair in number of orders and amount of cars per order, in the aggregate does not compare favorably with the business of pre-war years. Heavier buying of motors is expected within the next few months based on reports from various companies who are going into the market for cars. United Railways of St. Louis are expecting to place an order for 100 large cars and for twenty safety cars within the near future. Long Island Railroad is expected to place an order for 100 cars and a number of large cities will be in the market for a considerable number of cars as soon as questions of increased fares are decided.

Manufacturers who have had to carry large technical staffs at considerable expense when the amount of business transacted in the past two years did not seem to warrant it are again taking hope and are looking forward to a greatly improved season in railway motors for the coming year.

Rolling Stock

Mobile Light & R.R. Co., Mobile, Ala., is in the market for a number of safety cars.

Franchises

Montgomery Light & Traction Co., Montgomery, Ala.—The Montgomery Light & Traction Co. has received from the Montgomery City Commission a new franchise under which it will abandon the present direct system of trackage and establish a loop system. The work is to be completed within six months.

Lake Shore Electric Ry., Cleveland, Ohio.—The Lake Shore Electric Ry. has received a twenty-five year franchise from the city of Norwalk, Ohio. The company will pave its right right of way and pay a rental of $150 a year for the use of the streets. It will also pay $300 for the use of streets for the two years since its franchise expired.

Power Houses, Shops and Buildings

Birmingham Railway, Light & Power Co., Birmingham, Ala.—This company plans during the year to purchase one wheel grinder and one wheel boring mill.

Denver & Interurban R.R., Denver, Col.—Through its receiver W. H. Edmunds, this company is contemplating the purchase during the coming year of some shop and woodworking machinery.

Savannah (Ga.) Electric Co.—This company will equip during the year five 665-hp. boilers and two 493-hp.; also two 460-hp. boilers for burning oil.

Chicago, North Shore & Milwaukee R.R., Highwood, Ill.—This company proposes to purchase during 1920, two 1,000-kw. rotary converters and automatic substation equipment.

Metropolitan West Side Elevated Ry., Chicago, Ill.—This company expects to purchase during 1920 one 42-in. vertical boring mill and one 24-in. crank shaper.

Northwestern Elevated Ry, Chicago, Ill.—This company expects during the year to purchase one 36-in. heavy duty engine lathe and one 36-in. radial drill press.

Interstate Public Service Co., Indianapolis, Ind.—The Interstate Public Service Co. will build new central shops at Scottsburg, Ind. The company will also change forty-three miles of 1,200-volt transmission line to 600 volts and will discard the present 1,200-volt power-house.

Monroe (La.) Street Ry.—The construction of a new carhouse by the Monroe Street Ry. will begin shortly. The cost is estimated at upwards of $50,000.

New Orleans Railway & Light Co., New Orleans, La.—This company proposes to purchase during the coming year a 15,000 kw. turbine with condenser auxiliaries, a 30,000 gal. fuel oil storage tank with pumps, piping, etc., a 1,500 k.w. 125-250 volt rotary. Changes will be made in the station cables, and new cables will be installed.

Ironwood & Bessemer Railway & Light Co., Ironwood, Mich.—The Ironwood & Bessemer Railway & Light Co. and the Ashland Light, Power & Street Ry., Ashland, Wis., will build at Ironwood a car house of steel and brick to accommodate twenty cars.

Track and Roadway

Calgary Municipal Ry., Calgary, Alta., Canada.—The Calgary Municipal Ry. plans the purchase of 5 tons of No. 00 trolley wire, fifteen sectionalizing switches and sundry trolley hardware.

Chicago, South Bend & Northern Indiana Ry. and the Southern Michigan Ry., South Bend, Ind.—These companies plan during the coming year to purchase poles and high-tension insulators.

Indianapolis & Louisville Traction Ry., Scottsburg, Ind.—This company is contemplating a 30-mile extension of its transmission line and the installing of two rotary substations.

Interstate Public Service Co., Indianapolis, Ind.—This company proposes to change 43 miles of 1,200-volt line to 600 volts, discard the 1,200-volt power house and install three substations.

Peoria (Ill.) Ry.—The Peoria (Ill.) Railway will probably begin its $100,000 program of construction and rehabilitation early in March. The major portion of the building fund will be expended on the Monroe Street line and on roadway work. The original plans for the rehabilitation called for the completion of the work by Dec. 31, 1919, but the Public Utilities Commission has extended the time to May 15, 1920.

New Orleans Railway & Light Co., New Orleans, La.—This company expects to purchase trolley wire, 6600 volt, No. 0000 lead covered cable and some hard drawn trolley wire.

Boston (Mass.) Elevated Ry.—The Boston Elevated Ry. has been ordered by the Mayor of Boston to relay tracks on improved streets in the Roxbury District of Boston, Mass. The new location will be on Center Street and Belgrade Avenue, from Washington Street to Lagrange Street.

Toronto (Ont.) Civic Ry.—The City Council of Toronto, Ont., has instructed the Commissioner of Public Works to proceed with the construction of a double track on Bloor Street West.

Nashville Railway & Light Co., Nashville, Tenn.—The Nashville Railway & Power Co. proposes to lay additional tracks in the central part of the city of Nashville to relieve congested conditions. The plans call for the running of tracks through Fifth and Sixth Streets and Seventh Avenue. The company will eventually reroute its entire system.

Trade Notes

Tubular Woven Fabric Co., Pawtucket, R. I., proposes the erection of a new two- and four-story plant, which will cost about $200,000 equipped.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., will make an addition to its East Springfield factory at an estimated outlay of $150,000.

King Coil Manufacturing Co., Cleveland, Ohio, announces the removal of its offices from the factory at 1011 Power Ave. to 328 Schofield Building, Cleveland.

E. W. Clark & Co., Philadelphia, Pa., announce that effective Jan. 1, George L. Estabrook and Edward W. Clark, 3rd, have been admitted to partnership in the firm.

Stanley Insulating Co., Greenfield, Mass., has prepared plans for the construction of a new addition to its plant, for increased capacity. The structure is estimated to cost $30,000.

Sprague Electric Works of the General Electric Co., Bloomfield, N. J., has broken ground for the construction of a new two-story addition to its plant, estimated to cost about $40,000.

Chicago (Ill.) Pneumatic Tool Co., announces the appointment of Edward A. Woodworth as the company's special railroad representative with headquarters at Fisher Building. Mr. Woodworth has been for several years secretary of the Committee on Standards, United States Railroad Administration, Washington, D. C.

W. D. Ward has been transferred from the San Francisco office of the Pelton Water Wheel Co. to the New York Office as manager of the Atlantic department, which includes the territory east of the Mississippi, Europe and South America. Mr. Ward has been with the Pelton company for twenty-five years, of late as contract and sales engineer. In New York he succeeds F. W. Gay.

Doehler Die Casting Co., Brooklyn, N. Y., with its main office and Eastern plant at Brooklyn, N. Y., and a branch-plant at Toledo, Ohio, manufacturer of die castings in white metal, aluminum and brass alloys and bronze-back and aluminum-back babbitt-lined bearings, has just purchased a seven-acre tract in Chicago, on which the company will erect a modern one-story concrete steel and brick structure for the manufacture of die castings and bearings. The building is to be ready for occupation on or about Jan. 1, 1920.

Macomber & West, Boston, Mass., has been organized with offices at 261 Franklin Street to conduct a general consulting engineering business, including designs, supervision of construction and appraisals. George P. Carver, Alexander Macomber and John West are the partners in the new establishment. Mr. Carver for the past twelve years has conducted a general engineering practice in Boston, specializing in coal-handling and fuel problems, while Mr. Macomber and Mr. West have been associated with Charles H. Tenney & Co., the former as electrical engineer and later assistant engineering manager, and the latter as new-business manager of all the Tenney properties.

Roller-Smith Co., New York, N. Y., announces the appointment of Walter W. Gaskill, 141 Milk Street, Boston, Mass., effective Jan. 1, 1920, as its agent for Boston and New England territory, superseding the P. I. Perkins Company. He will also handle the products of the Ward-Leonard Electric Co., Mt. Vernon, N. Y. and those of the Brown Instrument Co., Philadelphia, Pa. After graduating from Harvard in 1908 and taking a post graduate course in 1909, Mr. Gaskill spent about a year and one-half on the General Electric test course at Schenectady, later becoming connected with the Boston office of the company where he remained until June, 1918, as a specialist on electrical apparatus for pulp and paper mill work. During the war he was with the Bureau of Aircraft Production.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces the appointment of Arthur Elliott Allen as district manager at New York succeeding Edward D. Kilburn, who was recently elected vice-president and general manager of the International Company. In 1902 Mr. Allen entered the employ of the Electric company at its Newark works, later being placed in charge of the test department where he remained until 1910. In 1911 Mr. Allen was assigned to the supply division of the New York sales office of which he became manager on December 1, 1915, retaining this position until he joined the Canadian Overseas Forces in October, 1917. After more than two years services overseas as a technical officer, in the Royal Flying Corps, he was honorably discharged and returned to the New York office of the company as executive assistant to the manager.

Underwriters' Laboratories, Inc., New York, N. Y., have now listed as standard a line of cartridge fuses, renewable type, as manufactured in certain sizes by the Economy Fuse & Manufacturing Co., the Trico Fuse Manufacturing Co., the Federal Electric Company and the Chicago Fuse Manufacturing Co., as follows: Economy fuses in both 250 and 600-volt types up to 600 amperes; Trico fuses in both 250 and 650-volt types up to 600 amp. Federal fuses in the 250-volt type up to 400 amp. and in the 600-volt type up to 100 amp.; and the Chicago fuses in the 250-volt type, up to 600 amp. All of the renewable fuses above specified have been found by the Underwriters' Laboratories, Inc., to conform to the specifications of the recently adopted standard for renewable cartridge inclosed fuses. Several lines of renewable fuses of other manufacturers are at present before the Underwriters' Laboratories, Inc., and it is expected that further standard listings will be given in the near future if the fuses are found to conform to specifications. Already the "Atlas Four-in-One" fuse, made by the Multiple Electric Products Co., has been approved in sizes of 0 amp. to 200 amp. for 250-volt ratings and 0 amp. to 30 amp. for 600-volt ratings.

New Advertising Literature

Roller-Smith Co., New York, N. Y.: Bulletin No. 420 describing ammeters and voltmeters for small switchboards.

Wheeler Condenser & Engineering Co., Carteret, N. J.: Bulletin No. 112 E on condensers, pumps, cooling towers, etc., illustrating the latest developments in condensor practice and showing photographs of a number of actual installations of turbo-air pumps, jet condensors and surface condensors.

Nelson Valve Co., Philadelphia, Pa.; Catalog and price list No. 10 on bronze, iron and steel valves, including gate, globe, check and non-return valves. A 156-page book containing 135 halftones, numerous drawings, and including a ten-page preface on valve service, giving design and construction features, inspection and tests, guarantees, recommendations for use of valves and valve service. A large number of pages of data are scattered throughout the book.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.—An illustrated pamphlet "Westinghouse Opportunities for Technical Graduates" which explains in considerable detail the plan developed for training technical graduates at its various works. It contains a list of prominent Westinghouse men who originally entered the company as graduate students, as well as a complete list of schools from which over 5,000 students have entered the employ of the company. Copies of the booklet will be sent to anyone interested on application to the educational department of the company at East Pittsburgh, Pa.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

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Minutes Saved in Transportation a Gain to All

FROM time to time we hear of plans for improvement of traffic conditions in this or that city—recommendations for double-berthing of cars, clearing the tracks of other vehicles, prohibition of automobile parking, etc. Less frequently we find that such recommendations become effective. We are sufficiently familiar with the obstacles that have to be overcome by railway managements to refrain from criticising when the ideals mentioned as possible do not become real.

However, the failure to take advantage of such recommendations does not lessen their value. At the October convention of the T. & T. Association, the committee on code of traffic principles presented a comprehensive report on this subject, and the discussion which followed indicated a real interest on the part of railway officials and city representatives. Many of the former had been discouraged by their inability to secure effective traffic ordinances or to have them enforced by local authorities. All knew the importance of a clear right-of-way in saving minutes that go to make up the car-hours which are now so costly.

A utility management can only do its own part in securing such improvements. The live operator knows that he has a better case in seeking help from a public service commission if he can point to a list of accomplishments indicating plain evidence of intensive development of the facilities at hand. Where he can show that further development has been prevented by opposition or by lack of co-operation on the part of the authorities or the public, his appeal is not likely to be made less effective thereby. Taking the other side of the question, the public can delay the coming of higher fares by insisting on just treatment for the local utility. The rights which are conceded when the municipality takes hold of a railway company should not be denied because the management is in private hands.

Who Says "Novelty Riding" to This?

THE other day we showed an Eastern railway man some up-to-date one-man car operation on the main street of a New England city and remarked cheerfully: "In one week these cars have increased patronage 60 per cent. What do you think of that?" "Oh well," was the owlish reply, "I guess most of that is novelty riding. Yankees like new toys. Wait a year and see what happens."

We went away from there with our head in our hands. As luck would have it, Mr. Burleson had just delivered a letter from the Terre Haute, Indianapolis & Eastern Traction Co.—safety car system *par excellence*. Terre Haute has had its year of that kind of operation, thought we. Let's see if there's any "novelty riding" gloom in the report of Brother Walker. Well, there was anything but gloom. The letter contained some riding and revenue figures in each case after just one year of operation up to Dec. 18. They are given below with statistics for the whole system for the first twelve days in January:

		Per Cent Increase over Previous Year	
Line	Period	In Service	In Revenue
South Seventh St.-Third St.	Dec. 1 to 18	20	36
North Eighth St..	Dec. 11 to 18	12½	14
South Seventeenth St.	Dec. 15 to 18	50	60
For all lines	Jan. 1 to 12	20	25

The industry knows that at Terre Haute "Business Follows Service" just as Mr. Walker believed it would. However, it is gratifying to be able to show the crape-hangers that not only do the American people appreciate the substitution of modern cars for ancient right away, but that the appreciation continues and grows into a most desirable habit. Here we have pitted safety car service after one year against safety car service as a novelty. If this be "novelty riding" let us have more of it to the confusion of the wiseacres who can see nothing but a hearse in any kind of trolley car and to whom anything less than a dime looks like a most contemptible form of money for a car ride!

Choice of Transportation by Plebiscite

THOSE students of American civics and economics who have expressed their amazement—and amusement—at the variety of strictly technical questions placed before American electors for decision will have new cause for wonder at our temperament when they read of such a poll as that of the Broadway (New York) Association in which the vexed question of car versus bus was up for consideration. We could put up a fairly sound argument for allowing the taxpayers to decide almost offhand upon transport questions that hit their pockets directly, such as constitutional amendments relating to enlarged canals; but how can we excuse the action of a body of so-called "hard-headed business men" who, without any thought of investigation whatsoever, blithely decide that they want the tracks removed and buses substituted for cars. If this be hard-headedness, it hath an osseous basis.

This is no place to discuss the morality of wiping out the present actual investment in the Broadway surface car routes—an investment that is enormously greater than it should have been, because the city of New York forced the railways to build the extremely costly conduit system instead of the economical overhead trolley. Let us forget the past for a moment and get down to the unescapable facts of today.

Car Versus Bus as to Speed and Obstructiveness

IT IS to be presumed that the majority of the members voted for the bus because they thought it would be faster, would be less obstructive, would carry more people and would charge less fares than the electric car. Let us take up these factors in order and see what the *facts* are.

First, as to speed: In London, where the buses, after leaving the congested section, spread out over a large number of routes, the average schedule speed of a thirty-four-seat vehicle is but 8.5 m.p.h. It is true that the operating company believes that a higher schedule speed would be attainable if it was permitted to have a free running speed higher than 16 m.p.h., but the same thing would be true if the London tramcars were permitted to have any free running speed they pleased. Now, actually, the seventy-eight-seat London car shows a schedule speed of 8.5 to 9 m.p.h. in spite of the fact that it is tied down to the rails. Anyone who has studied car operation knows that a smaller car averages fewer stops per mile. Therefore, it needs little perspicacity to see that if London's cars were thirty-four-seaters they would be substantially faster than the buses of equivalent capacity. It is significant that even the latest London bus does not seat more than forty-six passengers.

Coming right down to Manhattan Island, New York, we find that the Fifth Avenue Coach Co., which operates over New York's widest, and trackless highways, has a schedule speed of but 8.2 m.p.h. This is the average speed, so it goes without saying that it is less than 8.2 miles on the busier sections. On narrowest and busiest Broadway below Forty-second St., the fifty-one-seat cars average only 6 m.p.h., but on Broadway above Forty-second St., also with fifty-one-seat cars, the average schedule speed is 8 to 10.6 m.p.h. This gives a non-weighted average speed slightly in excess of 8 m.p.h. Obviously there would be no superiority of buses on a seat-for-seat basis, for the buses on Broadway would surely be slower than those running over a combination like Fifth Ave. and Riverside Drive. New York's jitney buses of small single-deck type are as slow as 6 to 7 m.p.h. on the really congested lines. It is significant also that in its recent proposals, the Detroit Motorbus Co. figured on no better speed than 9 m.p.h. for routes to include quite a lot of fairly open boulevards.

As a matter of long observation, both here and abroad, it would appear that on any long thoroughfare where traffic police control is exercised at almost every intersection, there is no noteworthy difference in the schedule speed of a large car and a middle-size bus. The only buses that usually are faster are those of the twelve to sixteen-seat jitney type which, because of their smaller size, make fewer stops and can also "worm their way" in and out of a traffic snarl better than a bus of street-car width.

Second, as to obstructiveness. Again, we may appeal to the far greater experience of the English. In a paper read late last year before the Institute of Civil Engineers of Great Britain, H. H. Gordon noted that the very failure of the buses to *keep in line* over London Bridge gave only 41 per cent efficiency in the use of that highway. He quotes the traffic branch of the Board of Trade (the body whose transit work has been taken over by the Ministry of Transport) as rating the obstructiveness of the car at 9 and the bus at 4 as individual vehicles; but if this is worked out on the basis of seats, the ratio is 9.2 to 9 in favor of the car in fair weather when all the bus seats are available. In wet weather, of course, the open-top London bus, like the open-top New York bus, loses half of its seating capacity. Hence in wet and cold weather, the bus is twice as obstructive as the car. The advantage of ability to run up to the curb to take on and discharge passengers is not particularly great with larger, wider buses, as they cannot pull up even to a fixed stopping place without delaying following traffic. It must be borne in mind, also, that every time a slow-moving bus turns out of the general line of traffic to make the curb, it slows up all traffic behind and does an accident-breeding thing besides. A bus of Fifth Ave. type is too wide to pull up to the curb on lower Broadway without slowing up following traffic.

Other Things the Broadway Association Overlooked

NOW, as to carrying more people: It is obvious that if the forty-four-seat Fifth Ave. buses do no better than 8.2 m.p.h. over their entire route and less than that on congested Fifth Ave., they would certainly do no better on narrower Broadway with its enormous commercial trucking and frequent obstruction of vehicles standing at the curb. Single-deck buses seating up to twenty-four and possibly thirty passengers would be faster, but not enough faster to make up for their smaller capacity. The real advantage of the bus is not superior capacity over a street already supplied with trackways, but ability to develop new routes where the traffic is insufficient to warrant the construction of tracks and usually at higher fares. The only way to get bus capacity even approximating that of a car is to use a double-deck; but the double-deck in turn slows down the time of interchanging passengers, as the most amateur observer can see for himself.

Last of all, we come to the matter of fares: Has the Broadway Association any idea that the motor bus will carry people for 5 cents up and down the only street that runs through Manhattan Island from stem to stern? It can't be done! Has the Association overlooked the trifling fact that the Fifth Avenue Coach Co. operates on a 10-cent fare with a much shorter haul?

The operating expenses per bus-mile (exculsive of 6.02 cents for taxes) of that company were 29.03 cents for the fiscal year ended June 30, 1919. In view of the fact that the Fifth Avenue Co.'s platform wages have been heavily increased since, and that gasoline is still going up, there is no magic cheapness about the operation of even this highly-efficient company. Or is it possible that the Broadway Association, like Grover A. Whalen, New York's Commissioner of Plant and Structure, thinks that one-man operation is peculiar only to the motor bus? Hardly, with some 125 to 150 cities already using the safety car! We do know that a thirty-two to thirty-five-seat one-man safety car is entirely practicable, but so experienced a bus operator as Harold B. Weaver of the Chicago Motor Bus Co. stated at the January, 1920, Highways Transport Conference in New York that a thirty-seat bus could not be run by one man on anything like a decent schedule. On the other hand, it is a fact that one-man safety cars negotiate busy streets at the same speed as a bus of three-fourths the capacity. Facts, such as quicker ingress and egress, stubborn things. We do not intend in this connection to discuss the question of whether one-man safety cars are suitable for the north and south line traffic in the city of New York; but we do know that with such operation their over-all cost of carrying a passenger most comfortably and most speedily would be far below the true cost of operation by means of any motor bus now available.

There is an old saying that we should not throw the dirty water out of the window until we are assured of clean; neither should we rush to the new ills and sorrows of the motor bus until we have actually exhausted the resources of the trolley car. Let us repeat that there are many wise and legitimate uses for motor buses; but the substitution of the bus for the car on long straightaway routes where track is already in place is not one of them. There was a reason for the supersession on Broadway of the horse bus by the horse car, and that reason still holds good.

May we not hope that on sober second thought the Broadway Association will go into a subject so vital to itself on a truly business basis and not permit its members to be misled by the same enthusiasms that in an earlier day built many a mile of useless track to be paid for in the higher fares and receiverships of today?

The Negro Bugaboo and the Safety Car

ALL THROUGH the South there has been a great supposed barrier to the more extended adoption of the one-man safety car; namely, the handling of negroes and white passengers in and out at the same entrance-exit. The feeling that this problem was a real obstacle to the use of the small cars has been so keen and so generally prevalent in the South that we recently took special pains to investigate this through personal observation and interview of the railway operating officials through the Southeast, South and Southwest.

In the Southern cities which are not yet using one-man cars, one of the first reasons given for the delay, usually, is fear of race trouble. In those cities which have undertaken the use of safety cars, the first installation has been hesitatingly made on a line having the least negro travel and with full expectancy that something would happen and with everything in readiness to pull off the trouble-making cars.

But these apprehensions have never become realities. So the initial installations have been extended to other lines having more and more negro passengers. And always this apprehension of trouble has been present to cause much uneasiness, but it has never materialized. Thus while nearly all Southern managements feel that herein lies a great potential source of trouble which might break out to bring complete discredit to the safety car and perhaps force its abandonment, the actual results of the roads having experience is causing this feeling gradually to be dispelled.

The conclusions we have reached are that the negro problem is largely mental, that it does not form a real barrier to the adoption of the safety car, but that judgment should be used in introducing the cars to the public, starting on those lines having light negro travel and working to the heavier ones. If this simple sound procedure is followed, there is no need for fear nor is this potential trouble ever likely to become seriously a reality.

Go After the Commercial Traveling Man

MANAGERS and operators of interurban lines should not overlook any good opportunity to advertise their service in such places and manner that it will be brought forcefully to the attention of the commercial traveling man. Here is a class of patronage which, if attracted and held, may bring into the railway coffers many needed dollars. At present there is more traveling being done than ever before in the history of the country. Everywhere hotels are crowded to capacity and prospective guests are being turned away, yet the railroad facilities for handling this increased travel are below normal.

Most interurban lines pass through many small or medium-sized towns where the average traveling man is limited to a very few calls. His ambition is to make as many of these towns as possible in a day, yet complete his business in each. If he depends upon the steam railroad, he is probably limited to one town, but he often uses it because he knows little or nothing about the interurban, and when he makes inquiry concerning trains from the hotel porter, he generally receives from this functionary information concerning steam trains only.

It is true that many traveling salesmen carry sample trunks, but the percentage of the total is not large, and, even so, the majority of interurban lines today are equipped to handle baggage. Those which are not so equipped must concentrate on the man who travels with a grip and portfolio.

An example of what a traveling man can accomplish by using the electric lines may be cited from the actual experience of such a traveler. This man, on a certain morning, left Chicago by the Chicago, North Shore & Milwaukee R.R. at 7 a.m. Arriving at Milwaukee, Wis., 80 miles distant, he made three successful calls, and boarded a Milwaukee Northern car for Sheboygan, 57 miles away. Here he made three calls, and found each party out. He ate dinner and repeated each call with success. At 3 p.m. he boarded an Eastern Wisconsin Electric Co. car for Plymouth 16 miles away, and made two successful calls. Leaving Plymouth at 5:58, he returned to Sheboygan, made one call, and had supper. From Sheboygan he returned to Milwaukee, spent forty-five minutes visiting the Arcade, and returned to Chicago, arriving in the loop at 12:45 a.m. This man in the round trip covered 318 miles, visited three cities, and made nine successful business calls. The same thing could be accomplished on many interurban lines, but the traveling man as a rule does not know it.

The most important place to advertise the service to the traveling man is in the hotel, not only in the leading hotels of terminal cities, but also in the hotels all along the line. The hotel cigar counter is a most excellent place to carry on the propaganda, either in the form of a framed notice, or by the distribution of pamphlets and time-tables. In the smaller towns, restaurants and, if possible, railroad stations, are good places to advertise the service. The hotel porter is, of course, a most important medium. His acquaintance should be cultivated, and he should be supplied with complete information concerning the service, and with time-tables and descriptive pamphlets. Teach him to think and talk the "electric way" first. The results may be surprising.

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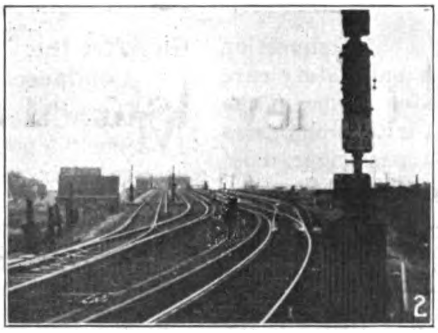
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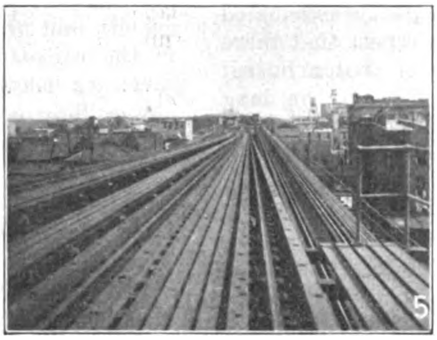
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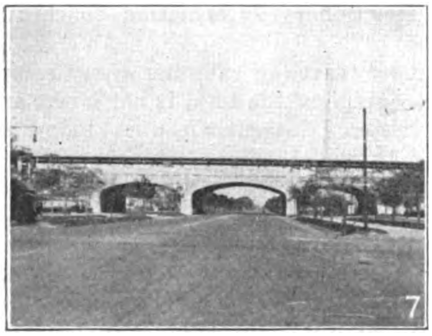
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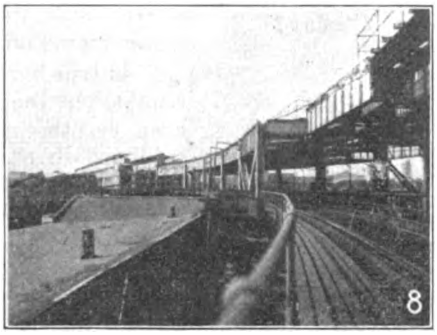
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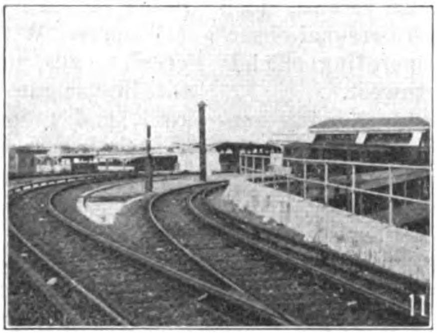
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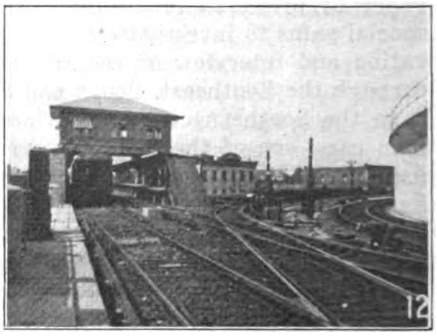
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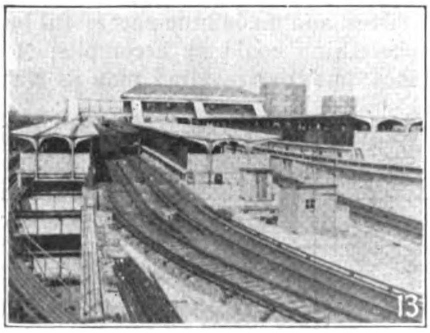
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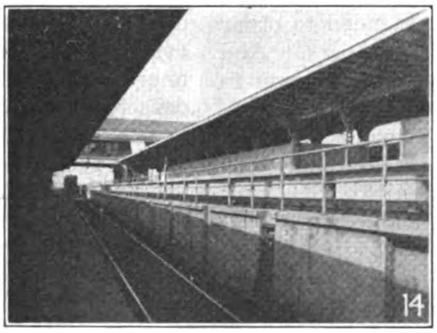
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THE NEW TERMINAL AT CONEY ISLAND

No. 1—Junction of Sea Beach and West End lines at Coney Island Creek bridge and entrance to Stillwell Avenue terminal; Interlock tower controlling train movements at the north end of the terminal. No. 2—Two tracks across bridge branching into four just beyond interlock tower. No. 3—Four tracks branching into the eight terminal tracks on the structure. No. 4—Looking back on the same eight tracks converging into four; concrete platforms at north end of station. Nos. 5 and 6—Opposite views of Brighton Beach four-track line where the structure becomes double-decked. No. 7—Graceful structure and station over Ocean Parkway, the principal automobile route to Coney. No. 8—Double-deck structure looking toward Gravesend station from the east. No. 9—Right-of-way only 40-ft. wide through amusement park, necessitating double-deck structure. No. 10—Luna Park in the heart of Coney's amusements, from the double-deck structure. No. 11—Brighton Beach line upper deck express tracks curving into Stillwell Avenue station. No. 12—Brighton Beach lower deck local tracks curving into Stillwell Avenue station; Norton's Point shuttle line station at left with interlock tower above it, controlling movements at the south end of Stillwell Avenue station. No. 13—Stillwell Avenue station and trainmen's building from interlock tower at south end of terminal. Nos. 14 and 15—A "close-up" in the terminal, showing the construction and the two track levels to connect with the upper and lower decks.

Handling Coney Island's Crowds

Extensive New Terminal Facilities for All Elevated and Subway Lines Involve Many Engineering Difficulties and Provide Efficient Means of Handling the Enormous Throngs of Pleasure Seekers

CONEY ISLAND, famous the world over as an amusement park and bathing beach, has two appeals to the transportation department of the Brooklyn Rapid Transit Company, which operates the important railway lines serving this popular resort. It is a delight from the point of view of the immense source of business it creates, but a bane to the operating personnel on those occasions when a sudden thunderstorm transforms the light-hearted pleasure seekers into a rushing, crowding mob bent on getting home immediately, and impatient and angry at the inability of the company to receive it *en masse.*

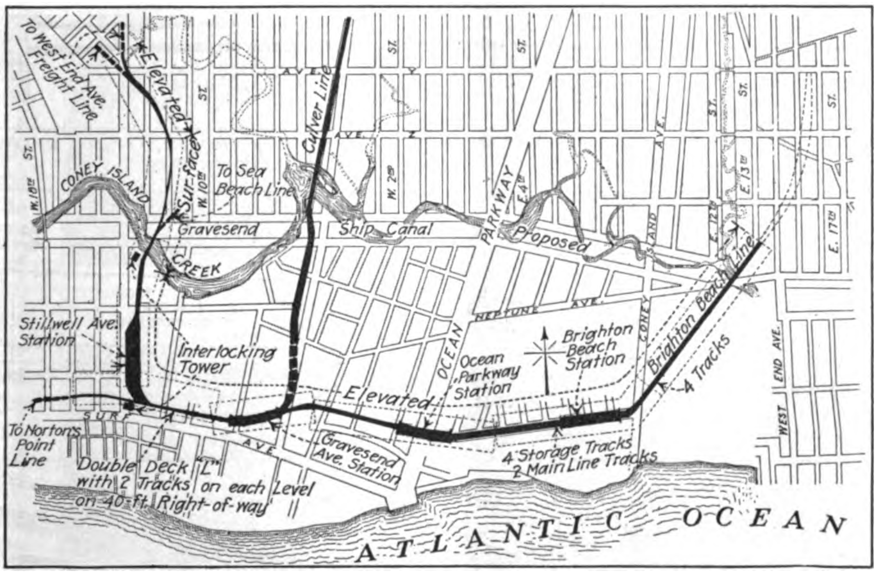


FIG. 1—MAP SHOWING THE COMPLETE LAYOUT AND TRACK CONSTRUCTION INVOLVED IN THE TERMINAL PROJECT

In this respect the Coney Island crowds are perhaps not different from other crowds, except that they number such multitudes. It is not uncommon for the Brooklyn Rapid Transit Company to handle a half million people on a hot Sunday, of which about 300,000 passengers (in and out) will be handled by the three elevated and subway or rapid transit lines. Nor is it uncommon for the rapid transit terminal facilities to be pressed into the necessity of receiving 25,000 outbound and 5,000 inbound passengers in an hour. Then there is a normal week-day traffic in the summer of about 90,000 passengers, in and out, handled by the rapid transit lines, and even a winter traffic of 18,000 passengers a day which must be served.

Such crowds and their habit of travel gave rise to the necessity for spending $1,500,000 in an immense new terminal project for all lines entering the island, exclusive of surface lines. This was begun in 1916 and prolonged through the delays consequent generally to the war conditions, so that it is just now reaching completion. The problem of providing the terminal facilities for the rapid transit lines to handle the large volume of traffic was complicated both by the engineering difficulties of providing for a complex train movement on a limited private right-of-way, and by the necessity of collecting fares of passengers leaving as well as entering the terminal. The surface lines, while somewhat restricted in their terminal facilities, were not included in the terminal project covered by this article.

Formerly, all of the rapid transit lines serving the island were laid on the surface. Two of the lines fanned out into a common small stub-end surface terminal and the third line entered the island at the east end and ran up a 40-ft. right-of-way parallel to Surf Avenue, terminating simply in a two-track stub end at about the center of the island. Evidently, these limited facilities were quite outgrown, and when it came to working out new terminal facilities, the limited right-of-way property available made it desirable to combine all of the rapid transit lines into a single terminal plan whereby the principal terminal station could be placed at a point at which the necessary amount of property was available, and which could be made to serve all lines. The plan also looks toward an ultimate through routing scheme of operation between the various lines, although the trains are now stub-ended in the terminal.

In general the island is served at present by three rapid transit lines—the Brighton Beach elevated line, the Sea Beach subway line, and the West End subway-elevated line. The manner in which these three lines enter the island and terminate in the Stillwell Avenue station is readily seen from the map of Fig. 1. A fourth rapid transit line reaching from the city to Coney Island is called the Culver line. This is an elevated railway which is being built by the city and is completed at the present time as far as Avenue X, Coney Island, leaving a link about 600 ft. long to be built to connect it up with the terminal facilities. As soon as this connection is built and operation begun over this line, it will be obligatory for the operating company to charge but a single 5-cent fare for the ride to Coney Island, the present fare being 10 cents. Of this 10-cent fare, the first nickel is paid upon entering the subway or elevated station, as usual, when going to Coney Island, and the second fare is collected when the passenger leaves the terminal at the island. On leaving the island, passengers pay the 10 cents upon passing through the station turnstiles and receive a ticket which is collected at a certain point en route to the city.

The complete terminal project involved the construc-

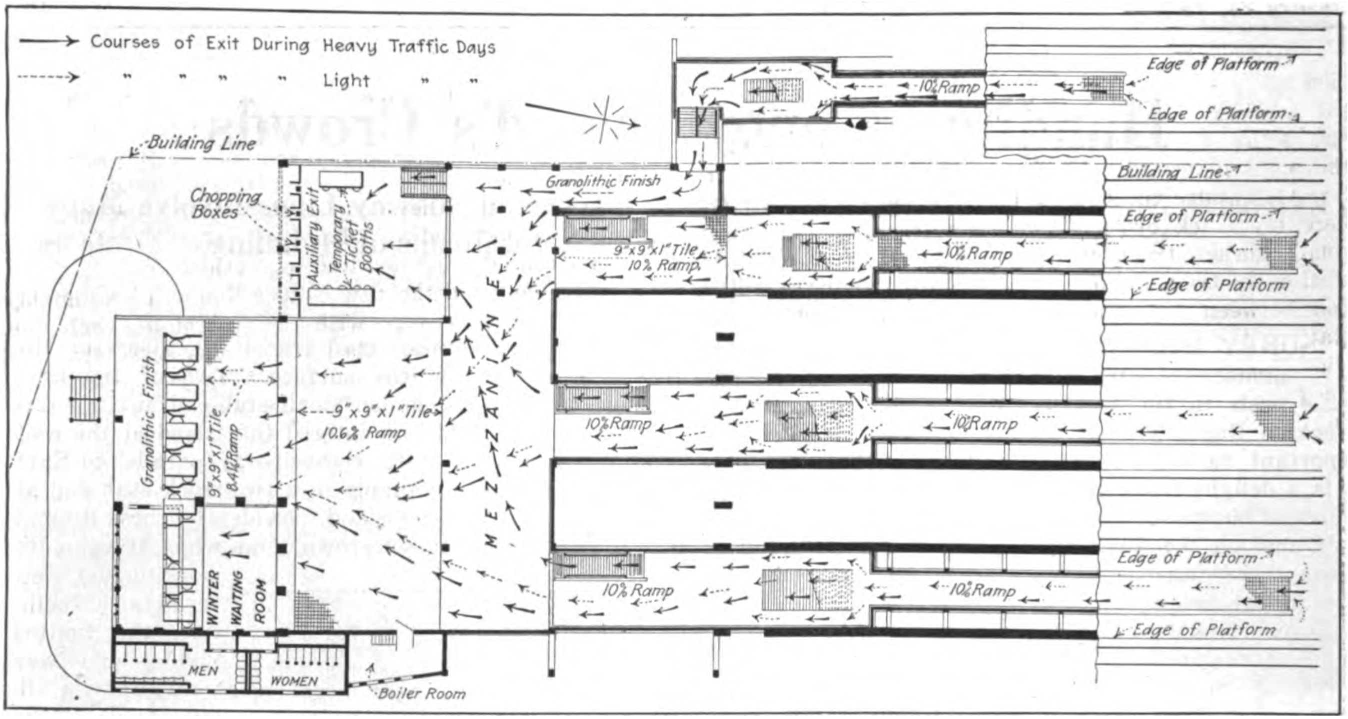

Courses of Exit During Heavy Traffic Days
" " " " Light " "
Building Line
Chopping Boxes
Auxiliary Exit
Temporary Ticket Booths
Granolithic Finish
9"x9"x1" Tile 10% Ramp
9"x9"x1" Tile 10.6% Ramp
9"x9"x1" Tile 8.4% Ramp
MEZZANINE
WINTER WAITING ROOM
MEN
WOMEN
Boiler Room
10% Ramp
Edge of Platform
Building Line

FIG. 2—STILLWELL AVENUE STATION PLAN AND FACILITIES FOR CONTROLLING THE CROWDS—ARROWS INDICATE LIGHT AND HEAVY TRAFFIC EXIT PATHS

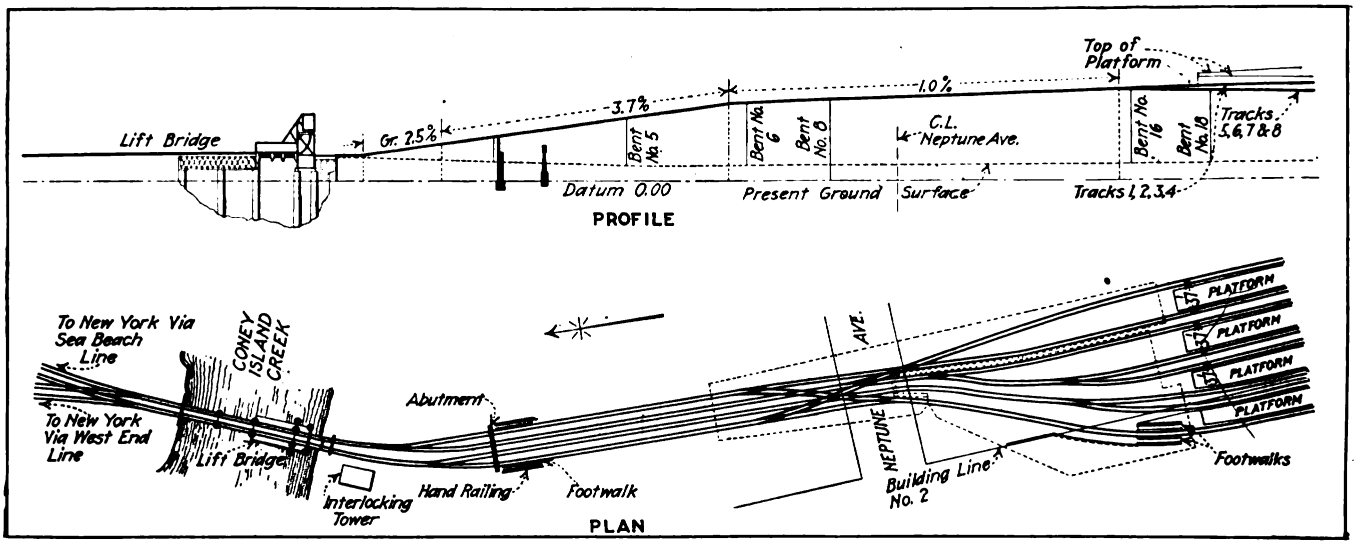

Lift Bridge
Gr. 2.5%
3.7%
1.0%
Top of Platform
Bent No. 5
Bent No. 6
Bent No. 0
C.L. Neptune Ave.
Bent No. 16
Bent No. 18
Tracks 5,6,7 & 8
Datum 0.00
Present Ground
Surface
Tracks 1,2,3,4
PROFILE
To New York Via Sea Beach Line
To New York Via West End Line
CONEY ISLAND CREEK
Abutment
Lift Bridge
Interlocking Tower
Hand Railing
Footwalk
NEPTUNE AVE.
Building Line No. 2
PLATFORM
PLATFORM
PLATFORM
PLATFORM
Footwalks
PLAN

FIG. 3—TRACK PLAN SHOWING COMPLICATED SPECIAL WORK AT THE NORTH OF STILLWELL AVENUE TERMINAL

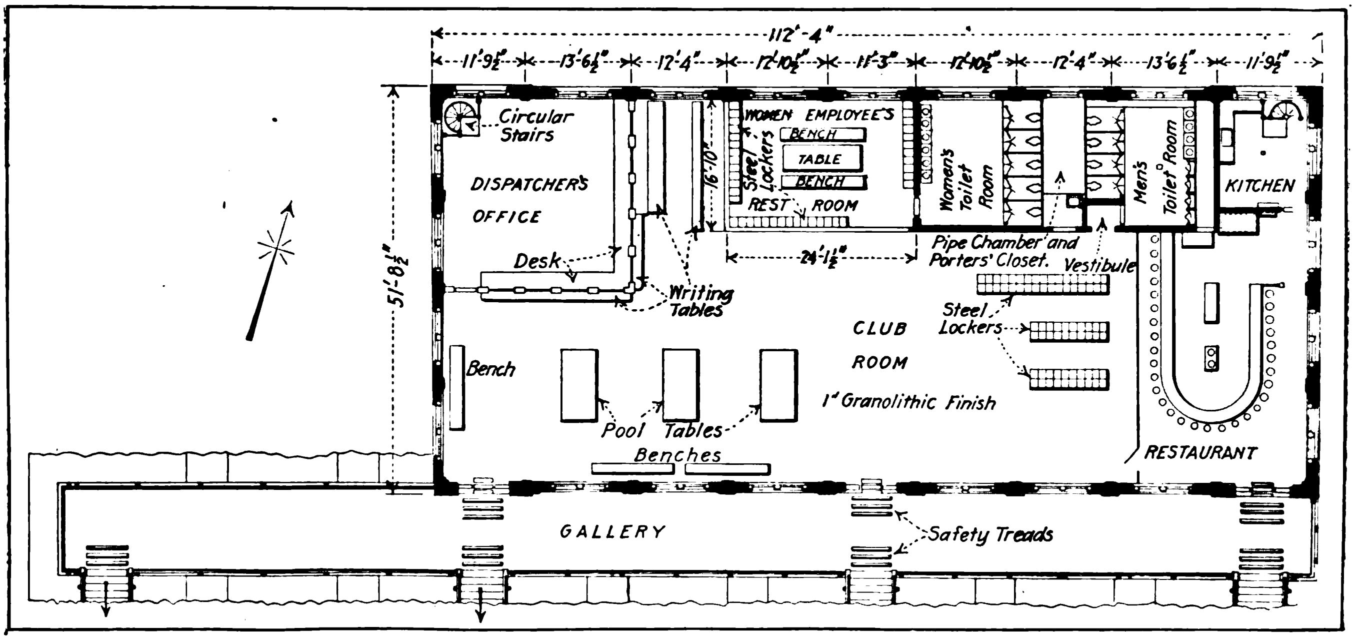
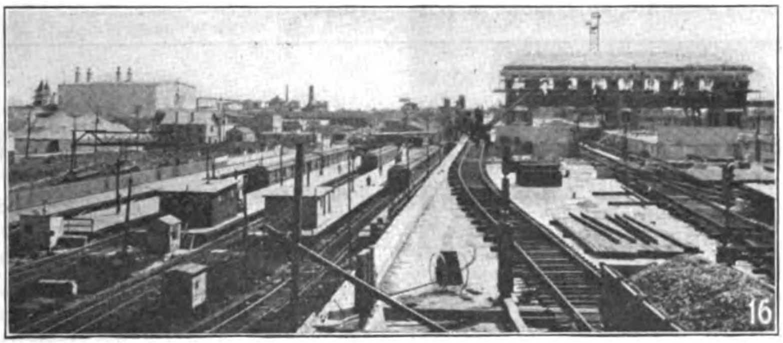

112'-4"
11'-9½"
13'-6½"
12'-4"
12'-10½"
11'-3"
12'-10½"
12'-4"
13'-6½"
11'-9½"
51'-8½"
Circular Stairs
DISPATCHER'S OFFICE
Desk
Writing Tables
16'-10"
Steel Lockers
WOMEN EMPLOYEE'S REST ROOM
BENCH
TABLE
BENCH
24'-1½"
Women's Toilet Room
Men's Toilet Room
KITCHEN
Pipe Chamber and Porters' Closet.
Vestibule
Steel Lockers
CLUB ROOM
1" Granolithic Finish
Bench
Pool Tables
Benches
RESTAURANT
GALLERY
Safety Treads

FIG. 4—PLAN OF TRAINMEN'S BUILDING BUILT ABOVE STILLWELL AVENUE STATION PLATFORMS

tion of new elevated line for all of the rapid transit railways on the island. The Brighton Beach line, which enters the island from the east end, was elevated from the point indicated on Fig. 1, and extended in a four-track structure to the Brighton Beach station. From here the track broadens into six tracks to provide a small storage trackage. Beyond the Ocean Parkway station the track again narrows into the four-track line, and between this station and the Gravesend Avenue station, the structure narrows into one of two-track width, with the two outside tracks of the four-track line and the two center tracks, respectively, extending onto the lower and upper levels of a two-deck structure. This character of construction was made necessary by the fact that the company had only a 40-ft. right-of-way up through the heart of the amusement park, and parallel to Surf Avenue. From this double-deck construction, these four tracks of the Brighton Beach line curve around into the Stillwell Avenue station, taking four of the eight tracks with which this principal terminal is equipped. For the Brighton Beach service, the express trains are operated over the upper deck of the structure, while the local trains are routed over the outside tracks on the four-track right-of-way and over the lower deck on the double-deck structure. Both the local and express Brighton Beach trains are at present stub-ended on the four center tracks of the Stillwell Avenue station. As they approach Coney Island, they discharge a good share of their load at the Brighton Beach, Ocean Parkway, and Gravesend stations before entering the Stillwell Avenue terminal. But their principal loading point on the return trip to the city is undoubtedly at the Stillwell Avenue station.



SPENCER'S
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TEMPORARY CONSTRUCTION AT THE TERMINAL

Top view (No. 16), temporary five-platform wooden terminal installed on the surface beside the site of the new terminal during the construction period. Bottom view (No. 17), temporary tracks laid beside the terminal approach structure and leading to the temporary terminal.

The West End and Sea Beach lines enter Coney Island from the opposite end of the semicircular island trackage. These two lines converge into a single two-track line to cross a lift bridge over Coney Island Creek, and then spread out into four tracks, and from these tracks into the eight tracks of the Stillwell Avenue station. From the elevated structure of the West End line and from the open cut right-of-way of the Sea Beach line, the two lines join on the surface into the two-track line crossing Coney Island Creek. From here the tracks rise gradually until they reach the level of the Stillwell Avenue station, which is of concrete-slab construction, placed on steel pillars strengthened with ¾-in. and 1¼-in. bars and incased in concrete. This leaves the space underneath the station available for the storage of surface cars.

In the Stillwell Avenue terminal, under present operation, the West End trains are stub-ended on the two westerly tracks while the Sea Beach trains are stub-ended on the two easterly tracks. It will be seen, however, that practically all of these tracks extend through the terminal at either end, so that it will probably ultimately be operated as a double-end station with trains through routed from one line to another.

When completed the new Culver line will presumably share terminal trackage with the Brighton Beach line. The Gravesend Avenue station will also serve this line as a loading and unloading point in the amusement park. The shuttle line which is operated from Stillwell Avenue down to Norton's Point at the west end of the island, has also been brought up onto an elevated structure and the track arranged to connect through with the main terminal facilities in order to interchange cars.

The extensive switching necessary in handling the train movements into and out of both ends of the Stillwell Avenue terminal are controlled from two interlocking towers located as shown in Fig. 3. These tower equipments as well as all of the track signalling equipment was supplied and installed by the General Railway Signal Company. There is also a small interlocking equipment installed at one end of the Ocean Parkway station which controls the movement of Brighton Beach local and express trains on heavy traffic days. On light days this interlock is not used, as all trains are operated over the "local" tracks only. The tower at the Coney Island Creek is a large one, requiring two men to handle it. This controls the movements of both Sea Beach and West End trains through the junction of the two lines, in and out, and through the complex two-track-four-track-eight-track special work with various cross-overs at the north end of the terminal. This track plan is shown in Fig. 3.

The problem of handling passengers in and out of the station is complicated by the necessity to collect a fare in both directions. Thus, passengers leaving the station must pay a second nickel, while those entering the station and moving in the opposite direction must also pass through turnstile ticket booths. For this reason, it was necessary to arrange these turnstiles mechanically, so that they would turn in either direction and register a passenger either leaving or entering the station. The regular ticket booths across the front end of the station entrance are supplemented by auxiliary ticket-selling booths and ticket-chopper boxes installed at the west side of the ground floor area. Two sets of arrows have been inserted in the plan (Fig. 2) of the terminal to indicate the streams of passengers during, respectively, heavy and light traffic days. On light traffic days the ticket booths at the very front of the station are used for the movement of passengers in both directions, and the other exits are closed. But on heavy traffic days, the supplementary exit mentioned before is opened and passengers leaving by this route purchase tickets at the temporary ticket booths, which are dropped in the chopper boxes as they pass through and out.

The great expanse of the area devoted to the entrance and exit of passengers to and from this Stillwell Avenue station, which is the principal terminal at the island, indicates without elaboration the extent of the facilities which are provided for handling large crowds. One of the features of the station is that while stairways have been provided, these have been shunted by large inclined walkways or ramps. These not only make it possible for the crowds to move more rapidly, but permit them to do so with greater safety and ease.

The terminating of the various rapid transit lines at the Stillwell Avenue station made this a desirable point for the location of a trainmen's building. This was provided without purchasing additional property by placing it up on the Stillwell Avenue station structure, above the platforms, and spanning five of the eight tracks. The floor plan of this building and the manner in which it is occupied and used is clearly shown in Fig. 4. A long gallery along the front of the building communicates by means of stairways with each of the four platforms, and makes it very convenient for the trainmen to go back and forth between the dispatcher's office and trainmen's room, and the platform and their trains.

Random Notes About the South

Impressions of Various Cities, Their Railway Systems and Their Business Conditions Gained During a Recent Trip Through the Coast and Gulf States

BY "SPECTATOR"

IN Atlanta, Ga., one has an excellent opportunity to observe how insufferable traffic conditions may become when permitted to follow a natural course unregulated. Any reactionary city father from another city who obstructs the passage of sound traffic restrictions has only to spend a day in Atlanta to appreciate what will sooner or later be the condition in his own town. The condition has ripened to this ultimate of chaos, confusion and delay earlier in the Southern metropolis than in almost any other city, partly on account of the complete limitation of all cross-city movements to three streets, only 200 ft. apart, which pass through the downtown section and are the principal business streets.

In addition to this cause of the congestion, three other evident reasons contribute to the general scramble. First, the streets are narrow and intersect at various angles. Second, both sides of the streets from morning until night are lined almost solidly with automobiles parked without time limitation and standing as nearly at right angles to the curb as the space between that and the car tracks will permit, thus leaving only the trackway for the movement of all vehicles. Third, the traffic policemen have a most peculiar system, or rather lack of system, of signaling and getting the traffic by.

This last is, of course, an easily remedied cause and hence not of great importance. But the writer marveled at the confusion attributable to the traffic officer himself and to his petite signal—cute, but almost invisible from 100 ft. away, because of its size and its aged painting and dilapidated condition. After watching these things at various corners, particularly at that known as "Five Points," the writer could not restrain the thought—"Wouldn't a Chicago or New York traffic cop delight the motorists and motormen here."

Is there any wonderment then at the statement of the railway men that "the congestion on our streets is worse than it is in New York." In point of confusion, if not in volume of traffic, they are right. There is no wonderment, either, at the fact that it takes the street cars thirty minutes to traverse the downtown section during the evening rush. Despite this almost incredible condition—incredible as existing in the city that desires to be the "greatest city of the new South"—Atlanta has no anti-parking regulations. It continues to make a garage of its Peachtree Street and other fine business streets. Certainly the injustice which this inflicts upon the vast majority of the people of the city who must depend on the street cars for transportation to and from their homes is so flagrant as seemingly to cry out for immediate adjustment, not to mention the serious costliness of this condition to the railway company. It puts an absolute barrier between the company and its aim to provide efficient service for its patrons.

How absurd, then, that the Mayor should veto the tardy ordinance recently passed by the City Council providing for some helpful though not adequate limitations upon parking, on some insignificant grounds, presumably that the railway would benefit too greatly thereby. The company would benefit some; enough, perhaps, to cope with the increasing operating expenses for another few months. But how much greater would be the benefit to the riding public and how much more efficiently could the business of the city be transacted.

Much is it to be hoped that this beautiful and progressive city of the South will not permit itself to be longer throttled by failure to remedy conditions so readily remedied. To this end, the speedy completion of the study now being started by a committee composed of representatives of the merchants, manufacturers, railway company and other interests, must certainly be the wish of every enlightened resident of the Gate City.

ATLANTA COMPANY PROSPERING NOW

With cotton selling at from 40 to 60 cents a pound and tobacco at $1.25, not to mention the immense sums of money left by the hosts of soldiers at the numerous camps placed in the warmer climate, there is money a-plenty in the South, and this has stimulated a business activity which is probably without precedent. The city of Atlanta is enjoying a generous share of this activity and prosperity, and the town is crowded. This condition is of course reflected in the number of passengers hauled by the local street railway. And having the good fortune to combine heavy haulage with a 6-cent fare the company is in the coveted position of showing good earnings and an operating ratio during the last two or three months which is getting down toward that of the old days when a nickel would buy 5 cents worth of material or labor. If the prevailing business conditions continue and some unwarranted and extravagant increase in wages does not have to be conceded, then Atlanta will be one more city added to the list of companies that are able to pay their obligations to owners and investors and have a small margin of safety left with which to insure the necessary flow of new capital into the property.

SHOULD A MAN ACT AS JUDGE IN HIS OWN CASE?

Time was when those railway managements which did not have state public service commissions to deal with were considered fortunate by a majority of the men of the industry. That was in the days when all rate revisions were revisions downward. But times have changed in this respect as in most others. The situation at Jacksonville, Fla., brings this to mind. Florida has a State railroad commission, but it is without jurisdiction in the case of the Jacksonville Traction Company which holds a franchise granted by the people of the city. This franchise specifies a 5-cent fare, and the only way that this can be increased is by grant from the same power that authorized the franchise.

The Jacksonville property, unlike some of the railway companies of the South and other parts of the country which have had prosperous electric lighting departments to hold them up, was recently placed in the hands of a receiver as the inevitable outcome of operation at a loss—a loss continuing in this case since 1914. The company had sought relief through a petition for a 7-cent fare and had made effort to show the people why this was the only way it could solve its difficulties. It succeeded in convincing the City Council that its case was well founded, and this body voted twelve to six for the increase. But the necessary referendum followed about forty-five days later with the usual result. A total of only about 2600 votes were polled, two-thirds of which opposed the increase. The company's enemies were of course all out to vote, while its friends were not, and the result which is usual the country over was recorded here. But friendly or unfriendly, it is human nature to oppose any increase in personal expenditures, if the right to oppose is afforded. So the receivership followed.

The outlook, to say the least, is not bright. There is no direct appeal from the decision of the voters—nothing much that can be done except to come back again to the people in a discouraging second effort to educate them to the injustice of exacting their pound of flesh.

How much better, then, in general, is the outlook for those companies which are privileged to rest their case with a state commission. Here there is a small body of men having expert knowledge of and the intelligence to appreciate the problems and obligations of the street railways and their tremendous value to a community. Such a body can be given the facts, can satisfy itself of their accuracy and then grant the necessary fare increase. Or, in the exceptional case where a commission cannot be induced to act, or when it acts unwisely, the company still has the recourse of direct appeal to higher authority. But the submission of such questions to the local electorate means a violation of a fundamental legal principle that no man will be asked to act as judge in a case in which he has a financial interest.

OIL FOR FUEL HAS BIG IMPETUS IN THE SOUTH

Particularly along the southeast and south coasts, there is a great movement on foot to change over from coal to oil for fuel in the railway generating stations. In some cases the change has been made under great pressure to avert a possible shutdown from any possible shortages of coal due to strikes of the miners. In more cases, however, the change has been made, or is about to be made, purely on the basis of economy. The constantly increasing coal costs and the prospects for further increases have everywhere given rise to a new consideration for oil, for the differential in favor of coal in the final cost of energy at the switchboard has everywhere been decreasing. Through the South, this differential has completely turned for the seaboard cities and for many inland cities, because of several contributing conditions.

Oil has been burned for years in a few southern plants on account of their nearness to the source of oil and remoteness from the source of coal. And recently, a great expansion of the oil industry on the one hand, and the skyrocketing of coal prices and the uncertain labor conditions in the coal and railroad industries which have created periodical serious shortages, on the other hand, are practically forcing most other southern plants to change over. In addition to the cost of fuel alone, there is also a saving of labor decidedly in favor of oil burning. Then the oil companies are installing enormous new storage plants at Charleston, Savannah, New Orleans, Galveston and a number of other points, so that while the coal supply is becoming more uncertain, the oil supply is becoming more dependable. This factor of dependability has been one of the greatest obstacles in the way of more extensive use of oil. But with a great increase in the number of companies producing oil and with the extensive building of storage plants of enormous capacities, it would seem that all considerations point toward a very material increase in the number of oil-burning generating stations. Under the present trend of labor conditions, it may reasonably be expected that in time oil will largely displace coal in large generating plants, except those situated very close to good mines.

TAMPA A BRIGHT SPOT IN THE INDUSTRY

The perversity of fate is exemplified, though cheeringly, in the happy condition which prevails at Tampa, Fla. With a franchise which carries no restriction or specification as to the rate of fare, and with no public service commission whose approval must be secured—in fact, with nothing standing in the way of the company's increasing the rate of fare, no increase is needed. Thanks to 53 per cent safety car operation and the use of oil for fuel, and to the conservative and efficient management, the 5-cent fare has continued to date to provide an adequate revenue.

To go to Tampa now, one cannot help but be impressed with the spirit of "busy-ness" which the "hustlin' little cars," as a Florida cracker described the Birneys, give to the city. They are always in sight, they come up so quickly and stop so sharply though gently, the doors open and close so snappily and then they are on their way again so smartly—they lend a spirit of animation to the whole city, and the people like them, the trainmen like them and they are building up more riding steadily and saving money too. Tampa has enjoyed a substantial growth due largely to continuing war activities, and this has of course contributed toward the present prosperity of the street railway. But it may fairly be said that the extensive and intensive use of the safety cars represents the difference between the company's present satisfactory condition and a condition requiring higher than 5-cent fares. Tampa is to be congratulated upon having a street car system that is right up to the minute in modernity and that is supplying the type of service which aids materially in attracting business to the city.

TEXAS INTERURBANS IN GOOD CONDITION—CITY ROADS IMPROVING

Texas is enjoying unprecedented prosperity. This is due largely to a fuller appreciation and greater realization of the natural resources of this section of the country. Nearly all the cities are crowded and are growing by leaps and bounds—from small towns to cities, almost overnight. But it is a natural, substantial boom which may be expected to continue. The intense activity in the oil fields is contributing immensely to the general good business conditions prevailing. The very high market price for cotton is bringing huge sums of money into the State, and a wage of $2.75 a hundred pounds and higher to pickers, and correspondingly high wages in other lines, is causing a very high circulation of money.

These conditions are naturally creating a great deal of business for the utilities, and both urban and interurban railway companies are carrying more passengers and earning higher gross revenues than ever before, with percentage increases in traffic over last year's figures which seem incredible. Companies are being taxed to the very limit to carry the people and are rapidly being forced to the position that additional equipment will have to be secured. The interurban railways, in the absence of a State commission, have been able to carry this abundance of traffic at a profit by increasing fares to cover the increased costs of operation, the rates ranging from 2.75 to 2.9 cents per mile. As a result, the Texas interurbans are today among the most if not the most profitable lines in the country, per mile of track, per car-mile, or any way it is figured. Dividends on common stock, really earned with full allowance for maintenance and depreciation reserve, are beginning to make their appearance for securities heretofore nonproductive. The movements of prosperous cotton growers, the movements of men engaged in oil pursuits, and even the weather which has supplied heavy rainfall and kept the roads in such condition as to minimize automobile competition, have contributed heavily to this gratifying traffic condition.

The city railway properties of Texas have not fared so well in their net earnings as have the interurbans, though nearly all of them are doing a large business, for most of them are still operating on a 5-cent fare. However, these companies have benefited greatly from the marked increase in the number of riders, and they are getting along excellently though not earning a proper return on the investment involved. This condition seems in a fair way to be remedied, for those who are intimately in contact with the public of Texas believe that there is distinct improvement in the attitude toward the railways and a rapidly growing disposition to permit them to earn a fair return on a fair value. In Texas, this is a matter entirely under local control, and while most of the capital invested in the railways came from without the State, there is a feeling more strongly prevalent now than heretofore that this capital must be protected in order to attract more capital into the State to develop its resources. Judged as a whole, the electric railway situation in Texas is very hopeful.

THINGS ARE MOVING AT BIRMINGHAM

The railway property at Birmingham, Ala., is both depressing and inspiring at its present stage. Things have been bad with the company for some time back and have gone from bad to worse until the regrettable receivership was reached. There has been an undercurrent of conversation among railway men likening Birmingham to a graveyard, and the appearance and sound of what rolling stock was capable of negotiating the streets justified the reference, for the condition was indeed distressing to the mechanical sense of any good operator. And, needless to say, the public has manifested its disapproval of the service and condition of the equipment by violent criticism of the company, though the responsibility for the situation rested largely with this same condemning public.

But things are on the mend. With the granting of a 6-cent fare, the earnings have shown a gratifying improvement; and with this to build upon, the management has set about the considerable task of completely rehabilitating the property. All hands have jumped into the task with an enthusiasm which comes of the joy of relief from the painful necessity to stand by with hands tied and watch one's own property go to pieces. A real rivalry has sprung up, for example, between the different departments of the shop to keep ahead of the others in putting the cars through complete rehabilitation from ground up. For what could be more inspiring than to take active part in restoring the equipment from a condition begetting shame to one in which there is basis for pride.

Likewise, the track and overhead departments are coming in for liberal allowances quickly to take care of the long deferred maintenance work. In other words, things are moving at Birmingham and the process of rehabilitation is rapidly changing the aspect of the situation. With the continuation of the present policy, it will not be many months until this property will be in a fair way to show some low maintenance costs, to earn a little money if business continues as good as it is now, and to be lifted from the receivership which hangs over it.

The Commission of French Engineers who visited this country early last summer for the purpose of studying the systems of heavy electric traction in use here have presented their report to the French Ministry of Public Works. This report accords with the preliminary report made by Prof. A. Mauduit, a member of the commission, which was abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 1, 1919, page 834. The full report goes into great detail of the study of the principal electrifications in this country.

What Is to Be Done With Our Electric Railways?

How One Company Is Making Effective Use of the Testimony Presented Before the Federal Electric Railways Commission

THE Interborough Rapid Transit Company, New York City, has distributed a sixteen-page booklet, 6 in. x 9 in. in size, giving excerpts from the testimony presented by about twenty-five of the witnesses who appeared before the federal commission. The typographical arrangement is "catchy," and the material speaksfor itself. After a brief "foreword" in explanation of the text, as given below, are the abstracts from the testimony. In conclusion some striking statements from other sources are appended. Following are some excerpts from the booklet:

From statements made before the Commission

FACTS

1. **Rise in Prices.** Materials for service have risen between 1916 and 1918 an average of more than 100 per cent.

2. **Wages.** Have risen since 1916 about 120 per cent and are still going up.

3. **Size of Industry.** Capital about $6,000,000,000. Employs about 300,000 men. 44,000 miles of track.

4. **New Capital Needed.** For extensions and improvements about $700,000,000 a year.

5. **Service Rendered.** The electric railways of the United States carry ten times as many passengers as the steam railroads.

6. **Losses to Investors.** Shrinkage of security values has already cost investors hundreds of millions of dollars. They will invest no more under present conditions.

7. **In New York State.** More than a billion and a quarter dollars of electric railway investment is in peril in New York State alone.

CONCLUSION

The Actual Situation. The industry cannot survive without increased income. A very important part of it must have relief at once.

Facts

First, what is the situation? The following bits of testimony before the Federal Electric Railways Commission touch upon the outstanding facts:

In Danger of Collapse

BY JOHN H. PARDEE

President of the American Electric Railway Association

An industry in which some $6,000,000,000 are invested and which, with more than 300,000 employees, operates more than 44,000 miles of electric railway track, is in danger of complete collapse.

Receiverships

BY J. W. WELSH

Statistician of the American Electric Railway Association

On May 31, 1919, a total of 62 companies, with a mileage of 5912 miles of single track were in the hands of receivers.

Sixty companies with a mileage of 763 had been dismantled and junked and 38 companies having 257 miles of single track had been abandoned.

The total for the three classes, nearly 7000 miles, represents almost 16 per cent of the total track mileage of all the electric railways in the country.

Increase of Prices

BY WILLIAM H. HEULINGS, JR.

Vice-President of the J. G. Brill Company, one of the foremost manufacturers of electric railway cars in the world.

RISE OF MATERIALS

	Per Cent
January, 1915 to January, 1916	36
January, 1915 to January, 1917	119
January, 1915 to January, 1918	128
January, 1918 to January, 1919	*18

*Decrease.

RISE OF WAGES

	Per Cent
January, 1915 to January, 1916	12
January, 1915 to January, 1917	40
January, 1915 to January, 1918	117
January, 1915 to January, 1919	119

(and it is still rising)

New Capital Needed

BY H. G. BRADLEE

President of the Stone & Webster Management Association

Street railways of the United States need between $600,000,000 and $700,000,000 new capital each year for necessary extensions and improvements if they are to keep up their service and meet the public demands.

Losses to Investors

BY FRANCIS H. SISSON

Vice-President of Guaranty Trust Company of New York

Electric railway security owners have seen their holdings precipitately and alarmingly depreciate in value.

The situation involves the validity of a huge structure of investment and credit the undermining of which to have far reaching effects upon general credit and business prosperity.

Public authorities should not forget that they are holding in their hands the credit of other cities, savings banks, life insurance companies and other institutions.

SHOWING HOW CREDIT OF STREET RAILWAYS HAS FALLEN

	Date of Maturity	Price July, 1909 to Yield	Price July, 1919 to Yield
Detroit United 1st Con. 4½s	1932	$5.90	$7.55
New Orleans Railway & Lt. Con. 4½s	1935	5.48	9.64
United Railways of St. Louis, 1st 4s	1934	5.01	9.98
Chicago City Railways 5s	1927	4.68	9.75
Metrop. West Side El. 1st 4s	1938	4.68	9.40
South Side El. 4½s	1924	4.95	9.71
West End Railway Co. Deb. 4s	1932	3.84	6.00
Philadelphia R. T. Co. Tr. 5s	1957	4.85	5.85
Aurora, Elgin & Chicago 1st 5s	1941	4.94	9.30
Chicago Railway 1st 5s	1927	4.90	9.80
Duluth Street Railway 1st 5s	1930	5.00	7.82
Los Angeles 1st 5s	1838	4.68	6.42
Louisville Ry. Con. Mort. 5s	1930	4.45	5.74
Denver C. Tram 1st & Ref. 5s	1933	5.22	13.25
B. R. T. Con. 5s	1945	4.60	8.30
1st Ref. Conv. 4s	2002	4.63	*8.70
Conn. Ry. & Lt. 1st & Ref. 4½s	1951	4.40	5.95
Int. R. T. 1st & Ref. 5s	1966	5.05	6.95

* Stock yield.

High Prices Here to Stay

BY THOMAS CONWAY, JR.

Professor of Finance, University of Pennsylvania

The "emergency" has not passed and will probably never pass in the sense in which the term is used by the average man.

The cost of operation of the electric railway has been permanently placed upon a higher level.

Opinions

By Public Service Commissioners

Numerous members of Public Service Commissions gave testimony. They all agreed that service cannot be continued below cost, and that a fair return to capital invested is part of the cost.

Dead Broke

BY CARL H. MOTE

Secretary of the Indiana Public Service Commission

Generally speaking the electric railways of the country are "dead broke."

I do not think we have reached the peak of the effect of competition [by automobile] on traffic, either passenger or freight.

Immediate Relief

BY RICHARD T. HIGGINS

Chairman of the Public Utilities Commission of Connecticut

The condition in which the American street railways find themselves is exceedingly serious.

Immediate and substantial relief must come primarily from the states or municipalities and should involve a material increase of rates and a reduction or suspension of taxes and other municipal obligations.

New York's Service Best

By Lewis Nixon
Public Service Commissioner, First District of New York

New York City has the best service in the world. In New York we now carry passengers 20 miles or more for 5 cents against a much higher charge by the steam railways.

The prime reason for all the difficulties in New York is the increased cost of labor and materials.

Or Service Will Suffer

By Wm. B. D. Ainey
Chairman Public Service Commission of Pennsylvania

If the public is to be adequately served, railways must be permitted to earn revenues large enough to pay operating costs, to maintain the property and to provide a fair return.

Without adequate service the economic, social and industrial life is seriously affected if not paralyzed.

The Facts Needed

By W. G. Bliss
Chairman of the Rhode Island Public Utilities Commission

I believe the public is reasonable if it can get the facts fairly presented.

I think the public are not permitted to get the simple facts and until people in public position and the press are willing to state the facts, the solution will be delayed.

Capital Must Have a Return

By Frederick J. McLeod
Chairman of Massachusetts Public Service Commission

It is useless to expect capital to invest in street railways without promise of a reasonable return.

As between the car rider and the investor, the car rider, so far, has had much the best of the bargain.

The Remedy

As Seen By Well Known Men of Widely Varying Interests

"What are you going to do about it?" No other question is so important. The following are the opinions of some of the best qualified men in America:

Street Cars Cannot Live

By Brig. Gen. Guy E. Tripp
Former head of the Production Bureau of the Ordnance Department

Street car companies cannot live under present conditions.

The individual investor generally takes the advice of his banker and the bankers are thoroughly informed as to the situation and are alarmed over it. The value of securities has been melting away like snow under a summer sun.

Fares Must Follow Costs

By Frank J. Sprague
Famous electrical engineer. Builder of the first electric railway in America

The people want efficient operation and a very high character of service from them all.

They cannot get it if capital will not invest the money. There must be a fair return. If costs go up, the price must go up.

Got To Do It Now

By Mortimer E. Cooley
Noted Engineer, Dean of the University of Michigan

I recommend that the street railways be given the right to charge fares that would permit them to meet their operating expenses, keep up their service and maintain their properties intact.

You've got to do it now.

In the Public Interest

By Edward N. Hurley
Former Chairman of the U. S. Shipping Board

Adequate and efficient electric railway facilities are just as essential to the development and prosperity of our communities as the transcontinental lines.

The public interest requires first class service and is willing to pay in additional fare—the public interest is best served when a fair return is paid on capital invested.

Reduce Taxes, Too

By Prof. Charles J. Bullock
of Harvard. Former President of the National Tax Association

The crisis that faces the electric railways is urgent.

Along with other measures of relief, a substantial reduction should be made in the taxes they are required to pay.

Immediate Relief Needed

By Samuel Insull
Chairman Executive Committee Chicago Elevated Railways

Your Commission can perform a signal service to the nation by bringing to the attention of the public the present deplorable conditions and recommending immediate relief—such increase of fares as will prevent the ruin of this necessary public utility.

The "Pound of Flesh"

By Thomas A. Edison

The electric railway industry has reached a serious stage. No more capital can be obtained except in special cases.

The municipalities can exact their pound of flesh if they so desire, with the ultimate bankruptcy of their organizations, but the spirit now abroad in the world is against this.

The Shrunken Nickel

By Prof. Irving Fisher
of Yale University

The purchasing power of the dollar is about one-half what it was before the war.

The failure of trolley fares to correspond with other prices is one of the most conspicuous examples of the havoc played by the depreciation of the dollar.

Recommendations

By United States Officials

Officers of the United States Government, from the President down, have realized the real peril of the electric railways. Holding that it is a local problem, they have appealed to local authorities to give the electric railways the needed relief.

From a Letter to President Wilson

By William G. McAdoo
When Secretary of the Treasury

I earnestly hope that you may feel justified in expressing the conviction that the vital part which the public utilities companies represent in the life . . . of the nation ought to receive fair and just recognition by State and local authorities.

In Reply to Secretary McAdoo

By President Wilson

I fully share the views you express regarding the importance of the public service utilities as a part of our national equipment.

I hope that State and local authorities will . . . respond promptly to the necessities of the situation.

From Annual Report, Jan. 31, 1918

By John Skelton Williams
United States Comptroller of the Currency

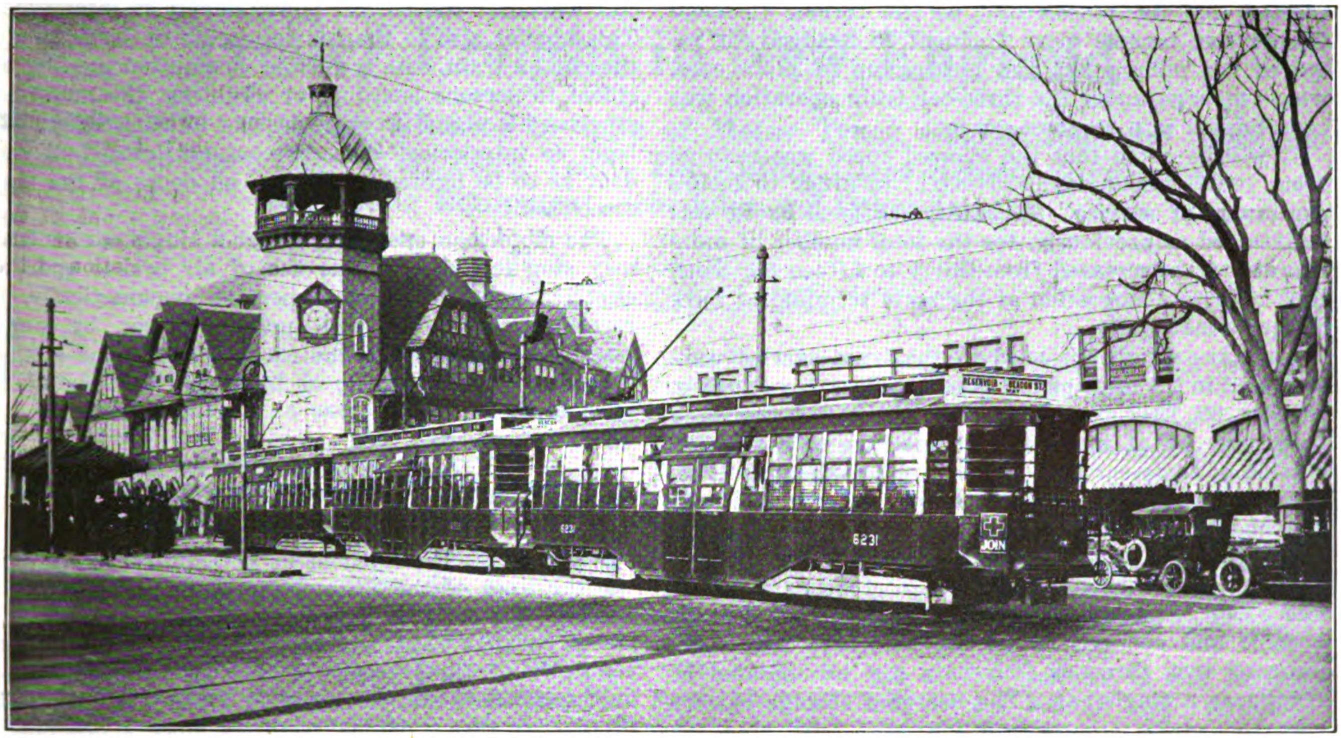
Many thousands of large and small investors have suffered seriously from the decline of the earning capacity of public utility corporations and the consequent shrinkage in the value of the securities representing investments of many hundreds of million dollars.

The breaking down of those corporations would be a national calamity.

From a Communication to the Federal Administration

By William H. Taft
Ex-President of the United States

This is not a question of turning on the history of the relations of local street railways and the municipalities in which they operate. The increase in fare must be given because of the imminent pressure for more money receipts now to keep the street railroads running.



THREE-CAR TRAIN AT COOLIDGE CORNER, BEACON STREET LINE IN BOSTON

Three-Car Trains Satisfactory in Boston

Traffic Condition on One Surface Route of Boston Elevated Ry. Made the Use of Three-Car Trains Economical and Desirable from the Operating Standpoint

BY EDWARD DANA
General Manager Boston Elevated Railway

FOR some time three-car train service has been given over the route, in Boston, from Reservoir carhouse to Park St. subway and it has worked out in a very satisfactory manner. The center-entrance cars which were added to the equipment some time ago were designed with train operation in view, and were provided with multiple-unit control. The three-car train route is shown in the diagram on the next page, the distance between the two points mentioned being 10.051 miles. The time allowance for the section is sixty minutes. Kenmore Station at the entrance to the Boylston street subway is the point of maximum loading. At this point 15,000 passengers were previously handled in each direction during the day, and 3,000 passengers were handled in the maximum hour in the direction of maximum traffic flow.

The Reservoir line was operated on five-minute headway with a motor car hauling a trailer, and the Coolidge Corner route, a short-line service 6.704 miles in length, was operated on a five-minute headway with single cars. The method of operation provided that the Reservoir line should run limited stops between Coolidge Corner and the subway, and the Coolidge Corner line should care for local traffic. It was so arranged that the Coolidge Corner service immediately followed the express service, and consequently the local line on the five-minute headway did not interfere with the making of reasonably high speed on the through line. Provision was made for the operation of twenty-four cars per hour in the outer section, and thirty-six cars per hour over the joint operating section.

Some time ago the traffic increased to such an extent that the local service was inadequate; additional service was also required between Coolidge Corner and Reservoir. The service as operated required thirty-three cars and fifty-four men. If both of these lines had been operated on an increased frequency to provide forty-five cars per hour, it would have required forty-one cars and sixty-seven men. It was then decided that the density of traffic had reached such a point that, whereas the long and the short line arrangement had worked out efficiently, a three-car train service over the long line on a four-minute frequency providing forty-five cars per hour, would meet the increased traffic demand. In order to obviate the necessity of delaying cars, the allowed time was increased from sixty to sixty-four minutes. Except in certain instances, the sixty-minute time was sufficient, but it was not thought wise to begin operation of three-car units on too close an allowance.

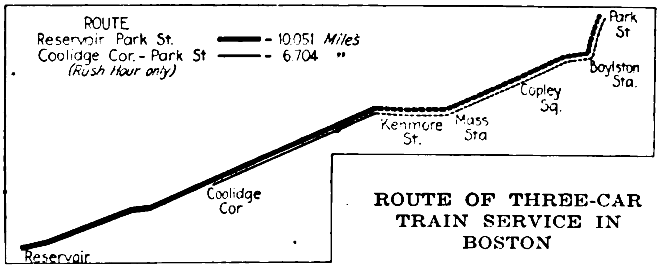
The operation of three-car train units over the long route without any additional service from Coolidge Corner requires, therefore, forty cars and sixty-four men, or one car and thirteen men fewer than would have been required if the former service had been operated to care for the traffic by the provision of forty-five cars per hour.

The actual mileage operated was only slightly increased, for the reason that as the former Coolidge Corner line became more frequent in headway, it required the pulling out and putting up of more cars, whose mileage under the three-car train operation was consolidated into revenue service.

It will be noted that the allowed speed was reduced from 10.051 m.p.h. to 9.920 m.p.h. in order to insure continuity of service. In reality, as good speed was maintained as previously, for the total number of units operated was decreased from thirty to fifteen per hour, thus relieving congestion at the main terminal at Park St. quite materially.

The cars which are used in the train service were described in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 29, 1917, page 1167, but a few notes regarding them may be of interest in connection with the discussion of three-car train service. The salient data regarding these cars are repeated for convenience in the accompanying table.

The control apparatus is located beneath the car and operated from a master controller located in the motorman's cab. The control circuit is so connected through a cable and connections on the drawbars that train units of two, three or four cars can be operated as readily as a single car. The use of a storage battery and the automatic couplers insures continuity of control current independent of the power supply, thereby providing means of reversing the motors in case of emergency. The master controller is, of course, provided with the "dead-man's" handle.



ROUTE OF THREE-CAR TRAIN SERVICE IN BOSTON

Heavy line represents reservoir—Park St. route, 10.051 miles long. Light line represents Coolidge Corner—Park St. route, 6.704 miles long (rush-hour service only). Parts of route represented by dotted line are in Boylston St. Subway.

The brake equipment comprises electro-pneumatic air brakes and electric application and release features which insure simultaneous braking on all cars of the train, and also the application of the brakes instantly in the event of the drawbars pulling apart. Any conductor on the train has it within his power to stop it by operating an emergency valve located under his stand. As a further safety precaution, hand brake staffs are provided in each cab, as well as in the center of the car near the conductor's stand.

In addition to the normal lighting system each car is equipped with lamps operated from a storage battery, these lamps being automatically brought into circuit whenever the normal power supply is interrupted. This applies also to the red tail-lights on both ends of the car or train. As a further precaution against accident to persons boarding or alighting, the motorman receives his signal to start by the lighting of a small lamp so interlocked through contacts located at each door as to be lighted only when all doors of the train are closed.

The motorman operating either a single car or train may stop it either by the use of air brakes operated electrically or air brakes operated pneumatically, by reversing the motors and applying power, by simply reversing and allowing the car or train to be stopped by regenerative braking, or finally by the use of the hand brake.

SALIENT DATA OF BOSTON ELEVATED CENTER-ENTRANCE CARS

Trucks	Brill 77-E-1
Motors and control	Part GE-247 motors, PC-5 control; part Westinghouse-514R motors, AB-PC control
Air	GE EP with CP-27 compressor
Length over all	48 ft. 9½ in.
Truck centers	24 ft.
Width over all	8 ft. 8¾ in.
Height, rail to top of running board	11 ft. 7¾ in.
Truck wheelbase	5 ft. 6 in.
Wheels	24 in. diam.
Seating capacity	56
Weight, light	45,000 lb.
Weight, loaded	66,800 lb.

Freight Business Still Increasing on the Sacramento Northern

THE steady development of agricultural areas along the lines of the Sacramento Northern Railway in the last two or three years is still continuing and the policy on that road has been to make adequate provision for freight traffic in the way of warehouses, industrial spurs and rolling stock. There has been still further extension of the facilities since a description appeared in the ELECTRIC RAILWAY JOURNAL of May 31, 1919, and present indications are for a continuous growth for some time to come.

During 1919 the company made no endeavor to increase the main line mileage, but the territory covered was developed by numerous short extensions that would more properly be classed as industrial spurs. Typical of the more important of these was a 2-mile branch to a 15,000-acre irrigated tract from which a considerable tonnage of produce is regularly handled.

To handle the freight business increase in 1920 over 1919 there are now on order for delivery in March, two 60-ton Westinghouse freight locomotives and a total of fifty-five box cars. Twenty-five of the cars, which are of the 40-ft., 80,000-lb. steel underframe type, are being built by the Mount Vernon Car & Manufacturing Co. and are to be shipped on June 20. Six are being built up on old trucks in the company's shops at Chico and the remainder, also built upon old trucks, are being made by the Pacific Car & Equipment Co. of San Francisco.

Clinkers on Boiler Tubes

IN THE question box of the October issue of *Combustion*, an engineer asked why there was a heavy deposit of what seemed to be clinkers in the lower three rows of tubes in the first pass of his steam boiler. The answer given was that steam soot blowers, if not properly drained before using, will, when the valve is first opened, discharge considerable water as well as wet steam. The moisture causes an accumulation of soot between the tubes, particularly if there is a deposit on the bottom row. For this reason only dry or superheated steam should be used with steam soot blowers. The deposit of a clinker or scale at the bottom of a lower row of tubes is usually found with stokers using forced draft, and this cinder or clinker accumulation cannot be removed with the usual soot blower. It must be scraped off with hook or scraper. This is readily done since the deposit does not as a rule adhere strongly to the tubes.

Trolley Freight in New England*

The Business Is Constantly Growing in Spite of Motor Truck Competition and Amounts Now to More Than $2,000,000 a Year—The Author Gives Helpful Suggestions Regarding Equipment, Schedules and Other Details

By R. E. COSGROVE
Freight and Passenger Agent Springfield Street Railway and Worcester Consolidated Street Railway

FROM an insignificant beginning in New England the transportation of freight by electric railways has grown to such an extent that trolley freight is an established fact in most cities and towns. Once the back door of the street railway, it has now become the side door, and if the hopes of its friends are realized it will some day be the *front door*.

In the early days of trolley freight many street railway officials questioned the advisability of entering the business. In New York State, several companies had embarked in the enterprise by 1900, there being an established freight service from Albany to Schenectady and surrounding towns. The Metropolitan Express Company, by traffic arrangements with the Third Avenue line and the Union Railway Company was well established. Out of Bridgeport, Conn., Cole's Express had built up a business over the lines of the Bridgeport Traction Company. The Rhode Island Company began freight service in May, 1901, and their Mr. Goodrich, now of the Colonial Line Navigation Company, fathered the enterprise to success. The movement spread from one company to another until by 1912 most of the present territory was opened and business placed on a firm foundation.

The story of trolley freight is much the same with all companies. In spite of makeshift freight stations, inadequate reconstructed equipment, and an almost hopeless beginning amidst the skepticism of a great many railway officials, the trolley freight has grown to command new terminals, specially constructed equipment and other improvements to the extent that the general street railway situation of today will permit.

To impress upon your minds the present scope of trolley freight, let me quote a few facts: There are 175 scheduled daily freight cars operating in New England, over 1750 miles of track, giving employment to 850 people. The annual gross revenue of these lines is in the neighborhood of $2,185,000, and it is increasing every year.

WHAT THE BUSINESS CONSISTS OF

One of the most remunerative operations is the switching and transfer of steam railroad cars to or from sidings on electric railways. This phase of the business has almost unlimited possibilities. Carloads of produce, lumber, coal, etc., are switched to and from communities that would be placed at a disadvantage without the electric railway. It brings the steam railroad right to their doors. The switching of steam railroad cars over city streets requiring special switches and curves is not an unsurmountable difficulty. In the larger cities where frontage along the steam railroads is at a premium, the installation of electric railway sidings gives the desired result at a small advance over the regular steam railroad freight charges.

The delivery of trap rock, sand and gravel by automatic dump cars is one of the best movements, and this service is being extended. By special arrangement with cities and towns, private contractors and State road commissioners, loads of material are dumped right on the job. The Connecticut Company has developed this type of business to the greatest extent, it being fortunate in the location of a very large trap rock quarry on its lines.

Of course the bulk of the business is less carload. Daily scheduled freight cars leaving large terminals keep the smaller cities and towns supplied. Before the war, food products formed the major portion of the tonnage, but the steam railroad congestion during the war period threw over to the trolley freight lines the raw materials and finished products of manufacturing concerns, and this class of freight is increasing in volume. Street railways are of necessity in closer touch with the public than steam railroads. The benefits of the trolley freight to the farmer for instance is immeasurable. It takes his milk and produce to market and brings back his supplies and farm machinery.

HOW IT IS CONDUCTED

The actual operation of freight cars calls for the co-operation of all street railway operating departments. The shop departments must co-operate in keeping freight cars fit for service. Most companies have just enough freight equipment for their immediate needs. The necessity therefore arises for frequent inspection and repairs. The passenger division must thoroughly second the efforts of the freight department. While freight service should be subordinate to passenger service, yet the two services can be handled without any serious interference. Dispatchers and inspectors should not unnecessarily delay freight cars. In the early days freight cars were sidetracked without regard to time or schedule, but conditions have changed. Freight operation calls for set schedules.

The operation of night service is increasing. Night schedule offers the best service to patrons and incidentally interferes less with passenger schedules. This does not necessarily mean the employment of a large number of men for night operation of terminals, but as the night business increases it will be found advisable to provide a force sufficient to unload and sort the freight for early morning delivery. This arrangement is now in effect in most of the larger terminals in New England, and any contemplated increase in schedule is usually provided for at night. This promises that the bulk of future freight business will be handled during the night. A shipment leaving Providence at night arrives in Worcester or Boston for delivery the next morning and in Springfield the next afternoon. Hundreds of tons are being transported nightly by trailer service out of Boston.

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*Abstract of paper presented at meeting of New England Street Railway Club, Boston, Nov. 6, 1919.

MOTOR TRUCK COMPETITION—TWO-CAR TRAINS

One of the features of the business is the staunch support given the trolley freight by the wholesalers in the larger cities. In some instances the growth of their business has been dependent to a certain extent on the trolley service. In these days of "ship by truck" movement it is a good transportation service that can hold the shorter haul business, and although many wholesalers have resorted to the use of trucks, the trolley freights handle a substantial tonnage. It is true that we have felt the effects of truck competition, yet there has been no cause for alarm because the trolley business has grown in spite of the keenest competition. Truck competition in most instances lasts only as long as it takes to find out it is unprofitable. The trouble is that some one is constantly trying it out, due to the able advertising and sales forces of the truck manufacturers. But they nearly always return sorry to the trolley freight.

The traffic manager of one of the largest concerns in Central Massachusetts, operating a fleet of about twenty trucks, is firm in his belief that the cost of transportation by truck is very much underestimated. His table of costs, taking everything into consideration, shows that truck delivery is unprofitable except for city delivery or for longer distances only in case of emergency. But when John Doe starts a one-truck express business, in most cases he does not base his rates on proper costs, with the result that disaster overtakes him.

One of the principal features in reducing the costs of trolley freight operation is the use of the trailer car. By the use of two-car trains, one of the Eastern Massachusetts street railways has reduced the number of uniformed men on its freight cars by 50 per cent yet is giving more service. Permission is now being sought to operate four-car trains. This particular company is fortunate in having a regular double-track steam railroad roadbed. Many companies, however, suffer limitations on the growth of their trailer business from poor track and weak bridges.

In this respect, the trolley freight is like a baby. Unless properly nourished with necessary equipment and good facilities, its growth is likely to be stunted. But with proper terminals, sufficient rolling stock, good trackage and strong bridges. there is bound to be a remunerative business, almost without solicitation.

HOW BUSINESS IS OBTAINED

Solicitation of new business is advisable, however. Our special inducement is service. Ordinarily, a trial shipment means a steady customer. As in other businesses you must keep the good-will of your patrons. Special accommodations and courtesy have their own reward.

The development of business to connecting trolley lines, steam railroads, boat lines, etc., offers another field. Out of Portland, Boston, Fall River, Providence, Norwich, New London, New Haven, Bridgeport and other ports, boat lines are in daily operation. In some instances through tariffs principally to New York or Boston are already filed, in concurrence with the trolley companies. Proportional rate tariffs are a second best inducement to through business. There are instances where trolley lines have published rates in connection with motor truck lines, principally on New York service. These rates, of course, are competitive with the American Railway Express rates. Such a connection, however, is not advisable unless the motor-truck line is financially well established, for auto-truck lines do not have nine lives, like cats and street railways.

The necessity of modern terminals for the principal cities becomes more apparent each year. One of the biggest mistakes in this respect is to underestimate the possible growth of the business by not providing space for enlargement of the terminal. In dozens of New England cities terminals were provided that were thought ample for years to come, but which actually have proved inadequate within a short time. The terminal should be planned with some idea of the future. In the smaller cities freight stations with side tracks are advisable to obviate the necessity of street delivery. Street delivery is expensive and should be necessary only in the smallest towns. Small agencies at general stores serve the purpose of delivery of freight in rural communities.

THROUGH ROUTES AND TARIFFS

There is a movement to tie up all connecting lines into one freight system, with through tariffs to all points. That would be the millenium of trolley freight. Many reasons, however, make this union difficult. In the first place some companies come under the Interstate Commerce Commission's jurisdiction, while others avoid it. The restrictions and regulations of the commission seem to strike terror into their hearts. Next to the Commission bugaboo, the most important obstacle is accounting. Accounting is like religion. Every road has a different system, and each thinks its own is the best. There are blanket waybills, individual waybills and old-line express waybills, as well as variations on all of them. The problem of interchange of equipment has not been so serious, due to the fact that freight rolling stock is of much the same type on most of the lines. But all objections to concerted action are being aired by a comparatively new association of New England trolley freight men. This association holding monthly meetings has done much to let everybody see what the other fellow is doing.

Every year adds new towns to the list enjoying freight service. But it is not always without a struggle that franchise rights are obtained. Local politicians demand all sorts of concessions for the franchise privileges. It gives them campaign material, and there are instances where street railways have been consistently denied the privileges and have had to resort to the state commission. Many restrictions are placed upon trolley freight by local governing bodies. Some limit the length of cars to be used, others provide certain hours for the passage of freight cars, while in some cities freight car operation is forbidden on certain streets, necessitating long detours. This condition of affairs should be remedied by new legislation.

The recent announcement that the Eastern Massachusetts Street Railway will develop the freight business in cities and towns north of Boston has been awaited by connecting lines for several years. This great industrial section honeycombed with trolley lines offers great opportunity for the freight business. Patrons of connecting lines have constantly requested information as to when this territory would be opened.

This interest on their part shows that the average shipper is interested in general trolley freight service to all possible points, regardless of limitations, lack of franchises or through billing arrangements.

In most instances street railway freight tariffs were based on steam railroad rates. However, present conditions warrant closer study before the issuance of new tariffs. It will be found on long distance hauls that the electric railway may command higher rates than the steam railroad, but on shorter hauls, truck competition, etc., in some instances make rates lower than the railroads. The reference to class rates calls attention to the experiment of the Connecticut Company in adopting only one class rate. This obviously simplifies billing and the checking of waybills and quotation of rates. V. S. Curtis, the company's general traffic agent, who is responsible for this classification, believes that trolley lines cannot accept the rules and regulations which are imposed upon steam railroads by the Interstate Commerce Commission through its official classification. His idea merits careful consideration, and it is believed by many that some day the commission will issue a special classification intended for the use of trolley freight lines.

RELATIONS WITH PUBLIC CORDIAL.

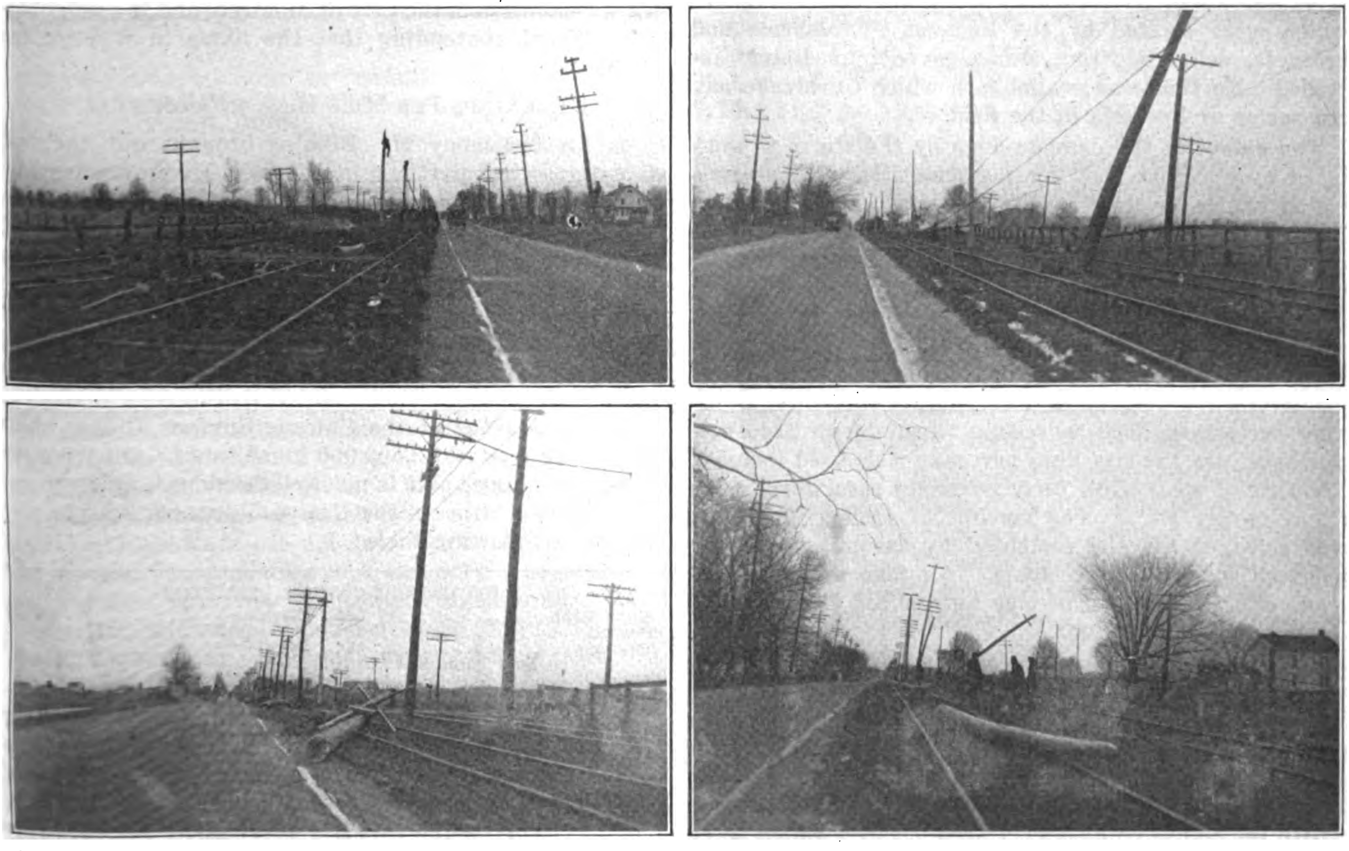
Relations with the general public have been cordial, and perhaps no other method of transportation so enjoys the confidence of the shippers. This is due in part to the fact that the trolley freight service is in a position to grant many conveniences to its patrons. Special loading and unloading privileges, extra cars apart from scheduled service, etc., make many friends. There is a minimum damage to freight enroute, and prompt attention to whatever claims may arise. But the main reason for the success of the trolley freight lines is service. In this one word lies the basis of everything. Quick service at reasonable rates will always bring patronage. In service also lies the future. May it bring its measure of success to the electric freight and its well wishers.

Quick Rehabilitation After a Hurricane

Detroit Lines Suffered $250,000 Loss But Service Was Quickly Resumed—Large Quantities of New Materials Required

THE terrific windstorm which caused an estimated loss of $250,000 to the Detroit United Ry. on Nov. 29 was the most severe outburst of natural forces ever encountered by that system. Within the City of Detroit there was little serious damage, and the service suspensions, although numerous, were not of long duration and were largely due to falling trees and limbs. On the interurban lines, however, the wind had full sweep and in addition to the damage and delays through the collapse of parts of the overhead system, the condition was made much worse by the pole lines of other utilities falling across the tracks and breaking through the trolley overhead system.

All interurban lines were compelled to suspend operation about 6 p.m. on Saturday, Nov. 29. Scores of poles on the Pontiac division were blown over or knocked down by falling trees. These included trolley poles and poles bearing wires of the lighting and telephone companies. For a stretch of 6 miles the roadway was strewn with wreckage. On the Flint division a large number of poles were down and at various points broken poles, tangled wires, trees and other wreckage covered the tracks.



THESE PICTURES ILLUSTRATE A SURPRISINGLY CLEAN SWEEP OF TROLLEY POLES, WRECKAGE BEING CLEANED FROM RIGHT-OF-WAY AND NEW POLES ERECTED. POLES BELONGING TO OTHER UTILITIES CAUSED MUCH OF THE DAMAGE

The Rapid Ry. was hardest hit. On this division more than 200 poles were wrecked. In one long cut the tracks were literally buried under wreckage of poles, wires and trees. In addition to this several bridges were weakened by washouts.

Many cars on all of the lines were in service at the time the poles fell and these were caught in the wreckage. Fortunately no one was injured. The stranded passengers proceeded on foot, by the aid of passing motor vehicles and where possible by vehicles furnished by the railway, to their destinations or the nearest hotel.

At the railway offices it was early realized from the reports coming in from all sources that it was a case of urgent need of men and materials. Extra gangs of track men and linemen were, therefore, dispatched at once to the suburban lines by automobile trucks. Trucks and wagons were pressed into service and loaded with poles, crossarms, insulators, drums of wire and all other material necessary for replacement. Tower wagons in some instances were sent out on the suburban lines. Digging tools, axes and saws were sent with the men. Immediately upon arrival of the men at the places of trouble, trees or poles were sawn up to clear the track and salvage the wires. These wires were carefully laid beside the right-of-way and kept in an untangled condition as far as possible, so as to facilitate their prompt re-election.

From the Detroit stores and the store yards on the several divisions, poles were loaded on flat cars for shipment to the wrecked areas. In many instances it was found that poles were cracked at the ground line but still stood. In some instances, if these poles would temporarily stand to hold wires up they were permitted to remain so, and in many cases poles were erected at every second span. Track men dug the holes for poles which were erected by the linemen. Crossarms and brackets, delivered from stores, were immediately installed. No time was available in which to salvage any crossarms or brackets in the field.

The extent of the damage done by the storm is indicated by a report showing the quantities of materials which had to be used in the repair work. To replace the trolley poles destroyed by the storm, 596 new poles were erected and it was also necessary to realign 1,000 poles. Other materials used on the interurban lines included 20,000 ft. of trolley wire, 35,000 ft. of span wire, 75,000 ft. of telephone wire, 5,000 ft. of high-tension wire, 672 high-tension insulators, 224 feeder insulators, 896 pony glass insulators, twenty-three lightning arresters, 500 porcelain insulators, 224 pole brackets. On the city lines new materials used included 1,500 ft. of span wire, forty porcelain insulators, 7,200 ft. of trolley wire. The amount of trolley wire that was salvaged may be computed by assuming the new poles as spaced 100 ft. apart. An idea of the disastrous effect of the storm may be realized from the accompanying illustrations.

In many instances every second pole was erected and the trolley attached to the bracket by means of tie wires in order to give the cars something to travel on. On one division a patron reported that he had traveled from Flint on a new form of railway, namely, the "wireless railway." He referred to three gaps of a mile each where the right-of-way was cleared but over which there was no wire. These happened to be located where the grade was level and there were no curves. A run was taken before the gap was reached and the conductor would pull down the trolley and the car would drift through. This was done for about two or three days in both directions in order that the men could have time to erect poles in a district which had suffered greater damage.

Interurban cars caught in the collapse of poles and wires served a most useful purpose. Fires were kept burning in them and meals were served as regularly as possible under the circumstances. Many of the line and track department men although excused on Sunday night continued at work and remained steadily on the job night and day from Saturday until Tuesday night.

In referring to the catastrophe, M. F. M. Werth, superintendent of power, gives the men themselves great credit for the spirit exhibited. He says: "There was no lagging, holding back or quibbling. It was a case of 'dig,' and the spirit of the men at all times was all that could be desired. If the men have confidence in the management, the management confidence in the men and each do the right thing, results can be produced."

Statistics on Montreal Traffic

Testimony Presented by J. R. Bibbins at the Public Utilities Commission Hearing Contains Interesting Statistics and Comparisons

SOME interesting particulars of the traffic in Montreal as well as comparisons of cost of operation in that city and other cities were given during the hearings in October before the Quebec Public Utilities Commission by J. R. Bibbins, special representative of Bion J. Arnold and the Arnold Company, consulting engineers, of Chicago. The hearing was called by the commission to consider the budget of the Montreal Tramways Commission, the City of Montreal and the neighboring villages contending that the items in it were too high.

EARNINGS PER MILE HIGH IN MONTREAL

In his testimony Mr. Bibbins brought out the fact that the settled portions in Montreal have an unusually high density of population for a city of its size, with the result that the local track mileage per thousand of inhabitants is considerably lower than usual, and the average density of service, as well as the earnings per mile of track, is unusually high. There are operated approximately 100,000 car-miles per year per mile of track, and the earnings per mile of track are approximately $33,000, this being equal to the service density and the earnings of the Chicago Surface Lines, which operate in a city of 2,500,000 inhabitants. On the other hand the riding habit is not well developed, as compared with various cities in the United States, as may be seen from the following table:

RIDES PER CAPITA PER YEAR

Manhattan	388	Cleveland	325
Detroit	360	Brooklyn	265
Chicago	334	Pittsburgh	230
Montreal	225		

This comparatively low riding habit in Montreal is probably due in some measure to the dense settlement referred to and the fact that a considerable percentage of the population lives within walking distance of the business section. While this has resulted in comparatively small earnings for the population served, it has likewise had the effect of requiring a very much smaller system than would ordinarily be expected, with a corresponding high density of service. To this latter is due in large part the successful operation of the Montreal system.

ECONOMIES POSSIBLE TO BE EFFECTED

The rush-hour service in Montreal is more than double (215 per cent to 230 per cent) the base day service. While this is not in excess of the rush-hour ratio in distinctly industrial cities, it is above the average. One reason for this is that during rush hours there is a concession in fares. Such a practice increases the operating expenses of the company and decreases its revenue.

Since 1913, the average speed has been increased from 7.52 to 8.32 m.p.h. While this is an improvement, it is believed that still further improvement is possible, and thus a considerable saving in car service expense may be secured. To do this, however, will require the coöperation of a number of interests, including the passengers, the city and police departments, the business interests and the press.

Attention is also called to the short distance between stops. Many of the blocks are only 250 ft. long and the present practice requires cars to stop on demand at every intersection, where passengers may desire to board or alight. A spacing of 500 ft. is preferred. Reduction of automobile parking and the introduction of safety cars are also recommended.

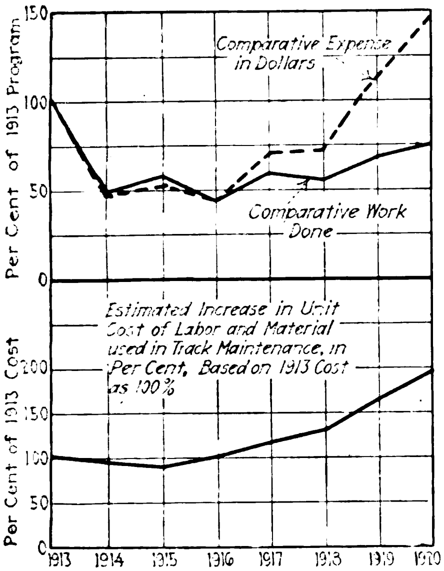


CHART SHOWING COST OF TRACK MAINTENANCE AND ACTUAL WORK DONE

One objection raised to the use of one-man cars in Montreal has been the heavy snows, and it was stated by the company's officials that no car was considered practicable which had a weight of less than 10,000 lb. per axle, and that single-truck cars with even this weight could not be successfully operated, because of the uneven distribution of the weight per axle on grades where it is most needed. Mr. Bibbins thinks, however, that a one-man car should be given a fair trial, particularly on some of the lines on which light cars are now operated. If light cars are not found practicable, some of the present heavy double-truck cars might be converted for one-man operation on lines of light traffic. It is even possible that the situation would justify the purchase of a number of one-man cars to be operated during nine months of the year, when the street conditions are favorable.

Mr. Bibbins makes the point that if the cost of a given piece of track maintenance work in 1913 is taken as 100 per cent, the cost for the same piece of work in 1919, based upon records of labor and material prices, provided by the company, is found to be 165 per cent, and is estimated for 1920 as 195 per cent. In consequence, although the 1920 budget in dollars amounts to 146 per cent of the 1913 expenditure, the actual work contemplated is 25 per cent below that done in 1913. This relation is shown in one of the accompanying charts. Estimates of car maintenance are shown in the second chart. The current appropriation for "renewals" is not subject to these price fluctuations because in Montreal the item of "renewals" covers only the original cost of appraised value of such items of property as have to be renewed during the current year, any increase in cost due to present high prices being considered a capital charge.

The conclusion reached by Mr. Bibbins was that the 1920 budget seemed conservative and should not be reduced. It is interesting to record that after this evidence was presented the city attorney asked that the decision of the Tramways Commission should be upheld, thus disposing automatically of the appeal filed by the city so far as its demand for an order lowering the charge fixed by the Tramways Commission was concerned. The commission also upheld the justice of Mr. Bibbins' estimate on the charge for maintenance of equipment and in general his recommendations that deferred maintenance accrued during the war period must be made good promptly to save the property from further deterioration which would surely set in from continual neglect. The commission also indorsed Mr. Bibbins' recommendation of the skip-stop system and it eliminated the reduced fares formerly charged during rush hours.

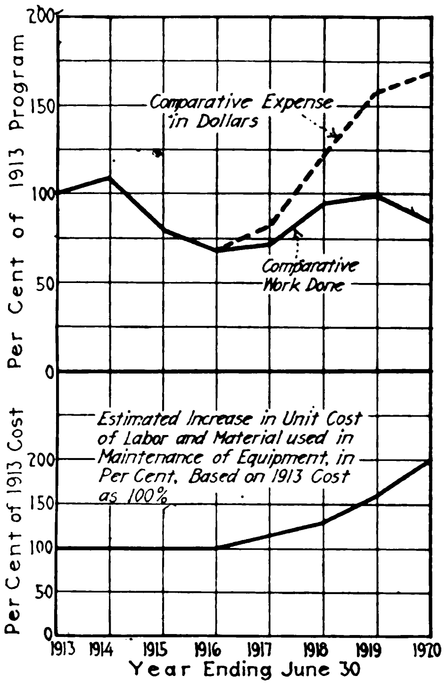


CHART SHOWING COST OF CAR MAINTENANCE AND ACTUAL WORK DONE

New Engineers' Club Formed

ON JAN. 7, 125 engineers, architects and chemists formed the "Mohawk Valley Engineers' Club" at Utica, N. Y. The club will have regular monthly meetings on the first Tuesday of each month, and special meetings as required. The territory embraced by its activities includes that covered by a radius of approximately 40 miles from Utica. The officers for the current year are: Byron E. White, engineer, Utica Gas & Electric Co., president; Hubert E. Collins, consulting engineer, first vice-president; Roy F. Hall, division engineer State Highway Department, second vice-president; Horace B. Sweet, consulting engineer, third vice-president; Frederick E. Beck, engineer Consolidated Water Co., secretary, and Clifford Lewis, Jr., civil engineer, treasurer.

Second Year of Automatic Substation Operation at Butte

The Maintenance Cost for the Second Year's Operation of the Butte (Mont.) Electric Railway's Automatic Substation Was But $249

By E. J. Nash
Electrical Engineer Butte (Mont.) Electric Ry.

IN THE article by the writer, published in the issue of the ELECTRIC RAILWAY JOURNAL for March 22, 1919, and entitled "A Year of the Automatic Substation at Butte," it was stated that the railway company planned to install another automatic substation and to automatize the central substation. Unfortunately the company has experienced the same financial difficulties as other roads have suffered, and these plans have not yet been realized. The one automatic equipment which we have, however, has given excellent service, as will be seen from the following recital of another year's experience with it.

OPERATING RECORD ALMOST PERFECT

As reliability of service is one of the prime requisites in the transportation business, one of the first questions to be asked in regard to the automatic substation is as to its proved trustworthiness as compared with the manually-operated station. On our property, as explained in the previous article, the manually-operated stations contained rotary converters of the same type, style and capacity as does the automatic substation. These machines are 500-kw., 60-cycle, six-phase, General Electric machines, diametrically connected. The full-load rating is 834 amp., and they are designed to carry 50 per cent overload for two hours, and 100 per cent overload momentarily. They have flash suppressors, or arc coolers.

While the rotaries in the manually-operated station have flashed over, and have flashed to the pedestal six times within the last year, the automatically-operated station has never flashed over. Four of the flashovers in the manually-operated station occurred when only the "owl" cars were running, or when the station load was light. However, the same condition was duplicated in the automatically-operated substation, for on three occasions the line broke within 3,000 ft. of the automatic substation, when the "owl" car was running. The station started on the no-load condition, for the breaker at the manually-operated station opened and fed into the "short" until the trolley wire was removed from the rail.

The automatically-operated station failed but four times the first year; during the last year it failed but three times. The causes of the failures were as follows: On one occasion the circuit breaker between the rotary and the bus, which is located on the switchboard where there is considerable vibration, opened either because it was not closed properly, or because paint lodged between the bearing surfaces of the catch and the holder. The station was off until an electrician arrived to close the breaker. The next time the failure was caused by the opening of the circuit through the bearing resistance, which caused the temperature relay to cut the machine off the line until the inspector arrived.

On the third occasion the finger of the brush-raising and lowering device had been jammed and given too much pressure against the movable contact, so that it did not drop at the proper time and thus did not raise the brushes when the machine was cut off the line by the underload relay. These three causes of failure kept the rotary off the line for but three hours, and at no time did the failure cause any delay in the car schedules.

In December, 1919, Butte experienced the coldest weather ever recorded. Thermometers near the station showed 50 deg. below zero on one day and 56 deg. below zero on the next. Cars had to stop running the first day, on account of the snow, but were operating the next day, that is, the day of the coldest weather. The station operated under these conditions without a hitch and without heat.

CURRENT LIMITING FEATURE ADVANTAGEOUS

The current-limiting control feature of the automatic substation has proved itself to be a great advantage. The control is accomplished by means of resistors, contactors and relays. Under normal conditions the two resistors between the machine and the bus are shunted by contactors, and a resistor in each feeder circuit is shunted by a contactor. These contactors are held closed by means of current through the contacts of instantaneous-opening, time-limit-closing overload relays. Under overload conditions, the feeder relay opens at a predetermined value, thus opening a contactor and inserting resistance between the bus and the trolley. On a continuance of the overload the relay set to operate at one and one-third overload opens, inserting more resistance. If the overload still continues, the third relay opens at one and two-thirds overload, or at whatever other overload is desired, inserting all of the resistance between the machine and the trolley.

The above explanation is necessary to show how the "automatic" on many occasions has contributed to the reliability of the power supply. The automatic substation is located about half-way between the center of the city and the end of the Englewood line, which includes about 7,000 ft. of 7 per cent grade. Last summer, in addition to the regular attractions at the park resort, there was an aviation circus staged by the United States government, which drew a large crowd. The cars carried 12,000 people to the field in one and three-quarter hours. Time after time, when the cars were badly handled in starting, or from overload, resistance was inserted in the circuit by the above-mentioned relays, and in consequence the trolley voltage was lowered a little, allowing the car to get under headway. Although the voltage was below normal, the power was available for the cars at all times without the usual opening and closing of circuit breakers.

MAINTENANCE COST $106 LOWER THAN IN 1918

The maintenance cost for the first year's operation was $355.80, while that for last year was $249.17. Of this amount $18.17 was for material, and the balance of $231 was for labor. The latter amount represents 264 hours of work, of inspection and cleaning, which is slightly more than five hours per week. The rotary converter and the auxiliaries are blown out once a week. The only other outlay chargeable to the station was for $113.56, the cost of installing resistance bearings, together with their relays and a circuit breaker between the machine and the bus. These pieces of apparatus were sent by the General Electric Co. free of charge as improvements over the existing equipment.

The Safety Car a Successful Merchandiser

The Experience of a Number of Cities Is Cited to Show that the Light, One-Man Car Is an Effective Business Getter

BY N. H. CALLARD, JR.
Railway Department Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

THE SAFETY CAR IS AN INCREASINGLY FAMILIAR SIGHT

THE chief function of a railway company is to *sell* rides at a profit. Whatever else it may do is but preliminary to selling. Its end is accomplished only by rendering complete satisfaction to the public and building up a popular confidence in the railway. The ideal has only been reached when the entire community believes that the railway furnishes a service that is superior to any other form of transportation of equal cost.

There has been no single development in years that seems so adequately to fill the wants of the public and so economically to permit the railway to approach this ideal as the safety car. Originally this car was designed and operated to duplicate as nearly as possible the service given by automobiles and to reduce the cost of operation from both the labor and the power standpoints. To the surprise of many operators of cars of this type, it was discovered that more passengers returned to their lines than were taken away by the automobile and thus the fundamental theory of transportation was again established that people will patronize any system of transportation that provides a conveyance when it is desired to be taken, and moves them rapidly and safely to their destination.

Operators of street railways have always realized that with quicker service more passengers will ride, but the cost of giving improved service with heavy equipments operated by two men was prohibitive. The one-man safety car makes this improved service possible. The companies that have adopted the safety car have invariably found that where increased service is given the percentage increase in revenue is one-half or more of the percentage increase in service. The only salesmen a railway property has are its cars; and the more of them that are present the more rides will be sold.

The methods by which the safety car can be utilized to sell more rides are innumerable. Examples of some will be given.

In Seattle, Wash., the Capitol Hill line operates from the Union Depot loop, up Third Avenue (which is a very busy street with a large number of transfer points from other parts of the city) to Pine Street; thence out Pine Street to Fifteenth Avenue and on to Galer Street. The principal shopping district of Seattle, including the Public Market, is in the vicinity of Third Avenue and Pine Street and the all-day shopping load from this district is very large. The regular cars pick up a large load from the Depot up Third Avenue so that when the cars arrive at this shopping district, there are seldom any seats left for the parcel-laden shoppers. This caused considerable criticism of the service and created a condition where husbands would leave their automobiles at home so that their wives could go shopping with a maximum of ease.

The railway could not economically operate more cars over the entire line, because the load that was picked up on Third Ave. would usually drop off at different transfer points less than a mile from Third Ave. and Pine Street. To relieve this condition, five safety cars were sandwiched in between regular cars to give additional service between this shopping district and Capitol Hill. The cars alternate with the larger two-men cars, of which six are in service all day, and eleven more go on as trippers during the rush hours. This change of schedule was made with the sole idea of building up traffic and fostering goodwill; reduction in operating expenses was a secondary consideration. Tables I and II show the difference between the old service and the new. An 89 per cent increase in cars per hour over this section of the line is obtained with only four men additional.

TABLE I—RESULTS OF SAFETY CAR OPERATION IN SEATTLE

	Old Schedule	New Schedule
Car-miles per day	1106	1535
Cars per hour	7.26	13.72
Longest headway (minutes)	12	4.5
Shortest headway (minutes)	5.5	3
Per cent increase in cars per hour	....	89
Per cent increase in seats per hour	....	54
Men required	28	32

TABLE II—TWO OVERLAPPING ROUTES IN SEATTLE

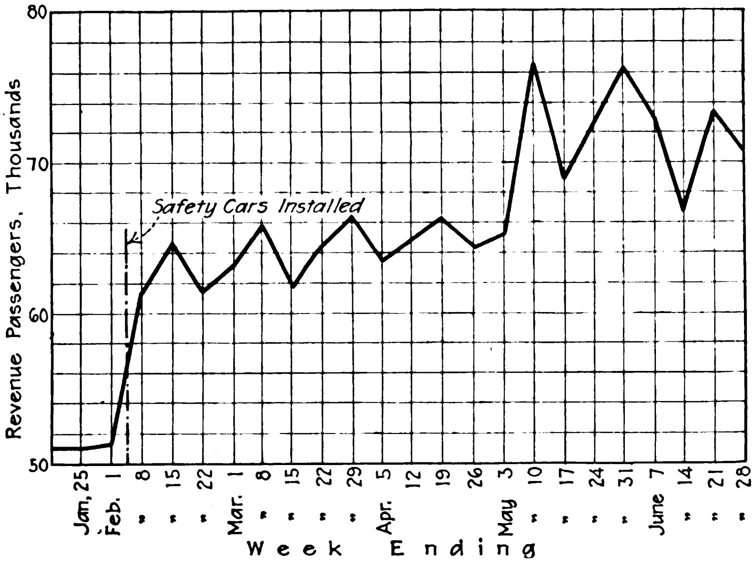
	Through Cars	Safety Cars
Length of line (miles)	7.0	4.5
Running time (minutes)	54 to 60	36
Shedule speed (miles per hour)	7.8 to 7	7.5

The new service is so convenient that an average increase of 34 per cent in revenue passengers has resulted. Many women who formerly drove their cars down town to shop now find it more convenient to use the street cars, for they can more easily go from one store to another and do not have to waste time and effort in finding places to park their cars.

The Kansas City Railways started safety car service on April 27, 1919, operating the new cars on the Sunset Hill line, which is seven miles in length and passes through Grand Avenue in the downtown district. This street carries extremely heavy traffic with a headway during the rush-hour portions of the day of from thirty to forty seconds. The Sunset Hill line has the usual heavy grades to be found throughout Kansas City and the safety cars encounter every type of severe conditions that are to be met any where.

Formerly on this line, during the rush-hour period, twenty large cars were operated, giving approximately a four and one half-minute headway. During the non-rush hours, an eight-minute headway was given with fifteen cars. With the inauguration of the safety car, a two and one half to three-minute headway was given during the rush-hour periods and a four and one half to five-minute headway during the non-rush hours.

Apparently riding did not fall off on adjoining lines and the results of operation after a considerable length of time showed the following increases over the average conditions prior to the inauguration of the safety cars: car-miles, 47 per cent; car-hours, 54 per cent; gross receipts, 19 per cent.



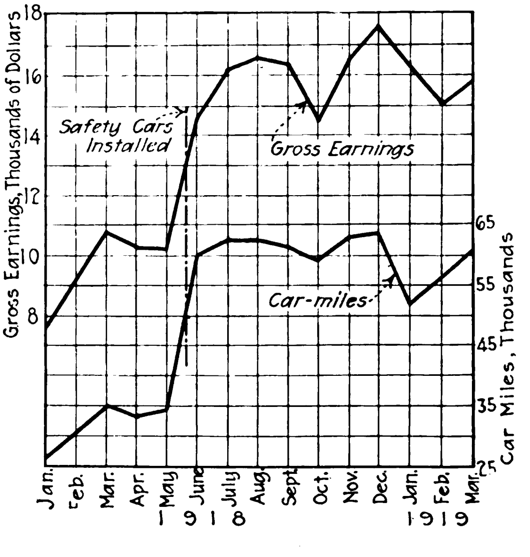
EFFECT OF SAFETY CAR OPERATION ON REVENUE IN BRIDGEPORT

One of the newest installations of safety cars is on the properties of the Virginia Railway & Power Company, operating in Richmond, Petersburg and Norfolk. The Belmont Avenue and the Laurel Street lines in Richmond are both operated with the new cars, service having been increased on the Belmont Avenue line approximately 55 per cent and on the Laurel Street line approximately 40 per cent. After a month of operation the revenue passengers on the Belmont line had increased 23 per cent over the previous average number of passengers. The Laurel Street line has not been operated by safety cars long enough to determine the increase in revenue passengers.

A most remarkable increase in revenue passengers resulted from the installation of safety cars on the lines of The Connecticut Company in Bridgeport, Conn. There were formerly two lines with rather infrequent service; the Oak Street line with 15-minute service and the South Park line with a 10-minute service. Parts of these lines were combined and safety cars were operated on a five-minute headway. No increase in service was given on the parts of these lines not operated with the safety cars. The accompanying diagram shows the increase in revenue passengers on both lines. It was found impracticable to segregate the data for the two. However, all of the increase can be properly attributed to better service.

Here is a case where more than 11,000 passengers per week are carried, who formerly either walked or used other conveyances. The traffic on adjoining lines does not show a decrease. The cost of giving the increased service is no greater than that with the older plan of operation.

In the spring of 1918 the Houston (Tex.) Electric Company found it necessary to purchase additional equipment. Safety cars were ordered and a crosstown line, known as the Woodland-LaBranch line, was selected to try them out. This line is 4¾ miles long, one way, including 3½ miles of double track. The single track has five turnouts with a wye at one end of the line and a loop at the other. The traffic on this line is comparatively heavy, as it passes through the most congested points of the business district, and crossing three steam railroad tracks at grade. Two of these crossings are without flagmen.



INCREASES IN CAR-MILEAGE AND REVENUE IN HOUSTON (WOODLAND-LABRANCH LINE)

In addition to the seventeen cars operated on the Woodland-LaBranch line, thirty-eight additional one-man cars are operated as regular and extra cars on other lines with excellent results. A second diagram shows the car-mileage and the revenue of this line for 1918 and the early months of 1919. Table III gives a comparison of two-man operation and one-man operation on the Woodland-LaBranch line:

TABLE III—COMPARISON OF TWO-MAN AND ONE-MAN OPERATION ON WOODLAND-LABRANCH LINE, HOUSTON, TEX.

	Old Schedule Two-Man Cars	New Schedule One-Man Cars
Headway, rush hours	6 minutes	4 minutes
Headway, normal hours	12 minutes	6 to 8 minutes
Running time, rush hours	72 minutes	68 minutes
Running time, normal hours	72 minutes	64 minutes
Number trips per day	136	200
Car-miles per day	1290	1897
Seats per rush hour	400	725
Seats per normal hour	200	262 to 350
Schedule speed, miles per hour	7.91	8.90

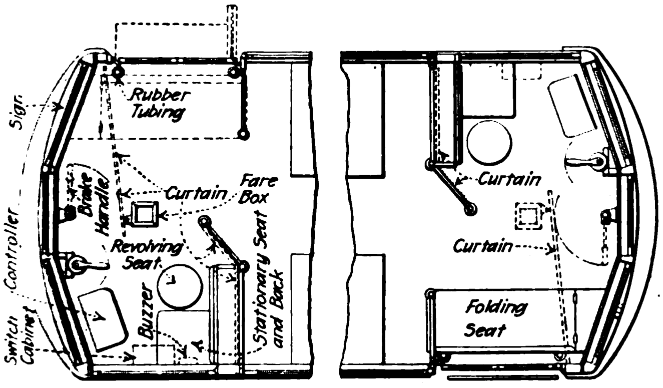
Houston is only one of the many cities where the Stone & Webster Management Corporation has used safety cars with very great success. In Tampa, Fla., the safety car is used on two lines. On one of these car-mileage has been increased 29 per cent with an increase in receipts of 13 per cent; on the other the car-mileage has been increased 51 per cent and the receipts 51.4 per cent.

In El Paso, Tex., two lines are operated with safety cars. One line shows an increase in receipts of 50 per cent with an increase of only 47.5 per cent in car-mileage and on the other line the increase in receipts has been 36.7 per cent, with an increase of 50 per cent in car-mileage.

Three lines in Tacoma, Wash., are operated with safety cars. The increase in car-mileage on one has been 75 per cent and in receipts 42 per cent; the increase in car-mileage on the second line has been 20.9 per cent and in receipts 25.8 per cent; on the third line, the increase in car-mileage has been 3.4 per cent and in receipts 17.31 per cent.

From the experiences of the Stone & Webster Management Corporation, H. G. Bradlee, its president, has assumed "that with a 50 per cent increase in mileage, you will be able to get a 25 per cent increase in car receipts, which is a small proportion for our figures show that for many of our properties the increase in receipts, in percentage, is fully equal to the mileage." All of these figures show the indubitable fact that receipts are dependent upon service, up to the point of traffic saturation.

Occasionally there will be cases where the safety car will give good service and increase receipts, even though a car-for-car replacement is made. Such a case is that of the Hartford property of the Connecticut Company. On its Asylum Street-Post Office Loop line single-track, side-seated cars holding twenty-six people were formerly used. A ten-minute headway was given until 7 p.m. and a fifteen-minute during the balance of the night. The company now operates three safety cars, giving a ten-minute service continuously, which, coupled with the easy-riding qualities of the cars and their attractive appearance, has actually increased the travel on this line. Cases like this, however, are very exceptional and it is usually found that where one-man cars are merely substitutes for two-men cars, the revenues actually decreas, for the public feels that their service has been cheapened.

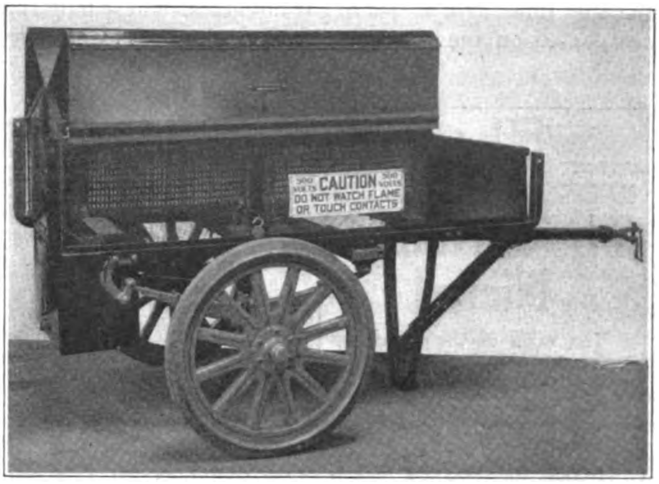


LAYOUT OF STANDARD SAFETY CAR

In conclusion a most extraordinary condition must be mentioned. When the safety car is installed as a merchandising means of selling more rides by giving better service to the railway's patrons all real objections to the car disappear. When thus applied, the use of the new type of car does not involve fewer men but in many cases actually more are required. Furthermore the automatic, laborless devices, with which the car is equipped, make it easier to operate and no justifiable complaint can be made by the operator. The shorter headways and the better time made due to the less frequent and shorter stops insure the instant approval of the public.

New Mounting for Welder

IN ORDER to meet the requirements of electric railways which are now handling their track maintenance equipment by automobile or motor instead of by team as formerly, the Indianapolis Switch & Frog Company has developed a high-speed mounting for its electric welders. This new mounting is equipped with heat treated Timkin axles, Timkin double-thrust roller bearings, super-strength artillery wheels with solid rubber tires, heavy oil-tempered semi-elliptic springs and a double-acting spring drawbar with attachment for connecting to a work car or a motor truck. This type of two-wheel mounting permits the welder to be handled in wheel mounting permits the welder to be handled in close quarters, as it can be turned in its length.



NEW HEAVY DUTY HIGH SPEED WELDING OUTFIT

In the design of this new mounting provision has been made so that it can be interchanged with the former four-wheeled steel tired mounting provided by this company. The change in mounting can be carried out in half an hour by removing six bolts and drilling four holes in the old frame.

Creosote Treatment Increases Life of Poles

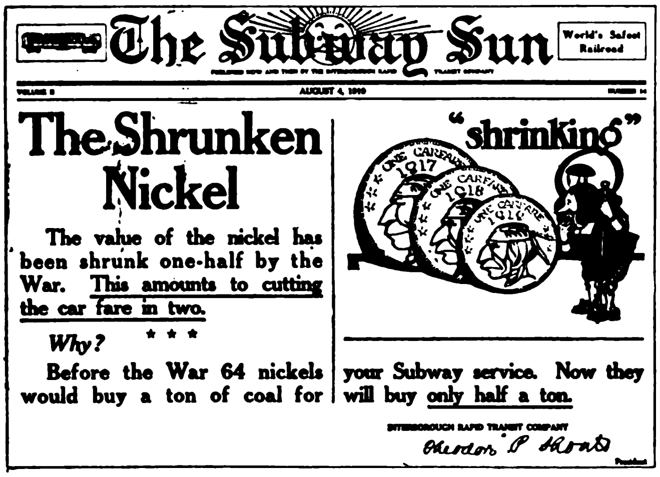
Data compiled by E. I. du Pont de Nemours & Co., Inc., show that the effect of applying creosote treatment to the ends of poles and posts which are to be embedded in the ground will lengthen their life somewhat as follows: White cedar, from sixteen to thirty years; cypress from six to fifteen years; chestnut from twelve to sixteen years; pine from six and a half to twenty years and juniper from eight to eighteen years. At present 4,000,000 poles are being erected annually, and records compiled by the United States Forest Service show that 95 per cent of all poles are destroyed by decay, 4 per cent by insects, and the remaining 1 per cent by mechanical abrasion.

That the electric railway is not the only utility which is suffering from high prices is indicated by the annual report of the Bureau of Railway News and Statistics which showed that during 1918, out of one dollar, 2.65 cents were available for dividends, reserves and surplus, as compared with 11.78 cents in 1916.

Bulletins Tell the Story

New York Posters Explain Need for Higher Fares

THE Interborough Rapid Transit Company of New York is making a strong effort to develop a popular conception of the need for higher fares on the subway and elevated lines by a series of car bulletins. These bulletins are pasted on the windows of the subway and elevated cars under the names "Subway Sun" and "Elevated Express." Typical posters of this kind are reproduced herewith. They are changed at intervals and may supply some ideas for posters or advertisements for the same purpose for other companies.



The Subway Sun

World's Safest Railroad

AUGUST 4, 1919

The Shrunken Nickel

The value of the nickel has been shrunk one-half by the War. This amounts to cutting the car fare in two.

Why?

* * *

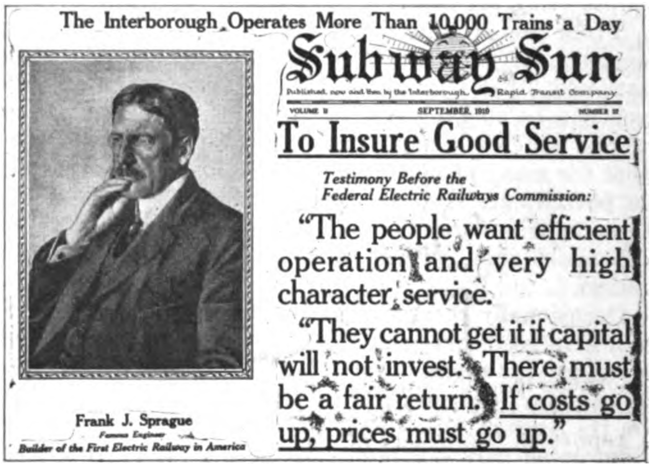
Before the War 64 nickels would buy a ton of coal for your Subway service. Now they will buy only half a ton.

INTERBOROUGH RAPID TRANSIT COMPANY

Theodore P. Shonts

President

"shrinking"
ONE CARFARE 1917
ONE CARFARE 1918
ONE CARFARE 1919



The Interborough Operates More Than 10,000 Trains a Day

Subway Sun

Published now and then by the Interborough Rapid Transit Company

SEPTEMBER, 1919

To Insure Good Service

Testimony Before the Federal Electric Railways Commission:

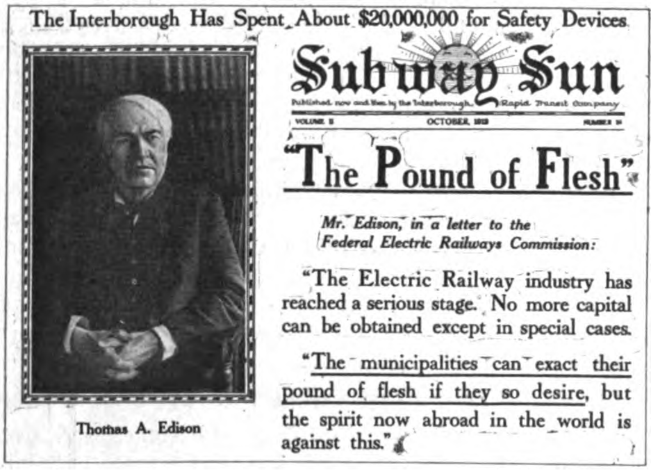
"The people want efficient operation and very high character service.

"They cannot get it if capital will not invest. There must be a fair return. If costs go up, prices must go up."

Frank J. Sprague

Famous Engineer

Builder of the First Electric Railway in America



The Interborough Has Spent About $20,000,000 for Safety Devices

Subway Sun

Published now and then by the Interborough Rapid Transit Company

OCTOBER, 1919

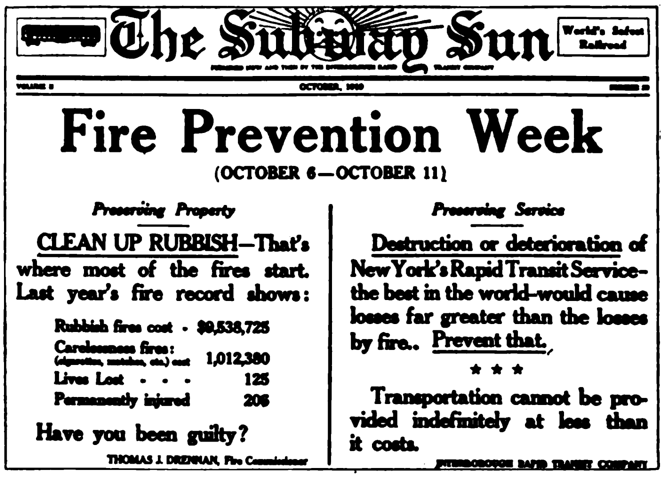
"The Pound of Flesh"

Mr. Edison, in a letter to the Federal Electric Railways Commission:

"The Electric Railway industry has reached a serious stage. No more capital can be obtained except in special cases.

"The municipalities can exact their pound of flesh if they so desire, but the spirit now abroad in the world is against this."

Thomas A. Edison



The Subway Sun

World's Safest Railroad

OCTOBER, 1919

Fire Prevention Week

(OCTOBER 6—OCTOBER 11)

Preserving Property

CLEAN UP RUBBISH—That's where most of the fires start. Last year's fire record shows:

Rubbish fires cost	$9,538,725
Carelessness fires: (cigarettes, matches, etc.) cost	1,012,380
Lives Lost	125
Permanently injured	206

Have you been guilty?

THOMAS J. DRENNAN, Fire Commissioner

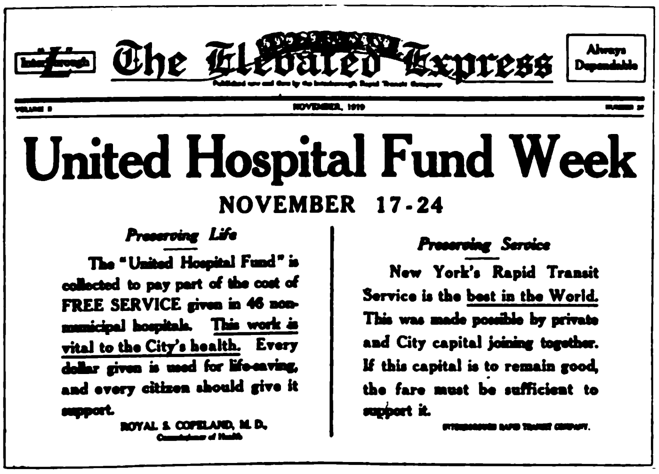
Preserving Service

Destruction or deterioration of New York's Rapid Transit Service—the best in the world—would cause losses far greater than the losses by fire.. Prevent that.

* * *

Transportation cannot be provided indefinitely at less than it costs.

INTERBOROUGH RAPID TRANSIT COMPANY



Interborough

The Elevated Express

Always Dependable

Published now and then by the Interborough Rapid Transit Company

NOVEMBER, 1919

United Hospital Fund Week

NOVEMBER 17-24

Preserving Life

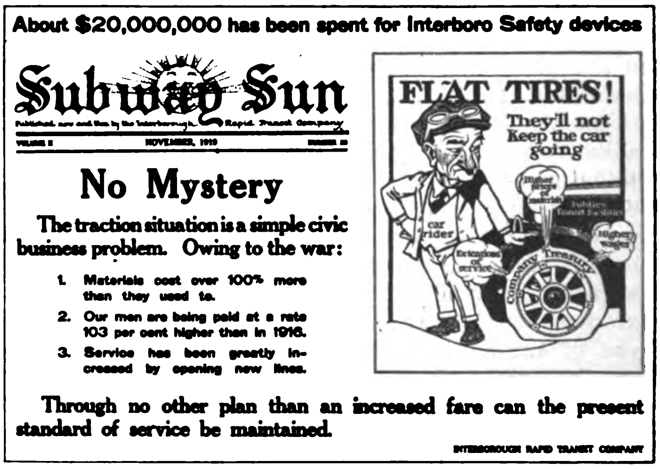
The "United Hospital Fund" is collected to pay part of the cost of FREE SERVICE given in 46 non-municipal hospitals. This work is vital to the City's health. Every dollar given is used for life-saving, and every citizen should give it support.

ROYAL S. COPELAND, M. D., Commissioner of Health

Preserving Service

New York's Rapid Transit Service is the best in the World. This was made possible by private and City capital joining together. If this capital is to remain good, the fare must be sufficient to support it.

INTERBOROUGH RAPID TRANSIT COMPANY.



About $20,000,000 has been spent for Interboro Safety devices

Subway Sun

Published now and then by the Interborough Rapid Transit Company

NOVEMBER, 1919

No Mystery

The traction situation is a simple civic business problem. Owing to the war:

1. Materials cost over 100% more than they used to.
2. Our men are being paid at a rate 103 per cent higher than in 1916.
3. Service has been greatly increased by opening new lines.

Through no other plan than an increased fare can the present standard of service be maintained.

INTERBOROUGH RAPID TRANSIT COMPANY

Association News

Information and Service Bureau Active

SINCE the statement issued, the following additional statistics have been prepared by the bureau of information and service: (1) A list of cities having increased rates of fare brought up to Jan. 10, 1920. This compilation shows a classified list of cities on the basis of the rate of fare, the population of the city served, the name of the company, the ticket rates in effect and the date the fare increase became effective. A summary of all cities showing the number in each group and total and average population served is also included. (2) A report on valuations. This contains a detailed statement of reports of the commissions and other public authorities, summarizing the valuation obtained for electric railway properties and abstracting the elements included therein. (3) A compilation of methods of interurban companies in increasing rates of fare dated Jan. 1, 1920. The compilation included the latest rates of fare on interurban companies classified as to the basis of the fare increase, whether on a mileage basis, a flat fare increase, change in zones, or by other means. This shows the existing rates of fare, the former rates of fare and the date of increase. (4) A report on the effects of increased rates on operating revenues in cities of over 100,000 population. This is based on a questionnaire recently sent out by the association. It shows present and former rates of fare, authority granting same, and gives a comparison by month, both for the increase in passenger revenue and in revenue passengers before and after the fare increase became effective.

Committee on Standards to Meet

CHAIRMAN H. H. ADAMS has called a meeting of the committee on standards to be held at association headquarters on Feb. 9. The purpose of this meeting is to review and pass upon the recommendations of the standing committees which were passed at the October, 1919, convention, and which require final action by the committee on standards before they can be incorporated in the approved standards, recommendations and miscellaneous practices of the association.

Reports and discussions which are to be considered at the meeting on Feb. 9 are as follows: (1) Corrected copy of report of committee on equipment. (2) Corrected copy of report of committee on power distribution entitled "Joint Specifications for Electric Light, Power Supply and Trolley Lines Crossing Steam and Electric Railroads." (3) Copy of discussion at Atlantic City convention on recommendations of equipment committee and power distribution committee to be acted upon by committee on standards.

The specifications and recommendations approved by the convention and requiring final action by the standards committee are the following: (1) Dimensions for A. E. R. A. steel wheel design; (2) design for tread and flange contours for steel wheels; (3) journal bearing and wedge gages; (4) gaging points and terms for wheels and rails, and (5) specifications as in (2) in paragraph above.

The standards committee as now constituted comprises H. H. Adams, Chicago Surface Lines, chairman; H. L. Andrews, E. J. Blair, C. H. Clark, L. P. Crecelius, C. G. Keen, John Leisenring, John Lindall, H. H. Norris, F. R. Phillips, Martin Schreiber, W. C. Starkey, N. W. Storer and N. B. Trist.

Equipment Committee Starts Active Work

THE equipment committee of the Engineering Association held its first meeting of the year at association headquarters in New York City on Jan. 16. Those present were Messrs. Durie, Adams, Benedict, Dalgleish, Holding, Johnson, Priest, Sargent, Simmon and Squier.

The personnel of the committee has been increased over the list in the Jan. 3 issue, page 61, by the appointment of Keith MacLeod, Montreal Tramways; Sylvester Potter, Detroit United Ry.; Terance Scullin, Cleveland Ry., and C. W. Squier, ELECTRIC RAILWAY JOURNAL.

Two additional assignments have been made, namely, a study of life of wearing parts, and revision of standards, making a total of seven. These have been subdivided among the committee as follows, the name given first in each instance being that of the chairman of the sub-committee:

(1) Revisions of standards for brakeshoes and brakeshoe heads—Messrs. Benedict, Sargent, Johnson, Adams and MacLeod. (2) Continuation of study of standardization of motor parts—Messrs. Dalgleish, McWhirter, Scullin, Simmon, Priest and Potter. (3) Report on helical gears—Messrs. Durie, Johnson, Dalgleish, Simmon and Priest. (4) Investigation of feasibility of adopting standard cars—Messrs. Scullin, Squier, Holding, Yount, Adams and MacLeod. (5) Co-operation with committee on way matters on rail heads—Messrs. Sargent, Benedict, McWhirter, Holding and Dalgleish. (6) Study of life of wearing parts—Messrs. Squier, Potter, Yount, Simmon and Priest. (7) Revision of standards—Messrs. Johnson, Dalgleish, Holding, Sargent and Adams.

At the meeting the seven subjects assigned for study and report were discussed in considerable detail and plans were outlined for carrying on the work. The chairman of the various sub-committees will obtain ideas and opinions of members not present at the meeting as soon as possible with a view to beginning activities at once.

Connecticut Section Considers Aviation

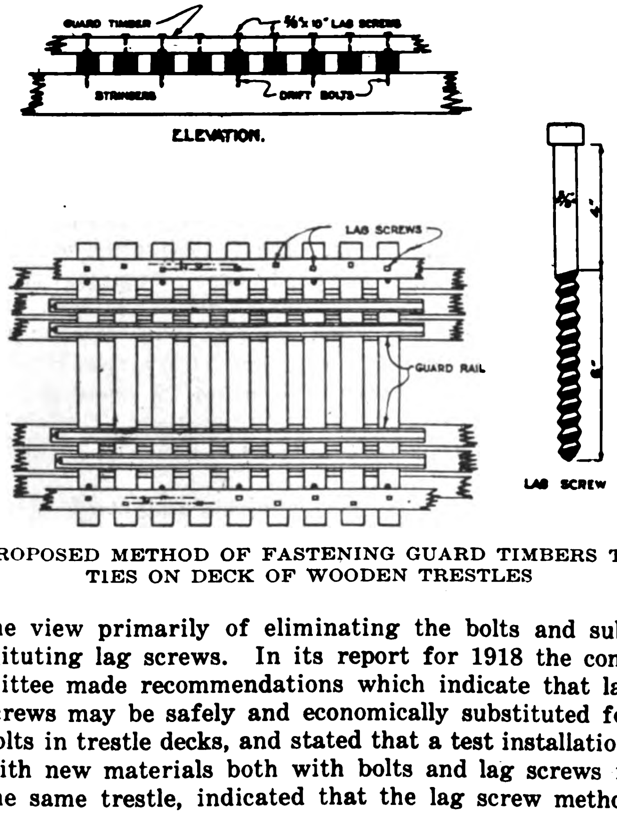
AT ITS dinner meeting held on Jan. 8 in New Haven, the Connecticut Company Section cast a glance ahead as it listened to a lecture by Prof. Hiram Bingham of Yale, on "Future Aviation." Professor Bingham had served during the war in charge of aviation work and gave the section a lecture full of information and inspiration. W. R. Dunham, Jr., the newly-elected president, presided at the meeting, and in taking the chair delivered a brief address on the work of the section. D. A. Kennedy, Boston, told a number of stories, and there were solos by guests and songs by a quartet from the Yale Glee Club.

The resignation of J. W. Colton from the vice-presidency of the section was received, Mr. Colton having left the employ of the Connecticut Co. to become editor of the *Hartford Times*. In accepting the resignation the section made Mr. Colton an honorary life member. Announcement was also made that at a meeting of the executive council held previous to the section, V. S. Curtis, secretary of the Connecticut Co., was elected vice-president in Mr. Colton's place, and E. T. Chapman, treasurer of the company, was appointed to fill his place on the program committee.

Lag Screws vs. Bolts in Trestle Construction

THE timber trestle builder has always been accustomed to the use of bolts, particularly in the decks of railway trestles. The general practice at present calls for the bolting of wooden guards to the ties. The guards are also dapped to fit over every tie, and the ties are dapped to fit the stringers. The purpose of all this has been to prevent shifting of the timbers, either laterally or longitudinally. The bolting and dapping call for a large amount of labor and material, and timbers have to be larger in size than is really necessary to provide for the dapping.

The committee on wooden bridges and trestles of the American Railway Engineering Association has been investigating this feature of trestle construction with the view primarily of eliminating the bolts and substituting lag screws. In its report for 1918 the committee made recommendations which indicate that lag screws may be safely and economically substituted for bolts in trestle decks, and stated that a test installation, with new materials both with bolts and lag screws in the same trestle, indicated that the lag screw method without dapping cost but 40 per cent of the bolt-and-dap method.



PROPOSED METHOD OF FASTENING GUARD TIMBERS TO TIES ON DECK OF WOODEN TRESTLES

Meanwhile a maintenance period of two years developed a reduction in cost of 94 per cent in favor of the lag screws, the maintenance consisting of tightening lag screws or tightening bolts and replacing missing nuts and washers.

The lag-screw type of deck construction as developed by the committee is shown in the accompanying figure, and the committee states that lining the track is greatly simplified with this construction. Some seventeen steam railroads have tried and are using this method.

The committee presented these conclusions: (a) Lag screws require greater care than ordinary bolts to install, but are cheaper on account of ease of application. (b) When properly applied, they hold ties from bunching equally as well as bolts and nuts, and better than daps, in timber guards. (c) If the lag screws are tightened after the timber has shrunk, there is less cost of maintenance than with bolts and nuts. (d) Use of lag screws renders dapping of guard timbers unnecessary and, therefore, decreases cost of trestles without impairing quality. (e) Surfacing (sizing) ties and guard timbers is better construction than dapping; makes a better riding track, thus decreasing impact stresses, and is, therefore, good practice. (f) For proper application of lag screws, holes in guard timbers should be bored with augers $\frac{1}{16}$ in. less in diameter, and holes in ties $\frac{1}{8}$ in. less in diameter, than the nominal size of the lag screws used.

Letters to the Editors

Publicity Direct and Indirect

NEW YORK, Jan. 21, 1920.

To the Editors:

Those who are familiar with some of the arts of publicity will recall Sheridan's witty catalog in "The Critic" of "the puff direct, the puff preliminary, the puff collateral, the puff collusive and the puff oblique, or puff by implication." It is a fact that where direct publicity proves incomplete it may be assisted by indirect publicity.

As an example, let us assume that an electric railway is desirous of making clear that it needs more revenue to improve its service. Perhaps it has been arguing itself black in the face from the angle of direct publicity. A certain number of people are convinced, but not enough to carry the point. The others sagely assert that it's all camouflage, bluff, etc.

Suppose now that the railway abandons this line of argument and goes to the public with some fare proposition which would result in carrying regular off-peak riders for less money. In trying to sell this proposition, the railway will have just the right opportunity to explain that a poor load factor is one of the reasons that lead to a higher fare; that if it could fill the seats of its cars eighteen hours a day instead of two, an increase in fare could be postponed indefinitely. This line of argument puts it up to the public to furnish the required extra patronage or else admit that the railway's point is well taken. The fact that the public is offered the off-peak riding at a rate decreasing inversely as its riding increases eliminates any objection that the company is asking something unreasonable.

Whether the railway succeeds in getting the needed additional revenue through such special rate propositions or not is entirely aside from the fact that it has been enabled to get its difficulties before the public from a novel and effective angle. What it fails to get in direct increase of revenue may come indirectly through a reduction of burdens permitted by an enlightened public opinion. Therefore, I might paraphrase Sheridan by saying that there is "advertising direct, advertising preliminary, advertising collateral, advertising collusive and advertising oblique, or by implication." It's what every publicity man knows!

ADVERTISING AGENT.

Bulletin News Page

Summary of the Principal Happenings of the Industry of Current Interest Since the Last Issue of This Paper Was Published

PRINTED JANUARY 23, 1920

The technical papers prepared by B. G. Lamme, chief engineer of the Westinghouse Electric & Manufacturing Co., have been reprinted in book form.

W. A. Smith, with the Omaha & Council Bluffs Street Ry., Omaha, Neb., since 1872, has been elected president of the company.

The buses in Brooklyn, N. Y., are carrying 45,000 passengers daily.

The city of Trenton, N. J., will have no part of the bus. It has turned down flat a proposal to establish such service there.

Manufacturers in College Point, Long Island, fearing for the future of the railway there, have come out for a 10-cent fare. The employers say they will buy tickets at 10 cents each and resell them to their employees for 5 cents each.

The Staten Island Midland R.R. has suspended service despite a restraining court order. A fleet of buses is making a bold effort to handle the business.

The 187 per cent paid out in dividends by the Interborough Rapid Transit Co., New York, N. Y., furnished a rare opportunity for the headline writers of New York's dailies to play with words. This amount was paid out since the organization of the company in 1904, or in sixteen years.

The receivers of the Pittsburgh (Pa.) Rys. feel that the recent increases in fares have removed the danger of the disintegration of that property. A statement covering figures for nine months is presented in detail.

Evidence seems to be accumulating of the failure of the different security holders of the Rhode Island Co., Providence, R. I., to come together on terms that will insure a peaceful reorganization.

The deficit of the Washington Railway & Electric Co., Washington, D. C., for the year just ended was $170,894.

In the seventeen months ended November, 1919, the Boston (Mass.) Elevated Ry. lost $5,934,255. The first annual report of the public trustees is reviewed.

The annual meeting of the Central Electric Railway Association will be held at Louisville, Ky., on March 10 and 11.

The Northern Ohio Electric Co., Akron, Ohio, has turned toward preferred stock as the most satisfactory way, under the present abnormal condition of the money market, of meeting an expiring short-term loan of $4,000,000.

St. Louis is to have a 10-cent bus system.

The Federal Court at Toledo has announced that it will extend the time within which the two divisions of the railway commission there are to report on plans for the settlement of the franchise and future of the Toledo Railways & Light Co.

The Lake Shore improvement of the Illinois Central Railroad at Chicago, including electrification, has been approved by the War Department.

A new street railway commission has been appointed at Detroit, Mich. Mayor Couzens says a railway should be run primarily for service, not for profit.

The union of employees on the Key Route, Oakland, Cal., is roundly scored by the arbitrators for their failure to live up to their contract. The arbitrators, however, confess themselves powerless under the circumstances.

The water-power bill has passed the Senate. The measure now goes to conference.

The sales idea in transportation is stressed in a communication from President Musser of the Harrisburg (Pa.) Rys. to the employees of that company.

The outlook at Pittsburgh is better. This the receivers frankly say in a statement recently made public. It is their hope that the disintegration of the properties included in the Pittsburgh Rys. system can be avoided. The earnings statement is for the nine months ended Sept. 30. Among the outstanding features is the statement that the recent fare increase has produced a revenue fully equaling the expectations of the receivers.

The merchants of Broadway, New York, have gone on record, through the Broadway Association, of having buses replace the street cars on that historic thoroughfare.

Traffic of the Interborough Rapid Transit Co. is increasing rapidly. Figures are given this week of recent B. R. T. gains.

Plans were urged before the Public Service Commission of the First District of New York on Jan. 21 looking toward the construction of a rapid transit loop to encircle the Herald Square and Times Square districts and linking up the Pennsylvania and the New York Central terminals. Among the proposals suggested is one for the installation of a moving platform.

The Assembly of New York on Jan. 20 concurred in a resolution adopted previously by the Senate calling upon Public Service Commissioner Lewis Nixon to report to the Legislature whether the electric railways in New York City can furnish adequate service at the present rates of fare.

Judge Mayer in New York has divorced another surface railway from the system of which it was formerly a part.

The Connecticut Company's answer to opponents of the zone system was given to the Public Utilities Commission at a hearing on Jan. 22. Figures were introduced by the company calculated to show that the zone fare system was workable, that the large majority of the people served by the company's lines were satisfied with it, and that receipts continue to increase under the zone system. The earnings for December, 1919, were $165,297 greater than the same month in 1918, and the gross for the first fifteen days of this month were $53,000 more than for the same period in 1919. The day before Christmas the company's riders paid within $1,000 of what had been secured on the most prosperous day in the past several years.

Safety cars are expected to be in operation on the lines of the Los Angeles (Cal.) Ry. about April 1.

To smoke or not to smoke: that is the question up for settlement in St. Louis. The company there says it cannot keep the smokers within bounds.

Justice Cropsey of the Supreme Court in Brooklyn has reserved decision in the appeal of the Brooklyn Rapid Transit Co. against the operation of buses by the city in competition with the railway.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Finding in Key Arbitration

Wages Increased 12½ Per Cent—Eight-Hour Day Denied—Other Working Conditions Satisfactory

A 12½ per cent wage increase has been granted platform men of the San Francisco-Oakland Terminal Rys., Oakland, Cal., in an award made recently by an arbitration board appointed to settle the differences arising from the strike of last October. The eight-hour day was denied, as was also the claim of the men for the elimination of "tripper," or emergency crews, and retroactive pay.

In granting the increase in wages the arbitration board ruled that the fact that the War Labor Board had ceased to function did not destroy the right of either party to ask for a readjustment of the award made by the War Labor Board in October, 1919. It found further that the old rates of 43 to 48 cents on the city lines and 45 to 50 cents within the Key route were not sufficient to provide a proper living but that an increase to a scale of 48 to 54 cents on the city lines and 50 to 56 cents on the Key route would be sufficient. This amounts to a 12½ per cent increase and will give the men an average income of $1,600 a year on the basis of a ten-hour day.

OLD RATES INADEQUATE

In denying the plea of the employees for an eight-hour day the arbitration board said that the eight-hour day would increase the cost to the company for wages at least 45 per cent and at the same time would not increase the earnings of the men above the amount granted in the present award. The board found the company positively unable to pay any such increase in the wages.

UNION SCORED

The employees had asked that any wage increase granted become retroactive to October, 1919. The board ruled that by their action in declaring a strike on Oct. 1 the men had forfeited their right to expect such retroactive pay. The strike caused the company a loss of $350,000. With one minor exception the remaining demands of the men were denied. This exception is the abolition of the system of hiring emergency or tripper men not on the regular list except between the hours of 7 and 9 in the morning and 4 and 6 in the evening.

The arbitration board was appointed after a strike beginning Oct. 1, 1919, and lasting eleven days. About Sept. 1 the men served notice on the company of a demand for certain changes in their contract, the most important of which were increased wages and the establishment of an eight-hour day. The company refused to grant the demand but offered to arbitrate the matter. Contrary to their agreement with the company and in contradiction to the constitution of the union, the men refused to arbitrate and struck. After eleven days of loss to the company, the men and the public, an agreement of arbitration was entered into and the men returned to work. Both the men and the company were pledged by the State Railroad Commission to accept the decision of the arbitration board. This decision is retroactive only to Jan. 1, 1920, and is to remain affective for a period of one year.

The board stated that under normal circumstances the award would have been made effective as of Oct. 1, 1919. It censured the men for having gone on strike, however, and as a penalty made the award effective on Jan. 1, 1920. In refusing to grant the request of the company for some assurance that the men will abide by their contract and this award the board said:

> Just what assurance be given is not suggested and we know of none. The cause of organized labor depends fundamentally upon organized labor living up to its contracts, but if the men themselves will not perceive this and voluntarily fulfill their agreements, we know of no machinery at the present time by which they can be compelled to do so. Upon this point of assurance all that we can say is that it is beyond our power.

Mr. Billings Wins Union Praise

C. P. Billings, manager of the Wheeling (W. Va.) Traction Co., has won praise from union sources in that city for his handling of a recent case in which a man was discharged. Under the title "A Hopeful Thing" the Wheeling *Majority* said:

> Last month a man was discharged by the management of the Wheeling Traction Co. Last week the case went to arbitration. The management and the union were unable to agree on the case, and the contract between the men and the company provides arbitration in all disputes. The arbitration board found the evidence sustained the manager and justified the discharge. And then the manager re-employed the man, returning him to his former position and rate of pay.
>
> It is a hopeful thing when the human relationship can thus enter the theoretically cold halls of business. The fairness of Manager C. P. Billings was vindicated by the arbitration decision; his kindness, which is more than mere justice, was shown by his subsequent action.
>
> The incident has two morals: one, that we are leaving the days of an industrialism of Simon Legrees and cringing slaves; the other, that arbitration will work. Men can be fair, and more than fair, if the atmosphere is created that develops fairness. And fairness, even to the point of charitableness, will not destroy discipline among employees. On the contrary, it develops a loyalty and co-operation which makes for efficiency in the service, through the management, to the public.

Power Bill Passes Senate

Measure Sent to Conference Between Upper and Lower Houses—Important Changes Are Forecast

By a vote of fifty-two to eighteen the Senate on Jan. 15 passed the water-power bill. The measure now goes to conference. It is a foregone conclusion that important changes will be made in the bill by the conferees. The conferees on the part of the Senate are Senators Jones of Washington, Nelson of Minnesota, Bankhead of Alabama, Smoot of Utah, Fall of New Mexico and Myers of Montana, and those who will represent the House are Representatives Esch of Wisconsin, Sinnott of Oregon, Haugen of Iowa, Sims of Tennessee, Taylor of Colorado and Lee of Georgia.

The amendment relating to compensation for the use of water powers utilized by private capital and not by the government, which had been lost by one vote in committee of the whole, was voted upon again in the Senate proper and was passed by a vote of forty-four to twenty.

The five provisions of the measure which were characterized by Gifford Pinchot as being anti-public and indefensible were not adopted except the one striking out the Senate committee amendment relating to joint approval of contracts and the one limiting to some degree the amount of severance damages. The Pinchot objections were pressed very strenuously by Senator Lenroot and others. It is expected they will receive consideration in the conference.

$25,000,000 DEVELOPMENT AUTHORIZED

As finally passed by the Senate, the bill contains the authorization for a $25,000,000 power development on the Potomac River at Great Falls and gives to the Federal Power Commission all the authority vested in the Newlands commission. It is regarded as not improbable, however, that both of these provisions of the bill will be stricken out in conference. The Newlands commission was empowered to study development and control of waterways and water resources and subjects relating thereto and to study the matter of bringing into co-ordination and co-operation the engineering, scientific and constructive agencies of the governmental departments so as to make recommendations as to irrigation, drainage, forestry, reclamation, clarification of streams, regulations of flow, control of floods, utilization of water power, prevention of soil erosion and waste, storage and conservation of water.

The matter of development of water

power on Indian reservations called forth considerable debate, but an amendment by Senator Nugent prevailed after determined opposition on the part of Senator Walsh of Montana. Among other things the amendment provides that "in the case of tribal lands embraced within an Indian reservation which said lands were ceded by the Indians to the United States by treaty, no license shall be authorized except by and with the consent of the council of the tribe."

An effort was made by Senator Nugent to amend the bill so that it would not take effect until the expiration of three years after its approval by the President. This amendment had the support of only a few votes.

Chicago Electrification

War Department O. K.'s South Shore Improvement and Illinois Central Electrification with Reservations

A new chapter in the history of Chicago railroad electrification has been opened with the receipt of word from Newton D. Baker, Secretary of War, that the government has approved the Lake Shore improvement and Illinois Central electrification, and that a permit for the improvement will be issued if a few slight changes are made in the plan. Thus after ten years delay it seems assured that the work will actually commence in the near future.

ORDINANCE REVIEWED A YEAR AGO

The new ordinance was reviewed in the ELECTRIC RAILWAY JOURNAL of Jan. 11, 1919, page 108. Since that time the ordinance has been submitted to the government for approval, and it seems that this has now been granted. The reservations that Secretary Baker requests have already been practically agreed upon by the Illinois Central R.R., and the South Park Board.

The railroad company has also requested a change in the wording of the amendment to the ordinance as a safeguard against delays resulting from federal railroad legislation. While an agreement as to this wording is being reached, it is expected that the City Council will grant the railroad's request for an extension of the acceptance date to Feb. 21.

The changes which Secretary Baker has requested apply entirely to the Lake Shore improvement work, and therefore have no particular bearing upon the plans for the electrification of the Illinois Central R.R.

The ordinance covers, in addition to the electrification of the Illinois Central, the erection by that road of a new passenger terminal at East Twelfth Street. With this completed the downtown terminals centering in Polk Street, Harrison Street, and Van Buren Street, will be transferred to the new lake front terminal.

Confidence is expressed that work will begin on the carrying out of the project by July, 1920.

$2,600,000 Improvements Suggested

Plans for the extension of the Lee, Taylor, Tower Grove, Natural Bridge and City Limits car lines of the United Rys., St. Louis, Mo., are being prepared by Charles S. Butts, superintendent of the department of public utilities of St. Louis, and will be submitted to a special committee of the Board of Aldermen within a few days. The improvements are designed to meet growth of the Union Avenue industrial district and other sections of the city.

Mr. Butts' plan provides for the extension of the Tower Grove, the Taylor Avenue line and the Natural Bridge line. The railway recently obtained funds to erect a station at Pine Lawn and announced a plan to divide the present Kirkwood-Ferguson line at that point. Engineers of the company have been working on the Natural Bridge extension to serve the General Motors and other new industries. The City Limits line is to be taken off Hodiamont Avenue, between Plymouth to the Hodiamont and Kirkwood-Ferguson tracks to Pine Lawn to connect with the Natural Bridge line. A bill granting a franchise for the use of Plymouth Avenue west of Hodiamont to carry out this plan is pending before the Board of Aldermen. The company recently announced a plan to extend the Olive-Maryland division north on Kings Highway to Waterman Avenue to connect with the University line and thence over that line to Pennsylvania Avenue.

The proposals required 64.45 miles of track, costing $2,600,000.

Banker Wants Lines Kept Intact

A. C. Robinson, president of the Peoples Savings & Trust Co., Pittsburgh, Pa., in an address before the Pittsburgh Association of Credit Men on Jan. 15, insisted that the Pittsburgh Rys. system must be treated as a whole if the interests of the public, the holders of securities and the railway itself are to be served. He deprecated the efforts of certain of the underlying companies to detach themselves from the system, and argued that a greater degree of co-operation among them must be had if a satisfactory solution of the transportation difficulties of Pittsburgh is to be arrived at.

Mr. Robinson took a determined stand against municipal ownership, but he did contend that, if the city must levy taxation to make up a deficit in the railways company's operation, there would be no injustice worked, since the railways company more than repays any expenditure of this kind by the city by the growth it encourages in the municipality.

He bespoke the whole-hearted support of the public for A. W. Thompson, recently-elected president of the Philadelphia Company, which is the holding company for the railways system.

New Board at Detroit

Mayor Couzens Announces His Railway Commissioners—Formal Approval of Railway Postponed

At the close of his annual message to the City Council of Detroit, Mich., Mayor James Couzens announced the appointment of a new Board of Street Railway Commissioners. At the request of the Mayor, formal approval of the $15,000,000 street railway addition, as provided for by the Castator street railway ordinance, has been postponed in order to refer the ordinance to the new Street Railway Commission for consideration. The new commission is composed of Attorney Ralph Wilkinson, W. G. Mayo, chief engineer of the Ford Motor Co., and G. O. Ellis, publisher of the *American Boy Magazine*.

REPRESENTATIVE COMMISSION

In commenting upon the personnel of the board, the Mayor stated that he had appointed a lawyer, an engineer and a business man, thus combining the three elements which he needs for the proper development of his plan. As the building of the railway system will naturally fall under these classifications, a man was chosen who is an expert in each.

It is believed that Mr. Wilkinson, who has been chosen president of the board, will be an able assistant to the Corporation Counsel in settling the numerous questions that will arise in connection with the consummation of the proposed railway plan.

Mr. Mayo's selection by the Mayor was prompted by his desire to obtain the services of a member of the Ford organization, familiar with the development of the new Ford gas traction car which is being considered in the matter of equipment of the tracks which the Mayor proposes to build. Mr. Mayo will also be competent to take an active part in the supervision of construction of the new lines.

The need of a practical business man on the commission was filled by the appointment of Mr. Ellis, a man possessing the proper qualifications and a member who, it is believed, will work in harmony with the Mayor in carrying out his plans.

MAYOR FAVORS MUNICIPAL OWNERSHIP

In discussing his plans, the Mayor outlined his reasons for favoring municipal ownership for Detroit. He believes such ownership of a transportation system superior to private ownership because, while municipal corporations stand primarily for service, the real reason for the existence of a private company is for profit.

Although the new lines are being planned with a view to using the Ford gas cars, complete electrification of the system has been provided for if needed. Great caution has been exercised in estimating costs of the proposed system, the Mayor stated, to insure that the money asked for would cover all requirements. Taxes, paving, sinking fund and interest charges similar to those figured by the Detroit United Ry., have been included in his estimates.

At its first meeting, on Jan. 16, the new Street Railway Commission analyzed the probable cost of construction and discussed the best way of placing the plan before the voters at the April election. The plan will go to the Council in the near future, in the form of the Castator ordinance, with a communication from the commission recommending its passage.

A publicity campaign will be organized with the view to furthering the Couzens plan by a schedule of meetings to be addressed by speakers who will be prepared to discuss details of the plan.

Protests Coal Price Increase

At a meeting of representatives of electric railway, light and power, gas, water and telephone companies of Indiana, on Jan. 3, letters signed by representatives of the five utility groups were sent to President Wilson by Arthur W. Brady, president of the Union Traction Company of Indiana, protesting against any further increase in the price of coal and recommending a larger representation for the public on the coal commission.

Representatives of the various utilities stated at the meeting that increased coal prices would mean either higher rates or impairment of the present service rendered to the public.

The letter to the President reminds him that the petitioners are the authorized representatives of the gas, electric light and power, traction, water and telephone services serving more than 3,000,000 people in the State of Indiana, and that these companies are apprehensive, because some of them have already been advised by the coal operators that it will be necessary to increase coal prices 25 cents a ton as a minimum, because of the 14 per cent increase already granted the miners.

As the Indiana companies consume approximately 7,000,000 tons of coal annually, the 25 cent initial increase will mean an addition of about $1,750,000 to the collective coal bill of these utilities. This presents a very serious problem.

Copies of the letter were sent to Senator Frelinghuysen, of New Jersey; Senators New and Watson, of Indiana; the members of the Senate committee investigating the coal situation; the members of the Indiana Public Service Commission, and to Governor Goodrich.

Mid-Crosstown Loop Urged

Advocates of the various projects for a solution of crosstown traffic of the uptown business center of Manhattan were heard on Jan. 20 by the Transit Construction Commission through Daniel L. Ryan, Deputy Commissioner. Of the thirty or forty who attended a majority represented the Thirty-fourth Street Board of Trade in its advocacy of a subway loop covering an area bounded by Seventh Avenue, Fourth Avenue, Forty-second Street and Thirtieth or Thirty-first Street.

In speaking for the Thirty-fourth Street organization, Milo R. Maltbie, former Public Service Commissioner, attacked the report of the chief engineer of the Rapid Transit Commission, Daniel L. Turner, both for his broad recommendation of the proposed moving sidewalk under Forty-second Street and his insinuation that the loop scheme was advocated by those that had a selfish interest. The advocates of the moving sidewalk scheme were not silent.

There were two advocates of the immediate extension of the Queensborough subway from Grand Central Terminal to Seventh Avenue. These were Maurice E. Connolly, president of the Borough of Queens, and Arthur G. Peacock, of the Interborough Rapid Transit Company counsel. The extension of the Queensborough subway crosstown long has been delayed, although it has been contracted, and Mr. Peacock said the Interborough demanded immediate fulfillment of the contract, at least before any other plans for crosstown traffic were considered or made.

Bills Introduced in New York

Senate Intro No. 21, Print No. 21, introduced Jan. 6 by Mr. Lockwood. Amending subdivision 2, 3, 6 section 161-d labor law, by striking out the provisions that no female over twenty-one years of age shall be permitted to accept fares in any railroad station, car or train of any street, surface, electric, subway or elevated railroad more than six days or fifty-four hours a week nor more than nine hours in any one day nor before 6 a.m. or after 10 p.m. of any day. This repeal is to permit the employment of conductorettes in Greater New York under the same conditions as prevailed before the law was amended last year as it now reads.

Ten-Cent Buses in St. Louis

The Board of Public Service of St. Louis, Mo., has agreed on the terms of an ordinance regulating the operation of motor buses in St. Louis. J. Lucas Turner, superintendent of the Missouri Motor Bus Co., has announced that his company will begin the operation about Feb. 1 of fourteen double-deck buses, seating sixty-one persons each. Routes have not been selected. A license of $25 a year for each bus operated and 5 per cent of the gross receipts of the buses are to be paid to the city.

The Missouri Motor Bus Co. has agreed, in order to avoid conflict with the cars of the United Rys. operating in the downtown district, that all lines established east of Twelfth Street shall run east on Chestnut Street, probably to Seventh Street, then north to Washington and back to Chestnut either on Sixth or Eighth Streets. The fare will be 10 cents.

Extension at Toledo

Court Indicates It Will Grant Additional Time for Conduct of Franchise Settlement Negotiations

On Jan. 16 it was announced that Federal Judge Killits would issue an order within a few days extending beyond Jan. 15, the time in which the city and the Toledo Railways & Light Co., Toledo, Ohio, must agree upon the terms of an ordinance, or alternative service-at-cost and municipal ownership proposals, to be submitted to vote at a special election.

It is expected the service-at-cost and municipal ownership divisions of the street railway commission will be required to submit reports of their proposals to the court on a definite date, reasonably soon, and that Council may be permitted to fix the date of the special election.

As a result of a conference between Law Director Martin and W. L. Milner, chairman of the service-at-cost commission, it was decided to hold no further meetings of this board until Jan. 19. It was expected that by that date the law director will have completed drafts of the service-at-cost ordinance, leaving only a few blanks for insertion of figures and phrases by which the big issues in dispute, such as valuation, rate of return to the company on its investment, and maximum fare will be settled.

COURT OVER-SANGUINE

Judge Killits made the statement on Jan. 15 that there were eighteen points in dispute between Mr. Doherty, operating head of the property, and the city, upon no one of which agreement had been reached. Law Director Martin said subsequently that since the meeting to which Judge Killits referred tentative agreements had been reached on many of these points between representatives of the city and Dewey C. Bailey, Mr. Doherty's personal counsel. Those who have followed the situation closely say it ought to be known very soon whether there will be an agreement or a definite break in the negotiations.

At the hearing in the Federal Court counsel for the company opposed any extension of time.

Judge Killits said:

> It is very obvious that the former order of the court must be modified or the right to discontinue car service after Jan. 25 will be a weapon in the hands of the company. As Mayor Schreiber says, the original order simply cannot be complied with. Under it, the city would be helpless and the company would have the unrestrained choice of doing as it pleased about continuing service.
>
> We all made a mistake by fixing the time so short. The city, by the ouster ordinance, had outlawed the company. Then the city found that was a very improvident act and asked the company to come back. It was entirely with the court's concurrence that the time limitations were placed in this order.
>
> I confess I had the over-sanguine notion that settlement could be reached in five weeks on the service-at-cost plan, with a municipal ownership ordinance as an alternative. But when it developed that the municipal ownership commission required new State legislation, I realized the awkward situation we were in.

Texas Interurban to Spend $160,000

Approximately $262,500 was expended last year by the Texas Electric Ry., Dallas, for new equipment, station improvements, ballasting and paving and track renewals in cities where city lines were operated. Of this amount approximately $87,500 was expended on the properties of the interurban system in the State. Two baggage trail cars were constructed in the company's shops during 1919 at a cost of $7,500, approximately $50,000 was expended for new station properties in various cities served by the lines as well as making improvements on stations owned.

Track ballasting entailed an expenditure during 1919 of $30,000 and some 60,000 new ties were put in place throughout the system. Expenditures on city lines during 1919 included the purchase of ten new one-man safety street cars for operation in Waco at an approximate cost of $80,000, the placing of air-brake equipment on cars in Waco, which cost $5,000, and the expending of about $90,000 for paving and track renewals in the various cities served by the company.

The outlook for 1920 for the Texas Electric Railway is encouraging, according to its officials. Expenditures contemplated for the new year will be slightly in excess of $160,000, depending on weather and crop conditions and other general conditions with which industries have to deal. In line with contemplated improvements in the system is also expected to come a substantial increase in the company's business.

Of the total amount to be expended during 1920 $50,000 will go for ballasting track, $40,000 will be used in the replacing of wooden and pile bridges with concrete and steel bridges, and between $15,000 and $20,000 will be set aside with which to purchase new shop equipment and tools. It is possible that new equipment will be needed for the system and the company has tentatively in contemplation the purchase of two new interurban passenger motor cars costing approximately $40,000. With this new equipment and increased transportation facilities the Texas Electric Railway and subsidiary lines will be in a position to handle a larger volume of traffic during 1920 than they have ever handled during any previous year.

Merchants Approve Car-less Broadway

Members of the Broadway Association of New York City, by a vote of nearly four to one, have approved a proposal calling for the removal of the present Broadway surface car lines and the substitution of a motor bus system instead. A one-fare motor bus service from Bowling Green to Kingsbridge is the association's preference.

The matter was put up to the 1,200 members by the association's transportation committee, consisting of John David, chairman; Frank G. Carrie, Thomas D. Green, Glenn A. Tisdale and J. E. Harrington. These were the three questions voted upon:

1. Are you in favor of a through line operated from Bowling Green to Kingsbridge for a single fare without transfer?
2. Are you in favor of the continued use of the present type of green car used on Broadway south of Forty-fourth street?
3. Are you in favor of the removal of the street car tracks and the substitution of a modern bus system operating on Broadway?

The returns showed that 77 per cent of the members favored abolition of the present surface car lines while only 15 per cent wanted the street cars retained. Eight per cent did not vote.

Bill to Amend Rhode Island Utilities Act

A bill amending the public utilities act of Rhode Island, to give the Public Utilities Commission control over all issues of stocks, bonds, notes and any other evidence of indebtedness of public utility corporations has been introduced in the House and sent to the judiciary committee.

The measure was prepared by City Solicitor Elmer S. Chace of Providence and is accompanied by a joint resolution of the Providence City Council, requesting the Legislature to pass the measure substantially as presented.

The act provides that before issuing any evidence of indebtedness extending beyond a period of one year, the public utility shall file a petition with the Public Utilities Commission for authority to do so, and that the Utilities Commission shall give a public hearing before granting such authority.

The change in the present law is made by adding three sections. The more significant provisions of these sections follow:

Sec. 61. A public utility may, with the approval of the Public Utilities Commission, but not otherwise, issue its stock, bonds, notes and other evidences of indebtedness payable more than twelve months after the date thereof for the purpose of defraying the cost of acquiring property of any kind which is reasonably requisite for present or future use

Sec. 62. No public utility shall issue any stock, bonds, notes or other evidence of indebtedness payable more than twelve months after the date thereof without first procuring an order of the Public Utilities Commission authorizing the same. No public utility shall apply the proceeds from stock, bonds or notes to any other purpose than those specified in the order of the commission authorizing the issue of the same.

Every public utility issuing stock, bonds or other evidence of indebtedness shall file with the commission an account showing the disposition of the proceeds of such issue. The decision of the commission as to the amount of stock reasonably necessary shall be based upon the price at which such stock is to be issued, and the commission shall refuse to approve any particular issue of stock, if, in its opinion, the price at which it is proposed to be issued is so low as to be inconsistent with the public interest.

Sec. 63. Any public utility which may apply to the Public Utilities Commission for authority to issue such securities shall file with its application a statement in reasonable detail showing the actual amount of items of expense already incurred and the estimated amounts of items of expense to be incurred for any of the purposes defined in section 61 hereof which it may desire to capitalize. The commission shall determine the actual or proper cost of such items, and if in its judgment the issue of such securities upon the terms proposed is consistent with the public good, it shall authorize the same to an amount sufficient at the price fixed in accordance herewith to provide funds for defraying the cost as so determined. Upon any application for authority to issue securities for the purpose of providing funds for discharging any indebtedness incurred by a public utility in good faith prior to Jan. 1, 1920, in acquiring property, or accomplishing any of the other purposes specified in the preceding section, no deduction shall be made from the cost thereof as determined by the commission on account of any estimated depreciation of plant and properties beyond the portion if any of such costs which it may appear has been paid out of the depreciation reserves of said public utility if any, or out of earnings, to make good depreciation.

Fundamental Treatment Necessary in New York

Dr. Charles A. Beard, director of the New York Bureau of Municipal Research, has recently published an interesting thirty-page study of the above title, issued as publication No. 94 of his institution. Dr. Beard points out that the New York situation calls for fundamental treatment. Much information concerning the organization and financing of the New York system is included and the pamphlet concludes with the enumeration of seven propositions "as a starting point for an agreement on a certain irreducible minimum":

1. It must be conceded that the principles evolved by the American people in fifty years experience in traction matters afford the basis for negotiation.
2. No increase of fare ought to be granted in New York City without a modification of the franchises and contracts of the existing companies in the public interest.
3. The traction problem of Greater New York must be treated as one problem involving the entire system. The convenience of the travelling public and the cost of the general service, not the operating costs of single short lines, should be the determining factors in fixing rates.
4. Provision must be made for unified operation with a view to effecting the economies which such operation promises, even though two or more companies might be embraced in the final settlement.
5. The total capital upon which a return may be earned should be determined once for all and the slate wiped clean for future extensions, betterments and additions on a basis of bona fide capitalization.
6. Definite provision must be made for assuring to the companies consolidated a fair return upon their adjusted capitalization and upon additional capital hereafter raised for extensions and betterments—such a guarantee being accompanied by a division of surplus, if any, between the city and company or companies owning the properties.
7. The way must be cleared for applying municipal ownership to the surface and elevated lines on definite terms and conditions as to acquisition and financing when and if such a step is desired by the people of the city.

The principles mentioned under heading one are: (1) that perpetual franchises are intolerable, (2) that the capital in traction lines already established must not be inflated by manipulation, and that new capitalization must represent bona fide expenditures for services, materials and labor, (3) that a public utility company must be allowed to earn a reasonable return on the capital invested, (4) that all profits above this reasonable return should be divided between the company and the local government in such a way as to furnish incentive for efficient and economical operation, and (5) that the terms and conditions of municipal ownership should be explicitly set forth in agreements embodying principles 1—4.

News Notes

Back to Low Tension D.C.—The Indianapolis, Columbus & Southern Tracton Co., Columbus, Ind., will reduce the voltage between Sellersburg and Seymour from 1200 to 600. When this is done the voltage will be uniform along the entire line from Indianapolis, Ind., to Louisville, Ky.

Bonus in Liberty Bonds.—The Phoenix (Ariz.) Ry., distributed between $2,800 and $3,000 at Christmas among its trainmen in recognition of faithful work. S. H. Mitchell, manager, was responsible for the awards. He said that the company is still operating under a 5-cent fare, and that he went the very limit to show the men that the company appreciated their loyalty and co-operation.

Railway Activity in Great Britain.—From the list of proposals for tramway extensions and other improvements which the British Parliament is considering on petition of municipalities and private companies, great activity in the line of urban and interurban transportation is expected in the immediate future in Great Britain. Particularly noticeable is the number of applications for permission to operate motor buses as auxiliary to the tramway service.

Arbitration Board Complete.—W. G. Evans and William C. Thornton, arbitrators representing the Denver (Col.) Tramway and the union respectively in the wage dispute, have notified the State Industrial Commission they have agreed upon a man for third arbitrator. Under the terms of a recent agreement, the appointment of the nominee agreed upon is left to the commission, leaving the prospective appointee free from any one-sided interpretation. The name of the third man was not made public.

Addresses at Glasgow Semi-Jubilee.—A brief account of the celebration on July 1, 1919, of the semi-jubilee of the tramways department of the Glasgow Tramways is given in a thirty-six page pamphlet. There was a picturesque pageant through the streets, in which one of the original horse-drawn cars participated, and this was followed by an inspection of the shops and other property of the department. The addresses and portraits of the speakers appear in the pamphlet.

Vocational Classes for Trainmen.—The Birmingham Railway, Light & Power Co., Birmingham, Ala., has drawn up comprehensive plans for vocational training classes for its trainmen. A course of thirty-six lessons, with two-hour sessions twice a week, will be given under the supervision of F. H. Jarvis, vocational training representative of the Department of Labor. The trainmen will be given theoretical and practical instruction that will make them more efficient in their work.

Wage Question Still Unsettled.—Officials of the Georgia Railway & Power Co. and the committee from the Amalgamated Association had not reached a wage agreement up to Jan. 16. The conductors and motormen are demanding a 50 per cent increase with time and a half for Sundays, holidays and overtime. The old contract with the men expired on Dec. 31, 1919. This contract called for 40 cents an hour, while the new contract calls for 60 cents and hour, time a half clauses and a demand for a closed shop.

I. R. T. Charges Dismissed.—The extraordinary Grand Jury which has been investigating charges of conspiracy made against officials of the Interborough Rapid Transit Co., New York, N. Y., and officers of the Brotherhood of Interborough Employees, on Jan. 17 handed to Supreme Court Justice Bartow S. Weeks a presentment dismissing all the charges on the ground of insufficient evidence. The Grand Jury investigation grew out of the strike of the Interborough trainmen several months ago.

M. O. Suggested for St. Louis.—Declaring that the receivership of the United Rys., St. Louis, Mo., has proved a failure, the executive board and United Rys. committee of the Civil League of St. Louis has addressed a letter to Mayor Kiel and President Aloe of the Board of Aldermen offering "our co-operation to the city for a real move toward relieving the people of St. Louis by taking over the street railway system at a proper valuation." To this end a study of the feasibility of municipal ownership is urged and it is suggested that Delos F. Wilcox, New York, be employed in such a survey. No reply has been made to the letter by either the Mayor or by the Board of Aldermen.

Underground Motor Roads.—Lord Ashfield of Southwell, the former Sir Albert Stanley, foreshadowed a vast system of underground roads for London devoted exclusively to motor traffic, in a speech at the American Luncheon Club on Jan. 16. These roads, he suggested, would be connected with the outer districts of the metropolis by what might be described as boulevards, the latter being used exclusively for motor traffic. Lord Ashfield said that London is the greatest riding city in the world. Some one has got to provide roads capable of dealing with 375,000 motor cars, and he predicted that a rapidly increasing number of underground railways would have to be built, as well as underground motor roads.

Interborough Men Not to Strike.—Employees of the Interborough Rapid Transit Co., New York, N. Y., will not strike because their company has failed to grant them the second 25 per cent raise, which would have met in full their demand made at the time of the one-day strike last August. They are not going to strike because they realize the company cannot pay them an increase and remain solvent. This was the result of a conference between Frank Hedley, president of the railway, and leaders of the Interborough Brotherhood. The men have decided to await the decision of the city's inquiry into the requests of the transit companies for a higher fare before pressing their claims.

Permanent Commission for South Carolina.—The General Assembly of South Carolina, now in session, will consider plans for the reorganization of the present State Railroad Commission. Two bills have been drafted, each providing for a permanent commission. One of these bills has been prepared by public service corporations doing business within the State, the other by the present commission, the two bills being very similar in detail. They contemplate a body of three members, and carry appropriations for the commission's expenses. Both of these bills would give the commission authority over rates and also over service rendered by Utilities. They would also give authority to approve securities of such companies. The two bills have been presented to Governor Cooper.

Praise for Mr. Connette.—E. G. Connette, retiring president of the International Ry., Buffalo, N. Y., is the subject of editorial praise in the Buffalo *Courier* of Jan. 6. That paper said: "President Connette has borne himself in a way that has gained for him the respect of those who have to do, officially and otherwise, with the relations of the company to the municipality and the public. For reasons which he candidly gives in a letter to the board of directors of the company Mr. Connette has resigned, the resignation to take effect on the appointment of his successor. In the light of his striking recitation of the salient facts of his record of management, even those who have at times been severe critics will no doubt be disposed to give him credit for very effective handling of a difficult task. Mr. Connette will carry with him to other fields the well wishes of numerous Buffalo friends."

Programs of Meetings

Engineering Institute of Canada

The annual business and professional meeting of the Engineering Institute of Canada will be held at the headquarters of the Institute in Montreal on Jan. 27, 28 and 29. At the convention questions of interest to the engineering profession of Canada and topics of special interest to the people of Quebec will receive attention.

Central Electric Railway Association

The annual meeting of the Central Electric Railway Association will be held at the Hotel Seelbach, Louisville, Ky., on March 10 and 11. At this meeting the annual reports of committees and the secretary and treasurer will be presented and the annual election will be held. It is expected that the printed program will be mailed by Feb. 15.

Financial and Corporate

Northern Ohio Financing

Stockholders Will Vote on Jan. 27 to Create $4,000,000 of 8 Per Cent Stock to Retire Loan

The Northern Ohio Electric Corp., Akron, Ohio, has coming due on Feb. 1, 1920, a loan for $4,000,000. It is proposed now to liquefy this loan through the issue of $4,000,000 of Class A, 8 per cent first preferred stock. The present 6 per cent preferred stock will be exchanged for new Class B 7 per cent second preferred shares, provided the holder subscribes for 66⅔ per cent of Class A preferred at par, and also pays $10 per share held for the privilege of the exchange.

The loan now about to be taken up was made at the time of the original financing of the company in 1916. At that time the issuance of $6,000,000 of preferred stock, 75,000 shares of common stock, without par value, and a $4,000,000 one-year loan provided for the purchase of approximately, $9,000,000 of common stock of the Northern Ohio Traction & Light Co. and also furnished about $900,000 of working capital. The one-year loan was secured by pledge of the Northern Ohio Traction & Light Co. common stock purchased. It has been renewed from year to year owing to the unfavorable financing condition attributable to the war.

OPPORTUNITY FOR STOCKHOLDERS

The last renewal was secured upon assurance that some plan would be devised for the retirement of the loan at maturity. As any security issued at this time for that purpose must carry a high rate of return, the directors feel that the stockholders should not only have the opportunity to subscribe therefor, but that the advantage in so doing should be especially brought to their attention. In consequence a special meeting of the stockholders has been called for Jan. 27 to vote on the new financing. The shareholders will be asked to increase the preferred stock and to classify all of the preferred stock as follows:

Class A: $4,000,000 (40,000 shares of $100 each) 8 per cent cumulative, dividends payable quarterly (March 1) to be preferred over all other stock, both as to the payment of dividends and distribution of assets; to be callable at 115; to participate in the distribution of profits equally per share with the common stock, after the common stock shall have received $4 per share in any year. This stock is to be secured by the pledge of two shares of Northern Ohio Traction & Light Co. common stock for each and every share of Class A preferred stock outstanding.

Class B: Not exceeding $6,000,000 (60,000 shares of $100 each) 7 per cent cumulative preferred stock, dividends payable quarterly (March 1) to be preferred over all other stock except Class A stock, to which it is subject as to payment of dividends and distribution as assets; to be issued upon the payment of $10 per share, only in excange for 6 per cent preferred stock now outstanding share for share, so that at no time will the aggregate amount of Class B and 6 per cent preferred stock exceed $6,000,000.

Upon subscription to the full amount of Class A preferred stock, and the conversion of 6 per cent preferred stock into Class B, 7 per cent preferred stock, the capitalization of the corporation will be as follows:

Class A 8 per cent preferred stock	$4,000,000
Class B 7 per cent preferred stock	6,000,000
Common stock (without par value), shares	75,000
Dividend on $4,000,000 Class A 8 per cent preferred stock	320,000
Dividend on $6,000,000 Class B 7 per cent preferred stock	420,000

A circular explaining the plan says that since August, 1916, the gross earnings have nearly doubled, while the operating expenses have greatly increased because of vastly higher cost of labor and material as have also the fixed charges occasioned by the financing of a large amount of extensions and additions to the property and the refunding of maturing obligations on a higher interest basis and largely increased taxes, the officers feel that the corporation has been exceptionally fortunate in its maintenance of net income, the decrease therein during 1917 and 1918 having been very much less than in the majority of public utility companies, while for the year 1919 there was a substantial increase, with excellent prospects for continuing improvements.

It is pointed out that the electric light and power business has increased remarkably, the total gross receipts from this source having been more than trebled during the past three years, and now being more than 35 per cent of the total gross receipts as compared with less than 22 per cent at the time the property was acquired. It is also pointed out that the interurban railway business is profitable and growing rapidly. The city electric railway business, however, is not satisfactory, no increase in fares having been secured, but continuing efforts are being made to secure such increase.

Relief Is Necessary

Washington Railway & Electric Co. Being Swamped With Rising Tide of Costs

The Washington Railway & Electric Co., Washington, D. C., and its subsidiaries, since the war, have failed to earn by approximately $1,000,000 a return of 6 per cent upon the value of the properties of the companies, according to a statement by W. F. Ham, president of the company, at the annual meeting of the stockholders on Jan. 17. Mr. Ham declared that unless further relief can be obtained with reasonable promptness, the integrity of the property of the company will be seriously threatened with deterioration of service and equipment. Mr. Ham said:

> Since 1914 our gross annual business has increased from $5,048,435 to $9,003,919, or 78 per cent. In the meantime, however, operating expenses, taxes and miscellaneous charges, not including interest, have increased from $2,891,112 to $7,242,293, or 150 per cent, the result being that with a very much larger business now being done than five years ago, we are actually earning much less as a return upon our investment, which has been increased several million dollars during that period.
>
> Two items alone will indicate the tremendous increase in operating expenses. Wages of conductors and motormen in 1914 amounted to $560,163; in 1919 to $1,409,113, an increase of $848,949, or 151 per cent.
>
> In 1914 we burned 94,283 tons of coal at a cost of $317,496. In 1919 we burned 213,114 tons at a cost of $1,220,825, an increase of $903,328, representing an increase of 284 per cent during the five-year period.

Mr. Ham submitted the accompanying statement of earnings.

COMPARATIVE STATEMENT OF EARNINGS OF WASHINGTON RAILWAY & ELECTRIC CO.

	1919	1918
Gross earnings	$9,003,919	$7,035,499
Miscellaneous income	80,298	41,748
Gross income	9,084,218	7,077,248
Operating expenses (including taxes and miscellaneous items)	7,242,293	5,150,961
Gross income (less operating expenses, taxes and miscellaneous items)	1,841,925	1,926,286
Interest charges	1,460,309	1,252,176
Surplus income for the year	381,615	674,111

DISPOSITION OF SURPLUS—1919

Surplus income for the year		$381,615
Additional miscellaneous profit and loss adjustments		59,739
Total		$441,355
Less—		
Sinking fund requirements—P. E. P. Co	$106,000	
Payment of 5 per cent dividend on preferred stock	425,000	
Payment of 1¼ per cent dividend on common stock	81,250	
		612,250
Profit and loss deficit for the year 1919		$170,894

Council Orders Service Restored

The City Council of Wellsburg, W. Va., ordered C. P. Billings, general manager of the Wheeling Traction Co. to restore service in that city immediately. All cars were taken from Wellsburg seven weeks ago, the company taking the position that the local system was not a paying proposition. It was announced that the equipment removed would be used to perfect the service of the company between Wheeling, W. Va., and Steubenville, Ohio, Wellsburg being on the route. Mr. Billings says he will not carry out the order of the Council, but will take the matter up with the Public Service Commission.

$5,934,255 Loss in Boston

This Is Amount Boston Elevated Went Behind in Seventeen Months Ended November

The trustees' report of the Boston Elevated Ry. for a period of seventeen months ended Nov. 30, 1919, has been made public. This report comprises three statements, viz., a five-months period, ending November, 1918, a period extending from November, 1918, to November, 1919, and a period of seventeen months from the beginning of the trusteeship to November, 1919.

A summary of the last statement appears in the accompanying table.

RECEIPTS AND COST OF SERVICES FOR SEVENTEEN MONTHS, ENDED NOVEMBER, 1919

RECEIPTS	
From fares	$36,906,919
From operation of special cars, mail pouch service, express and service cars	163,849
From advertising in cars, on transfers, privileges at stations, etc	415,703
From other railway companies for their use of tracks and facilities	68,329
From rent of buildings and other property	109,497
From sale of power and other revenue	178,087
Total receipts from direct operation of the road	$37,842,385
Interest on deposits, income from securities, etc	138,647
Total receipts	$37,981,033
COST OF SERVICE	
Operating Expenses:	
Maintaining track, line equipment and buildings	$5,143,203
Maintaining cars, shop equipment, etc	3,536,508
Power (including 388,751 tons of coal at $6,412, $2,492,833)	3,856,501
Depreciation	2,839,000
Transportation expenses (including wages of car employees, carhouse expenses, etc.)	13,806,800
Salaries of administrative officers	131,305
Law expenses, injuries and damages, and insurance	1,594,273
Other general expenses	1,270,205
Undistributed back pay	3,937
Total operating expenses (of which $20,187,625 is for wages)	$32,181,735
Total increase over 1917-18, $5,746,961.	
Taxes, proportion	1,414,380
Rent for leased roads (exclusive of subways)	3,672,867
Proportion of rent of subways and tunnels, to be paid to the city of Boston, exclusive of Cambridge Subway owned by the B. E. Ry	2,125,657
Interest on Boston Elevated bonds and notes	2,052,713
Miscellaneous items	66,023
Proportion of dividends under Acts of 1918	1,945,207
Interest on unpaid taxes	30,347
Uncollectible accounts cancelled	2,079
Total "cost of service"	$43,491,012
Net loss	$5,509,978
Delayed credits in profit and loss not applying to this period	11,071
Back pay for May and June arising from the award of July 20	435,348
Total net loss seventeen months ended November, 1919	$5,934,255

The total net loss of $5,934,255 was accumulated in great part during the earlier months of the trusteeship. The deficit for the last five months is $529,827. The receipts per revenue passenger were 10.057 cents and the cost of service was 10.474 cents, 5.229 cents being the labor portion. A considerable reduction in loss for the latter part of the seventeen months period is due to the 10-cent fare.

The first annual report to the Senate and the House was submitted by the trustees of the Boston Elevated Ry. in pursuance of the provisions of the special acts of 1919. While the letter of the statute requires only a statement for the year ended Nov. 30, 1919, it seemed proper to the trustees that the report should also cover the full period of public control. The appended record of operations therefore begins with July 1, 1918.

In view of recent public discussion and the comprehensive report of the Street Railway Commission with reference to the conditions and needs of this railway, the preliminary general statement is very brief.

The public control act expressly imposed upon the trustees two distinct duties. The first was that of establishing the service upon a self-supporting basis. Under private management the 5-cent fare had failed to produce sufficient revenue to pay operating expenses and fixed charges. In consequence the railway property which came into the hands of the trustees was in many departments much the worse for lack of maintenance and in a condition unfit for efficient operation.

Successive changes in fare were made to obtain receipts that would meet expenses. In August the 5-cent fare was changed to a 7-cent fare which, in December of the same year, gave way to an 8-cent fare. The receipts from the 8-cent fare after a trial of seven months also proved inadequate so that the results of operation for the year ended on June 30, 1919, showed a total deficit of $4,980,151. In accordance with the terms of the statute this amount was assessed upon the cities and towns served by the railway—the transaction in effect being a loan that must be repaid and not a permanent contribution to the cost of the service.

The deficit of that year had really exceeded the amount named and paid by $435,348, which additional loss resulted from the retroactive character of the wage award in July adding this sum to the wages which had been paid in May and June.

On July 10, 1919, the fare was made 10 cents. Owing to strikes and other extraordinary conditions operating losses continued until the middle of September. Since then, however, the 10-cent fare has produced revenue in excess of expenditures. This surplus on Nov. 30, 1919, had reduced to $518,755 the deficits incurred in July, August and September aggregating $928,694.

The trustees point out that in forecasting the amount of excess in revenue over expenditures for the balance of the year allowance must be made for the favorable traffic conditions that always prevail in October, November and December. The average for the twelve months may be less than the average for these three months. However, the trustees believe that receipts will continue to exceed expenditures and that on June 30, 1920, all losses will have been absorbed and no deficit exist to be assessed upon cities and towns. This statement is subject, of course, to the happening of events not reasonably to be anticipated. As the law now stands there can be no lower fare until the cities and towns have been reimbursed for the amounts paid to meet past deficits and the reserve fund of $1,000,000 has been restored.

The second duty imposed upon the trustees was that of bringing the railway to a condition suitable for efficient operation. With insufficient receipts to meet expenses and without capital available for permanent additions and improvements, the task of bettering the service has been difficult. A beginning has been made, however, under a program of improvement which can only be completed in a series of years. The changes thus far made are featured in the purchase of modern cars, in replacement and addition to former equipment, the completion of certain through lines, the lengthening of tunnel trains with the introduction of two and three-car trains on surface lines, larger and more frequent rapid transit service. Full provision is now being made for maintenance and depreciation, so the trustees point out.

The sale of the Cambridge Subway authorized at the recent special session of the Legislature, when carried into effect, will make available for capital expenditures approximately $8,000,000. The trustees say:

> It goes without saying that a businesslike administration is as essential to success in the conduct of a public service as it is in the conduct of private affairs. Therefore none but a prudent use of the proceeds of this sale, which at least for the time being afford the only source of capital, could be justified. Such use would secure important improvements with resulting economies and tend to re-establish the credit so vital to the development of railway facilities.

The trustees believe that car riders ought not to be subject to a special tax for using public highways either through payment of subway rentals or assessment for street improvements. The Street Railway Commission recommended changes in the law to relieve them from this burden. The trustees say that this question is between the car rider and taxpayer and is one for legislative decision in determining what is a proper service at cost.

Danger of Disintegration Removed

Receivers of Pittsburgh Railways Make Statement That Promises Hopes for the Future

In a lengthy letter submitted on Dec. 1 to the City Council, the receivers of the Pittsburgh Railways notified the public that the increase of revenues through the recent fare raise has temporarily removed the danger of that disintegration of the traction system which was threatened a few months ago when two of the underlying companies took steps toward withdrawing their properties from the combination. This danger, the receivers added, cannot be permanently eliminated until the just claims of security holders have been satisfied and until the company embarks upon a policy of meeting those claims as they arise.

The receivers have been defaulting upon rentals, interest charges, municipal claims and expenses other than operating charges, in pursuance of their theory that the best interests of both the public and the security holders could be served, for the moment, by devoting all available moneys to rehabilitation of the system. The time has come, they indicate, when this policy should be changed.

The letter, as such, is a review of the operation of the railway for the nine months ended Sept. 30 last, with such comments upon that operation as the receivers felt pertinent. One suggestion they pressed home most forcefully was that the city and other municipalities served should abandon their custom of assessing the railways for large sums for such items as street cleaning, pole taxes and tolls on bridges.

To the letter is appended a schedule showing that the railways on Oct. 1, owed the city of Pittsburgh $232,843 and the county of Allegheny and other political subdivisions another $84,217.

In opening the letter, the receivers declared to the Council:

> Inasmuch as the Pittsburgh Railways is a public utility engaged in rendering transportation service to the people of this city, its receivers recognize you as a party in interest in the trust represented by them.

The communication then says in part:

> The recent fare increase has produced a revenue fully equalling our expectations. The month of September, last, being the first full calendar month since the increased fare became effective, shows an increase in revenue compared with previous years as follows: September, 1916, $1,057,317; September, 1917, $1,094,882; September, 1918, $1,221,584; September, 1919, $1,450,382.
>
> The daily average receipts for the same month of the same years were as follows: In 1916, $35,243; in 1917, $36,496; in 1918, $40,719; in 1919, $48,346.
>
> The daily average for the month of October was $51,018, and the daily average maintained for the month of November to and including Nov. 24 was $52,637.
>
> While encouraged by this increase we are greatly concerned respecting the continued increase of operating expenses by reason of which the net revenue continued incapable of meeting the legitimate fiscal requirements of the system. For the first nine months of the present calendar year, the operating expenses exceeded by $586,312 the amount estimated in the budget made by the receivers at the beginning of the year. The months of October, November and December will show increases over our estimates.

The letter thereupon launches into a contradiction of statements contained in the annual report of E. K. Morse, City Transit Commissioner of the city of Pittsburgh, issued several days ago. The commissioner, it says, would have Pittsburgh's railways operated in line with practices in other cities, although experience has shown that the conditions in Pittsburgh are so unlike any others that "rule of thumb" methods are suicidal here, and general rules do not apply. It draws attention to the competition in this city between steam railroads and electric lines, but going on from that, insists that the "riding habit" is as fully developed in Pittsburgh as in any other city in the country, the transit commissioner to the contrary notwithstanding, and that the "riding habit" has increased in Pittsburgh by a greater percentage in the past year than in any other city in the country.

> At the beginning of the present calendar year, we prepared a budget based upon the rates of fare then in force, from which it appeared to be impractical, for the time being, to pay the interest on any of the railway mortgages or rentals upon any of the operated lines. * * * * By reason of the increased rate of fare, the larger revenues resulting therefrom, we have now more funds available than was anticipated when the annual budget was submitted. We now feel that, after ample provision for maintenance and necessary charges and provision for the rendering of satisfactory service, the income accrued to the holders of the securities should, as far as practicable, be paid in so far as such securities represent the actual investments which have provided the system for the public service.

WANTS TO PREVENT DISINTEGRATION

> The extent of our ability to discharge obligations representing the cash which created the properties is largely affected by the disposition to be made of the claims arising out of municipal ordinances imposing charges upon the street railways. It would be our hope that a substantial solution of our problem might be reached, without further increase of fares, if these municipal claims could be eliminated. Of course it is clear that expenditures therefor contribute nothing to holding of the system together or to its ability to serve the public. * * * * We are confident that it is the desire of the community and of its representative that the service be well maintained and the disintegration of the system prevented. Such disintegration cannot be prevented, or much longer deferred, unless just claims of security holders be met to such extent as will afford reasonable hope of their ultimate payment.
>
> The trustees representing the bondholders of the Southern Traction Company obtained authority to foreclose upon their mortgage, and started foreclosure proceed-

COMPARISON OF ACTUAL INCOME ACCOUNT FOR NINE MONTHS ENDED SEPT. 30, 1919, WITH ESTIMATED INCOME ACCOUNT FOR THAT PERIOD ON THE BASIS OF THE BUDGET

		Actual Income	Estimated Income
Income			
Passenger revenue		$11,259,791	$11,022,637
Other transportation revenue		85,039	86,725
Other operating revenue—street railway		120,484	111,823
Auxiliary operations—inclines and bridges		125,101	121,890
Other income		102,977	93,702
Total income		$11,693,392	$11,436,777
Operating expenses			
Maintenance of way and structures	(a)	$1,937,494	$1,343,615
Maintenance of equipment		1,444,887	1,334,551
Traffic		26,885	31,851
Power		1,473,761	1,570,893
Conducting transportation		4,056,730	4,053,140
Bridges and inclines (operation only; maintenance included above)		19,665	22,785
General and miscellaneous	(b)	803,275	819,550
Total operating expenses		$9,72 ,697	$9,176,385
Net operating revenue		$1,930,695	$2,260,392
Taxes (on basis of payments due that are d. finite and determined):			
On real estate and buildings		$49,346	$46,500
On capital stock—to state		194,824	185,000
On gross receipts—to state		58,556	58,556
Federal income and excess profits		56,473	89,541
War		1,670	1,313
Total		$360,869	$380,910
Operating income		$1,569,826	$1,879,482
Deductions			
Interest on real estate mortgages		$12,956	$13,068
Interest on car trust agreements		81,660	81,660
Principal payments on car trust agreements		225,000	225,000
Interest on bonds		37,500	....
Rental of leased properties		15,000	....
Interest on overdue bond interest		563	....
Total		$372,679	$319,728
Net income (available in cash for otl er purposes)		$1,197,147	$1,559,754

(a) Excludes $65,056 for street cleaning taken into account but not paid.
(b1) Includes $48,438 for receivers' fees for which there was no provision in the estimate.
(2) Includes $023,083 for injury and damages payments. Accrual for this item, $451,685.
(3) Includes $8,267 for insurance premiums. Accrual for this item $34,837.
(4) Excludes $82,192 for bridge tolls taken into account but not paid.

Memorandum

Paid on account of four months, bills for supplies, etc.		$311,549
Purchased materials and supplies for stock		37,670
Additions and improvements to property		20,654
Real estate mortgage purchased		4,500
Cash in treasury Sept. 30, 1919, in excess of unpaid payrolls and current bills for power and supplies	$1,206,154	
Cash at Dec. 31, 1918	270,273	935,881
Total		$1,310,254
Accounts receivable collected Jan. 1, 1919, to Sept. 30, 1919	$28,860	
Metal tickets sold in advance of use	65,983	
Payment on account real estate mortgage	1,167	
Advance payment on scrap sales	1,406	
Increase in miscellaneous accounts payable	9,049	106,465
Balance		$1,203,789

> ings some time ago. The Consolidated Traction Company several months ago gave notice of its intended withdrawal from the system. We believe that in both these cases the improved situation resulting from increased revenue has caused further action to be suspended and possibly it may be averted. To enable us, if possible, without further increase of fares, to hold the system intact and to re-establish its credit so as to render possible the securing of the needed capital, * * * * we trust that proper adjustments may be made with the municipalities concerning the municipal burdens to which we have referred.

The letter is accompanied by photographic reproductions of the general balance sheet of the company as of Sept. 30, comparisons of the actual income account with the budget estimates, and a schedule of interest and rental items due on Oct. 1.

Reorganization Prospects Not Bright

Indications point to the failure of the general committee representing security holders of the Rhode Island Co., Providence, R. I., and the Rhode Island Suburban Ry. to agree upon a plan of reorganization for the company. The trend that affairs have taken recently with respect to the reorganization has resulted in several expressions of opinion by men prominent in public life. Among these men is William C. Bliss, chairman of the Public Utilities Commission. Mr. Bliss is quoted as saying:

> I think it is the absolute duty of the holders of the underlying securities to unite on some plan of reorganization to present to the General Assembly. Until they do so, they cannot expect any sort of relief from the Legislature, either in the abolition of practice or in any other way.
>
> I would regard it as a calamity to the State if the present Rhode Island system was disintegrated, as it must be if the receivership proceedings are carried to their furthest logical conclusion. It is at present unified operation that makes it possible to keep many of the less important lines going. Break up this unified operation, lose the economy of centralization, and these lines could not stand on their own feet.
>
> I repeat that it is clearly the duty of the security holders to get together on some plan. If they do not unite on a plan, I fear that session will expire without the needed legislation and that the existence of the system as a unit will then be gravely imperilled.

As noted recently in the ELECTRIC RAILWAY JOURNAL, Benjamin A. Jackson and Harold J. Gross have been appointed temporary receivers of the Rhode Island Suburban Ry. by Judge Turner in the Rhode Island Superior Court. A hearing for the appointment of a permanent receiver has been set for Feb. 2. The receivership was asked in a bill of complaint filed by the Union Trust Co., Providence, R. I., trustee under the first mortgage 4 per cent bonds at 1900, of which $4,751,000 are outstanding and on which the July 1, 1919, and Jan. 1, 1920, interest has been defaulted. Counsel for the complainant said they wish to emphasize that the receivership proceedings were not brought to embarrass the pending reorganization of the Rhode Island Company, but rather to assist it. The property of the Rhode Island Suburban Ry. was leased to the Rhode Island Company, but the lease was terminated by decree of the Superior Court on May 14, 1919, because the Rhode Island Company had failed to pay its rent. Since the termination of the lease the property has been used by the receivers of the Rhode Island Company under an arrangement by which these receivers are to pay the Suburban Ry. for the use of its property.

Financial News Notes

Dividend by Holyoke Company.—The Holyoke (Mass.) Street Ry. has declared its first dividend in two years. The payment is for the period of one year and amounted to 3 per cent, or $40,260.

No Dividend on Lehigh Transit.—Owing to high cost of operation it was found impossible to declare any dividends at the annual meeting of the Lehigh Valley Transit Co., Allentown, Pa., on Jan. 12.

Dividends Resumed in Montreal.—The Montreal (Que.) Tramway has declared the regular quarterly dividend of 2½ per cent payable on Feb. 2, to stock of record of Jan. 24. With this distribution the company resumes regular dividend payments which were suspended in July, 1918, at the time the question of higher fares was brought up.

Successor Company at Fort Wayne.—Indiana Public Service Corporation is the name of the new corporation organized to succeed the Fort Wayne & Northern Indiana Traction Co., Fort Wayne, Ind., the property of which was sold at receiver's sale on Dec. 29. The incorporators are Henry C. Paul, Sam W. Greenland, Harry E. Vordemark, F. H. Schmidt, F. R. Fahlsing, Harry V. Norford and James M. Barrett.

Receiver for Staten Island Line.—Federal Judge Chatfield in Brooklyn, on the application of Bertram G. Eadie, has appointed Jacob Brenner temporary receiver of the Midland Ry., Staten Island, N. Y., which has suspended service. Mr. Brenner is commissioner of jurors of Kings County. The Westinghouse Electric & Manufacturing Co., a creditor, joined in the application to the court.

To Value Connecticut Trolleys.—The Public Utilities Commission of Connecticut was directed by the last Assembly to inform the latter as to the values of the various electric railway properties in the State. This valuation will be undertaken shortly by Chief Engineer E. Irvine Rudd, Assistant Engineer Joseph P. Wadhams and Electrical Engineer Archer E. Knowlton. To facilitate the work of its engineers, the commission has established a temporary office in New Haven.

Bondholders Call for Deposits.—Charles A. Peabody, Alexander J. Hemphill and Ellis W. Gladwin have announced that at the request of the holders of a large amount of the first mortgage 5 per cent gold bonds of the Brooklyn, Queens County & Suburban R.R. (Brooklyn Rapid Transit System) they have consented to act as a committee under the terms of a deposit agreement dated Jan. 5, 1920, for the mutual protection and benefit of the bondholders, default having been made in the payment of the interest which matured on July 1, 1919, and Jan. 1, 1920, on the said bonds. Holders of these bonds are invited to deposit their bonds on or before Feb. 7, next, with the Guaranty Trust Co., New York, N. Y., the depositary.

Successor to Inland Empire Incorporates.—Reorganization of the Spokane & Inland Empire Ry. system is indicated with the recent filing of articles of incorporation for the Spokane & Eastern Railway & Power Co. and the Inland Empire R.R. The former is capitalized for $3,000,000 and the latter for $1,000,000. The Inland Empire R.R. will operate the present "inland division" of the company, comprising interurban lines to Moscow, Idaho and Colfax, Wash. The other company will operate other property of the concern, including the city railway system in Spokane, the Coeur d'Alene, Idaho, interurban line, and the power plant. The property recently was purchased by the bondholders at receiver's sale. F. E. Connors, receiver, and Waldo G. Paine, traffic manager, are named as incorporators.

Amended Reorganization Plan Approved.—The plan for the reorganization of the Oakland & Antioch Ry., Oakland, Cal., as amended, has been approved by the California Railroad Commission. In an order issued by the commission the San Francisco-Sacramento R.R., the new company to be formed to take over the Oakland-Antioch lines, is authorized to issue not exceeding $6,550,000 of common stock, not exceding $1,330,000 of preferred stock, and not more than $900,000 of 6 per cent serial bonds. The proceeds from the bond sale are to be used to pay first lien creditors, pay non-assenting bondholders, pay part or all of the reorganization expenses, finance the construction of additions and betterments and provide working capital. The stock is to be distributed to the bondholders and creditors of the three lines which make up the Oakland-Antioch.

Court Orders Leased Roads Returned.—Federal Judge Julius M. Mayer at New York has ordered Job E. Hedges, receiver of the New York (N. Y.) Railways, to return the Fourth and Madison Avenue surface lines to their owners, the New York & Harlem Railroad. The lines have not been running on a paying basis. They are to be returned at midnight of Jan. 31. As a result of this order, the transfer privileges with the lines of the New York Railways will be discontinued. The Madison Avenue line, which runs over the Williamsburg Bridge, will also be discontinued, as the company has no franchise to run over Delancey Street.

Traffic and Transportation

Wants Segregation

Representatives of Bridgeport Opposing Connecticut Zone Plan, Want City Lines Separated from Others

Clifford B. Wilson, Mayor of Bridgeport, and Lieutenant-Governor of Connecticut, advocated segregation of all suburban electric railway lines in Connecticut from those lines now operating in the principal cities. This suggestion was made to the Public Utilities Commission at a hearing upon the petitions of various communities in the State to abolish the zone-fare system recently adopted by the Connecticut Co., the principal operating company in Connecticut. The hearing was held at Bridgeport on Jan. 15.

MAYOR WANTS FIVE-CENT FARE

In his plea to the commission Mayor Wilson declared it to be his belief that the railway lines as at present conducted are not operated upon a sound business basis—a basis that might be calculated to lessen opposition by jitneys which in Bridgeport, he said, had solved the transportation difficulties of a large percentage of the population. Mr. Wilson proposed that the lines of the Connecticut Co. in Bridgeport, which he contends are a paying proposition, be segregated from the lines in the outlying district and be operated at a 5-cent fare.

Mayor Wilson held that with one-half of the population living within the four largest cities of the State, the 5-cent fare within those city limits should be adequate to conduct the operation of the trolley lines and to pay reasonable profits upon the investment. He said:

> It is unjust to assess individuals who wish to ride upon trolleys in cities where lines are self-supporting for such losses as may be entailed in operating suburban lines for the convenience of the few.
>
> Any deficiency in operating expense of necessary suburban lines should be defrayed by the state as a whole rather than by individual car riders in self-supporting districts.

In answer to a question by the commissioners as to whether suburban lines entering cities did not contribute to the welfare of such cities, Mayor Wilson replied that he believed they did, but not so much as they contributed to the welfare of outlying sections that were not capable of supporting such lines.

LABOR FAVORS ONE-MAN CARS

The witness further declared that in Bridgeport, the first city in the United States to place them under full police regulations and operation, the jitney had proved very useful in that they served many industrial plants where trolley lines were impractical. He expressed the belief that in the future the electric railway and the jitney would exist side by side, and that both would earn fair financial return upon capital invested.

Many suggestions were made to the commission by witnesses from various sections of Fairfield County, ranging from State ownership to a 3-cent fare.

The Central Labor Union, representing all organized labor in Bridgeport, advocated replacing the heavier type of cars with the one-man car to be operated more frequently.

Major Charles F. Hunter, Stamford, electrical engineer at the Stamford Rolling Mills and formerly connected with the New York State Public Utilities Commission, recommended a 5-cent fare in the cities with increased suburban fares and commutation to overcome such obstacles that are certain to arise under the zoning system.

Senator John B. Dillon, Shelton, argued that it was a mistake to get away from the nickel. He said:

> It is conceded that the city lines in Connecticut—Bridgeport, Hartford, Waterbury and New Haven—pay for themselves. Under what reasoning, therefore, can the city residents be asked to pay an additional amount merely to support suburban lines for suburban people who fail to support lines operated for their particular benefit. I believe the next Legislature will remedy the existing condition, but meanwhile I do not think that we should crucify the people in cities for the salvation of people in suburban sections.

Representatives from Fairfield, Stamford, Devon, Milford, Stratford, Darien and other sections appeared in protest to the zone-fare system, which they contended was both unfair and the cause of serious traffic delays.

Announcement was made that the hearing would be continued on Jan. 22.

Tickets Popular in Kansas City

More than 90 per cent of the patrons of the Kansas City (Mo.) Rys. are riding at reduced ticket or token rates, according to a recent survey of conditions on the company's more important lines. Since the company began charging 8-cent cash fares on Dec. 14 the number of persons paying the 7-cent rate, which is available through the purchase of tickets in quantities of five or more, has steadily increased until at present it represents more than 50 per cent of the car riders. A large proportion of the remaining riders buy tokens at the rate of two for 15 cents.

The reduced rates are becoming popular in Kansas City, Kan., as well as on the lines in Missouri. The company began charging 8-cent cash fares on the Kansas side on Jan. 4 under authority of Federal Judge John C. Pollock, who authorized the increase from the former 6-cent rate when the municipal authorities refused to halt the jitneys.

First New York Session

Inquiry Under Way By City Officials Into Needs of Companies for Relief

Officials of the Interborough Rapid Transit Company, New York, N. Y., were examined at the first session, Jan. 21, of the Board of Estimate investigation into the city's traction situation. Corporation Counsel William P. Burr is conducting the inquiry. The scope of the proceeding had previously been announced by City Comptroller Charles L. Craig. The information which it was planned to seek was outlined in the ELECTRIC RAILWAY JOURNAL for Jan. 17, page 175.

James L. Quackenbush attended as counsel for the Interborough. Among the witnesses on the first day were William M. Fullen, assistant counsel to the Transit Construction Commission; Edward J. F. Gaynor, auditor of the company, and Horace M. Fisher, secretary. Mr. Fullen was asked to identify certain contracts which had to do with the construction of the original subway. He was unable to furnish the board with a schedule of the physical assets of the lines and the actual amount spent in equipping the roads prior to operation because Mr. McDonald, the contractor, had not complied with the section of the contract requiring this.

Mr. Gaynor was asked about the intercorporate relations of the company. Much was made in the daily newspapers of the testimony of Mr. Gaynor that the company had paid out 187½ per cent in dividends to its stockholders in the last sixteen years. This proved great meat for the Mayor and he promptly began to chew upon it, suggesting that the stockholders be called together and asked to help the road out from their former profits. All this was information available to anybody with a disposition for figures who has access to any one of a number of financial manuals sold to the general public. But it made great headline copy. Of course it was all true, but as Mr. Quackenbush explained the war conditions could not have been predicted in advance and even if the shareholders were inclined to help the company's finances their aid would be inadequate, simply postponing a situation which would have to be met another day.

The hearing also developed that August Belmont & Company received an honorarium of $1,500,000 in Interborough stock for services rendered during the organization and financing of the company. Mr. Gaynor said that others could best testify as to the services of Belmont & Company in connection with the financing. Later on it was established that Belmont & Company were the only financiers who could be induced to have anything to do with the carrying out of a project which at its inception was an entirely unknown quantity as to the liability which might attach to its sponsors.

Zone System a Success

Hearing in Connecticut Confirms Wisdom of Adoption of Present Fare Basis

The Connecticut Company's lines earned 21 per cent more in November and December, 1919, the first months of the new zone system, than in the corresponding months of 1918, according to figures introduced at the zone fare hearing in Hartford on Jan. 22. Of the fifty-eight cities and towns in the State which the company serves, it was shown, only sixteen have joined in protest to the public utilities commission against the zone system. The company is run by federal trustees and no dividends have been paid on the stock since 1916. The 6-cent fare regime, from October, 1917, to Nov. 2, 1919, was a failure. The zone system, on a service-at-cost basis, is on the face of things a real success.

ZONE FARES INCREASE REVENUES

The hearing on Jan. 22 gave the company the opportunity to offer rebuttal to the arguments of the several towns which have been protesting that the zone system was iniquitous. Most of those arguments had simmered down to the one basic protest against the zones as laid out by the company, and not against the zone system.

The company presented figures to show that in spite of being "boycotted" by Manchester riders it had been able to keep its revenues under the zone system higher on that line than in the corresponding months in 1918 with the 6-cent fare. Joseph F. Berry, attorney of the company, introduced a mass of figures, with several articles from the ELECTRIC RAILWAY JOURNAL, to show that various other electric railways throughout the country were in bad straits.

Members of the public utilities commission questioned the company's implied claim that the increase in revenues had been brought about almost entirely through the zone system of collecting fares, but Walter J. Flickinger, assistant to the president, maintained that probably 20 of the 21 per cent increase could be laid at the door of the new method of getting revenues.

RESULTS AT HARTFORD COMPARED

The commission's questions were based on figures the company presented showing that with the old 6-cent fare system the period Aug. 1, 1919, through Oct. 31 of that year brought 13 per cent more revenue than the corresponding period in 1918. The company claimed that the discrepancy in figures could be accounted for largely because of the influenza epidemic which raged in the last months of 1918.

The three lines near Hartford which are under attack are the Manchester, Rockville and New Britain-Berlin. The figures presented for the corresponding periods of 1918 and 1919 in each case were:

Hartford-Manchester

	November	December
1919 (zone)	$14,285	$15,960
1918	14,020	14,725

Hartford-Rockville

1919 (zone)........	$9,965	$10,838
1918	7,810	8,476

New Britain-Berlin

1919 (zone)	$7,802	$8,705
1918	5,871	6,772

B. R. T. Traffic Gains

Figures submitted to the Public Service Commission for the First District of New York showing traffic on the lines of the Brooklyn Rapid Transit Co. reveal that ticket sales from May to November, 1919, inclusive, increased 25,247,952 over the same period in 1918. This is a smaller increase than reported by the Interborough Rapid Transit Co. during the past year.

The increase in gross receipts of the Brooklyn Rapid Transit Co. aggregated according to the company's figures, about $2,162,500 a year, or approximately $308,928 a month. In the following table of increase in traffic on the Brooklyn Rapid Transit System it is shown that in one month, August of last year, there was a decrease, but it was due to the strike that tied up the lines for four days:

	1918	1919
May..................	23,895,961	28,090,025
June..................	24,833,523	28,381,724
July..................	27,998,781	29,475,663
August................	27,742,691	26,063,571
September............	23,647,843	28,025,053
October...............	22,947,302	29,293,687
November............	22,885,568	29,869,898
Total.................	173,951,669	199,199,621

An analysis of the figures indicates that the average increase in sales per month was 3,600,000, or 43,250,000 for twelve months.

The figures for November and December have not yet been reported.

A Plea for Co-operation

Frank B. Musser, president of the Harrisburg (Pa.) Rys., in a booklet given to all of the employees of the company on Jan. 7 pointed out that the men who work on the various lines have it in their power to make the company a success or a failure and also took occasion to thank the employees for their loyalty. The booklet was placed in the pay envelopes of the employees. It is in a measure a short talk on "Co-operation." Mr. Musser asked the men to give their best service to the community during the year and to make "co-operation" a "habit." The booklet says in part:

> We are engaged in the business of manufacturing and selling transportation to the public. This we deliver to our customers in 6-cent lots. It is, therefore, only by making the largest number of sales that we can be a success.
>
> In order to make a large number of sales we must render a satisfactory, prompt, reliable, safe and courteous service to our customers. The men operating our cars have it in their power to make this service a success or failure. They are our salesmen, and if their co-operation is whole-hearted and sincere, they will materially increase the sales of our goods, which is transportation.
>
> We aim to co-operate with each and every one of our 400 employees, and in turn we ask their full co-operation with the management to make the service we render to the public of Harrisburg and vicinity the best possible. To this end we assure you that our offices are always open to each and every one of our employees, so that constructive criticisms and suggestions may be made, and we earnestly invite our employees to come in and make such suggestions that will aid us toward rendering a more perfect and satisfactory service to our patrons.
>
> In assuring our men that our offices are always open to them, it is with the thought in mind that each man is entitled to and shall receive a square deal from the company; and, in return we ask that each man resolve and continue to give our company a square deal.

Transportation News Notes

Would Raise Interurban Rate.—The Kansas City (Mo.) Rys. has applied to the State Public Service Commission for authority to increase the rates on its line between Kansas City and Independence. The company would charge 8 cents at each of the four collection points on the round trip between the two cities.

Six Cents in Fort Smith.—The Fort Smith Light & Traction Co., Fort Smith, Ark., on Jan. 16 raised its fare from 5 cents to 6 cents under an order of the State Corporation Commission. The commission directed the company to sell nine tickets for 50 cents. The 6-cent fare will continue in effect for a period of six months.

Would Retain Five-Cent Fare.—The City Council of Seattle, Wash., at a recent meeting passed a resolution favoring the retention of the present 5-cent fare charged by the Seattle Municipal Street Ry. A ordinance was passed limiting the expense which the company should pay for paving in business and residential districts.

Mayor Approves Fare Increase.—Mayors and other city officials of Morris County, N. J., at a recent meeting in Morristown, declared themselves in favor of an increase in the fare of the Morris County Traction Co. The company has applied to the State Board of Public Utility Commissioners for authority to raise its rate from 6 cents to 7 cents.

Relief Ordinance Still Pending.—The City Council of Columbus, Ohio, is still deliberating over the proposed ordinance looking toward the extension of financial relief to the Columbus Railway, Power & Light Company. There was another meeting of the Council in the evening of Jan. 20 and the matter was again postponed.

Asks Higher Rate on Interstate Line.—The Wheeling (W. Va.) Traction Co. has applied to the Interstate Commerce Commission for an advance in rates on its Steubenville-Brilliant Line in Ohio. This action was taken after efforts to arrange a conference with the city councils of Wheeling and Mingo Junction to consider measures of relief for the company, had failed.

Straight Five-Cent Fare in Kokomo.—The Indiana Public Service Commission has authorized the Indiana Railways & Light Co., Kokomo, to install a straight 5-cent fare on its lines and to discontinue the sale of six tickets for 25 cents. The sale of eight tickets for 25 cents to mail carriers and city park employees will also be discontinued. Free transfers are retained.

No Jitneys for Trenton.—The City Commission of Trenton, N. J., has refused the application of the Automotive Collateral Co. for authority to operate a bus line within the city limits. This action was taken to give the Trenton & Mercer County Traction Corp. an opportunity to carry out plans for improving the service in Trenton. The company recently raised its fare from 6 cents to 7 cents.

Reduced Ticket Rate on Missouri Interurban.—The Missouri Public Service Commission has ordered the Kansas City, Clay County & St. Joseph Ry., Kansas City, to install a commutation rate of 1.3 cents a mile on its lines between Kansas City and Liberty, Kansas City & Ferrel Valley, and St. Joseph and Dearborn. The present rate is 2 cents a mile. The new rate will become effective on Feb. 15.

Would Raise Long Island Rates.—The Long Island R.R., New York, N. Y., has notified the Public Service Commission for the First District of its intention to raise its rates within the city of New York. The company's lines, which are electrically operated, serve large sections of the borough of Brooklyn and Queens. The fare to any station within the old Brooklyn city limits on the Atlantic Avenue branch was reduced to 5 cents about 1913 and was subsequently raised to 6 cents.

Safety Cars in Los Angeles.—The Los Angeles (Cal.) Ry. will install one-man safety cars on several of its lines within the next few months. The company has ordered forty-five of the cars, which it hopes to put in service by April 1. Their use was recommended in the report of the chief engineer of the State Railroad Commission as a means of improving the service in Los Angeles. The City Council has rejected a proposal to require motormen to pass an examination to demonstrate their fitness and ability to operate cars.

Will Seek to Restore Five-Cent Fare.—Walter P. Armstrong, city attorney for Memphis, Tenn., under the new administration, expects to go before the Tennessee Utilities Commission and seek a restoration of the 5-cent fare on the lines of the Memphis Street Railway. The railway was permitted to increase fares from 5 cents to 6 cents last June as a temporary measure while a valuation was being made. This work has been completed and the city will contend that a 5-cent fare will pay and pay handsomely. An effort will also be made to abolish the skip-stop system.

Would Grant Ten-Cent Fare.—Fearing that the New York & Queens County Ry., Queens Borough, New York City, will discontinue operation unless it secures more revenue, manufacturers of College Point, which is served by the company, have announced that they will ask the Board of Estimate of New York to allow the company to raise its fare from 5 cents to 10 cents. The manufacturers declare that, if service is abandoned, their employees will be unable to reach their work. If the fare is raised they propose to purchase the tickets and to sell them to their employees at 5 cents each.

Brooklyn Bus Case Argued.—Supreme Court Justice Corpsey heard argument on Jan. 16, in a suit brought by the Brooklyn (N. Y.) City R.R. to restrain Grover A. Whalen, Commissioner of the Department of Plant and Structures of New York City, from operating buses in competition with the company's lines. Counsel for the company contended that the buses were operated in violation of the provisions of law in that they were practically unregulated. Justice Cropsey reserved decision. Commissioner Whalen recently announced that, from Oct. 27, 1919, to Jan. 6, 1920, the buses carried on an average 45,000 persons daily.

Would Compel Transportation of Firemen and Policemen. — Mandamus proceedings have been started in the Superior Court by the city of Seattle, Wash., through Corporation Counsel Walter F. Meier, against the Seattle & Rainier Valley Ry., to force the company to carry uniformed policemen and firemen without charge. The declaration is made that when the company obtained its franchise, it was specifically provided that firemen and policemen in uniform should have free transportation. The company replies that it carried out this agreement until Nov. 17, 1919, when it filed new tariffs with the Public Service Commission, and discontinued the practice.

Wants Seven-Cent Fare Enjoined.—The St. Joseph Railway, Light, Heat & Power Co., St. Joseph, Mo., filed suit on January 7 against the State Public Service Commission in the Federal Court at Jefferson City, asking a permanent injunction to restrain the commission from enforcing a 7-cent fare in St. Joseph. For rate-making purposes the commission last month valued the holdings of the company in its various lines at $5,800,000. The company contends that a fair valuation would be $11,521,639. It asks the court to order an 8-cent fare and higher lighting and heating rates than the commission awarded. The company contends that the rates of the commission are confiscatory and in violation of the fourteenth amendment to the Federal Constitution.

Fines for Running by Stops.—St. Louis motormen who pass by persons waiting at street corners to board cars, can be charged with a misdemeanor and, upon conviction, punished with a fine of from $5 to $100 or a jail sentence of one to thirty days, or both fine and imprisonment. This fact was established when a motorman of the United Rys. was arraigned in police court after having been arrested by a patrolman who had been passed up along with a number of other people waiting to board the car. When the case was called a City Court attorney remembered that there was an old ordinance on the subject. The matter was looked up and an ordinance dating back to early horse-car days was found, providing the fine and improisonment for passing up passengers.

Injunction Hearings at Houston.—Hearings have been resumed before Federal Judge Otis P. Hamblen, sitting as referee in the case of the Houston (Tex.) Electric Co. against the city of Houston. The company is seeking an injunction to prevent the city from interfering in the promulgation of higher fares. The company claims that the present 5-cent fare is not sufficient to yield an adequate return on the value of the plant and system in Houston, and that it is losing $1,000 a day due to the 5-cent fare and jitney opposition. The hearing was begun on Dec. 3, 1919, before Judge Hamblen and continued several days, the company putting its witnesses on the stand to show reproduction value of the plant and cost of operating. At the conclusion of the testimony of witnesses for the company, the court adjourned to meet on Jan. 5.

Few Cars Added in St. Louis.—Figures made public recently by the United Rys., St. Louis, Mo., show that the increase of the number of cars in service is not keeping pace with the increase in the number of passengers carried. During the quarter ending Dec. 31, 1919, the company collected 65,152,120 fares, or 9,515,150 more than during the corresponding quarter of 1918, while the average number of cars operated daily was increased by only fifty-seven. The total number of passengers carried during the last quarter was 13,713,856 greater than during the first quarter of 1910 and the average daily number of cars operated was 269 greater. Receiver Rolla Wells of the company announced that the company was making every effort to improve the service, but said that unless it was able to obtain needed funds the service could not be bettered.

Trainmen's Lunchrooms Improve Morale.—To meet the needs of their trainmen the El Paso (Tex.) Electric Ry., The Northern Texas Traction Co. and the Houston Electric Co., Stone & Webster properties, are operating lunch rooms at the main carhouses in these three cities. The carhouses are situated on the outskirts of the respective cities at a distance from restaurants where wholesome food can be obtained. Investigation of cases of illness among the trainmen showed that poor food was the cause of much inefficiency and loss of time. The company managers, after several attempts to improve conditions in the eating places in the vicinity of the carhouses, decided to open lunch rooms where food should be served at cost. Designed to meet the needs of the night and early morning trainmen, these operate only from 7 p.m. to 7 a.m. The plan has met with much favorable comment and has increased their efficiency to an appreciable extent.

Wants Smoking Abolished.—Arguments for and against smoking on cars were submitted to the Public Service Commission of Missouri recently when Commissioner Blair took testimony in connection with the application of the United Railways, St. Louis, for an order prohibiting smoking in any part of cars at any time. Commissioner Blair announced that the commission would pass on the question in the near future. Col. Albert T. Perkins, manager of the company, testified that many complaints had reached his office about promiscuous smoking on cars and that upon investigation he found the complaints were justified. Conductors had been disciplined, he said, for failing to enforce the "no-smoking" rule and many of them had protested that they were unable to enforce it because of the large number of men who were smoking in all parts of the cars. Trouble for the company had resulted in several cases where conductors had ejected passengers for smoking. In the past the company has permitted smoking on the three rear seats of cars when the weather permitted the windows to be open.

Staten Island Company Suspends.—The Staten Island Midland R.R., Staten Island, N. Y., has carried out its threat to suspend service. The line is entirely shut down and as noted elsewhere in this issue its affairs are in the hands of a receiver. The company has been insisting for some time that it could not continue at a 5-cent fare. Its plea fell upon the deaf ears of the officials of the city of New York. The only attention they paid to the matter was to secure a temporary injunction against the shut down from Justice Faher of the Supreme Court for New York sitting in Brooklyn. Efforts to serve this order on R. L. Rand, vice-president and general manager of the company, failed, but Harry J. Blackam, superintendent of the company, was located and duly served. He is not an elected officer of the company. Meanwhile the Supreme Court stepped into the case and appointed a receiver. This official has ignored the order of the State Court, to which of course he is not responsible. In explaining the suspension to the newspapers Mr. Rand said that he was sorry for the commuters. The company, however, gave them and the city fair warning. He personally had no choice in the matter. The road belonged to the Roger's Estate, which had instructed him to cease operations. He had to obey. An emergency service with buses has been installed by the city to replace the facilities of the railway, but the buses appear to be entirely inadequate to meet the demands made upon them.

New Publications

Manila and Wire Rope

No. 26 in the series of safe practices pamphlets issued by National Safety Council, Chicago, Ill.

A Study of the Forms in Which Sulphur Occurs in Coal

By A. R. Powell and F. W. Parr. Engineering Experiment Station, University of Illinois, Urbana, Ill.

Results of researches are given and an appendix is devoted to the constitution of coal, a chapter which will be of great value to all coal users.

Trucks and Wheelbarrows

No. 30 in the series of safe practices pamphlets issued by the National Safety Council, Chicago, Ill.

This pamphlet is a brief treatise on the subject of materials handling in shops, warehouses and railway terminals. It was drafted by R. H. Duerrant, safety engineer of the council.

Technischer Literaturkalender, 1919

Published by R. Oldenburg, Munich and Berlin, 320 pages.

This is a sort of "Who's Who" of German technical writers, arranged to give name, residence, title, date of birth, list of principal works and other cognate matter. Some 4,000 names are listed.

The Orifice as a Means of Measuring Flow Water Through a Pipe

By R. E. Davis and H. H. Jordan. Bulletin No. 109 of the Engineering Experiment Station, University of Illinois, Urbana, Ill.

This bulletin contains the results of researches in the subject indicated by the title, the data and conclusions being put into such form as to be of assistance in the making of accurate water flow determination by means of the loss in head in an orifice.

Commercial Explosives

No. 28 in the series of safe practices pamphlets of the National Safety Council, Chicago, Ill.

This leaflet contains valuable information for men whose work obliges them to handle dynamite, blasting powder, etc. It was drafted by the safety engineer of the council with the assistance of the E. I. du Pont de Nemours & Company and the helpful criticisms and suggestions of the conference committee of fifty safety engineers.

Passenger Train Resistance

By E. C. Schmidt and H. H. Dunn. Bulletin No. 110, Engineering Experiment Station, University of Illinois, Urbana, Ill.

This bulletin gives the results of tests on resistance met by heavy railway passenger cars (not motor cars) at speeds up to 75 m.p.h. for car weights ranging from 30 to 75 tons. The data given are the results of tests extending over a period of more than ten years. The well-known dynamometer car of the university was used in the tests.

Tests on the Holding Power of Railroad Spikes

By A. H. Beyer and W. J. Krefeld. Bulletin No. 1 of the Civil Engineering Testing Laboratory, Columbia University, New York City.

This bulletin gives results of tests on cut, screw and grip spikes, including direct-pull tests and redrive-and-pulling tests. The data are presented in tabular and graphic form, and are used as the basis of a number of conclusions.

Timber, Its Strength, Grading and Seasoning

By Harold S. Betts, M. E., Forest Service, U. S. Department of Agriculture, 234 pages, McGraw-Hill Book Company, Inc., New York, N. Y.

Complete technical data relative to steel and concrete have long been available to engineers. Although one of the first materials used by man for structural purposes, accurate data relative to the properties of timber have not been available in a convenient form. This book is an effort to supply this deficiency and it attains its purpose in an admirable way. Complete data on all of the commonly used woods are incorporated in the text. In fact, it is a complete manual on the use of timber for engineering construction as it not only gives the physical properties of timber but also discusses methods of testing, seasoning and preservation and collects in convenient form the specifications of various timber associations. It should form a valuable addition to the working library of a maintenance or construction engineer.

Electrical Engineering Papers

By Benjamin G. Lamme, chief engineer Westinghouse Electric & Manufacturing Company. Published by the company, East Pittsburgh, Pa. 773 pages.

The Westinghouse Company has done the electrical industry a great service by reprinting from various sources the technical papers which have been prepared by its chief engineer during thirty years of activity in this field. Many of the papers were presented before the American Institute of Electrical Engineers. Electric railway engineers will be particularly pleased to have in such convenient form the papers on the development of the electric railway motor in America, on the development of direct current generators, on alternators, on the single-phase commutator-type railway motor, on 60-cycle rotary converters and many others. Mr. Lamme has the happy faculty of being able to put technical theory in readily understandable form. His papers are non-mathematical in character, but they go thoroughly into the theory underlying the particular aspect of engineering which they discuss. Taken together the papers form a remarkably complete and logical treatise on the subject of electrical machinery development. They will be useful as reference text in connection with college courses and can be read with profit by engineers generally.

Personal Mention

Ira Piper has been appointed roadmaster of the Caldwell (Idaho) Traction Co.

Richard L. Jones, master mechanic of the Massachusetts Northeastern Street Ry., Haverhill, Mass., has resigned.

Ross E. Luellen has been appointed to the newly created office of safety engineer of the Union Traction Co. of Indiana, Anderson, Ind.

William A. Underwood has tendered his resignation as superintendent of the Wheeling (W. Va.) Traction Co. after sixteen years of service. He will leave on Feb. 1 for Chicago, where he has accepted a position with the Bayton Food Product Co.

C. B. Barnhart, formerly connected with the Oskaloosa Traction & Light Co., Oskaloosa, Iowa, has been appointed general auditor of the Urbana & Champaign Railway, Gas & Electric Co., with headquarters at Champaign, Ill. He succeeds James R. Wood, who has been named assistant superintendent of the company.

James R. Wood has been appointed assistant superintendent of the Urbana & Champaign Railway, Gas & Electric Co., with headquarters at Champaign, Ill. The position is a new one, having been created for Mr. Wood. He has been associated with the company for the past twenty-four years and, prior to his recent promotion, served as its auditor.

D. W. Pontius, formerly traffic manager of the Pacific Electric Railway, was appointed to be general manager of the San Diego & Arizona Railway, passenger traffic on Dec. 1. Mr. Pontius began railroad work more than twenty-five years ago as a supervisor of track for the Pennsylvania System. The San Diego & Arizona Railway will operate in connection with the Southern Pacific Railroad to form a new direct trans-continental route between San Diego and the East.

William M. Rank has sailed from San Francisco, Cal., on the Pacific Mail liner *Venezuela* as the representative of an English and American syndicate that proposes to build a modern electric railroad where once stood the great walls of the city of Canton, China. Mr. Rank is well known in the railroad construction field in the West and more particularly in California. He was the associate of the late George Meyers and in conjunction with Mr. Meyers had a prominent part in building electric lines in Oakland and Alameda. It is understood that the American International Corporation is interested in the project at Canton with which Mr. Rank has become associated.

W. A. Smith Heads Omaha Traction System

William A. Smith, vice-president of the Omaha & Council Bluffs Street Ry., Omaha, Neb., has been elected president of the company by the board of directors. Mr. Smith succeeds the late Frank T. Hamilton, who died several months ago.

Mr. Smith has been connected with the street and electric railway industry for nearly fifty years. He joined the Omaha traction system in 1872 when it consisted of two miles of single track and five horse cars. Today the Omaha & Council Bluffs Street Ry., which owns the electric railway system in Omaha and several neighboring towns, operates more than 160 miles of track and has 1250 employees. Mr. Smith has been a director of the company since 1874 and for many years served as general manager. In 1901 he became treasurer, retaining the general managership. He was elected second vice-president in 1910, and subsequently became first vice-president.

W. A. SMITH

He resigned as general manager following the death of Mr. Hamilton and, as first vice-president, had charge of the company's affairs pending the selection of a new president. The system in Omaha and Council Bluffs consists of 162 miles of road.

George N. Brown, formerly electrical engineer for the New York State Rys., Syracuse-Utica Lines, has been appointed district manager for the Buffalo office of the Shiefer Electric Co., Rochester, N. Y. Mr. Brown joined the New York State Rys. in 1912 as assistant engineer of the Syracuse-Utica lines, becoming electrical engineer in the following year. As a first lieutenant of engineers he was assigned to the 303rd Regiment, 78th Division at the outbreak of the war, later being promoted to the rank of captain. He went overseas in the spring of 1918, was with the British in Flanders for four months, and later served with the A. E. F. at St. Mihiel and in the Argonne.

H. Hobart Porter, vice-president and general manager of the Brooklyn (N. Y.) City R.R., has been elected a director to succeed Seymour L. Husted, Jr., resigned. Mr. Husted was the oldest member of the company in point of service of the Brooklyn City board, having been elected on Jan. 8, 1894. In a letter to Frank Lyman, president, Mr. Husted, who is now in San Remo, Italy, said that his stay in Europe might be a long one and for that reason he felt that he should relinquish his place as director. Mr. Porter became general manager of the Brooklyn City R.R. when the lines of that company were separated from the Brooklyn Rapid Transit system and returned to their owners on Oct. 19, 1919. He is a member of the firm of Sanderson & Porter, engineers, and is connected with numerous large enterprises, including the American Water Works & Electric Co., of which he is president.

Obituary

Charles Williams died at his home in Lynn, Mass., on Jan. 17. Mr. Williams entered street railway service in 1880 as a conductor on the Boston & Lynn R.R. He later became cashier for the same company and was appointed treasurer in 1891. He became assistant treasurer of the Bay State Street Ry. in 1900 and also served as a director of the Boston & Revere Electric Street Ry. and the East Middlesex Street Ry. He is survived by a widow and a son.

Henry T. Jones, general superintendent of the United Railroads of San Francisco, died suddenly on Jan. 13. Mr. Jones was born in Bristol, England, in 1866. He aided in the construction of the first cable railroad in England, operating the first car over the line in 1884 with the Lord Mayor of London as a guest. When Sir Clifton Robinson, his employer on the cable railroad in London, undertook the construction of a similar line in Los Angeles in 1887, Mr. Jones came to this country and served as assistant superintendent of the Los Angeles line. In 1890 he voluntarily returned to the ranks to learn more about car operation. He went to San Francisco, where he became a conductor on the Market Street Cable Ry. Upon the organization of the United R.Rs. in 1902 he joined the company as superintendent of employment. In 1904 he became division superintendent and in July, 1913 was made general superintendent.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Rail Prices May Go Higher

Steel Corporation's Prices of $45 and $47 Still Hold—Other Producers Are Quoting Up to $57 Per Ton

Some rail producers are holding off as to rail prices for first and second quarter deliveries. The United States Steel Corporation is still quoting prices of March 21, 1919, which were $45 a ton for bessemer and $47 a ton for open hearth T-rails. Recent quotations by the Cambria Steel Company, however, are $55 for bessemer and $57 for open hearth. No large orders have been reported at these prices although it is probable that this latter company is getting some tonnage in small lots. Orders for rails have been such that the United States Steel Corporation could probably roll all requirements at the prices given, but it is probable that it will accept only its own share of the business and will take care of its old customers. Those companies which have not already contracted for rollings may be compelled to buy where they can and at the best price possible. The cost of production for the steel corporation is of course low, as seen by its pig-iron requirements, which are figured at the old price of $27 per ton as compared to present pig prices ranging from $33 to $40. A large independent is quoting $57 for standard open hearth rails and some orders have been placed at this price.

Steel Shortage May Affect Car Builders

Shortage of Raw Steel Prevents Increase in Production—Plates and Fabricated Steel Affected

Failure of the steel mills to receive raw materials, thus causing a lessening of production, is assuming serious proportions in some lines. One of the largest manufacturers of fabricated products advised that although the company had plenty of inquiries and orders on hand, the situation as to deliveries was so uncertain that for the most part they were principally engaged in writing their customers that orders would be accepted subject to mill conditions and to the prices ruling at the time of delivery.

In addition to a pig-iron shortage, many localities are short of coke. The shortage in coke is blamed directly to the coal shortage which in turn has been charged to a lack of cars to move the coal from the mines. Again the amount of coal coked has been less than usual, first on account of a labor shortage, then later by a lack of cars to move the product. Also the price is at present restricted by the government to $6 per ton for furnace coke and $7 for foundry coke. According to reports operators believe that they can better afford to sell their coal at this price than to convert it into coke. This may add to the seriousness of the coke situation and in turn to the steel shortage.

Car builders in the electric railway field may be affected within the near future, for although the shortage of material up to the present time has been chiefly in the lighter grades, plates, shapes, and fabricated pieces are getting scarcer and scarcer. In most instances car builders are covered by contract, but they would no doubt be affected in the case of a decrease in production. In the steel manufacturing plants, production is now from 65 to 75 per cent of normal. Electric sheets are sold up for the first half of 1920 and wire products of all kinds are practically impossible to obtain.

Coal Production for 1919 Falls Off 20 Per Cent

Prospects for 1920 Believed to Be Good—Production Depends Largely Upon Seasonal Buying, Transportation and Labor Conditions

Seasonal buying of coal supplies by railway and other consumers will go a long way toward solving present difficulties in coal mining. The past year has held much of uncertainty, including car shortages at critical times and even a strike which undoubtedly was caused from irregular working time as much as from any other specific cause. In many cases railway operators were forced to cut their services 50 per cent and in some cases many trains on interurban schedules were taken off altogether, resulting in great inconvenience to the public as well as reduced revenues to the railways. Production of coal for 1919, which is figured as commencing in April, according to the Geological Survey, amounted to 367,470,000 tons as compared with 460,890,000 tons for the preceding coal year from April 1, 1918, to March 31, 1919. This is a decrease of 93,420,000 tons or approximately 20 per cent. Although this decline is naturally discouraging, it is believed that the decrease will be wiped out during 1920, after the reasons have been made known and an opportunity given to all large coal consumers to save themselves trouble and money by seasonal buying.

In the early months of 1919 the demand for coal was rather light because industrials and dealers were well supplied to handle the let-up in industrial needs following the war. Over the same period in previous years, however, the demand for coal has been heavy, as that is part of the normal heavy buying season. It is not till April that this demand usually lets up, from which time on for a few months the mines operate intermittently.

Were it possible to operate at full capacity during these months of the second quarter, there would be plenty of coal to serve all domestic needs, even allowing for car shortages here and there, although it would require that certain large interests purchase their winter requirements during the spring and summer. The urgent need is for increased production and for forehanded buying. As the coal is brought out of the ground it must be taken away since there are no storage facilities at the tipple.

Production which reached a high rate during the week ended Jan. 3, according to the Geological Survey figures, declined somewhat during the following week. The daily rate is estimated at 1,905,000 net tons as compared with 2,060,000 tons on the five full working days of the week before. Up to the present time, production during the first two weeks of 1920 so far is well above that of 1919 and 1918 and even slightly more than the line on the chart which represents 1917. The total output for the week ended Jan. 10 is estimated at 11,432,000 net tons, which is an increase over the corresponding week of last year of 10.3 per cent. In fact, the week's production was exceeded but five times during the entire year 1919.

Westinghouse Brake Co. Changes

Westinghouse Traction Brake Company, Wilmerding, Pa., announces that J. R. Ellicott, manager of the Eastern district, has retired after a long service. He will, however, act with the officers of the company in a consulting capacity. Mr. Ellicott was general manager of the Standard Traction Brake Co. until it was taken over by the Westinghouse Air Brake Co. He will be succeeded by his son, C. R. Ellicott, who has also been with the company a good many years.

C. H. Beck, heretofore special representative Safety Car Devices Co., succeeds C. R. Ellicott as assistant Eastern manager at New York. Robert Burgess, representative at Atlanta, becomes Southeastern manager, Munsey Building, Washington, D. C. A. K. Hohmyer, formerly of the Chicago office, becomes assistant Western manager.

J. B. Wright, assistant Southeastern manager, is made assistant district manager at Pittsburgh. F. H. Parke, resident engineer, Southeastern district, is appointed general engineer, Westinghouse Building, Pittsburgh, Pa. T. W. Newburn, assistant resident engineer, Southeastern district, becomes district engineer, Southeastern district, headquarters Munsey Building, Washington, D. C. J. C. McCune, special engineer, Wilmerding, is appointed assistant to district engineer, Eastern district, 165 Broadway, New York, N. Y., and J. H. Woods of the commercial-engineering department, Wilmerding, is appointed engineer, export department, with headquarters in the Westinghouse Building, Pittsburgh.

Insulators and Hardware Advance 5 to 10 Per Cent

Deliveries Gradually Improving—Two to Three Months Being Quoted by Large Producers

Effective Jan. 17, pintype insulators and suspension insulator hardware are advanced 10 per cent. Suspension insulators, bushings and all other porcelains are up 5 per cent. Labor charges are principally responsible for the latest increase although difficulties in the raw material situation also enter into the increase.

Good sales are reported in the high-tension insulator market. In addition to the domestic business, some large orders are coming in from Europe and South America. Although prices of the American-made goods are much higher than those in England and Germany, delivery is of prime importance and it is for this reason that many orders are coming to this country. Large orders have been placed recently in Sweden. Other foreign countries have placed orders of fair size. During the week an order of 4,000 high-tension units was reported from South America. Also a large order for third rail insulators has been received from a European road.

There is much difficulty at the insulator factories in obtaining raw material, and especially malleables, for insulator manufacture. Conditions are not becoming any better and with the rather heavy demands from foreign countries for insulators, many domestic customers may be seriously embarrassed unless they get into the market early.

Should a decrease in the insulator manufacture become effective as it has in some other lines, manufacturers will be compelled to distribute their capacity to take care of the best interests of all its customers, which usually means cutting down each individual order. Deliveries are now quoted at from sixty to ninety days on both pintype and on suspension units.

Old Engineering Firm Changes Name

Barclay Parsons & Klapp, consulting engineers, 60 Wall St., New York, N. Y., announce the change of the firm name to Parsons, Klapp, Brinckerhoff & Douglas, the personnel remaining unchanged. Mr. Brinckerhoff is a graduate of Stevens Institute of Technology, and in 1892 and 1893 was assistant engineer for the intramural railway at the World's Fair in Chicago. Later he became electrical engineer and in 1898 general manager of the Metropolitan West Side Elevated Ry., in which capacity he remained until 1906. He then left railway work to join the firm of Barclay Parsons & Klapp, of which he has been a partner for a number of years. Since leaving Chicago he has investigated and reported upon many of the operating conditions of the largest companies in this country and visited the systems in Europe as well. In 1916 he was appointed chief engineer of the Chicago Traction & Subway Commission for the investigation of traffic conditions. Mr. Brinckerhoff recently has been engaged on a series of reports on traffic conditions in Cleveland and Detroit, abstracts of which have appeared from time to time in the ELECTRIC RAILWAY JOURNAL.

Recent Incorporations

Houston, Richmond & Western Traction Co., Houston, Tex.—The Houston, Richmond & Western Traction Co. has filed amendments in the office of the Secretary of State changing its name to the Houston, Richmond & San Antonio Traction Co. and increasing its capital stock from $50,000 to $250,000. Ed. Kennedy, vice-president of the company, has announced that the company would within a short time begin actual construction of an interurban line between Houston and San Antonio, passing through the towns of Richmond, Wharton, Yoakum, Gonzales, Willow Springs and New Berlin.

Power Houses, Shops and Buildings

Mesaba Ry., Virginia, Minn.—The Mesaba Ry., will build a passenger station and a freight house at Hibbing, Minn. and at Kitsville, Minn., respectively.

Kansas City, Clay County & St. Joseph Ry., Kansas City, Mo.—The Kansas City, Clay County & St. Joseph Ry. plans an extension to its car shops in North Kansas City. The dimensions of the structure will be 50 x 140 ft.

Jamestown Street Ry.; Chautauqua Traction Co.; Jamestown, Westfield & Northwestern Ry., and Chautauqua Lake Navigation Co., Jamestown, N. Y.—These companies plan to purchase a 3,000-kw., 60-cycle, 3,600-r.p.m., 2,200-volt turbine. Also 2,500 hp. in boilers, superheaters and stokers.

Marine Ry., New York, N. Y.—This company plans during the year to purchase new charging apparatus.

Cincinnati & Dayton Traction Co., Cincinnati, Ohio.—This company has purchased a Brown Hoisting Company's 15-ton steam locomotive crane.

Cincinnati, Milford & Blanchester Traction Co., Cincinnati, Ohio.—This company proposes during 1920 to purchase two new substations comprising transformers, rotaries and panels and also three new cars complete.

Cleveland Union Terminals Co., Cleveland, Ohio.—The City Council of Cleveland, Ohio, has passed an ordinance authorizing the Cleveland Union Terminals Co. to build a passenger station facing the public squares. Work must be begun by March 1.

Ohio River Electric Railway & Power Co., Pomeroy, Ohio.—This company expects during the year to purchase about $400 worth of tools and also some additional equipment.

Pacific Power & Light Co., Astoria, Ore.—This company expects to purchase a new 3,750-kva. generating station for use of light and street railway departments jointly. The contract has already been let.

Montoursville (Pa.) Passenger Ry.—This company contemplates some powerhouse changes which will enable them to produce more power. The lines will also be built heavier to carry the increased output. Turbo blowers will be purchased.

Jackson Railway & Light Co., Jackson, Tenn.—This company recently contracted with the Babcock & Wilcox Co. for a 505-hp. Sterling boiler to be installed during the first quarter of 1920.

Track and Roadway

Virginia Railway & Power Co., Richmond, Va.—The Virginia Railway & Power Co. has accepted the recommendation of the State Corporation Commission for an extension of its line in Monticello Avenue, Norfolk, to Ninth Street.

Seattle (Wash.) Municipal Railway.—The City Council of Washington, D. C., is considering an ordinance providing for the construction of a double-track railway on East Marginal Way, providing improved transportation service for residents of South Seattle, to be commenced in the near future, and to cost $275,000. The sum has been appropriated out of the 1919 railway betterment fund of $790,000. Mayor Fitzgerald urges the immediate commencement of work, so that employment may be provided ex-service men in the city. Plans call for a double-track line, beginning at the intersection of East Marginal Way and Carleton Avenue and extending on East Marginal Way to the intersection of that street with First Avenue South. The line will be 2½ miles long

Trade Notes

Walter A. Zelnicker Supply Co. announces that Hugh L. Siegel, formerly general sales manager for the Ford Roofing Products Co., has joined the company as assistant to the president.

General Electric Co., Schenectady, N. Y., has awarded contract for the construction of a new four-story addition to its plant on Boyd Street, Newark, N. J., about 60 ft. x 80 ft., which will cost $66,000.

Fairbanks Company, New York, N. Y., announces that it has been given the exclusive distribution for industrial applications of Lincoln electric motors, manufactured by the Lincoln Electric Co., Cleveland, Ohio.

Link-Belt Co., Chicago, Ill., announces an addition to its Belmont foundry at Indianapolis, Ind. The building will be about 70 ft. wide by 400 ft., and when finished will complete the foundry as originally laid out.

Bryant Electric Co., Bridgeport, Conn., has completed plans for the construction of a new four-story addition to its plant, for increased capacity. The structure will be about 60 ft. x 218 ft. and is estimated to cost $120,000.

Rome Wire Co., Rome, N. Y., advises that it is adding a new electric furnace for bronze, a heat-treating furnace for annealing, new machinery and enlarging its buildings. The company hopes by spring to be in better shape on shipments.

General Electric Co., Schenectady, N. Y., is preparing plans for the construction of a new six-story structure at its Schenectady plant to facilitate operations. The structure will be about 54 ft. x 219 ft. and is estimated to cost $400,000.

Standard Underground Cable Co., Pittsburgh, Pa., announces that the St. Louis sales office of the company, E. J. Putzcker, manager, will on Feb. 1 be removed from the Security Building, where it has been located since 1897, to the Arcade Building.

Cooper Hewitt Electric Co., Hoboken, N. J., to secure more room for factory expansion, moved departments of its offices, about Dec. 1, to 95 River St. The engineers' department will remain at the present location in the factory, at Eighth and Grand Sts.

William J. P. Simpson, consulting engineer, Seattle, Wash., recently returned from France, where he has been a major connected with the Engineering Corps since September, 1917, and will re-enter private practice, with offices at 317 Railway Exchange Building.

Fairbanks, Morse & Co., Chicago, Ill., will erect a building to cost $315,000, three stories, 150 x 300 ft., located at Thirty-eighth Street and Loomis Place, in the central manufacturing district. The new structure will be built so as to carry two additional stories if needed.

Crescent Insulated Wire & Cable Co., Olden and Taylor Streets, Trenton, N. J., is considering plans for the construction of an addition to its plant. The company has completed negotiations for the acquirement of additional property on Webster Street as a site for the proposed structure.

Goulds Manufacturing Co., Seneca Falls, N. Y., manufacturer of pumping machinery, has completed negotiations for the acquirement of the seven-story building, about 25 ft. x 152 ft., now occupied by the company, at 19 Park Place, and extending through to 16 Murray Street, New York City.

John F. Vaughan, Engineers, 185 Devonshire Street, Boston, Mass., announce that they have secured the services of Henry D. Abbott, recently resigned as New England manager of the United States Shipping Board, Emergency Fleet Corporation. Mr. Abbott becomes an associate of the firm.

F. S. Montgomery, for the past six years advertising manager of the National Metal Molding Co., Pittsburgh, Pa., tendered his resignation which took effect Dec. 31, since which date he has been associated with the Ivan B. Nordhem Co., outdoor advertising, 8 West Fortieth St., New York City.

C. G. Boyden has resigned from the Eastern Massachusetts Street Ry. to become sales engineer of the Lincoln Electric Co., with headquarters at 10 High St., Boston, Mass. Mr. Boyden is making a specialty of electric welding and is covering the New England territory in that connection, including industrial plants as well as utilities.

Black & Decker Manufacturing Co., Baltimore, Md., has opened an additional office on the Pacific Coast, at 201 Maynard Building, Seattle, Wash. This office is in charge of A. E. Nordwall, who will have charge of the distribution of Black & Decker products in the State of Washington, working under the direction of the main Pacific Coast office in San Francisco.

Francis H. M. Riley, formerly associated with Vaughn & Meyers, consulting engineers, Milwaukee, Wis., announces his appointment as Wisconsin representative for the Vulcan Soot Cleaner Co. of Dubois, Pa., the Vulcan Fuel Economy Co. of Chicago, Ill., and the Green Engineering Co. East Chicago, Ind. Mr. Riley is established at 614 Security Building, Milwaukee.

J. E. Mellett, formerly commercial engineer with the Georgia Railway & Power Co., has joined the executive staff of the Carter Electric Co., Atlanta, Ga. Mr. Mellett has resided in Atlanta for eight or nine years, and before joining the Georgia Railway & Power Co. he had been one of the sales engineers of the General Electric Co. and at one time manager of its Chattanooga office.

A. L. Mercer, for several months assistant director of sales of the War Department, has tendered his resignation effective Jan. 1, 1920. It is reported that the board of directors of the Needham Tire Company, Charles River, Mass., will elect Mr. Mercer president of the corporation at its annual meeting in January, and that he will take up his new duties on Feb. 1. This company expects to manufacture a complete line of rubber goods for all purposes.

B. F. Goodrich Rubber Co., Akron, Ohio, announces through T. L. Barnes, manager of sales, insulated wire department, that this department of the Goodrich company has been sold to the Rome Wire Co. of Rome, N. Y., in order that the Goodrich company might expand still further in manufacturing goods entirely of rubber. The kind of wire concerned is National Electric Code, automobile wires and cables, mining machine and other types of rubber-insulated wire.

New Advertising Literature

Caille Brothers Co., Detroit, Mich.: A booklet in which are described its electric ticket sellers and electric ticket choppers.

General Electric Co., Schenectady, N. Y.: Bulletin No. 47,702A, superseding No. 47,702 and covering rheostat and compensator operating mechanisms.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.: Bulletin No. 1632C, a fifty-two page publication covering the centrifugal pumps and pumping units made by this company.

National Association of Manufacturers, 30 Church Street, New York City: Through its foreign trade department the second edition of its publication "An Export Order and Allied Topics." The original issue of this publication was brought out in 1918.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.: Booklet containing a brief outline of the opportunities offered to technical graduates in its shops. It contains the statement that during twenty years more than 5,000 men have entered graduate students' courses in its plants.

E. I. du Pont de Nemours & Co., Wilmington, Del.; indicating device applicable in electric railway safety campaigns. It is called the "Accidometer," and is simply a large bulletin board to which have been attached accident thermometers for every craft at work on one of the company's large engineering jobs. Painted above each group of thermometers is the name of the general foreman of the particular craft, with the names of the foremen directly under him. A horizontal twelve month scale, subdivided into quarterly periods, indicates the relative standings of the several crafts at the end of any month. Supplementing the effect of the accidometer in the creation of departmental competition, bronze and silver medals are awarded to foremen and general foremen for clear accident records for six and twelve months respectively.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

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Weed Out the Pessimists

THERE is no room in the industry for pessimists. It seems almost imperative that all electric railway executive positions be occupied by men whose visions are not handicapped and beclouded with pessimistic prejudice. The industry is in dire need of the best brains obtainable, brains open to new ideas of operation and new thoughts of management. The industry is not a dead one; nor is it going to die. It is too fundamentally essential to die. Nor is it in any danger of supersession at the present time, for no more economical and reliable system of transportation is in sight than the electric railway, Henry Ford's ideas to the contrary notwithstanding. Thanks to the efforts and faith of a part of the men of the industry, the worst has passed for most roads, and there is every reason for an optimistic outlook for the future. But the future is not to be easy. There are many serious problems ahead. This points to the demand for sound judgment and vision—vision born of honest faith in the industry. Looking back, there is much food for the pessimist; and the pessimist is a back-looker; he sees ahead only with eyes that color the future according to the trend of the past. It is not he who acts to bring about a controversion of the past trend. Hence the pessimists, with whom the industry has been harrassed the last few years, have no place in the present railway situation. He is a wise chief who will proceed forthwith to weed them out of his organization, clearing it for the task ahead. The future is not insolvable for men with minds unbiased by past discouragements.

Shift Surplus Safeties to Big-Car Routes at Night

IT WILL naturally take a long time before all those who need safety cars will have enough of them to use on most of their lines most of the time. This does not mean, however, that the customary method of assigning available safety cars to certain lines only cannot be bettered. Let us assume that we have already equipped one-half of the routes with such cars. During the busier hours of the day practically every one of the safeties will be required to give the desired headways of three and one-half to five minutes. After the evening rush, however, the headways will probably be lengthened to such a degree that one-third and perhaps one-half of the cars are taken off. We are then confronted by the absurd situation of one-man, light-weight cars standing idle while two-man, heavy-weight cars are handling the lightest service of the day on certain lines.

It may not be orthodox to run one kind of car during certain hours and another kind of car during other hours on the same line. Yet there is no reason to suppose that the public would object to a car with a different boarding and leaving routine so long as the change is effected during the off-hours. Incidentally, this would not prove a bad plan for getting the public used to what will eventually be the style of operation at all hours. It is obvious also that the diversion of surplus safety cars to other lines would make possible better headways and greater income aside from the savings in platform and power cost. Surely, it is just as logical to use light cars on heavy car lines during low-traffic hours as it is to use big cars on safety lines during the rush hours.

Why the Public Can Misunderstand the Single-Truck Car

THOSE railway men who have an idea that the average man in the street doesn't know whether the cars are running on four wheels or eight would be disillusioned if they began asking people at random what they thought of the cars. We had this experience recently in a town where the single-truck cars came in with the Spanish-American War or thereabout. Since that war strong youths have changed to feeble men, but the same cars still roll and pitch along as in the days when propulsion by electricity covered a multitude of defects. In the same town are a number of double-truck cars, not particularly good but of such conspicuously better riding qualities that they are sure to get a good word from the same people who condemn the smaller cars.

Now the unfortunate thing is that in the minds of these people, single-truck cars are associated with bad riding and double-truck cars with good riding. The burden of their complaint is: "We want no single-truck cars." Of course, it is going to be quite a job to convince them that the single-truck car of today is quite a different proposition from that of a generation ago; to explain to them what even many a railway man forgets, namely, that during the big-car vogue the improvement of the single truck was almost entirely neglected. If our British brethren can devise spring suspensions that make even a double-deck single-trucker prove tolerable, we may rest assured that still better results are possible with single-deck cars. Certainly, the new trucks shown at the Atlantic City convention, as well as the slightly earlier designs now under hundreds of safety cars and in use in many parts of the country possess riding qualities that will popularize them with the public once an opportunity is given.

This fact is worth the attention of those operators who are still doubtful about using single trucks for one-man cars because of their feeling that their patrons will object to single-truck cars as "small-town stuff."

Sell the Salesman First!

IF THE TERM "selling transportation" is not to be merely a phrase, electric railways must study all the schemes that merchants work up in putting out their products for purchase. In some respects the electric railway man has a more difficult task because he is selling a somewhat intangible article and one which is pretty much the same all the year round. Nevertheless, the general principles of selling are as applicable to the sale of rides as to the sale of shoes. One of these principles is that you must sell the salesmen before you can hope to sell the ultimate purchaser. Applied to the electric railway this means clearly that the platform men, and more particularly the conductors, must have a concept of what the management is striving to do.

Let us take, for example, a change in the cost of transportation worked out through the use of a new kind of fare ticket. The management has adopted the ticket after weighing all the pros and cons. Perhaps it has even gone so far as to advertise to the public the merits of the innovation; but it has omitted an important link if it failed to take the platform men into consultation.

Conductors are as human as anyone else. If asked to give their opinion about a new form of fare they will not only be pleased at this recognition of their importance but will be glad to offer suggestions that might not occur to the man at the desk. The larger part of such co-operation, however, is that the men are enlightened as to the "why" of the change so that all of them can tell the same story to their customers on the car and tell that story straight. It is the conference before the sale that puts behind a department store's bargain all the dynamic energy of the sales organization.

To paraphrase an expression from the business world: There is a great difference between a salesman (of transportation) and an order (fare) taker!

Jitneys or Trolleys—Take Your Choice

THE EYES of the street railway world are focussed on Massachusetts, where the electric railway companies have succeeded in crystallizing present-day public opinion so that the people apparently realize that unless sufficient revenue is obtained to pay the cost of operating cars, the service must be discontinued. This business axiom was brought sharply to the attention of everyone interested in urban electric railway transportation by Governor Coolidge several days ago, when in response to an appeal by the officials of one of the cities in the Salem District of the Eastern Massachusetts Street Railway Company for the restoration of service, suspended by the public trustees of that road, he said the public could expect nothing but what it was willing to pay for in transportation any more than in anything else. Salem lost its car service when the city officials failed to choose between the trolleys and the jitneys.

Soon after taking charge of the affairs of the former Bay State Street Railway on a service-at-cost plan, under an Act of the Legislature, the public trustees announced unequivocally that trolleys and jitneys could not operate competitively without an economic waste. To this policy the trustees have adhered throughout the several spectacular controversies with city officials.

In consequence of this position jitney competition has been gradually disappearing from the Bay State territory since last September. In the few spots, however, where it remains there is a constantly growing public sentiment in favor of the elimination of wasteful rivalry in the transportation field, and newspaper comments indicate that the trolley company has a host of new friends, ready and willing to champion its cause whenever necessary and without fear of being labelled as "corporation tools."

The fact that a State Board directs the affairs of the Eastern Massachusetts Street Railway and that the communities served have to make up any deficit from operation, if they want the service continued, undoubtedly was of help in bringing about the result secured. A privately owned company might not always find it judicious to use such heroic measures. Nevertheless, that a private company can also secure the support of the community is shown by the recent action of the Springfield (Mass.) Chamber of Commerce, where, at a mass meeting, 300 of the leading business men voted practically unanimously in favor of granting the street railway a monopoly of transportation.

The railway men never had a better time than now, as any student of psychology will tell them, to assert with telling effect every ounce of available energy they possess for what rightfully belongs to them, as the public is ready and willing, if handled rightly, to give the traction companies a square deal.

Real and Fictitious Bus Flexibility

MR. PALMER'S well-reasoned article on "How Buses Are Run in Baltimore," published in our Jan. 3 issue, carried a tip on a way to make profitable use of the motor bus even where the service does not pay in itself. We refer to the possibilities offered by routeing buses over near-by but not congested streets. This characteristic advantage of the bus is not developed by jitney bus operators, as the latter are not originators but stealers of traffic. Their claim that the bus is faster because more flexible is a joke, so far as concerns operations over streets where there is, at every corner, a traffic control officer who sees to it that practically all traffic, whether on rails or rubber, moves along at the same gait. The superior schedule speed of the jitney bus really arises from the fact that a smaller vehicle makes fewer stops in the district outside the congested area—a fact that is proved quickly enough when a thirty-two-seat safety car replaces a forty-four jumbo.

It is, therefore, not surprising that it has remained for the first American street railway which uses buses in co-ordination with cars on a large scale to point out not the fictitious but the genuine flexibility of the bus that comes from exploiting a vehicle that can use almost any highway at will.

The situation as regards Charles Street, Baltimore is paralleled in many other cities. We have in mind a municipality where traffic has absolutely reached the saturation point, so far as the tracked highways downtown are concerned, an index to the degree of congestion being afforded by the fact that the rush-hour schedule is 15 to 20 per cent slower than at other times of the day with a corresponding increase in platform wages To widen the streets or build a subway in what is naturally the costliest territory of the city would be out of the question. The solution, at least so far a speed of transportation is concerned, apparently lies in diverting as much rush-hour travel as possible to other thoroughfares by means of special bus services between the principal factories and the residential sections. Under present conditions, almost every car on this system comes down to the congested area for both routing and passenger transfer reasons. With the aid of buses, a large part of the present transfer passengers could be routed direct by means of by-roads running blocks away from the congested streets. For such high speed service a special fare could properly be charged and easily collected.

It is in such service as this, as auxiliary to the electric railway system of a city, that the main field for buses in city transportation lies, and preferably such service should be supplied under the direction of the existing railway company. If those who are advocating the use of buses for city transportation would turn to such cases as these, rather than to that of paralleling existing rail lines, communities would be much better off.

No Procrastination With This Commission

IT IS with much satisfaction that we review the recent decision of the Public Service Commission of Maryland in the case of the petition of the United Railways & Electric Company for an increase in the rate of fare. Such fearless and rapid-fire action on the part of a utilities commission in a case known to be meritorious is indeed encouraging and suggests that there is still relief for those who find their burdens unbearable.

The Baltimore decision, we believe, establishes a record for a quick hearing and prompt decision on such a petition. The hearing occupied the entire day of Dec. 30 until 4 p.m., and the decision of the commission was announced the same evening. It is true that this was really a continuation of the fare case heard by the commission during August and September, when the company felt that it had proved the necessity of a 7- or 7½-cent fare but was allowed a cash fare of 7 cents with metal tickets to be sold at four for 26 cents, afterward voluntarily reduced to two for 13 cents. The commission, therefore, was thoroughly familiar with the whole case and with the results that had been obtained for the nearly three months since the fare went into effect on Oct. 1, and granted a straight 7-cent fare.

The action of the Maryland commission is in sharp contrast to that of the commissions of some states where procrastination in granting relief and help to the hard-pressed electric railway companies has resulted in great damage and financial loss to the companies and, in many cases, actually in receiverships. These serious results in some cases certainly could have been avoided had the commissions assumed the proper responsibility. The idea of a public regulatory body maintaining an existence only for the purpose of downward regulation of fares and rates has been demonstrated by actual results to be fallacious and much credit is due a commission which accepts its responsibilities and, in the face of almost certain adverse public opinion, grants to a public utility that rate which is essential to insure efficient operation.

Would that certain other commissions might follow the good example set by the Maryland body.

Depreciation Is a Fact, Not a Theory

DURING the past three years capital and labor, hand in hand for the country's best interests, have been directing their efforts so intensely toward distinctly war efforts that no maintenance or replacements of electric railway property have been authorized on most roads beyond those absolutely required to permit the roads to give satisfactory service. The consequent state of the physical property is such as emphatically to call attention to the depreciation which has occurred. To add to the problem, the rise in the cost of materials and labor without a corresponding rise in rate of return has increased to alarming proportions the amount of money needed to bring the physical property to a satisfactory condition. From the standpoint of both the public and the company, we must insure against any similar situation arising in the future from causes which may not now be foreseen.

In conditions like these it is indeed refreshing to have the analysis of the treatment of depreciation by various commissions and courts which Mr. Fish presented at Cleveland on Jan. 8, in his address proposing a policy of the establishment of an adequate depreciation reserve fund by all electric railway companies. The JOURNAL is glad to be able to present an extended abstract of this address. It represents the type of thinking and analysis from which we believe the industry can well profit and which it should encourage. There is no subject other than giving satisfactory transportation service to the community which appeals more to those interested in electric railway management than the maintenance of the integrity of the legitimate investment in the enterprise. As Mr. Fish points out, this can be accomplished only by an adequate depreciation reserve fund, and fortunately this is the view generally accepted by the courts and commissions. This is a healthy situation for both public and company. The transportation question is of community interest and any permanent system for providing transportation must be on a financially sound basis.

But there is also a word of warning in all this. While there has been a tendency in some valuations to allow inclusion of the cost of property abandoned or replaced years ago, there is an expressed feeling that that is merely the best way at present of settling the past and getting a fresh start, and that the future must be conducted in a different way. The whole trend of opinion points definitely to the conclusion that depreciation, both as maintenance and as replacements, is an operating charge and, as such, takes precedence over fixed charges and dividends. This warning is not a threat, but a logical result of evolution in the financial and accounting history of the industry and constitutes a more or less generally accepted basis of standard practice.

There will be no excuse in the future for failure to make provision for depreciation. To be sure, no universally accepted basis has yet been evolved for a depreciation reserve or for many other related questions, but it would appear that this fact merely accentuates the duty of the industry to get as far as possible toward an answer. It is a joint problem for the accountants and engineers, and we hope they will be encouraged to continue to work on the subject. Depreciation is always with us and we cannot evade its consideration if we would.

How One Railway Eliminated Jitneys

Public Trustees Use Courage to Curb Unfair Competition and Are Backed Up by Governor in Their Actions — Only One District Now Has Jitney Competition

THAT the trolley car is still recognized by the public in several Massachusetts cities served by the Eastern Massachusetts Street Railway, to be the best mode of transportation, has been demonstrated frequently during the past few weeks. Even the Governor has assisted the trustees in their endeavor to provide the public with the best transportation service possible at the lowest fare consistent with the cost of the service rendered.

The special act of the Massachusetts Legislature, under which the board of trustees operate the road, provides that the cost of service must be borne by the car rider, and unless traffic conditions are such as to bring this about, service can be discontinued providing the communities affected are not willing to meet the deficits incurred by continued operation.

The public trustees assumed control of the property on June 1, 1919, and divided it into twelve operating districts, each of which was expected to be self-supporting in that the revenue from operation would be sufficient to cover not only operating expenses but fixed charges and a depreciation allowance. Continued operation, however, showed that in the so-called Lawrence, Salem, Brockton and Quincy districts, where jitney competition was most prevalent, a deficit was being incurred during each month of operation.

Under the terms of the service-at-cost act there was nothing for the public trustees to do but to discontinue operation, unless aid could be secured, either financial or otherwise, from the cities and towns in these several non-profitable districts.

QUINCY AND WHITMAN VOTES FAVORED ELECTRIC CARS

The first decisive step was taken on Sept. 10, 1919, when the trustees notified the mayor of Quincy that unless the jitney buses on the Hough's Neck line were removed it would be necessary to discontinue service on and after Oct. 1, due to the fact that the cost of service was greater than the receipts.

Prior to the date set for discontinuance, the Mayor took a post card referendum of all the people served by this route, with the result that more than 700 recorded themselves in favor of the trolley car, while less than twenty favored the jitneys. Within a few days thereafter the citizens at Hough's Neck in public meeting declared themselves for the retention of the street railway service. The final result was that the mayor ordered the motor buses which were operating under hackney licenses to discontinue operations in that part of the city and since that time no competitive service on that route has been run.

On Oct. 28, 1919, the people of Whitman, one of the towns in the so-called Brockton district, in special town meeting voted by ballot for the retention of car service after being informed that if the jitney competition to Brockton continued the trolley cars would be taken off. The so-called jitney act was likewise accepted. Within a few days thereafter the Whitman selectmen adopted an ordinance prohibiting jitneys from operating on any street where the railway company was giving service. For a time the jitney men defied the ordinance, but finally withdrew.

JITNEY DRIVERS IN BROCKTON DISTRICT APPEAL

On Nov. 11, 1919, notices were posted in all the cars operating within the Brockton district that service on five designated local lines would be discontinued on Nov. 17 unless the unfair jitney competition was eliminated. Two days after this the local manager met with the city officials and discussed the situation. The outcome was that the day set for discontinuance was extended so that public meetings could be held to determine the sentiment of the people and on Nov. 17, four days after the notices were first posted, the board of aldermen, following the sentiment expressed in the public meetings, voted 7 to 1 for the revocation of all city jitney licenses to take effect at the end of the week. When the jitney men, at this meeting, indicated their intention to operate in defiance of the action of the aldermen, they were informed by the mayor that "their destination would be the police station and that they would get tired of operating before he would tire of having them arrested." Instructions were given to the city marshall to that effect. Two or three men who attempted to operate were promptly arrested, and since that time no jitneys have been operating in the city of Brockton or from any of the surrounding towns into that city.

However, the Brockton jitney interests have been before the Supreme Court on injunction and certiorari proceedings. Their counsel argued particularly upon the ground of no hearing, but Justice Carroll ruled that the appearance of the agent of the Brockton Auto Bus Association, even though he was not served with a formal notice by the city council and the further fact that he did speak before the Council, constituted a hearing, providing there was actual necessity within the meaning of the law for a hearing. The ruling of the judge on the facts presented were to the effect that the City Council was confronted with the necessity of choosing between an adequate form of transportation which served the public convenience and necessity of all of the people and an inadequate form of transportation which served only a part of the people. The case was appealed and will go before the full bench on its merits, and a decision was expected some time in January.

The unfair competition being eliminated, the railway company, in accordance with a previous agreement with the city, established a reduced rate ticket of sixteen rides for $1, good from any point in the city zone to the traffic center, without the privilege of transfers. No change, however, was made in the cash fare or limited commutation tickets.

On Nov. 11 the trustees notified the Mayor and City Council of Lawrence that, owing to the unfair jitney competition that existed in that city and which so materially affected receipts, all local service, as well as most of the interurban service, would have to be discontinued on and after Nov. 26, until such time as the jitneys were effectually restrained. To substantiate the actual financial condition of the railway, monthly figures showing the operating revenues and expenses were submitted with the notice of suspension. These statements showed conclusively that the receipts were insufficient to pay any fixed charges or set aside an allowance for depreciation as was required by law.

Naturally, the action of the trustees caused considerable caustic comment, both on the part of the public and the city officials. After two or three days of desultory discussion, during which an effort was made by the City Council to have the question decided by the people at the city election on Dec. 9, the trustees reiterated that they could not operate at a loss and that they would be obliged to adhere to the terms of their original notice and enforce the discontinuance order of "on and after Nov. 26."

In taking this step, the trustees held that the city officials were duly elected representatives of the people and as such could choose for them, and further, that when the original franchises were granted, they did not have to refer the matter to the individual voters. Why now, it was urged, should the question be submitted to the public, even though the election was only a few days hence?

The City Council on Monday, Nov. 24, approximately twenty-four hours prior to the time that the discontinuance order would become effective, revoked all the jitney licenses. The revocation became effective immediately, but no enforcement regulations were adopted. As a result, the jitney men defied the authorities and operated as usual on the following day, under the so-called "donation plan," notwithstanding the revocation of their licenses.

No apparent molestation was given by the police until about 5 o'clock, when, as a result of flagrant violation of the "donation plan," evidence having been collected that fares were actually solicited in more than a hundred instances, the trustees announced that car service would be suspended indefinitely the following day, *i. e.*, Nov. 26. This action on the part of the trustees caused the Public Safety Commissioner within five minutes to make four arrests of jitney drivers for a test case. The trustees, however, did not consider this as acting in good faith, and in accordance with the notice given all service in the Lawrence district, with the exception of that on two interurban lines, to Lowell and Haverhill respectively, was discontinued.

In the police court the next day each of the four drivers was fined $10. Their attorney, however, appealed the case on the advice of the judge that there was nothing to prevent them continuing operation until the case again came up for final adjudication.

STRINGENT JITNEY LAW PASSED

After an unsuccessful appeal that same day to the Governor by the city officials to compel the trustees to restore service, the Mayor and members of the City Council met with the railway trustees. At this conference it was agreed to resume service immediately if the City Council would that day pass a new jitney ordinance effectually restraining all bus or jitney operation.

The ordinance, which was drafted by the trustees and passed by the city, provides that competitive service shall not be operated over, along or across any street car route, that all buses must be bonded for $5,000 and $500 additional for each seat in excess of five, and that they must operate twelve hours per day. Further, that the city shall not issue a jitney license until the railway company has received at least seven days' notice and it has been properly shown that public convenience and necessity require such operation.

At the outset no member of the Lawrence City Council was apparently in the least inclined to regulate or interfere with jitney competition in that city and there is no doubt but for the drastic action which the public trustees found necessary to resort to, that competitive conditions would be exactly the same in Lawrence today as they have been for the past two years.

CARS STOPPED IN SALEM, BEVERLY AND PEABODY

Soon after the Lawrence situation had been cleaned up unsuccessful conferences were held with the Mayors of Salem, Beverly and Peabody to eliminate jitneys in the Salem district. Finally, on Dec. 11, notices were posted in all cars on that division to the effect that on and after Dec. 18 service would be withdrawn. As in the other cases the City Councils showed no disposition to act until within forty-eight hours before the discontinuance became effective, and in each instance action was postponed until the night before the withdrawal was to take place, the reason given being that they wanted to "call the bluff of the street railway."

The railway company held to its plan of action, and all service, both local and interurban, in and between the three towns, was discontinued after the cars pulled in on the night of the seventeenth. Limited service, however, was maintained between Salem and Marblehead, for the reason that no jitneys had ever operated between these two points. Full service was likewise operated between Salem and Danvers, due to the fact that several weeks previously the people of Danvers, after also having been informed that one of their lines would be discontinued unless the unfair jitney competition was restrained, voted in town meeting for their elimination and the Selectmen had subsequently enforced the express wishes of the people.

When the City Councils of Salem, Peabody and Beverly met in special session on the night of Dec. 18 they all voted for the revocation of jitney licenses. For several days thereafter the jitneys were not in operation except to non-competitive points that were not intended to come within the scope of the action asked of the city officials by the railway trustees.

Since that time no buses have been operated in Peabody or Beverly and the Mayors have rigidly enforced the action of the Councils. In Peabody and Salem, however the jitney bus operators took advantage of a clause in the city charter and got 12 per cent of the voters to sign a petition for a referendum on the question. In Peabody the City Council passed and the Mayor vetoed the request, but in Salem it was granted on Dec. 26 and Jan. 27 set for voting. However, due to the manner in which the Salem Council revoked the licenses, the railway trustees held that such a referendum would be illegal, due to the licenses being revoked individually and not by any measure passed by the Council.

In the mean time the bus operators claimed they had a right to operate, which they did, inasmuch as under the law any measure passed by the City Council becomes inoperative once it is questioned by a fully accepted referendum petition.

The trustees believed the city was playing to retain both forms of transportation and warned the officials repeatedly that they could not have the street railway service unless they paid the cost. The city government, instead of showing the slightest desire to co-operate in putting the railway on a paying basis, chose to juggle with a dangerous situation and made no sincere effort to eliminate the jitneys, but wasted time playing politics.

SALEM SERVICE AGAIN WITHDRAWN

Prior to the second suspension of service in Salem the Peabody Chamber of Commerce sought the aid of the Governor to secure full service between Peabody and Salem should the cars be withdrawn again in the latter place.

The Governor, in reply, noted that he was most eager to aid the Peabody public in gaining good trolley service, but that he had no jurisdiction over the trustees. The whole question, he said, was a matter of securing enough revenue to furnish service. It might be a convenience to have several kinds, and there would be no difficulty in having all the transportation the public is willing to pay for. Nevertheless, it would have to make a choice, if it could pay for but one of the two kinds. The public must understand that what it has it must pay for.

On Jan. 14 the Salem City Council passed resolutions to ask the Governor to oust the trustees for the good of the road and the public, claiming that they had by their action perpetuated the old methods of former managements that taught the public to despise the road and all connected with it.

No further action being taken by the city to restrain the jitneys the trustees, in accordance with notices posted on Jan. 7, withdrew all local service for the second time on Jan. 15 and only a modified service was maintained during the rush hours to the neighboring cities and towns. Such cars as were run were operated express while within the limits of the city of Salem.

As a result of this action the Mayor of Salem addressed a communication to the Governor in which he held that "the present cessation of service was more than a strike by public officials against the public. It was an attempt to chastise the people of the city because they saw fit to exercise their rights and prerogatives guaranteed them by their charter." He also wrote that the removal of the trustees was imperative and should be accomplished immediately.

The outcome of this was a conference with Governor Coolidge at the State House on Jan. 17, attended not only by the Mayor of Salem, but also by the Mayors of Peabody and Beverly, the chairmen of the boards of selectmen of Marblehead and Danvers, as well as the trustees and others. For two hours each side accused the other of "passing the buck," and several times the conference threatened to break up. When Governor Coolidge first announced his plan to drive the jitneys off the streets, the Salem city solicitor attacked the plan as "childish and foolish," saying in effect: "We have got to have service. If we don't get car service, we will have jitney service. If you drive the jitneys off and don't put the cars on we will be found fighting on the side of the jitneys." The Governor replied that if the trustees did not put the cars on when the jitneys are taken off he would remove them. Then turning to the trustees he asked, "If I stop illegal jitney service, will you start the cars?" Trustee Wadleigh answered "Yes."

The climax of the hearing was reached, however, when the Governor failed to get the Salem representatives to request the attorney-general's opinion on the question of bus operation in Salem and had to make the request himself. The opinion being rendered that it was "illegal" the Governor said that so long as the municipal authorities refused to ask the higher courts for a finding on the decision of the lower courts, he would take the opinion of the lower courts and of the attorney-general, would shoo the jitneys off the streets and arrest any driver for violation. Arrangements were made to suffer the jitneys to operate until the chief of the state police visited Salem on Sunday, Jan. 18, and agreed with the Salem chief of police that the trolley service was adequate.

The trustees commenced operation of the cars that same afternoon, but it was not until Sunday that the service was judged adequate, and the jitneys driven off the streets.

The referendum scheduled by the City Council for Jan. 27 was protested by taxpayers and the city enjoined on Jan. 26, by Judge Crosby of the Superior Court. The court ruled that the action of the City Council of Salem in revoking the licenses was not a "measure" within the scope of the referendum provisions of the statutes of 1915, and for that reason an election to pass on its action could not legally be held.

The court's decision came on a petition of twelve taxpayers to the Superior Court to restrain the city from paying out money for illegal purposes, after the attorney-general on Jan. 17 at the Governor's conference had ruled that jitney bus operation in Salem under the existing circumstances was illegal. The effect of the injunction is to defeat the effort of the motor bus men to regain their licenses by appeal to the people.

RECENT ACTION IN QUINCY

On Monday, Dec. 22, the Quincy City Council, as a result of notification of suspension of service, passed an ordinance which prohibits the operation of jitneys on any street or part of street where the railway renders service. At Quincy, however, the so-called jitney act of the Massachusetts Legislature does not apply, as the jitney men are operating under hackney licenses and are permitted to do a jitney business merely on sufferance.

The Mayor of Quincy believes that between the street railway and the jitney the people must choose the street railway and, further, that unless the railway has the full public support it cannot give satisfactory service. On Jan. 16 he ordered a cessation of operations by all jitney-bus men who had been running their cars under hackney licenses. These men, according to the order. must now obtain a jitney-bus license before they will be allowed to resume business. The chief of police was also notified, beginning Jan. 17, to arrest all persons operating jitney buses without such licenses.

Licenses will, however, be granted to operators who do not operate in competition with the street railway.

LYNN NOW ONLY DISTRICT WITH JITNEYS

The only district now having any great number of jitneys is Lynn, and there the police department is following closely any violation of the city regulations. During the past week several licenses have been suspended for periods less than thirty days, and one has been revoked entirely due to the inability of the Council to find the owner of the car.

The net result of the elimination of the jitneys in the competitive territory of Lawrence, Salem and Brockton has been to increase the passenger revenue nearly 30 per cent, notwithstanding the fact that a reduced rate ticket giving sixteen rides to the traffic centers, has been established.

Springfield Votes Against Jitney

SPRINGFIELD is another city in Massachusetts which is opposed to the jitney. Several days ago 300 members of the Chamber of Commerce voted practically unanimously to give the Springfield Street Railway a monopoly of the urban passenger transportation business, thus recommending that all jitney bus licenses be revoked. This monopoly would not be brought about by conferring any new rights upon the company but would simply enable it to demonstrate at present whether it could provide satisfactory service if allowed to regain the revenue necessary for its fullest development.

If the company should prove unequal to the fulfillment of these obligations then there would be nothing to prevent the restoration of competitive service. The company maintains, however, that it now has sufficient cars, men and power house capacity to give this service.

Recent estimates place the revenue of the 175 jitneys now operating in Springfield at $300,000 per year, enough to enable the company to build several much needed extensions to new factory districts. Springfield as a manufacturing city is rapidly growing. It now has 400 industries and within the last 10 months new concerns with a capitalization of $25,000,000 giving employment to 6,000 persons have located there. The Chamber of Commerce does not believe that the railway will be supplanted by the motor vehicle, for the streets are too narrow to accommodate the number of vehicles necessary to carry the riding public.

Cleaning Deck Sash and Windows

DECK sash and windows of electric cars become very dirty in service and due to their location it is rather difficult to clean them properly when the cars come into the shop for painting. The Connecticut Co. has followed the practice of removing all deck windows on cars to be painted as they come into the company's shops in Hartford, Conn. After the windows are removed they are soaked in a vat constructed of wood 3 ft. 4 in. long, 12 in. wide, and 10 in. high. The solution used in this vat consists of a mixture of water, potash and washing powder. The solution used is 1 lb. of potash and ½ lb. of washing powder to 14 gal. of water. The sash are allowed to soak for an hour in this solution when they are taken out and scrubbed with a brush. They are then rinsed with clean water. It is found that the solution will take off all dirt, varnish and paint and leave the sash clean and ready to be refinished. This method has proved a great saver of time and labor in preparing these windows for repainting.

The Chicago Elevated Railways are carrying a car card calling the public's attention to the fact that the company has not had a fatal accident to a passenger in twelve years. During this time two billion passengers have been carried.

Comment on the French Commission Report on Heavy Electric Traction

THE presentation of the preliminary report of the commission of French engineers who visited the United States early in the summer of 1919 to study heavy traction conditions here was favorable to high-voltage direct-current electrification. This report is naturally bringing out criticism from those who have reached conclusions in this matter different from those of the French commission.

For example, *le Génie Civil* for Nov. 1 contains an article in which quotations are made from another by W. Kummer, an engineer of Zurich, Switzerland, appearing in the *Schweizerische Bauzeitung*. The principal point made by Mr. Kummer was that according to the nature of the electrification the variety of current to be used must be selected in the light of all conditions. Consequently, he thought, the complete rejection of all systems other than high-tension direct current is too radical a solution of the problem. He takes issue with the statement in the preliminary report by Prof. A. Mauduit (see ELECTRIC RAILWAY JOURNAL, Nov. 1, 1919, page 834) that the single-phase system is far from being perfected and still presents a certain number of problems insufficiently solved in actual practice, notably the development of a motor capable of remaining a long time under current without turning, to permit the starting of heavy trains on deep grades, and provision for electric braking with regeneration.

Mr. Kummer asserts that if American motors merit such comment, the extension of these criticisms to single-phase motors actually operating in Switzerland is entirely unjustified. He asserts that comparisons among the various systems will be possible only on the basis of complete calculation and exact data. He points out also the importance of giving serious consideration to the connections between one electrified railway system and others as a factor in the choice of system, as well as the relative merits of the systems themselves.

The writer in *le Génie Civil*, in commenting upon the points made by Mr. Kummer, says that the question of relation between the French railways and neighboring systems is secondary, because each system will be provided with its own power plants and equipment, and even on international lines the locomotives will not be taken across the frontier. The use of a uniform system of electrification certainly facilitates installation and equipment of lines which use the same stations, but this consideration is of minimum importance in comparison which considerations affecting the whole or even part of the railway system.

As for the influence that the adoption in France of any given scheme will have on the electrification of the Swiss federal system, it will be noted that Switzerland is already using single-phase on the Loetschberg line and soon will do so on the St. Gothard line. Any preference that is given in France to the high-voltage direct-current system, therefore, will not modify nor retard the program adopted after long years of study by the Swiss Federal Railways. In the matter of electrification, says this writer, as in other developments, no progress will be made if projects are not undertaken until perfection has been reached and experience has definitely established the value of a given proposition.

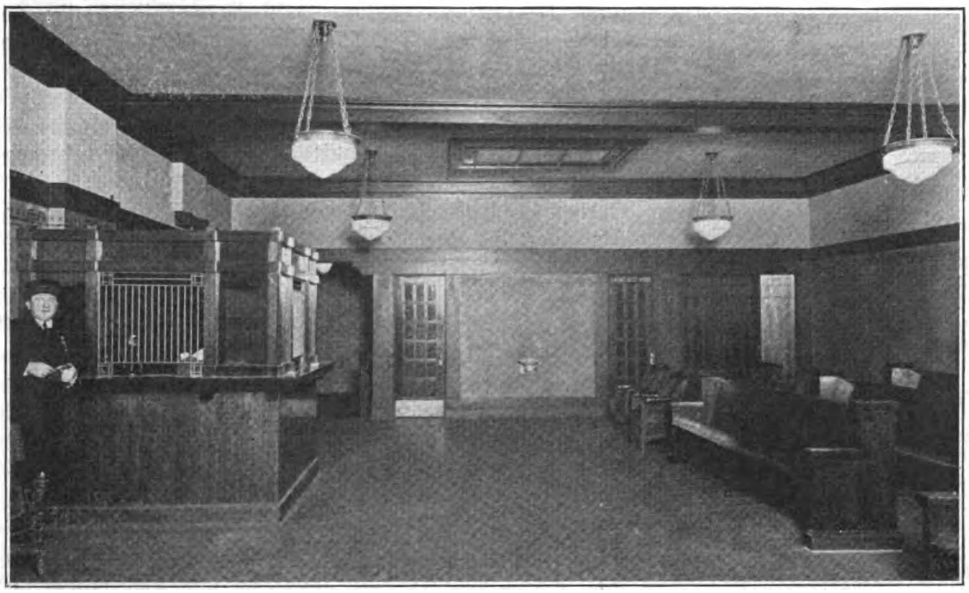
New Loop Station for North Shore Line

Attractive Station in Heart of Chicago Shopping District Attracts Increased Patronage to Already Popular Service

As was announced a short time ago in the news columns of the ELECTRIC RAILWAY JOURNAL, the Chicago, North Shore & Milwaukee Railroad has extended its service from Evanston to the "loop district" of Chicago. The latest event is the opening of a new station in the heart of Chicago's shopping district.

Formerly the southern terminal of the North Shore line was at Davis Street, Evanston. Passengers for Chicago were obliged to change to the Chicago Elevated lines at Central Street. Such arrangements were finally consummated with the Elevated Railroads that on Aug. 6 last the North Shore line began its direct through service between Chicago and Milwaukee. Passengers formerly boarded the North Shore trains at certain of the elevated stations, and a station for handling baggage was opened at the south end of the loop.

It was a rather unusual sight to see finely equipped dining cars running around the elevated loop in the heart of the city but the new service proved very popular. Hourly through limited service is given between the heart of Chicago and the heart of Milwaukee from 5.37 a.m. until 10.37 p.m. with one diner in each direction morning, noon and evening.



ABOVE, FIRST FLOOR OF NEW NORTH SHORE PASSENGER STATION. AT LEFT, WAITING ROOM OF CHICAGO LOOP STATION OF NORTH SHORE LINE.

To accommodate its increased business and give added convenience and comfort to its patrons, the railroad opened a new station at Adams and Wabash Streets. This is a two-story structure, with direct access by bridge from the second floor to the elevated platform, a section of which is reserved for the North Shore line.

The interior decoration on the first floor is of the style of Louis XV. The lower walls are of light green marble finish. The panels are of old rose imitation damask silk with gold rococo border. The upper wall is finished in golden yellow. The pilasters are of imitation Tennessee marble with Ionic columns and gilded caps. The three-window ticket booth is constructed of weathered green oak with green cathedral glass at the sides of and above the window openings.

On the lower floor are cigar, candy, fruit and magazine stands, soda fountain and quick-lunch counter. There is also a check room. In connection with this the important feature is that arrangements have been made with the leading department stores whereby patrons may check their purchases at the store and the store will deliver them to the North Shore Station where the identification may later be presented.

At the back of the main floor, with an entrance under the balcony, a restaurant will shortly be opened. One room is furnished in the style of Louis XV de luxe. The walls are finished in gold with old rose imitation damask silk panels and a rococo molding in white ivory. The ceiling is dome-shaped, finished in sky blue with a large skylight from which is suspended a trelliswork of wood finished in white ivory and decorated with green leaves.

The waiting room is on the second floor. The lower wall is finished in glazed olive green with an ornament in yellow and brown. The upper wall is golden yellow and the ceiling is a cream white. The wood work is cypress finished mission style with a weathered oak stain. There is a ticket booth in this room smaller but of similar construction to that on the first floor. Adjoining this room by doors with panels of green cathedral glass are a gentleman's smoking room and a ladies' rest room. Large French windows at the front of the waiting room open onto the street, and at this side the elevated structure is reached by a bridge.

Freight and Parcel Service in the United Kingdom

Restrictions That Hamper Big Developments Explained by J. B. Hamilton, General Manager Leeds City Tramways, Who Has Developed Private Right-of-Way Connections and Is Planning to Remove Much Heavy Drayage to Save Paying Expenses at a Profit to Both Customer and Tramway—Carriage of Parcels on Cars Either With or Without Door Delivery a Big Item on Some Tramways

ALTHOUGH British tramways carry more passengers per car-mile and operate on closer headways than is customary on American street railways, they are not unmindful of the posibilities of carrying other than "two-legged parcels," to use the humorous expression of J. B. Hamilton, general manager Leeds City Tramways. The practice of carrying small parcels on cars in charge of the conductor or motorman is quite common, and to a lesser degree arrangements are made for the delivery of the parcels by means of carters and boys, as at Dublin and Aberdeen respectively. There has been little development, however, of the larger service characteristic of American interurbans with steam railroad connections. For this backwardness, there are sound reasons, as explained by Mr. Hamilton in a recent interview concerning the advanced work done at Leeds.

TRACK GAGE AND WHEEL DIFFERENCES HINDER INTERCHANGE

Mr. Hamilton said that although Leeds has a track gage of 4 ft. 8½ in., its rolling stock is by no means interchangeable with that of steam railways of the same apparent gage, due to differences in the width of treads and thicknesses of flanges. The corresponding street railway gage suitable for inter-operation is really 4 ft. 7¾ in., and this is found only at Huddersfield and Glasgow. At the latter city, therefore, it is possible for a car or train to make use of tramway tracks in running between a steam railroad yard and a shipyard in the Govan district. At Leeds the only steam connection is one that serves the tramway storage headquarters.

Besides the physical difficulties, there are prejudices and red tape to overcome. The steam railways have usually been silently if not vocally opposed to any effort by electric railways to enter the field of goods haul—even though most of the developments, being of a short-haul character, would be beneficial to them. Regardless of this hindrance, every extension of a main line calls for a Parliamentary act and a permit from the Board of Trade, so that the cost would often not be worth while.

LEEDS FREIGHT SERVICE BEING DEVELOPED TO SAVE PAVING

But, continued Mr. Hamilton, he was in an exceptionally happy position to try what could be accomplished by the tramway as a goods carrier right on his own system. As commercial manager of the city of Leeds he was just as interested in maintaining well-paved streets at minimum cost as he was in operating the tramway system as an efficient common carrier. It followed that if he could save the city money in the long run by inducing people to send their goods over rails instead of over paving, it was his duty to do so. No community could afford to maintain paving for the benefit of heavy lorries or the steam wagons and trailers that are so common in Great Britain. If these were replaced by electric tramcars, the city would surely save a lot of money and be spared a lot of noise. On the other hand, the tramways department of the city would be able to make a little money and actually carry goods for less than was now the case. Leeds had full parliamentary powers for all forms of freight and parcels handling so that the way was open. Mr. Hamilton estimated that even with the present small pioneer development, the city was saving £3,500 a year in paving upkeep.

The topography of Leeds, he said, might be likened to a tipped-up saucer. At the lower rim or river valley were most of the railway connections and the principal industries. At the upper or northern rim was a plateau about 500 ft. high. To haul materials from the lower to the upper part of the city was slow and costly business if done with horse or self-propelled vehicles. With cars run at passenger speeds to avoid interference with regular day-time traffic, the results were far more satisfactory. For example, the freight motor car had a capacity of 8 tons compared with 4 tons of the lower motor lorry. A plan now in hand calls for the loading of coal cars from chutes filled by hopper-bottomed steam trailers, and the routing of these cars to coal distributing depots in the upper parts of the city. The only question is whether the city of Leeds will also cart the coal from these depots to the consumers or whether that part of the haul will be handled by the present coal dealers. In any event, an enormous amount of slow-moving tonnage will be taken off the streets. Instead of increasing the rate of wear of the rail, this change will decrease it for in more than one instance Leeds has found that drayage is responsible for a greater share of rail wear than the car wheels themselves.

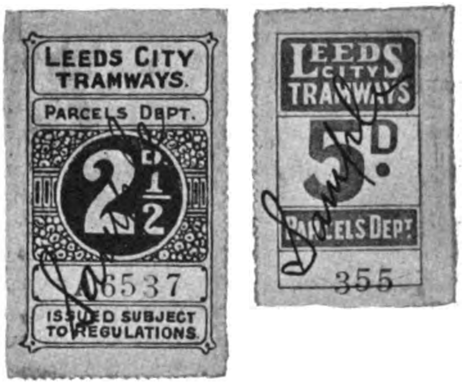
In the building of the model community of Middletown on the southern side of Leeds, all the construction material for some 4000 to 5000 houses, as well as the roadway material, etc., will be delivered by cars over the very same track that will carry the residents of the new town.

Of big jobs already accomplished, one may mention the delivery of more than 50,000 tons of sand and gravel for the Leeds reservoir and filter beds at an enormous saving to the city and some profit to the Leeds City Tramways as such. Also, for the past three years, the tramways have been carrying 500 to 600 tons of coal every week over a run of 5 miles for a colliery. About £2,000 a year gross business is done with the Leeds Fire Clay Company in hauling fire shale from the quarries at Harehills on one side of the city to the kilns at Wortley in the Armley district on the other side of Leeds. This is largely a private right-of-way connection. That portion which is on the customer's land is its property, the rails, wire and other appurtenances having been purchased as erected. The cost was modest inasmuch as it was possible to use a large amount of second-hand material. The distance between mine and kiln is 6½ miles, with a 1-mile connection to the colliery mentioned. Each car for the carriage of the fire shale is equipped with two tipping buckets, with one man as crew. There is no law compelling the employment of two men on cars in service of this character.

From the foregoing, one may expect some interesting developments in freight haulage via motor cars. Certainly, the placing of all tramway and roadway facilities under one head offers a unique opportunity to determine the relative merits and demerits of cars versus lorries.

PARCELS SERVICE GROWING AT LEEDS

The practice of charging extra for large parcels brought on the car and accompanied by the passenger is an old one at Leeds. Unlike other cities, no special parcels ticket is issued. Instead, the passenger must buy an extra fare receipt punched to destination as in the case of a passenger ride. The rates are: For less than 14 lb., free; 14 to 42 lb., 1d. for two stages or 2d. for any distance; 42 to 60 lb., 2d. for two stages, 3d. for three stages and so on. Bicycles and perambulators may be taken along at the rate of 3d. for a 1d. or 2d. passenger ride, 4d. for a 3d. passenger ride and 6d. for greater distances. Folding go-carts travel for 1d.



LUGGAGE TICKET, PARCELS STAMP FOR LOCAL AND THROUGH SERVICE RESPECTIVELY

A special parcel car was placed in operation, in April, 1918. The public was asked to "Be patriotic and insist upon your parcels being sent by your own Electric Service—Quickest and Most Reliable." They were further advised that parcels would be handled through some thirty shopkeepers who would act as agents for collection, but not necessarily for delivery. As a matter of fact, about one-half of the agents did undertake to deliver parcels left by the car at a charge of 1d. per parcel. This extra fee went entirely to the agent. The latter arrangement was confessedly temporary as it was not considered wise to go to the expense of building up a complete delivery service when the popularity of the move was problematical and when buildings were dear and labor scarce. It was not until Jan. 13, 1919, that arrangements were perfected for the collection and delivery of all parcels within half-a-mile radius from the center of the city. On the same date also, the service was extended to include Bradford, Halifax and the heavy woollen district. The original service was purely local and was handled by a remodeled passenger car which left the headquarters of the parcels department at 10 a.m. and 4 p.m. daily to serve the Roundhay, Chapelton and Headingly districts. Up to Dec. 31, 1918, 22,679 parcels or an average of 102 a day had been carried, and the estimated total up to Feb. 20 was 30,000. As the business continues to expand, specially-rented stores and car depots will be used for gathering and distributing centers and every step from collection and delivery will be directly under the tramways management so that no reliance will have to be placed upon outside agents. The gross annual receipts from this service last year were about £1,200.

Under the present arrangement each agent is guaranteed at least £10 per annum or 1 farthing (½ cent) per parcel handled by him. If he does not have errand boys to deliver the parcels to the consignees, he sends out a printed postcard advising that in addition to the penny post charge it will be necessary to make a storage charge of 1d. a day if the goods are not called for within two clear days from date of postcard. Ordinarily, the consignee calls before notification as he knows where to expect the parcel.

The agents are supplied with all stationery, forms and a spring balance without charge, the balance and other fixtures remaining the property of the tramways. Among the forms are the agent's requisition for the parcels stamps sold to shippers, one copy of this form staying in the agent's requisition book and two copies going to headquarters. One of the latter copies goes back to the agent with the stamps requisitioned. Accountings with agents for stamps so purchased are made quarterly. With each batch of parcels, the agent gets a duplicate and triplicate of the waybills in the waybill book at the office. He signs and returns the duplicate to the office at once, returning the triplicate when he has obtained the signatures for delivery of all the consignees shown on the individual waybill which is made to include up to ten parcels. Every agent is, of course, provided with display posters to advertise the parcels business, aside from those which the tramways post in the cars.

The charge for parcels carriage between any depots within Leeds is as follows: Up to 7 lb., 2½d., to 14 lb., 3½d., to 28 lb., 4½d., to 56 lb., 6d. An extra penny is charged if carriage is to or from a depot outside the city boundaries. At discretion, an extra penny is also charged for parcels which are bulky in proportion to weight. Double rates are charged for fragile articles (designated by a red sticker marked "fragile"). Parcels of value may also be insured at the rate of 4d. for £15, 5d. for £20 and 6d. for the maximum of £25. Insured parcels are so marked. All parcels must be prepaid by stamps purchased from the agent and duly affixed to the package. As a matter of record keeping, the stamps of each denomination are serially numbered. Buyers of £5 of stamps get either 5 per cent discount or thirty days credit.

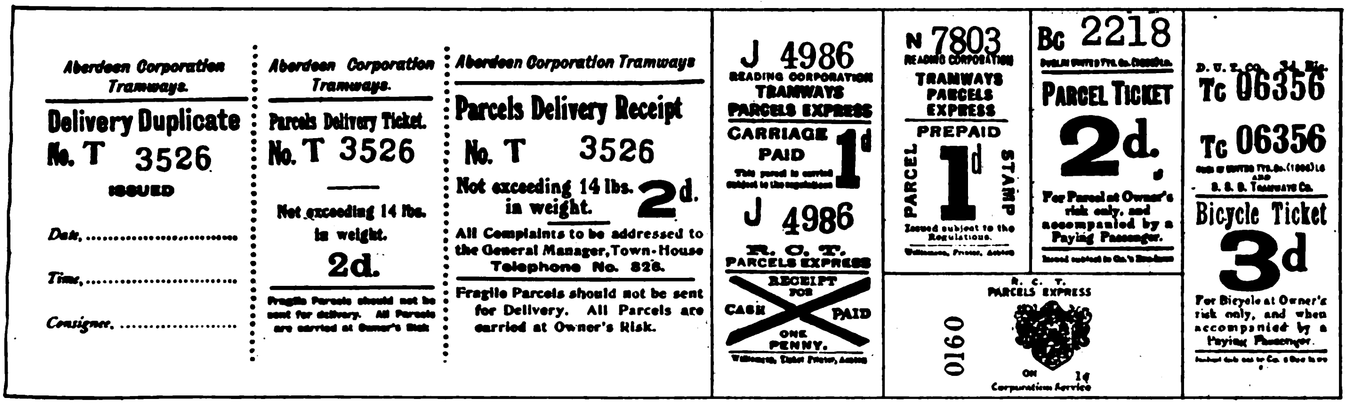
A similar line of stamps, but somewhat smaller to denote the different use, is employed for the through service with the Bradford Corporation Tramways. The rates in this joint service are: To 3 lb., 4d.; to 7 lb., 5d.; to 14 lb., 6d.; to 28 lb., 7d., to 42 lb., 8d. and to 56 lb., 9d. The Bradford service includes actual collection or delivery in that city, delivery being understood to mean within ½-mile from any tramway line or terminus. Receipts of the Bradford business proper are divided on a 50/50 basis. The service to Bradford is handled by a combination storage battery and trackless trolley vehicle built by the Bradford Corporation Tramways. The trackless trolley is used for main-line running at speeds up to 16 m.p.h. while the storage battery permits the truck to make little side trips at 8 m.p.h. away from the trolley wires which are provided for the regular passenger service between Leeds and Bradford. The run to Bradford, 9½ miles, is made in one hour, including an intermediate stop.

In addition to the services described, newspaper parcels are carried on any car with or without a messenger at the rate of 1d. for parcels weighing not more than 21 lb. Labels showing that the charges on such packages have been prepaid are sold to the newspaper publishers in books of fifty. Mail is also carried on ordinary cars by special contract, an employee of the Post Office being on hand at each end to take care of the bags.

$3,500 ANNUAL PACKAGE REVENUE AT ABERDEEN

The Aberdeen Corporation Tramways carry packages on regular passenger cars under two conditions: First, if the owner accompanies some bulky article, in which event a flat charge of 1d. is made; second, if the package is to be handled by Corporation employees, in which case the following scale applies: packages weighing 14 lb. or less, 2d., over 14 lb. and up to 28 lb. inclusive, 4d., over 28 lb. and up to 42 lb. inclusive, 6d., over 42 lb. and up to the maximum of 56 lb., 8d. Before the war, the maximum charge was 4d.

The passenger who is encumbered with a chair, a bagpipe or other large article receives a fare receipt or luggage ticket for his penny exactly as in the case of ordinary human transportation. This ticket, like the passenger fare receipt which it resembles in appearance, carries identification letters and serial numbers which make deceit dangerous. The revenue from this source for the last fiscal year was approximately $500.



Aberdeen Corporation Tramways.
Delivery Duplicate
No. T 3526
ISSUED
Date, ...
Time, ...
Consignee, ...

Aberdeen Corporation Tramways.
Parcels Delivery Ticket.
No. T 3526
Not exceeding 14 lbs. in weight.
2d.
Fragile Parcels should not be sent for delivery. All Parcels are carried at Owner's Risk

Aberdeen Corporation Tramways
Parcels Delivery Receipt
No. T 3526
Not exceeding 14 lbs. in weight. 2d.
All Complaints to be addressed to the General Manager, Town-House Telephone No. 826.
Fragile Parcels should not be sent for Delivery. All Parcels are carried at Owner's Risk.

J 4986
READING CORPORATION TRAMWAYS PARCELS EXPRESS
CARRIAGE PAID 1d
This parcel is carried subject to the regulations
J 4986
R. C. T.
PARCELS EXPRESS
RECEIPT FOR CASH PAID ONE PENNY.

N 7803
READING CORPORATION TRAMWAYS PARCELS EXPRESS
PREPAID
PARCEL 1d STAMP
Issued subject to the Regulations.

R. C. T.
PARCELS EXPRESS
0160
ON 1d
Corporation Service

Bc 2218
PARCEL TICKET
2d.
For Parcel at Owner's risk only, and accompanied by a Paying Passenger.

D. U. T. Co.
Tc 06356
Tc 06356
Bicycle Ticket
3d
For Bicycle at Owner's risk only, and when accompanied by a Paying Passenger.

SAMPLES OF PARCEL TICKETS USED BY BRITISH TRAMWAYS

Another form of ticket, sold in 80d. books containing twenty tickets is illustrated and is used for the general package goods handling. The patron of this service simply deposits the package with the conductor of the first passing car. The conductor in turn delivers the package to the parcels department downtown. There, all packages are assorted according to districts and then delivered by boys according to their routing. These boys come on at 9 a.m. and work in shifts until 11 to 11.30 p.m. One of their auxiliary duties is to turn trolley poles for the late conductors and conductresses while the latter are turning in their reports.

The receipts from the parcels delivery service for the fiscal year ending May 31, 1918, were approximately $3,000. The service is much appreciated and may be extended in future.

Instead of making a flat charge for the carriage of heavy luggage accompanied by the passenger, the Reading Corporation Tramways charges exactly the same prices, namely, 1d, 1½d. or 2d., as the passenger pays for fare.

Special attention has been given to the development of a parcels delivery service and with such success that despite a slight drop due to the war economy "Carry your parcel home" movement, the Reading Corporation Tramways carried 133,123 parcels during the fiscal year ending March 31, 1918, for a gross revenue of nearly $5,500. Parcels are delivered within ½ mile of the lines at the following rates: For 5 lb., 2d.; for 10 lb., 3d.; for 20 lb., 4d.; for 30 lb., 5d.; for 40 lb., 6d.; for 50 lb., 7d. The rates are double for every additional ½ mile.

A patron may deliver a parcel—even a hot dinner—to a conductor of some passing car. The conductor is provided with pads of fifty stickers of the style illustrated. For each penny collected he gives the sender of the package a stub receipt and pastes the remainder of the ticket on the package. The latter is then delivered to the parcels office which is served by two clerks and twelve to twenty delivery boys. A ticket of different color is used when the packages are delivered directly to the parcels office. Tradesmen may purchase parcels express tickets in lots of thirty for 2s. 6d. (60 cents) which is no reduction from the regular price. In order to save postage for the several departments of the municipality, penny letter stamps are sold in rolls of 240 (£1) for the carriage of letters.

The carriage of parcels as developed in Reading has met with but one objection. This came from a department store which, while admitting a saving of 25 per cent, asserted that it lost contact with its customers although the reliability of the tramways service was very high. While this loss of the personal touch may be a valid argument in the case of a large establishment which can afford to maintain its own delivery service at a high load factor, the benefit to the small merchant who cannot keep a wagon busy more than a few hours a day is beyond dispute.

CARTAGE A FEATURE OF DUBLIN'S SERVICE

The Dublin United Tramway makes a flat charge of 2d. for heavy luggage accompanying the passenger, except travelers with bags and suitcases. The charge for a bicycle is 3d. If the passenger deposits his bundle on the front platform, the motorman gives a special signal indicating that fact to the conductor. Whether or not a charge is to be made is left largely to the discretion of the conductor, but he is of course obliged to issue a fare receipt for the parcel exactly as in the case of a receipt for a passenger ride. A sample ticket is illustrated. The gross income from this source for the year 1918 was £543 ($2,715).

For more than a decade, also, the company has conducted a parcels express service for points along its own lines, within a mile or two thereof, and in conjunction with the Dublin South Eastern Railway (steam). Up to Nov. 3, 1918, the minimum charge for packages up to 4 lb. weight was only 2d. On Nov. 4. 1918, it was necessary to inaugurate the following increased scale for points on the local lines:

Local Rates per Package

Up to 4 lb.	4d. each	Up to 42 lb.	9d. each
Up to 14 lb.	5d. each	Up to 56 lb.	1s. each
Up to 28 lb.	7d. each	Up to 84 lb.	1s. 3d. each

Up to 112 lb.—1s. 6d. each

Special Rates for Tradesmen's Light Goods

From 28 lb. to 56 lb., 6d. each.............From 56 lb. to 84 lb., 8d. each

From 84 lb. to 112 lb., 10d. each

Special rates are charged according to whether or not the article is accepted at the owner's risk, as in the case of bicycles 9d. or 1s. 3d. or a sewing machine on stand for 1s. 6d. or 2s. if at the railway's risk. For packages, in general 50 per cent extra is charged for frail or breakable articles.

The foregoing rates apply to collection and delivery in Dublin or within 1 mile of any of the eleven tramways parcel offices. For delivery beyond 1-mile, 2d. per parcel per ½ mile up to 28 lb. and 4d. per half mile up to 56 lb. is charged, but no parcel is delivered beyond 2 miles nor is punctual delivery beyond the 1-mile limit guaranteed.

To Economise Transport

HAVE YOUR

Parcels Sent by Tram.

Two Deliveries Daily to your Depot.

SOLICITATION CARD

Special prepaid rates are made for empties not exceeding 30 lb. weight as follows: Up to 30 miles, 7d.; up to 50 miles, 8d., and up to 100 miles, 9d. These rates therefore include railway as well as tramway charges.

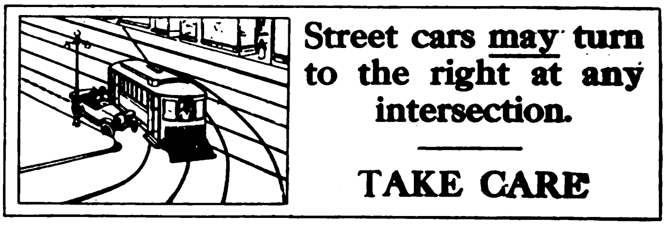
Similar schedules at higher rates are applied to the Clontarf-Howth suburban service and to the joint service with the Dublin South Eastern Railway. The latter is paid a fixed sum for clerical work and transportation, and after the Tramway Company has deducted its own expenses, the surplus of the joint business is divided evenly. This is the longest service of all, extending to Greystones 18 miles away with delivery within 1 mile of that city as in the case of the Dublin and intermediate stations.

The personnel especially required for this service comprises station clerks, messenger boys and drivers for the wagons. When an order is received by telephone, a messenger is sent out to get the parcel. If it is going to some one in his territory, he delivers it at once: Otherwise, he puts it on the front platform of a passing car to go to the general parcels office where it will be assigned to the proper district messenger. One reason for raising the rates was the increase in wages for the boys as under the government unemployment benefit scheme a boy between 14 and 16 years of age receives 12s. a week! Packages which require cartage must be delivered direct to the central office. The gross business of the parcels express in 1918 was £14,000 and the net earnings, £1,360 ($6,830).

From a tabulation prepared by R. Stuart Pilcher, general manager Edinburgh Corporation Tramways, it appears that the following charges are in vogue on certain other tramways as follows:

System	Charge for Personal Luggage	Charge for Parcels Delivery
Blackburn	1d.	14 lb., 3d.; 28 lb., 4d.; 56 lb., 6d.
Bradford	Over 28 lb., 1½d.	7 lb., 3d.; 14 lb., 4d.; 28 lb., 5d.
Burnley	None	7 lb., 2d.; 14 lb., 3d.; 28 lb., 4d.
Bury	None	7 lb., 2d.; 14 lb., 3d.; 28 lb., 4d.
Cardiff	Over 28 lb., 2d.	7 lb., 2d.
Dundee	None	7 lb., 2d.; 14 lb., 3d.; 21 lb., 4d.
Glasgow	None	7 lb., 3d.; 14 lb., 5d.; 28 lb., 7d. 56 lb., 9d.; (8-mile haul)
Halifax	Over 28 lb., 1d.	5 lb., 2d.; 10 lb., 3d.; 18 lb., 3d. 28 lb., 5d.
Huddersfield	Over 28 lb., 1½d.	None
Leith	Under 28 lb., 1d.; over 28 lb., 2d.	7 lb., 2d.; 14 lb., 3d.; 28 lb., 4d
London County Council	Over—28 lb., 2d.	None
Manchester	Over 28 lb., 2d.	14 lb. to 24 lb., 6d.
Newcastle	1d.	None
Northampton	Over 28 lb., 1d.	2 lb., 1d.; 5 lb., 2d.; 10 lb., 3d. 28 lb., 4d.
Oldham	Over 28 lb., 1d.	None
Salford	Over 28 lb., 1d.	None
Southampton	Over 28 lb., 1d.	None
South Shields	Over 28 lb., 1d.	None
Walsall	Over 28 lb., 1d.	None
Wigan	Over 14 lb., 1d., over 28 lb., 2d.	7 lb., 2d.; 14 lb., 4d.; 28 lb., 6d

Cutting Down Collisions



Street cars ~~may~~ turn to the right at any intersection.

TAKE CARE

POST THIS IN A PUBLIC OR PRIVATE GARAGE

THE United Railroads of San Francisco are responsible for the design for a poster shown in the accompanying illustration. It was reprinted by the Ontario Safety League as a special traffic bulletin. The tremendous increase in accidents of this character renders welcome any suggestions as to ways in which their number can be reduced.

What Makes the Cleveland Franchise Popular

THE following editorial from the *Ohio State Journal* which appeared under the caption, "Cleveland's Fare Plan," and was reprinted in the *Chicago Tribune*, gives evidence that the service-at-cost franchise will prove increasingly popular. The reason is obvious.

Apparently the city of Cleveland is in position to offer real help to other cities suffering from traction troubles. Years ago Cleveland adopted the Tayler plan of settlement of its street-car problems. No one would claim it as a perfect plan, and developments have made necessary a few changes in the grant. Under the plan the rate of fare must produce a revenue that will pay 6 per cent dividend on the stock. It may be advanced when cost of operation goes up and reduced as economies are developed.

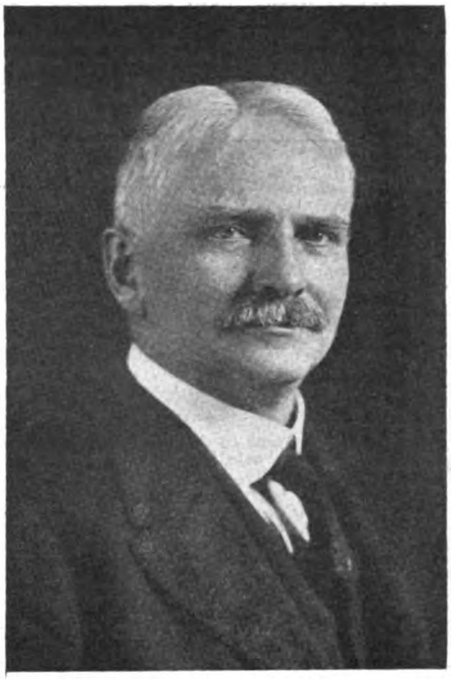
During the war the fare was advanced to 5 cents, although it is known as a 3-cent fare franchise. The people made no special protest over the advance in fare, the peaceful and uneventful introduction of the boost being quite unlike the rows developed in other cities when fare increases were proposed. Last July the fare was reduced, dropping from 5 cents to eleven tickets for 50 cents. Last week another decrease was made, the fare now being six tickets for a quarter. While Cleveland is now giving its car riders good service at six for a quarter, Kansas City has a 7-cent fare where tickets are bought, or an 8-cent cash fare. In Cleveland the cash fare is 5 cents. Cleveland has no street car fare rows, the stock of the traction company sells close to par and has sold as high as $112, and the car riders have good service.

The Tayler plan has stood the brunt of war experience and fare has been quickly reduced. It would seem to have merit and might be studied by other cities with much profit.

The Depreciation Reserve Fund*

A Thorough Study of the Subject of Depreciation, With Numerous Citations From Commission and Court Rulings—Arguments for the Establishment of a Depreciation Reserve Fund

BY WILLISTON FISH
Vice-President, West Penn Railways, Pittsburgh, Pa.



WILLISTON FISH

IT REQUIRES no proof that almost all elements of the physical property of a street railway have limited lives. Eventually the time of their retirement and replacement or abandonment is bound to be reached. And as to each piece of property that must be retired, it needs no proof to show that at some time and from some source the money must be found to replace it. Land held under "right-of-way" title may have to be replaced with other land, and fee-simple lands may have to be relinquished at a loss and new land purchased in their stead.

The question before the commissions and courts in making and passing on valuations and on rates, and the question before city councils and other like bodies in making rates and conditions in ordinances, and the question before us in presenting our cases, is: When and whence is this money to be obtained?

All acts of repairs are in their essential nature replacements, although accounting classifications promulgated by the various utility associations and regulating commissions have attempted to distinguish between current repairs and other kinds of replacements. The distinction is not complete, there being a twilight zone between replacements which are evidently repairs and replacements which cannot be classed as current or cyclic repairs. If the reference is made to our engineers and accountants, they will make and lay down plain, accurate definitions and distinctions.

I will now read some definitions of depreciation laid down by the commissions and courts so that we will have in mind what they understand by depreciation and the various terms used in connection with it (see decisions below).

OFFICIAL DEFINITIONS OF DEPRECIATION

Depreciation may be defined as the lessened money value caused by physical deterioration or lack of adaptation to function, and is occasioned by wear and tear due to the use in the service and the age of the instrumentality; to obsolescence due to a change or development in the art * * * to inadequacy or supersession caused by the growth of the business so that the old instrumentality is no longer adequate * * * and deferred maintenance. Webster Teleph. Co. (S. D.) P. U. R. 1915-E, 516.

See also, Estelline Teleph. Co. (S. D.) P. U. R. 1917-F, 160.

Depreciation may be divided into two classes,—physical, due to wear and tear; and functional, due to inadequacy and obsolescence which require replacement of equipment before it actually is worn out. Depreciation of both classes is divided further into complete and incomplete depreciation. The former represents that part of the original equipment, which, through destruction or obsolescence, has perished as useful property; whereas the latter represents impairment in value of the portion of an aggregate plant which remains in existence and in continued use. Springfield vs. Springfield G. & E. Co. (Ill.) P. U. R. 1916-C-281.

Depreciation of a gas plant means a sufficient amount set aside each year to replace the main parts of the property when the same shall have deteriorated from causes other than operation. El Reno vs. El Reno Gas Co. (Okla.) P. U. R. 1915-A, 226.

Depreciation may be broadly defined as the lessening in worth of any article by wear and tear, by the action of the elements, by supersession through improved devices (obsolescence), by insufficient capacity (inadequacy), or by other similar and divers causes. Lincoln vs, Lincoln W. & L. C. (Ill.) P. U. R. 1917 B-1.

See also Re. Chicago N. S. etc. (Ill.) P. U. R. 1918-A, 432.

Depreciation has been the subject of much unnecessary confusion. The fact that property wastes away under use and finally becomes valueless is readily grasped. The relation of this fact to public utility regulation is not so easily understood.

The principle of depreciation accounting may be most easily understood by a simple illustration: The owner of a steam plant finds it economical to buy a five years' supply of fuel. The expenditure is charged to a capital account under the head of stores and supplies. If, now, he uses up this fuel and continues to carry the cost as capital, his assets will be made to appear larger and his expenses smaller than they really are, so that he may be made to believe that his business is making a profit while it is actually running at a loss. His proper course is to make a charge to monthly expenses for the fuel consumed and reduce his capital account accordingly. Substitute a machine for a coal pile and the principle is still the same. * * * Failure to recognize this annual wastage of capital results in a fictitious showing of net earnings which may deceive the owner or be used by him to deceive the public in the sale of securities. The using up, or depreciation of plant, differs from the using up of stores and supplies only in the fact that its extent cannot be exactly determined as it progresses. Re. Pacific T. & T. Co. (Ore.) P. U. R. 1919-D, 345.

* * * While it might be difficult for the ordinary man to give the precise definition of the word "depreciation," its meaning as it is ordinarily used is very well understood, and agrees with the technical definitions which are given in the dictionary. It means a lessening in value, which may be due to one of a great many causes, a few of which are use, wear and tear, storms, and obsolescence.

* * * In connection with the depreciation reserve, it is proper for this commission to bear in mind that no possible benefit can accrue to the public through the establishment of an inadequate percentage for a depreciation reserve. The ability of a public utility to promptly substitute efficient and approved apparatus for that which is worn out and inadequate, and, therefore, its ability to give good service, and ultimately even its solvency, are dependent upon an adequate depreciation reserve. Birmingham vs. Southern Bell Teleph. & Teleg. Co. P. U. R. 1919-B, 792.

Much of the confusion which exists on the whole valuation subject is, we believe, caused by lack of a clear comprehension of just what is meant by this term, "depreciation." There are two kinds of depreciation as ordinarily considered: One is caused by the action of the elements and the wear to which the facility is subjected; the other is caused by the inadequacy or obsolescence of the facility due to developments which have made it incompetent to perform its functions properly or economically. The first of these kinds of depreciation is generally called physical depreciation and the second functional depreciation. * * *

Considering now physical depreciation: There are three viewpoints from which it can be examined and applied, but it is not possible to view this subject consistently in any single appraisal from more than one of these viewpoints. There can be no commingling of the three, and any attempt to do so will inevitably lead to confusion of thought and unsatisfactory and indeterminate results. The first of these viewpoints, for want of a better name, we shall call the market viewpoint. The measure of depreciation from a market viewpoint is the difference between cost and present value, present value being what the facility would bring in an open market when passing from a willing seller to a willing buyer. The second of these viewpoints can be called the investment viewpoint, and represents the investor's side of the question, which is concerned chiefly with keeping the invested capital secure and intact. From this point of view we shall have to deal with proper depreciation reserves and with proper bookkeeping methods. The third point of view we shall call a present ownership and service viewpoint. From this viewpoint depreciation is strictly a function of the life of a facility in its present service, and under its ownership and life, and condition, of course, is directly dependent upon weather stress and wear. * * * Re. Central P. R. Co. (Cal.) P. U. R. 1916-B, 845.

The fact must be kept in mind that in all street railway properties there is a constant deterioration of the plant from the moment of its use until there comes a time when the physical units, as the result of wear and tear or obsolescence, can no longer be made useful by ordinary repairs and must be discarded and replaced by new property.

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*Abstract of paper presented at the mid-year meeting of the American Electric Railway Association, Cleveland, Ohio, Jan. 8, 1920. (In publishing this address, quotation in full of all decisions referred to by Mr. Fish appears impracticable but typical cases are quoted, excerpts from others given and all are so identified that they may be easily located. Italics in the citations are by Mr. Fish.—EDS.)

If deterioration has not progressed sufficiently to require a replacement * * * the depreciation is usually described as incomplete or accrued depreciation.

On the other hand, where the useful life of the property is exhausted, although the property is still in place, the depreciation is termed complete or matured depreciation. Bay State Case, P. U. R. 1916-F, 276.

So far as depreciation is concerned, there are nearly as many theories as there are authors on the subject; nearly as many applications of each theory as there are Public Service Commissions in the country; and in each commission nearly as many variations of a particular theory as there are cases before the commission. This is necessarily so. A depreciation reserve is set up to create a fund with which a whole plant, or any of the several units thereof, may be replaced when worn out or discarded for any reason. Churchill C. Winthrop & W. Light & P. Co. (Me.) 1916-F-764.

* * * Depreciation is usually referred to under two general classifications, viz., *unit* and *composite*. *Unit* depreciation is the decay of the individual machines or other units of the plant; *composite* depreciation is the resultant effect upon the whole plant of unit depreciation. * * *

Expense incident to damage by storm (kind not stated) chargeable against depreciation and to be eliminated from operating expense. * * * Re. Jefferson & C. B. Teleph. Co. (S. D.) P. U. R. 1919-A. 650

Sleet storm damages should be charged to depreciation. Re. Home Teleph. (Ind.) P. U. R. 1919-C, 209.

DISTINCTION BETWEEN DEPRECIATION AND MAINTENANCE

Much is said in the cases as to the distinction that is to be made between depreciation and maintenance, and you will see that some of the cases are firm in the opinion that the distinction must be made and made carefully.

DISTINCTION BETWEEN DEPRECIATION AND MAINTENANCE

There is no precise and accurate differentiation of maintenance from depreciation. But between these two extremes there is a twilight zone in which it is very difficult and not very important to determine whether the expenses should be charged to maintenance or depreciation. One fact, however, ought not to escape observation. The larger the maintenance fund that is maintained, the smaller the depreciation fund should be maintained. Each is in a measure maintenance, and each is in a way replacement. Peck & Indianapolis L. & H. Co. (Ind.) P. U. R. 1916-B, 484.

* * * Demarcation between depreciation and maintenance is not clear and the decision * * * is more or less arbitrary. A high order of maintenance results in a lower depreciation, and, conversely, a low order of maintenance results in a higher depreciation. Estelline Teleph. Co. (S. D.) P. U. R. 1917-F, 160.

The words "maintenance" and "depreciation" are ofttimes confused. Maintenance should be understood to mean "upkeep," and should cover all expenditures for current or ordinary repairs, renewals, or replacements of property resulting through wear and tear, or through casualties which are incidental to the nature of the operation, and which expenditures are necessary in order to keep up the productive capacity of the plant to its original or equivalent state of efficiency. When, however, a complete replacement of any building or structure, facility or unit of equipment is made necessary regardless of such expenditure, the extraordinary repairs, renewals, or replacements made necessary should be charged to the depreciation reserve accumulated for that purpose. Home Teleph. Co. (Ind.) P. U. R. 1918-A, 27.

As the amount set aside for annual reserves—for depreciation, as well as the amount which shall be paid as a return on the value of the property used in performing the service, must be deducted from revenues and paid by the public receiving the service, the question of the proper determination of the rate of depreciation should receive the most careful consideration. *A too high rate of depreciation, especially in those cases where the depreciation reserve may be invested in additions, betterments, and extensions, will conceal secret reserves or secret profits; and conversely, a too low rate of depreciation may result in a partial destruction of the property.* * * * Webster Teleph. Co. (S. D.) P. U. R. 1915-E, 516.

The depreciation incident to furniture, and boats and teams is carried on the books of the company as a direct charge to various clearing accounts. Consequently no further advance is made for depreciation of these classes of equipment. Bogart vs. Wisconsin Teleph. Co. (Wis.) P. U. R. 1916-C, 1020.

Expenditures for labor and materials incident to keeping the physical property in operating condition and providing for repairs and renewals are broadly classified as maintenance and depreciation charges. *The distinction* between the two is largely, although not wholly, arbitrary. A certain amount of labor which is not connected with any replacement of materials is required to keep the property in good operating condition, and the cost of this is always classified as maintenance. Work on the roadbed, certain repairs to equipment, and the clearing of snow and ice from the track, are illustrations. *Where replacements are involved, the distinction usually made is largely one of size.* The recognizable units of street railway property for the most part are composite —that is, made up of fairly distinct parts. Sooner or later *the unit must be renewed as a whole*, but before that time arrives, parts must often be replaced. The renewing of the unit as a whole is usually classed as a depreciation charge, while the renewing of the parts is called maintenance. To illustrate, a car body must eventually be renewed as a whole, and this is clearly depreciation. In the meantime, its paint requires frequent renewing, panes of glass break, seat covers must be replaced. Minor replacements of this character are maintenance. Bay State Case 1916-F, 276.

APPROXIMATE DEFINITIONS

Necessarily considerable work by good hands will be required in framing definitions in their final accurate form. Our accountants and engineers, our lawyers and our specialists generally, will unite in drawing true definitions, and then the commissions and afterwards the courts will put their seal upon them.

The following definitions derived mostly from the cases cited above are rough approximations that may serve us for the purposes of this paper.

Depreciation, in general, is any lessening in value or reduction in worth. In special use in relation to the reduction in value or worth of public utility property, the definitions may run as follows:

Depreciation is any reduction in worth in an element of a property, from its worth when installed, exclusive of such reduction in worth as under the rules properly applicable to the particular property, is to be restored by maintenance.

This reduction in worth may be due to physical deterioration caused by wear and tear, by any action of the elements, as by heat, storm, flood, fire and the like or by any other physical cause; or this reduction in worth of an element may be due to the reduction in its comparative economic fitness to the purpose for which it was installed, due to progress in the art or arts concerned in the production of such element of property; or as I should think, such reduction in worth may be due to a partial or complete, present or approaching, certain or contingent failure of the purpose for which the element was installed; or depreciation may be due to any combination of these causes.

The various classes of depreciation seem to be defined thus:

"Physical Depreciation"—That resulting from operation of physical forces upon physical elements of property.

"Functional Depreciation"—That resulting from progress in the art or industry which makes or tends to make the element obsolete, or that resulting from changes in the utility or in the demands made upon it, which make the element wholly or partially inadequate.

"Complete or Matured Depreciation"—Depreciation carried to the last degree at which the usefulness of the element for the purpose for which installed is terminated.

"Incomplete Depreciation"—Depreciation less than complete.

"Unit Depreciation"—The depreciation of a single or unit element.

"Composite Depreciation"—The depreciation of the entire property, or of any particular section or class.

"Accrued Depreciation"—The depreciation existing at any given time.

It seems that the same rules for classifying maintenance repairs and replacement repairs are not necessary on all properties.

If a property has such a diversity among the ages and conditions of the various units of any element of its property that an equal burden for replacement in such element must be borne this year and next year and forever, then no fund for work beyond the present year would be needed—that is, no reserve fund would be needed for that element.

Or if there is such diversity among ages and conditions of units among any number of the elements of the property that an equal burden for replacement upon all such elements will have to be borne every year indefinitely into the future—then there would be no call for a reserve fund for years beyond the present —as to those elements.

Thus a company may consider that its replacement of ties, or even of rails will be the same year after year.

Possibly the replacement of cars might be the same year after year. And many items may be thought of. It is hardly conceivable, however, that in any case the replacement of car stations and power houses would come in equal amounts each year.

And then there are disasters, such as floods and storms, which recur at uncertain intervals and there is the vast unforeseen in the work of obsolescence of equipment and even obsolescence of purpose.

Moreover, I think we should consider this: That though it may be that now we have great confidence in figures we make showing that part or all of our replacement work will fall in in equal amounts each year, far into the future. What of it? Suppose that we establish a reserve fund just the same and make it fairly liberal—something more, perhaps, than the figures we have made would call for.

If our prognostication is right, then the withdrawals each year from the fund will leave none too much in it and we shall be as well off as if we had established no fund. On the other hand, if we fall behind in our replacement work in any year, as we are likely to do, the fund will not fall behind. Again, the fund will be highly useful as a barometer, and on this point note particularly what is said in the Holyoke case (Mass.) P.U.R. 1918B, 212, an extract from which I will come to a little later on.

DEPRECIATION AND MAINTENANCE ACCOUNTS TO BE KEPT SEPARATE

Joint account for maintenance and depreciation was disapproved and separate depreciation account ordered, as said to be required by commission's regulations. Northern Ind. Gas Co., (Ind.) P. U. R. 1919-B, 507.

The rate payers should not be taxed with a large operating expense, *including* expenditures properly chargeable to depreciation and also with a return on investment, and in addition be required to pay a full rate of depreciation which may be utilized by the company or the stockholders, as they may see fit.

Commission finds it necessary that a strict line be drawn between maintenance and depreciation; that the depreciation fund be jealously guarded. Citizens' Teleph. Co. (Ind.) P. U. R. 1919-B, 359.

Under the rules of accounting approved by this commission, current repairs and replacements in kind may be charged to operating expenses; hence, a considerable portion of the depreciation annually accruing in a composite railroad property is reflected in its normal operating expenses, and for this part the company should receive no separate allowances to care for such depreciation. However, there is depreciation in such properties that is not overcome by ordinary maintenance, and to care for which it is proper to permit the utility to earn additional sums. Of the first kind of depreciation, ties form an excellent example, as their cost is charged to operating expenses, and suitable renewals as required from time to time will keep the roadbed in proper condition. Manifestly, to permit the road to charge the cost of ties to operating expenses, and to earn sufficient to set aside similar amounts in depreciation allowances, would place an unjust burden upon the patrons of the company. As an example of the second type of depreciation may be taken the office building of petitioner. E. St. Louis R. Co. (Ill.) P. U. R. 1919-D, 42.

DEPRECIATION IN FIXING VALUES AND RATES

Naturally, depreciation is a factor in determining the value of a utility property for sale. It is also a factor, or many consider it a factor, in determining the investment value on which proper return is to be figured and in determining what the reasonable operating expenses to be included in the gross revenues provided by the rates are to cover.

If, for the last five years, a street railway man had attended all the hearings of all our state commissions engaged in considering these aspects of depreciation and had followed the appeals into the courts, he would consider that he had gained more or less information.

Usually, I think, he would have admitted that the decisions and rulings made were based on good law, good business and fair dealing, and, therefore, he would have judged that the principles announced would continue in force to govern future cases; and, in any case, he would have learned the present condition and tendency of the commissions and of the times; and he would have been aided in guiding his own company in accordance with that position and tendency.

I have been pretty well through all the reported commission cases of the past five years in valuing matters considered in this paper, and I will give you very briefly what they said.

DEPRECIATION IN VALUATIONS

A water plant, with all its additions, begins to depreciate in value from the moment of its use. Before coming to the question of profit at all, the company is entitled to earn a sufficient sum annually to provide not only for current repairs, but for making good the depreciation and replacing the parts of the property when they come to the end of this life. The company is not bound to see its property gradually waste, without making provision out of earnings for its replacement. It is entitled to see that from earnings the value of the property invested is kept unimpaired, so that at the end of any given term of years the original investment remains as it was at the beginning. It is not only the right of the company to make such a provision, but it is its duty to its bond and stockholders, and, in the case of a public service corporation, at least, its plain duty to the public. If a different course were pursued, the only method of providing for replacement of property which has ceased to be useful, would be the investment of new capital and the issue of new bonds or stocks. This course would lead to a constantly increasing variance between present value and bond and stock capitalization, —a tendency which would inevitably lead to disaster either to the stockholders or to the public or both. If, however, a company fails to perform this plain duty and to exact sufficient returns to keep the investment unimpaired, whether this is the result of unwarranted dividends upon overissues of securities, or of omission to exact proper prices for the output, the fault is its own. When, therefore, a public regulation of its prices comes under question, the true value of the property then employed for the purpose of earning a return cannot be enhanced by a consideration of the errors in management which have been committed in the past. Knoxville vs. Knoxville Water Co. 1916-D, 607, 608.

This language would seem at first blush to justify a public service commission or other regulatory body in holding that the proprietors of a public utility which had operated under the conditions above pictured should be obliged for all time to bear the loss in the value of their investment which they had failed to guard against in the past by setting up and maintaining adequate depreciation reserves.

But a close study of this decision and of the numerous other decisions of the same court upon the subject of state regulations of public utilities leads us to believe that such language should not be so construed.

In the first place, it is seldom wholly just to penalize any one for failing to do a thing which he had no reason to believe it was his duty to do. Thirty years ago, or even twenty years ago, the theory of the depreciation reserve was hardly known much less generally understood. As we know it today, it is an evolution in accounting so far as applied to public utilities. It has, of course, always been understood that a business man must make provision in advance against the time when the property used in his business will wear out and be no longer fit for use. But the idea that the proprietor or a public utility had an absolute right to charge the public a sum sufficient to create and maintain such a reserve was born of the necessity which arose when the states first began to engage actively in the regulation of rates, and to say that the man engaged in a public business of this character should be limited in his profits to a fair return upon his investment.

And in the second place, a literal interpretation of this language of the Supreme Court would in many cases defeat the very object which the State has in view in regulating such enterprises,—the furnishing of adequate service at reasonable rates. Comment by Maryland Commission on Knoxville water case.

In an estimate of value, if made on the basis of reproduction new, the extent of existing depreciation should be shown and deducted. * * * We are concerned with a charge of confiscation of property by the denial of a fair return for its use and to determine the truth of the charge there is sought * * * the present value of the property. * * * When particular physical items are estimated as worth so much new, if in fact they be depreciated, this amount should be found and allowed for. If * * * not * * * the physical valuation is manifestly incomplete. Minnesota Rate Case 230 U. S., 352 (1912).

Depreciation represents loss in use value either present or future, and in valuing a public utility the commission must consider all of the elements affecting that value, not only the physical condition of various units of the plant as they depend upon age, decay, adequate maintenance, etc., also their utility value as measured by adequacy or inadequacy and obsolescence. Racine Water Co. (Wis.) P. U. R. 1917-D, 227.

* * * The general tendency of utilities involved in a rate-making procedure is to argue that either nothing, or some merely nominal amount, should be deducted from cost-new figures to cover the depreciation that will take place in the future. In general this commission cannot hold that there can be one rate for depreciation in a property for the time that has passed, and another for the time that is to come, with the date of the rate proceeding as the dividing line. * * * The law in Illinois authorizes this commission to require a public utility to set aside certain predetermined amounts to meet the losses due to depreciation. Acting in conformity with the statute, supplemented by the weight of authority briefly touched upon in preceding paragraphs, this commission has heretofore taken the position that it is just, proper and reasonable to require the establishment and maintenance of a depreciation fund. Such a course appears to be both wise and prudent, and the commission reaffirms its position of permitting and requiring proper annual allowances to be made for protection against the ultimate loss that is bound to occur in utility property due to the depreciation. Bowe vs. Jacksonville R. & L. Co. (Ill.) July 11, 1916. Cited Page 544, 1917-E, P. U. R.

In some of the elements making up respondent's property the original cost may be a proper basis on which to fix present fair value. The reproduction new less depreciation cost of other elements may reflect their fair value. * * * In determining the fair value of respondent's property, we made due allowance for a proper depreciation thereof on account of its age and present condition. * * *

In speaking of fair value in this case we speak of that value as found for determining the reasonableness of the rates. What we are discussing is not value in a strict sense of that term, but rather an amount or figure which, under all the circumstances, is a fair basis for determining the reasonableness of the rates.

It may differ from its reproduction cost less depreciation. Ben Avon Borough vs. Ohio Valley Co. P. U. R. 1917-C, 390.

Having determined the fair cost new of each item of the respondent's property used and useful in the service of the public, it becomes necessary, in order to obtain the fair present value, to make a deduction of an amount representing the inevitable depreciation that has taken place because of age, wear and tear, obsolescence, and other causes. * * * [In addition to this finding an annual allowance for depreciation is determined.] Thayer vs. Beaver Valley Water Co. P. U. R. 1916-E, 962. See also Greensburg vs. Westmoreland Water Co. (Pa.) P. U. R. 1917-D, 478.

Idaho: Murray vs. P. U. C. P. U. R. 1915-F, 436.

Missouri: Commercial Club vs. Mo. P. U. C. P. U. R. 1915-C, 1017.

Missouri: Simms vs. Columbia Teleg. Co. P. U. R. 1915-C. 366.

California: Re. Center, P. R. Co., P. U. R. 1916-B, 845.

Illinois: Champaign & Urbana Water Co., P. U. R. 1919-E, 798.

DEPRECIATION IN FIXING VALUES AND RATES

Function Given by Commissions to Depreciation in Fixing Rates

A reasonable rate is a rate which yields a fair return on the value of the property necessarily employed over and above expenses and depreciation. * * * Milwaukee E. R. & L. Co. vs. R.R. Commission (Wis.) P. U. R. 1919-E, 223.

Another item of importance is that of depreciation or the deterioration in value which property undergoes with the lapse of time. It is necessary for the protection of the stockholders of a utility that they receive on their investment, in addition to the reasonable return to which they are entitled, a sufficient income to enable the utility to set aside annually during the life of the utility, a sum which properly invested will amount to the present value of the plant; otherwise, the stockholders would lose their investment, and be obliged to content themselves with the interest they had received on their investment. Clarksburg L. & H. Co. (W. Va.) P. U. R. 1917-A.

In order to offset depreciation, and to maintain the integrity of its investment by enabling it to make renewals as they become necessary, defendant is entitled to set aside from income reasonable amounts in a depreciation reserve, or, as it is sometimes called, a "renewal fund." Kansas City E. L. Co. (Mo.) 1917-C, 774.

It is quite clearly established by the late authorities that in the making of a schedule or tariff of rates to be charged by a public utility there must be an annual allowance for depreciation. Webster Teleph. Co. (S. D.) P. U. R. 1915-E, 516.

If by reason of insufficiency of the rates or reserves or otherwise the public has not repaid the utility the depreciation which its property has in fact undergone, the utility might well have an equitable claim against the public on account of such depreciation. N. Y. & N. S. Trac. Co. P. U. R. 1918-A, 910.

Arizona: Harris vs. S. S. Gas & E. P. U. R. 1915.

California: Corona Home T. & T. P. U. R. 1915-F, 1014.

San Diego: 118 Cal. 556; 38 L. R. A. 460; 50 Pac. 633.

Colorado: Mountain States T. & T. P. U. R. 1917-B, 198.

District of Columbia: Wash. & M. R. P. U. R. 1915-B, 558.

Indiana: Oakland City E. L. & P. Co. P. U. R. 1915-B, 846.

Illinois: Belleville vs. St. Clair Co. G. & E. P. U. R. 1915-F, 235.

Iowa: Cedar R. Water vs. C. R. 118 Iowa 234; 91 N. W. 1081.

Kansas: Ft. Scott G. & E. P. U. R. 1915-B, 481.

Kentucky: Cumberland T. & T. vs. Louisville 187 Fed. 637.

Maine: Murchie vs. St. C. G. L. P. U. R. 1917-B, 384. Churchill vs. W. & W. L. & P. Co. P. U. R. 1916-F, 752.

Maryland: Havre de Grace & P. Bridge Co. in Md. Court of Appeals, 103 Atl. Rep. 319.

Massachusetts: Mass. N. E. St. Ry. P. U. R. 1917-A, 331.

Missouri: Simms vs. Columbia Teleg. P. U. R. 1915-C, 366.

Nebraska: Omaha & Lincoln R. & L. Co. P. U. R. 1915-B, 416.

New Jersey: Re. N. J. Gas Co. P. U. R. 1918-B, 438. Re. Bridgeton & M. T. P. U. R. 1918-B, 357.

New York: Jamaica Water S. vs. State Tax Commsrs. 196 N. Y. 39.

Oklahoma: El Reno G. & E. P. U. R. 1915-A, 226.

Pioneer T. & T. Co. vs. Westenhaver 29 Okl. 429: 38 L. R. A. (N. S.) 1209; 118 Pac. 354.

Oregon: Bend vs. Bend W. L. & P. Co. P. U. R. 1915-F, 913; Pacific T. & T. Co.—P. U. R. 1919-D, 345.

South Dakota: Hamlin & D. County Teleph. Woonsocket vs. Schuler, etc. P. U. R. 1915-B, 223.

Washington: P. S. C. ex rel. P. U. R. 1915-B. 135.

Wisconsin: Charlesworth vs. Omro E. & L. Co. P. U. R. 1915-B 1.

Re. Kenosha P. U. R. 1918-D, 751.

CASES WHERE COMPANIES LACKED PROPER DEPRECIATION RESERVE

Counsel for certain remonstrants have suggested, not with great apparent confidence, that the payment of even the moderate dividends paid by this company, without taking care of depreciation, is mismanagement seriously affecting the right to a fair rate. But there is a great practical difference between the payment of dividends averaging 4.35 per cent, no more, perhaps even less, than an investment rate on money (which tends to keep the corporation in some sort of credit), and the payment of dividends in excess of an investment rate which would tend to put the stock of the company on a speculative basis. * * * But we make it very plain that the payment of dividends in excess of an investment rate, without caring for depreciation and all other proper operating charge, would be mismanagement requiring the commission's effective condemnation. Middlesex & Boston Case (1914) 1916-F, 265.

A good deal was said at the hearings with respect to the question of depreciation. Under the former local management a dividend of 8 per cent was maintained for many years and a substantial surplus, invested in fixed property, was built up out of earnings. Doubtless, this surplus is more than sufficient to take care of the inevitable loss resulting from the abandonment of the generating works and also the excess paid for the Waltham property over any reasonable valuation of the plant acquired. *The present owners, however, have made no charges to depreciation other than for mains, services, and meters abandoned, taken up, or retired from service. Practically all extensions have been built with borrowed money, and, between the price paid for the gas purchased of the Boston Company and the dividends paid to the stockholders, substantially all of the earnings have been exhausted. The effect of this policy upon the company's property in relation to its authorized capital is obvious, and it is a factor affecting materially the reasonableness of the return and any future allowance for depreciation.* Newton & Watertown Petition (Mass.) P. U. R. 1915-D. 787.

The ruling of the commission in the Middlesex & Boston Rate Case was accompanied by the express stipulation "that, if there is mismanagement causing such loss, such loss must be charged against the stockholders legally responsible for the mismanagement." In other words, the company is held to the same standard of honesty and prudence in the management and maintenance as in the original acquisition of its properties. *It must, so far at least as it reasonably can, keep its investment good.* If through some fault of its own it has failed to make due provision for depreciation, it cannot reasonably expect the public to pay a return upon that portion of the investment which it has neglected to preserve. But under a consistent application of the investment theory, *it would seem in general that deduction should be made for the depreciation which comes from age and use in so far only as the failure to make provision for it is due to the payment of unwarranted dividends, or is otherwise attributable to mismanagement.* * * *

To sum the matter up, the property has depreciated in value in the public service, and the stockholders have had no dividends. On the other hand, the public served has been receiving transportation at less than real cost, and has, in effect, used up a portion of the property without giving an equivalent in return. * * *

Under the circumstances of the case, then, we rule that, in determining the revenues to which this company is fairly entitled, allowance should be made for an amount equal to a fair return upon all the "capital honestly and prudently invested," without deducting accrued depreciation. In ruling to this effect, however, we must not be understood as deciding that the company can, if it earns the amount to which it is entitled, properly pay dividends to its stockholders before the depreciation and other deficits from past operation have been made good. In Re. Blue Hill St. R. Co. (Mass.) P. U. R. 1915-E, 370.

It is doubtless true that it would not now be regarded as sound business practice for a public utility company to pay any dividend whatever at the expense of adequate provision for depreciation. * * *

In 1898, just before the advent of the Massachusetts Electric Companies, the following statement was made: "The greed for dividends on the part of the stockholders of many of the companies, who have generally invested with the mistaken expectation of not only sure, but lucrative, returns, is often too importunate for the managers to resist; but the practice of paying dividends where no divisible income has been earned, or in excess or anticipation of such income, or even to the full amount of such income, *with no reserve for depreciation*, is vicious and fatal in the end to the strength and success of the company. * * *

* * * The fact must be kept in mind that in all street railway properties there is a constant deterioration of the plant from the moment of its use until there comes a time when the physical units as the results of wear and tear or obsolescence can no longer be made useful by ordinary repairs and must be discarded and replaced by new property. If this deterioration has not progressed sufficiently to require a replacement, the property in which it exists still being in place in a state of usefulness with a part of its service life remaining, the depreciation is usually described as *incomplete or accrued depreciation*. On the other hand, where the useful life of the property is exhausted, although the property is still in place, the depreciation is termed complete or *matured depreciation*. Under the policy adopted by the Bay State Company it was assumed that no account need be taken of incomplete depreciation if *current repairs were attended to and if the necessary renewals were made when the depreciation became complete*. This theory, as we have already pointed out, would not now be regarded as sound business policy. The necessity has been recognized of establishing a depreciation reserve in the nature of an insurance fund to provide for the heavier demands for renewals in the later years of the service life of the property. It was, however, the theory of the management of the Bay State Company that the creation of a reserve fund was not necessary to provide for depreciation, but that renewals could be made from time to time as the need for them arose as part of the maintenance expense.

In determining whether such a view might have reasonably been entertained, it is proper to point out that the Bay State system was made up of a large number of city, suburban, and interurban lines, some of which were nearly forty years old, while others had not been completely built. It was a highly composite and heterogeneous property of varying condition of upkeep and service life. *There may have seemed at the time some justification of the view that the property had reached a condition where the renewal requirements of successive years would not vary greatly in amount, or, at any rate, would not increase more rapidly than the growth of travel which might be anticipated from the improved transportation facilities made possible through electrification.* * * *

In view of all the circumstances, the Bay State Company should not be too severely criticised for adopting a policy which was in conformity with the prevailing standards of the time and to a certain extent with existing practice, even if experience has since shown that it was erroneous. It is proper to observe, however, that there would probably have been less reason to criticise this theory if it had been consistently applied. * * *

If neglect had been confined merely to incomplete depreciation, and if existing property had been maintained in suitable condition for efficient, safe, and economic operation, we should be disinclined, notwithstanding the payment of dividends, to hold that the loss was caused by mismanagement which must be charged against the stockholders. But where, as in this case, a company has neglected not only incomplete, but complete, depreciation, and has failed to replace property which is obsolete, inadequate, or worn out; and where the payment of dividends has been continual,—a different state of affairs exists. It will hardly be denied that failure to replace such property not only increases operating expense, but decreases revenue. How marked this effect may be cannot be determined with accuracy, but certainly it is substantial.

Upon consideration, the commission is of the opinion, under all the circumstances of the case, that the failure to make due provision for the complete depreciation of a portion of the property was mismanagement, which ought to be charged against the stockholders legally responsible therefor. Bay State Case (Mass.) P. U. R. 1916-F, 264.

As we have seen in our illustration of the new company starting under state regulation, an ample reserve is necessary to enable the utility at all times to render adequate service. * * *
Therefore it would seem that all we have said as to the necessity for ample depreciation reserves in the case of a new company applies with equal if not greater force to the case of an old company. In other words, an ample reserve for depreciation is an absolute necessity in the case of every public utility, whether new or old.
And it further seems to us that if mistakes have been made in the past by such utility, through a failure to set up proper depreciation reserves, the sooner such mistakes are corrected and the utility placed on a sound basis with respect to such reserves, the better it will be for all concerned. Re. Chesapeake & P. T. Co. P. U. R. 1916-C, 925.
[In the above case there is an interesting discussion of this question: With an old company having insufficient depreciation reserves or none, to what extent should the public be called on by rates it pays to bear the depreciation of both past and future? Note by Author.]

It appears that none of the companies in this proceeding have been in the practice of setting aside anything to take care of depreciation. This is a matter that does not require any extended discussion, as it is admitted by all practical telephone men that it is necessary and good business policy for a company to set aside out of its earnings a reasonable percentage of the value of its plant to take care of the item of depreciation. While this item does not show up to its full extent until a late period in its life, it is nevertheless, a fact that it is taking place all of the *time* and should be provided for during each and every year in the life of the plant. Re. Telephone Co.'s (S. D.) P. U. R. 1915-A.

On account of age and use certain of the operating physical properties of the utility included in the foregoing estimate of reproduction cost new have depreciated, so that * * * the value of the operating plant of the utility as above described is lessened. * * * The company has not carried a depreciation account prior to the inception of these proceedings, and whether any replacement fund was carried by any of its predecessors is not apparent. For the reason previously stated in the case of Hydro Electric Company, such depreciation is equivalent to a voluntary withdrawal of capital. Campbell vs. Hood River G. & E. Co. (Ore.) P. U. R. 1915-D, 885.

One of the first duties of a public utility whose earning power is limited to a fair return upon its investment is to set aside from year to year out of the gross earnings a sum sufficient to enable it to maintain its plant and equipment at all times up to the standard of efficiency represented by the construction of the plant new. Re. North Dakota Ind. Teleph. Co. (N. D.) Dec. 30, 1916, P. U. R. 1917-E, 544.

We believe it proper to call attention to the fact that the company has not been setting aside a sufficient amount for "accrued amortization of capital," and that it is essential that this be given thoughtful consideration. * * * Good management, both from the standpoint of the public and the corporation, requires the creation of a reserve of this character, and we would be failing in the performance of our duty if we did not call this matter to the attention of the corporation. Re. Lockport Gas & E. L. Co. (N. Y.) P. U. R. 1917-F. 871.

Dividends may be declared only after all operating and re-maintenance expenses have been met, and an adequate depreciation reserve provided. Re. Tamarack Telep. Co. (Wis.) P. U. R. 1917-E 540.

The return of a natural gas plant should be high enough to amortize the property, less salvage, during its life, but where rates have been voluntary and no provision has been made in the past for amortization the company cannot place the whole burden of amortization on the future. Re. Ashtabula Gas Co. (Ohio) P. U. R. 1917-D, 790.

The owners of a public utility are entitled to compensation for the natural depreciation of their plant which has been devoted to public use without adequate return. Re. Lincoln Water Co. (Me.) P. U. T. 1919-B, 752.

The rate payers should not be taxed with a large operating expense, *including* expenditures properly chargeable to depreciation and also with a return on investment, and in addition be required to pay a full rate of depreciation which may be utilized by the company or the stockholders, as they may see fit. Re. Citizens Teleph. Co. (Ind.) P. U. R. 1919-B, 359.

A telephone company paid large dividends for seven years and neglected maintenance and renewals; ordered to suspend dividends for four years. Re. Eagle Teleph. Co. (Neb.) P. U. R. 1919-A, 842.

By proper maintenance the machine will furnish good service for a given number of years. At the end of that time its working value has disappeared and it is good only for junk. * * * Failure to recognize this annual wastage results in a fictitious showing of net earnings which may deceive the owner or be used by him to deceive the public. The using up or depreciation of plant differs from the using up of stores and supplies only in the fact that its extent cannot be exactly determined as it progresses. When a machine goes out of service its depreciation is complete but the annual charge to be made to operating expenses in the anticipation of that event can only be estimated and may be found subject to change from year to year. Pacific T. & T. Co. (Ore.) P. U. R. 1919-D, 345.

Railroad property abandoned in order to effect an improvement by a better route may properly be amortized over a period of years. Kansas City Southern vs. U. S. 231 U. S., 423.

A utility which demands that rates shall be sufficient to amortize over a series of years property which has become nonoperative has the burden of showing that depreciation reserves which the utility and its predecessors have set up, or could reasonably have set up, are insufficient to care for the abandoned property. San Francisco vs. Pacific G. & E. Co. (Cal.) P. U. R. 1918-A, 506.

For a considerable period of years the present management has been in control, and the company has consistently pursued a policy of including in its plant accounts every item of expenditure attendant upon the extensions of its distribution system and enlargement of its generating plants, whether incurred for labor and materials purchased, or for the engineering and supervision of its regular officers, and of representing the full amount of such expenditures in capital stock. While liberal provision for repairs and renewals has been made as a part of the operating expenses, *the actual charges to depreciation have been slight, and the distributions of the net earnings in dividends have been so large as to leave but little available to make good the original cost of machinery and appliances which, owing to changes in conditions or the progress of the art, have had to be practically abandoned or supplanted, even though still in place.*
Under the prices which have prevailed in the period mentioned, for both gas and electricity, it seems fair to assume that the consumers have met all their just and natural obligations toward depreciation of the plant. If the payments for that purpose have not been put back into the plant, but divided as dividends, the consumers should not be called upon indirectly to discharge that obligation again by the maintenance of a price in order to provide a certain return on new money, a substantial part of which a more prudent policy might have made unnecessary. Such a course persistently pursued may also result in a serious injury to the stockholders; for the safety and growing worth of their investment lies chiefly in the potential value of a relatively low capitalization, taken in conjunction with the increased earning power of a reasonable surplus. In Re. Lawrence Gas Co. (Mass.) P. U. R. 1915-A, 814.

Other cases cited:
Massachusetts: Lawrence Gas. Co. P. U. R. 1915-A.P., 814.
New Bedford & Onset Rate Case P. U. R. 1915-F, 264.
Oregon: La Grande Commercial Club vs. East Oregon L. & P. Co. P. U. R. 1915-D, 909.
Maine: Knowlton vs. Farmington Village Corporation P. U. R. 1918-E, 884.
California: Meade vs. Pacific G. & E. Co. P. U. R. 1915-D, 630.
Illinois: Quincy R. Co. P. U. R. 1919-E, 391.
Colorado: Colorado Springs L. H. & P. Co. P. U. R., 1917-F, 385.
Michigan: Ann Arbor R. Co. vs. Fellows P. U. R. 1917-B, 523.
Missouri: Commercial Club vs. Missouri Pub. Ut. Co. P. U. R. 1915-C, 1017.

REQUIREMENTS AS TO MAINTAINING DEPRECIATION RESERVE

The Interstate Commerce Commission makes it optional with railroad companies whether or not to carry any depreciation accounts as to any of the items under maintenance of way and structures. *As to maintenance of equipment, the Interstate Commerce Commission requires* the carrying of a proper and adequate depreciation account, but leaves the rate to be based upon such percentage of the original cost, ledger value, or purchase price of such equipment as may be determined to be equitable from the carrier's experience and best sources of information. * * *
The public utility act applicable to the Philippine Islands gives the Board power to require every public utility to carry, if reasonably necessary for protection of stockholders or creditors, an adequate depreciation account.
The board shall from time to time ascertain and fix proper and adequate rates of depreciation of the property of each public utility * * * which rates shall be sufficient to provide the amounts required over and above the expense of maintenance to keep such property in a state of efficiency corresponding to the progress of the industry.
Identical or substantially identical provisions in the public utility acts of Arizona, California, New Jersey, Ohio, Oregon and Wisconsin. Manila Co. P. U. R. 1915-C, 711.

On authorizing an electric railway and light company to issue securities for improvements, Commission directed company to set aside annually 7 per cent of entire amount of outstanding liabilities for maintenance and depreciation funds. Omaha & L. R. & L. Co. (Neb.) P. U. R. 1915-B.

A natural gas company should provide annual allowance for depreciation. Oblong Gas. Co. (Ill.) P. U. R. 1915-A, 598.

The public service commission's law very wisely provides that in determining reasonable rates, due regard shall be given to the necessity of making reservations out of income for surplus and contingencies; and I am of the opinion that a reserve for renewals and contingencies should be sufficient to cover the average annual cost of the renewals of plant and property, with a margin for contingencies in addition thereto. Stadtlander vs. N. Y. Edison Co. (N. Y.) P. U. R. 1915-B, 690.

Approves annually setting aside 4½ per cent of property of an electric and street railway company for depreciation. Fort Scott G. & E. (Kan.) P. U. R. 1915-B.

A gas and electric company was denied permission to *defer* setting aside a depreciation reserve for one year, although it had spent on extensions and improvements more than a proper sum for depreciation, it appearing that the revenues were sufficient to establish proper depreciation reserve and pay reasonable return on investment. Tucson Gas E. L. & P. Co. (Ariz.) P. U. R. 1916-D, 640.

Consequently it would seem to be clear that the ideal condition for a public utility subject to state regulation would be for such a utility to have a depreciation reserve created and kept up by the public, at all times ample to cover not only the existing, visible deterioration of its property, but also all latent depreciation, in order that it might be in a position to make replacements when and as required. Such a reserve would stand as a perpetual guaranty to the utility against any loss the property might sustain in the public service, and at the same time as a perpetual guaranty to the public that the utility would always be in a position to render adequate service. Chesapeake & P. Teleph. Co. (Md.) 1916-C, 961.

The safe and imperative policy * * * is, *it is necessary* to keep capitalization and charges upon income within the narrowest possible limits and *to set apart* year by year some substantial portion of the earnings as a fund for future contingencies, and for the increasing burdens of expense which are sure to come and whose weight is now only partially felt or known. Bay State Case P. U. R. 1916-F, 266-7.

All outside construction of an electric lighting plant, such as pole lines, transmission lines, transformers, etc., should be maintained from year to year out of earnings; but there should be a depreciation fund for boilers, engines, generators, switchboards, etc., which may have to be replaced at one time. Mangum vs. Mangum Electric Co. (Okla.) P. U. R. 1916-E, 764.

A natural gas rate fixed by a State Commission is confiscatory in violation of the Federal Constitution, where the rate will not produce sufficient revenue to provide for extensions to secure gas to replace a failing supply, for a sufficient sum to purchase gas, for depreciation due to the expiring life of the company, and for a return of 8 per cent rather than 6 per cent. *Landon* vs. Public Utilities Commission of Kansas in U. S. Dist. Court D., Kansas First Division 234 Fed. 152; Reported in P. U. R. 1917-A.

The Massachusetts Commission disapproves the policy of paying dividends with money that should go to depreciation. Middlesex & B. St. R. P. S. C. 2096, June 29, 1918.

Neither Sec. 52 nor any other section of the New York Public Service Commissions Law authorizes the commission to require a utility to create a reserve fund, to renew the plant when it shall become worn out, or obsolete. New York Railways Co. vs. P. S. C. First District. P. U. R. 1918-F, 125. N. Y. Court of Appeals, May 14, 1918.

It is an established principle in rate-making proceedings that the owners of the property are entitled to sufficient sums to care for the inevitable deterioration from action of the elements, wear and tear, inadequacy, or obsolescence. Peoples Power Co. (Ill.) P. U. R. 1918-E, 676.

That an allowance should be made including operating expenses for the current depreciation in the property has come to be so well established as hardly to need argument or explanation. An accurate cost of rendering service cannot be ascertained without taking it into consideration. Springfield Consol. Water Co. (Pa.) P. U. R. 1918-E, 676.

Other cases cited:
Oregon: Portland R. L. and P. U. R. 1916-D, 976.
Wisconsin: Franksville Telephone Co. P. U. R. 1917-A, 275.
North Dakota: North Dakota Ind. Tel. Co. P. U. R. 1917-E. 544.
Alabama: Birmingham vs. Southern Bell Tel. & Tel. Co. P. U. R. 1919-B, 792.

RELATIVE ADVANTAGES OF PLAN OF DEPRECIATION RESERVE OR PAYING FOR DEPRECIATION AS IT ACCRUES AND PLAN OF PAYING ONLY AS DEPRECIATION MATURES

There is a vast amount to be said on this matter, and it would be singular, considering all the aspects that the matter presents and the importance of them, the differences in the properties to which the plan is to be applied, the long periods of time during which it may be contemplated the plan chosen will be in effect, the different changes that may be expected to come to traffic in different cases, the various laws and ordinances under which the various companies are operating, and the great number of minds which have studied this matter—with all this it would be singular indeed if all the minds had agreed that the depreciation reserve plan is the best for all concerned all the time.

With the plan of paying and bearing depreciation as it matures is often associated the theory that the accrued depreciation, if it has not matured, is to be ignored in any valuation whether for sale of a property or for fixing the investment on which return is to be figured. And this latter theory is sometimes, or perhaps always, supported by the "100 per cent operating efficiency theory."

Experts of the very highest class have supported all or some of these anti-depreciation reserve theories, and I certainly hesitate to dispute with them. However, they will take no exception if I ramble around a little, citing authorities. And, in the first place, I will read some of the anti-depreciation reserve authorities.

ANTI-DEPRECIATION RESERVE DECISIONS

The company insists that there should be added to *operating expenses* * * * depreciation on track and overhead, 3 per cent, * * * power station, 6 per cent, * * * car houses and shops, 2½ per cent. * * * In connection with this claim of further allowance for annual depreciation it is interesting to note that the company in its report to this commission does not carry any such depreciation account. The only depreciation reserve which the company carries is that prescribed by the Interstate Commerce Commission, to which this company reports. Under the Interstate Commerce Commission Rules, this railroad is obliged to carry depreciation only on equipment. * * * Passing over this claim of the company for a moment. let us see if there is any necessity for or justice in decreasing the original cost value, $199,781.50, by any amount whatever for actual or theoretical depreciation. * * * As a matter of fact, the respondent company maintains such a depreciation reserve * * * as satisfies the requirements of the Interstate Commerce Commission. In the absence of evidence that this is not sufficient, * * * we do not in this particular case feel that there should be any deduction from the above amount of $199,781.50, and we therefore find that this amount is the fair value of respondent's property. * * * And inasmuch as we make no deductions from the above named figure representing the original cost and present value, we do not allow any additions to operating expenses for the items of depreciation claimed by the company. * * * *Butler* vs. Lewiston A. & W. St. R. (Maine) P. U. R. 1916-D, 44.

[Here the company asks for a robust depreciation on track, power stations and carhouses, but it weakened its claim by not carrying any depreciation reserve for them, and then the commission made the plain mistake (unless there was an immense diversity in the property) of assuming that excellent maintenance will forever make unnecessary the replacement of power plants, carhouses and shops.—Note by Author.]

The prevailing practice in making valuations for rate making or upon which to apply rate of return, adopted by public service commissions and other public utility supervising bodies in the past has been "cost to reproduce new, less depreciation." * * *

Depreciation has been classed by all students of the subject to be an operating charge and not a capital account item. The only provision is by making proper repairs and proper renewals when necessary and these expenditures should be charged as an operating expense. * * * The integrity of the capital investment is thereby maintained against depreciation to the extent practicable or economically possible. * * *

Every public utility property should be maintained at 100 per cent operating condition, but it is both impractical and uneconomical to maintain any property approximately 100 per cent physically good. * * *

There is a certain amount of total accrued depreciation that never can be taken care of in any operating, growing property.

The full original investment remains in the property and the investor is entitled to a return upon every dollar until the investment is repaid to him. Where a property has not been kept in good physical condition and there is unmistakable evidence of "deferred maintenance" found in any property, the subject should receive special consideration and if the property being valued has been a prosperous one in the past and the fact is in evidence that the money that should have been expended for renewals and repairs has been diverted to other uses of benefit to the company, the company should be required to make good this deferred maintenance, the cost to be charged to its individual account and not to operating expense.

If, on the other hand, it can be shown that any company carrying "deferred" maintenance has been well managed but that the income has not been sufficient to pay the increased costs of operation, franchise obligations and interest, and, in addition, to properly maintain the property, then provision should be made in any rate adjustment to permit the company to earn the amount necessary to put the property in good operating condition.

Your committee wishes to emphasize its conclusions with respect to the subject of accrued depreciation in the strongest manner possible, as follows: Where a property has been maintained in good operating condition and an appraisal is being made to determine investment value for "rate-making" or for sale to municipality, state or government, no deduction should be made for accured depreciation. From Report of Committee of A. E. R. A. on Valuation.

[If a utility under good management had never earned, or through any and all proper efforts had never had the opportunity to earn a cent which under right and reasonable rates could and should have been devoted to depreciation, then if the original investment was prudently made, it would surely be just and right that in rate making no deduction should be made for depreciation. But how about *other* utilities in which some or all these conditions are wanting. Moreover, this report states at the beginning of this extract that the "prevailing practice in making valuations for rate-making * * * adopted by public service commissions and other public utility supervising bodies in the past, has been 'cost to reproduce new less depreciation'." So far as the ruling fixed by these bodies are not reversed by the courts, we must be guided by them and guide our companies by them.—Note by Author.]

This court is of the opinion that the rule of cost of reproduction less depreciation, adopted by the commission, is the correct general rule or principle to be applied in this class of cases. However, we believe that in ascertaining values in this way, the worth of a new plant of equal capacity, efficiency and durability, with proper discount for defects in the old, and the actual depreciation for use, should be the measure of value, rather than the cost of exact duplication.

So far as the question of depreciation is concerned, we think deduction should be made only for actual tangible depreciation, and not for theoretical depreciation, sometimes called "accrued depreciation." In other words, if it be demonstrated that the plant is in good operating condition ,and giving as good service as a new plant, then the question of depreciation may be entirely disregarded. Murray vs. Public Utilities Commission. Pocatello Water Case (Idaho) P. U. R. 1915-F, 436. (Idaho Supreme Court.)

Applying the rule laid down in the Pocatello Water Company case (James A. Murray vs. Public Utilities Commission of Idaho) by the Supreme Court of Idaho, we must find that no deduction may be made for depreciation in this case as the testimony shows conclusively that defendant's plant is in first-class operating condition without any actual or tangible signs of depreciation. * * * City of Sandpoint vs. Sandpoint Water & Light Co., Ltd. (Idaho) P. U. R. 1919-F, 445.

[This case seems to decide only that when no dividends have been paid, past depreciation is to be ignored, but for the future provision must be made.—Note by Author.]

Other cases cited:
Idaho: Taylor, Mayor of Wallace vs. Northwest L. & W. Co. P. U. R. 1916-A, 372.
Mullan Water Works P. U. R. 1916-D, 894.
City of Cœur d'Alene vs. Interstate Utilities Co. P. U. R. 1916-C, 438.
J. T. Wiseman, et al vs. Rupert Elec. Co. P. U. R. 1917-C, 111.
Oklahoma: Osage and Oklahoma Co. P. U. R. 1917-C, 428.

[The Pioneer Telephone & Telegraph case came to the Oklahoma Supreme Court through an appeal by a telephone company of proceedings brought by a city to obtain a reduction of rates. The company claimed it was not allowed in the order a sufficient return to give adequate reserve for depreciation. The court found that plant was kept up to a high degree of efficiency by replacements paid for out of current revenue; that any deterioration covered by obsolescence would not affect the result in the case, and therefore an allowance for reserve fund not necessary. The company contended that even with best maintenance "the time inevitably comes with every building and unit of equipment when it can no longer be kept serviceable by repairs, and when it must be replaced substantially in its entirety. It contends that without a depreciation fund provided for from year to year out of earnings, sufficient to replace the plant at the end of each life expectancy period, the dividends paid will before long represent the better part of the investment. The court says that a great many authorities and opinions of experts are cited by counsel which they say conclusively show the economic necessity of the principle contended for.]

After examining such of these authorities as are available to us and others on the same subject not cited, we find ourselves unable to agree with counsel in their assumption that the doctrine of depreciation, as contended for by them, meets with the approval of the courts and the economists. From our investigation of the problem of depreciation we are convinced that precedent on this question is varying and that there is also great contrariety of opinion among the heads of the public service corporations themselves, some companies believing that their best interests lie in adopting the largest possible depreciation charge and in the consequent accumulation of a permanent fund in the future, whilst others contend that the application of the doctrine amounts to a virtual confiscation of their property. Without attempting to set out herein our analysis of these discordant views, it is sufficient to say that we have reached the conclusion that in plants of considerable size that have attained their gait, to which class the plant herein is conceded to belong, there is both theoretically and actually a normal condition in which the replacements come along with comparative evenness, and where there can be no possible use for a so-called depreciation fund of any considerable amount.

In the case at bar, * * * the commission made no deduction from the value of the plant on account of depreciation, but allowed returns upon its value as a going concern, kept up to a high degree of efficiency by replacements paid for out of current revenue. There is no principle of public regulation more firmly established than the right of the company to charge in its rate an amount which will enable it to make these replacements, and as investors put their money into public utilities for the sake of the returns they will be able to obtain, if the allowance for replacements is sufficient to keep up a high degree of efficiency and prevent a lowering of the ability of the plant to earn returns, we are unable to perceive the necessity for building up a fund to be used for the purpose of counteracting a purely theoretical depreciation. The theory of the commission seems to be that charges should be made in rates sufficient to counteract or prevent depreciation by replacements, and that when replacements are thus fully provided for, depreciation is counteracted. We see no error in this; at least, none of which the appellant company has any just cause to complain. Pioneer Teleph. & Teleg. Co. vs. State of Oklahoma Supreme Court L. R. A. 1918-C, 138; P. U. R. 1918-A, 465.

I analyze the Pioneer Telephone & Telegraph case about like this:

The court says that a great many authorities and expert opinions were cited by counsel for company; that it had examined the available ones and others not cited; that it was unable to agree that counsel's doctrine of depreciation meets with universal approval.

But the court does not cite an authority against the doctrine. It does not even state that the preponderance of authority is against the doctrine, but only that it is not approved. Of course the court did not intend to say that if you go into court on a principle that is almost universally approved but not quite, you simply have to lose. All that the court said about authority was of no value, for it obtained no doctrine or principle from them. It just says in effect what it says in fact: "It is sufficient to say that we have reached the conclusion, etc."

After all, all that the court decided was that "in plants of considerable size, there is theoretically and actually a normal condition in which the replacements come along with comparative evenness, and where there can be no possible use for a so-called depreciation fund—for any considerable amount."

Well, the question of the amount my resolution proposes to leave to experts. It will be a question to what, if any, extent this Pioneer Case reverses the earlier Magnum vs. Magnum Electric Company's case in Oklahoma, already quoted.

I also give authorities on the other side. You must note and see what an assemblage of commissioners, judges and experts have come in here with me to appear on behalf of the plan for depreciation reserve.

OPINIONS FAVORABLE TO DEPRECIATION RESERVE PLAN

Under the policy adopted by the Bay State Company, it was assumed that no account need be taken of incomplete depreciation, if current repairs were made when the depreciation became complete. This theory as we have already pointed out would not now be regarded as sound business policy. The necessity has been recognized of establishing a depreciation reserve in the nature of an insurance fund to provide for the heavier demands for renewals in the later years of the service life of the property. Bay State Case P. U. R. 1916-F, 269.

In the District of Columbia the commission is required to ascertain proper, adequate rates of depreciation to which each public utility must then conform its account.

The rate payers having to provide for this consumption of property are vitally interested in the amounts included in their rates for the purpose, if such amounts may logically vary under different equitable methods. Now, in the first place, there are, broadly, two ways in which moneys may be considered to be collected in rates for the purpose of such property renewals:

1. The renewals as made each year may be paid for out of the moneys collected for the purpose in the rates of that year.
2. The moneys as collected in the rates of each year for the purpose of property renewals may not be predicted on the renewals of the respective year, as in method 1, but such that, together with similar amounts from other years (and with or without interest accretions), the renewals of succeeding years may be made as required.

Method 1 is the so-called replacement method. While it may be logically applied to a large steam railroad-track system, for instance, where, after the property has aged somewhat, renewals year by year become quite uniform, this method does not apply *in toto* to public utilities such as the one here under consideration. It does not apply *in toto*, because of the great lack of uniformity from year to year in the amounts represented by expiring property items. Required renewals may be very heavy one year and very light the next, so that method 2, in part at least, becomes an absolute necessity in order that a reserve for future heavy renewals may be created. Potomac Elec. Pr. Co. (D. C.) P. U. R. 1917-D. [The commission then considers straightline (a) and sinking fund (b) depreciation.]

The commission holds that the respondent company not only may justly set aside out of its earnings an amount sufficient to provide a reserve for depreciation which will adequately protect its capital against impairment but further than such a reserve must be provided before there is any revenue which may properly be called new earnings. This proposition is not controverted. * * * In connection with the depreciation reserve it is proper for this commission to bear in mind that no possible benefit can accrue to the public through the establishment of an inadequate percentage for a depreciation reserve. The ability of a public utility to promptly substitute efficient and approved apparatus for that which is worn out and inadequate, and therefore, its ability to give good service, and ultimately even its solvency, are dependent upon an adequate depreciation reserve. Birmingham vs. Southern Bell Teleph. & Teleg. Co. (Ala.) P. U. R. 1919-B, 792.

* * * In order that it may not be thought that we have confused depreciation and efficiency let it be here said that we fully realize that a given machine may be apparently performing its work in an entirely efficient manner, and still, during the passage of years, have worn to a point where its value has practically disappeared for the reason that the old machine will have to be replaced by a new one. * * * The money to make this replacement must come from somewhere, and to meet this need modern business men have evolved the plan of setting up a depreciation reserve fund. Churchill vs. Winthrop & W. Light & P. Co. (Maine) 1916-F, 764-5-6-7.

The fact that plant of a public service company is operated at 100 per cent efficiency does not entitle company to a plant value of 100 per cent of value new. Salinas City vs. Coast Valleys Gas & E. Co. (Cal.) P. U. R. 1915-B, 460.

Companies make a serious mistake if they do not segregate depreciation renewals from ordinary maintenance repairs and lay down some definite rule for caring for depreciation, failure to follow which will at once be apparent. Under ordinary methods of management and accounting, decreased earnings are often compensated for by deferring or neglecting renewals; and little indication of the fact appears upon the face of public records, so that stockholders and investors are misled as to the real financial condition. Holyoke St. R. Co. (Mass.) P. U. R. 1918-B, 212.

EMPLOYMENT OF RESERVE FUND

This fund is kept invested, ordinarily in additions to and extensions of the plant itself, should be earmarked in such a way as to be always easily identified, must be credited with all its accumulations such as interest (if it be in a bank or invested in interest-bearing securities) or profits (if it be invested in additions or extensions to plant). Churchill vs. Winthrop & W. Light & P. Co. (Me.) 1916-F, 768.

The accrued depreciation fund so accumulated should be drawn upon only for renewals and replacements of existing unamortized property, and should remain intact in an individual and separate account (except for such withdrawals as are made necessary to reimburse the investors for future depreciation only.) The fund should be subject to an annual audit by this commission's accountants, and should receive full credit for all interest which it may earn. With the consent and approval of the regulatory body, coupled with proper and judicious utility management, a large portion of the accumulated depreciation reserve either could be invested safely in readily marketable bonds, or could be reinvested to great advantage in extensions and betterments of existing property. Springfield vs. Springfield G. & E. Co. (Ill.) P. U. R. 1916-C, 281.

"Each public utility shall conform its depreciation accounts to the rates so ascertained, determined, and fixed, and shall set aside the moneys so provided for out of earnings, and carry the same in a depreciation fund. The income from investments of moneys in such fund shall likewise be carried in such fund. This fund shall not be expended otherwise than for depreciation, improvements, new constructions, extensions, or additions to the property of such public utility." Public Utilities Act for the Philippine Islands.

Identical or substantially similar provisions are to be found in the public utilities acts of Arizona, California, New Jersey, Ohio, Oregon and Wisconsin. Manila Co. P. U. R. 1915-C, 711.

CONCLUSION

In the opinions of courts, commissions and experts it is sometimes said by way of introduction, that there is a great deal of confusion, misconception and contradiction among the authorities; that is, in the introduction. But fortunately every judge, commissioner and expert—right out of this depressing situation—immediately rallies, and clears everything up and makes matters coherent, consistent and logical, before he gets half way through. If I am allowed a few moments more, I will clear matters all up and make them coherent, consistent and logical. And of course each man that rises on the question must have the same privilege.

Now, for the moment, instead of talking in particular cases, I wish to talk generally on this question of the relative advantages of, (1) paying depreciation as it accrues, and (2) paying it as it matures.

I do not understand that either plan, when adopted, is intended to have any effect upon the time of making replacements. If any of those who advance the 100 per cent-operating-efficiency theory mean that theoretically all equipment may be maintained by successive repairs or minor replacements, they are hardly right, for equipment must not fall too far behind the progress in the industry and the needs of the service. And, moreover, the time comes with almost everything when repairs exceed replacements in cost.

Following is an extract from an authority:

> Electric railway motors purchased fifteen or twenty years ago can still be kept in service. Measured by ordinary standards of service, they can be made to propel the car at a satisfactory speed with minimum delay arising from motor defects. On the other hand, they weigh more per unit than a modern motor, operate at a lower efficiency in the conversion of electrical into mechanical energy and require greater expense for current maintenance. Such old type motors can be kept in service indefinitely by the process of successive repairs. We assume, however, that it is the duty of a public utility to maintain its apparatus in an efficient condition; it is not required to abandon such apparatus before it has served its economical useful life. But after such life has expired there may be a serious question about the right of the utility to continue to earn a reasonable return upon its original investment in portions of plant which are expensive to maintain or keep in service. In any event, the question will be raised. Some means must obviously be provided for retiring from active service and removing from property and plant account, items of physical property which are no longer useful in public service. For this purpose a replacement reserve is esential.

THE THEORY OF THE REPLACEMENT RESERVE

From one of the best of authorities I take the following, bodily:

> The theory of the replacement reserve contemplates that the original cost of property no longer useful will be taken out of the property and plant account by crediting such account and simultaneously debiting replacement reserve with the net loss resulting from such removal. Most of the street railway property was constructed prior to 1915. Since that date there have been very large increases in materials and construction costs and no depreciation reserve could have been created in the past in a sufficiently adequate amount or with any degree of probable accuracy that would provide for the increases in construction or replacement costs. The theory of replacement reserve requires that any excess cost of the replacing item of property over and above the original cost of the property abandoned, shall be debited to property and plant account; this excess cost affords the basis for the issue of securities and basis of increased values for rate-making and public sale purposes. In times past when the cost of replacements was about the same as it was ten or fifteen years previously, it was not so important in accounting practice to distinguish between the replacements that were in the nature of repairs and those that were in the nature of replacements; today the problem has become more complicated and the subject is deserving of the attention of our engineers and accountants.
>
> The problem of providing for replacement of physical property is akin to that of life insurance. A reserve should be created from month to month and from year to year so that it will provide an amount sufficient to take care of replacements of items of physical property at the end of their probable life times. The lowest rates of accrual will be obtained on the assumption of setting up a sinking fund; that is interest is to be allowed on reserve balances. This is the proper conception of the subject from the actuarial point of view and should be followed.
>
> No company that does not provide out of current earnings for the proportions of charges required to meet the maturing obligations of replacements, can be said to be keeping its books in the proper manner. Failure to recognize this obligation to effect future replacements presents an improper or misleading balance sheet of assets and liabilities.
>
> Some years ago it was the theory that a reserve of some specified sum in an amount sufficient to take care of abnormal fluctuations in repairs or replacements from year to year was all that was necessary; in other words, depreciation or replacement reserve was used in the nature of a maintenance reserve for the purpose of equalizing the influence of repair expenditures on the net earnings. This view is not supported by any sound theory or principle; it was developed and followed as a matter of expediency. I have in mind a situation supposed to be conservatively capitalized and operated under the jurisdiction of * * * a commission; * * * for some years it was believed that (a certain) depreciation reserve was sufficient. An inspection of its track and roadway and its equipment will convince even the most optimistic * * * that some means should have been provided for financing the replacement of much of its physical property. * * *
>
> If the electric railway industry had more generally recognized the necessity of currently providing for future replacements there would have been fewer 5-cent fare franchises in indeterminate areas accepted by the electric railways. * * *
>
> No company that is not to-day setting up adequate replacement reserve out of current earnings and that is paying only a reasonable return upon the fair value of its property can be said to be making money.

The same authority points out that if an assumed "Cost-of-Service" franchise fails to make provision for adequate depreciation reserve it is, in fact, a "less-than-cost-of-service" franchise.

> It is accordingly important that public utility companies (a) insist in all rate-making cases upon an adequate allowance for future replacements, (b) in all negotiations for cost-of-service franchises some adequate provisions be made to create such a replacement reserve to the end that the integrity of the physical property and accordingly its investment may not be impaired, (c) that companies recognize on their books of account the necessity of currently providing for future replacements by setting up such credits to replacement reserve monthly as the circumstances justify.

CONCLUSION AS TO WHAT THE AUTHORITIES SAY

Depreciation is a fact. All the authorities agree on this. If there had been one that disagreed, the people in Oklahoma would have had to say that as the doctrine of perpetual dissolution and decay is not universally held, there is nothing in it.

Yet, in fact, I suppose the people in Oklahoma, including the judges who are really all right and certainly as wise as the rest of us, are aiming and striving and hoping and hurrying to get together—now and right along—the money they will need for new clothes and new roofs and new mowers and reapers and probably new autos. And they are paying their fire insurance right along, and their life insurance, which is one outstanding depreciation reserve.

And now for the conclusions:

1. Depreciation is a fact—in law and in nature.
2. In fixing value of a property to determine the amount on which due return rate shall be figured, it is the prevailing practice of public service commissions and courts to take "cost to reproduce new" less depreciation, but this rule has been modified by many of the best authorities and perhaps by all that have passed directly on the question, so that the rule in fact, is as favorable to investors as this: In fixing the value of a property, prudently planned and properly managed, to determine the amount on which due return is to be figured the rule is to take "cost to reproduce new" less that part of the accrued depreciation which the revenues, after paying operating expenses, taxes and a fair return, have been sufficient to provide.

In some cases, too, as we have seen, the authorities have gone farther and refused to allow depreciation on a property excellently maintained.

3. All authorities agree on the principle that in fixing a tariff of rates, it is proper to include in annual requirements any depreciation, as a separate item, not already included in maintenance. But if a company adopts the 100 per cent-efficiency-theory, with the plan of meeting depreciation as it matures, then it can scarcely ask for a depreciation allowance in excess of its maintenance figure.

4. Statutes give directly to the I. C. C. and a number of the State Commissions power to require the utilities under their charge to carry adequate depreciation reserves. The I. C. C. has required a reserve to cover rolling stock. It seems to be the strong opinion of about all the commissions that have considered the matter that depreciation reserve should be carried.

5. The depreciation reserve has perhaps three functions: (a) To provide the money for replacements when made; (b) to equalize annual replacement demand upon revenues; (c) to maintain the integrity of the investment.

If the annual demands for replacement money were to be equal each year, then two of the purposes of a fund—providing the replacement money and equalizing yearly demand on revenues—would be met by either plan.

How many utilities can safely count on equal replacement demand year after year? Let each company figure it out for itself. Of course, figure it carefully, for it is an important matter. But suppose, with the most thorough study, a company concludes that its normal replacement demands will be equal year after year, or that they will vary only with change in revenue—then that company's manager will know that with all the vicissitudes of things he will not make the replacements just according to the survey. Things will not wear as expected; changes in demands will not be as expected; changes in industry and art will not be as expected; financial situations will not be as expected. What will be as expected? I can think of nothing.

But suppose that the demands for replacement money will be quite unequal. Then a depreciation fund certainly does serve the three important purposes above stated: provides money for replacements; equalizes the yearly demand; maintains integrity of investment. To have this fund ready for use is to follow one of the ancient and wise rules—to put something aside for the rainy day. Any company may have rainy days, and they may come on unexpectedly. Many replacements may come on together, and the current year may be utterly unable to meet the requirements. It is another highly desirable thing from every viewpoint to equalize the yearly revenue replacement demand.

All demands on revenues should be equalized so far as these demands accrue equally—for only by equalizing them is the true situation shown. This is why, though we pay three or five years' insurance at one time, yet as the insurance cost accrues constantly, the charge is divided way down to the last division—by months. And so with all sorts of costs.

This distribution shows, to the very highest degree of accuracy possible, the normal expense and this normal expense is what deeply concerns everyone—manager, board of directors, stockholders, bankers, possible investors, public service commissioners, the people—everybody.

Then, finally, should all adopt the theory of the reserve fund? There is nothing in the way, so far as I see. It will do no harm even with those companies which are to have uniform demands far into the future. And if they have made some error in their calculations, a reserve fund will be desirable.

The commissions all allow a yearly depreciation charge in fixing rates. They naturally will figure a charge or rate fairly uniform over a period of years. Then if a company does not spend all this allowance in a given year, what is it going to do with the balance? If it finds it has to spend more, where is it going to get the money?

By all means, the theory of the depreciation reserve should be adopted, and the practice also, as soon as means permit. And companies should go after rates and economies that will provide the means for the fund.

And the fund should be liberal. Experienced railway men and their friends, the manufacturers, can foresee a great deal, but not everything. In this active age, it is the tendency to accelerate in all things, even in change. An immense number of factors will determine future replacements, and some, and even a liberal, allowance should be made for the unforeseen. I recall to you the striking words in the Birmingham case which were written only this last year:

> * * * In connection with the depreciation reserve, it is proper for this commission to bear in mind that no possible benefit can accrue to the public through the establishment of an inadequate percentage for a depreciation reserve. The ability of a public utility to promptly substitute efficient and approved apparatus for that which is worn out and inadequate, and, therefore, its ability to give good service, and ultimately even its solvency, are dependent upon an adequate depreciation reserve.

Public Utilities of Indiana Organize

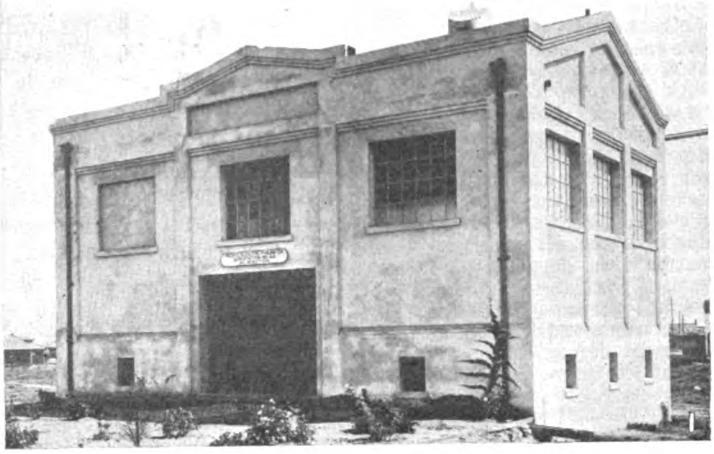
INDIANA public service companies have organized the Indiana Public Utility Association, the purposes of which are to consider common problems of the members and to enlist public co-operation in a movement to improve standards of service, despite the high cost of living. The officers of the new organization are: President, Charles L. Henry, Indianapolis & Cincinnati Traction Company; vice-president, Harry Reid, president Interstate Public Service Company; treasurer, Charles C. Perry, Indianapolis Light & Power Company; secretary, Thomas Donohue, manager Lafayette Electric, Gas & Heating Company and secretary of the Indiana Electric Light Association. The membership includes gas, traction, light, heat and power, water and telephone service.

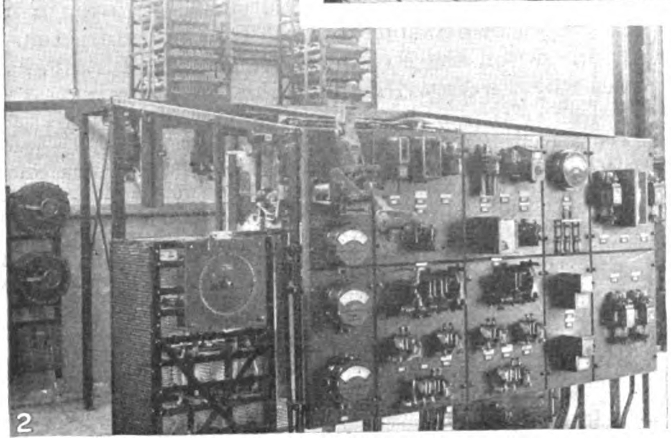
The organization issued the following statement outlining its purposes subsequent to its organization:

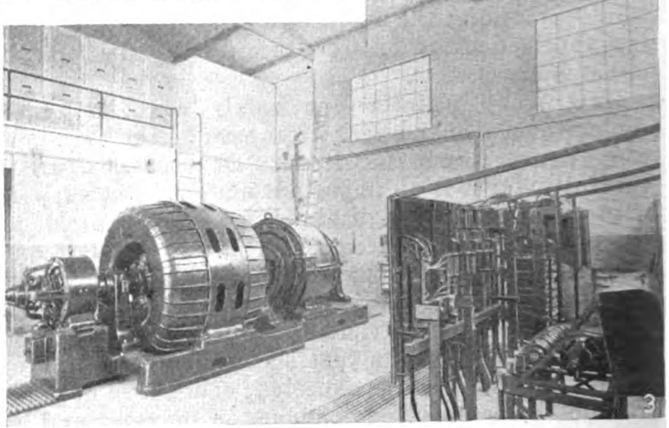
> Public service companies throughout the United States are facing a critical situation because of the continually advancing costs of material and labor. The situation in Indiana, where it is almost impossible to advance rates in step with increasing costs, is typical of the national situation. Rates for public service are more or less static. They are fixed and they stay fixed until such time as, after much legal procedure and necessarily slow financial investigation, they can be shown to be insufficient. Service is frequently impaired, and the companies suffer losses while the public suffers inconvenience until rates can be readjusted.
>
> The public is usually in no mood to put up with poor service or with facilities outgrown since war days, and because all other service and commodities have been and are increasing in price, the public is resentful of new increases. On the other hand, public service companies provide common service and rightfully expect some measure of co-operation from the public.
>
> They must, therefore, find sufficient income to meet increasing labor and material costs to maintain and improve pre-war standards of service. At this period their problem is especially difficult because maintenance and replacement materials, as well as operating materials, such as coal for example, have increased in price.

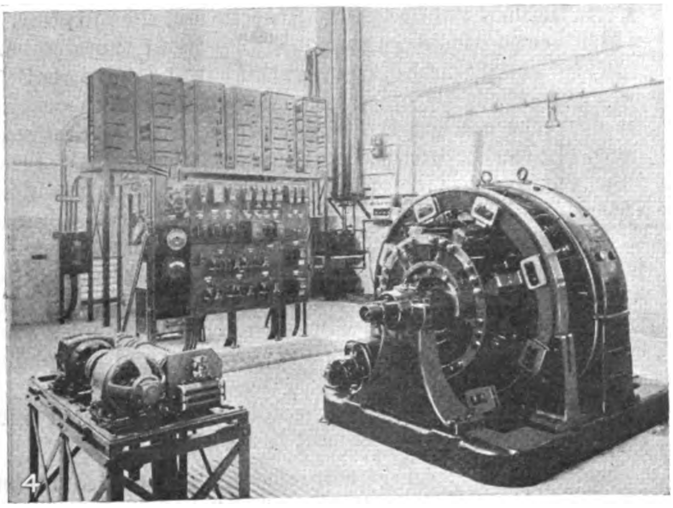
Automatic Substations on the Pacific Electric

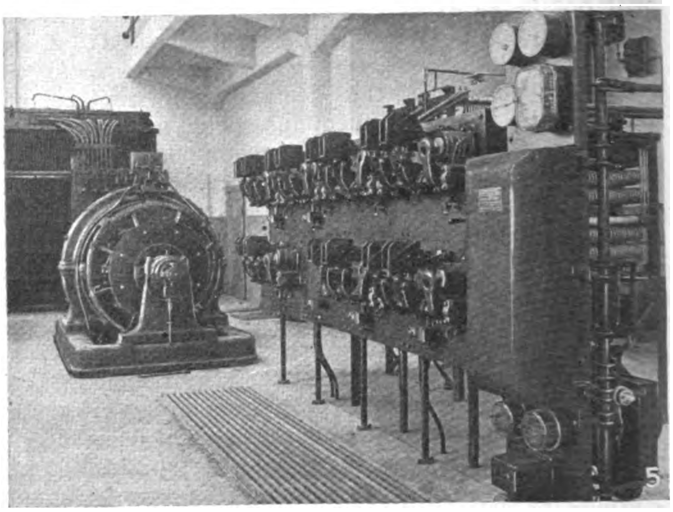
Operation of these substations has resulted in uniformity of load and power economies.

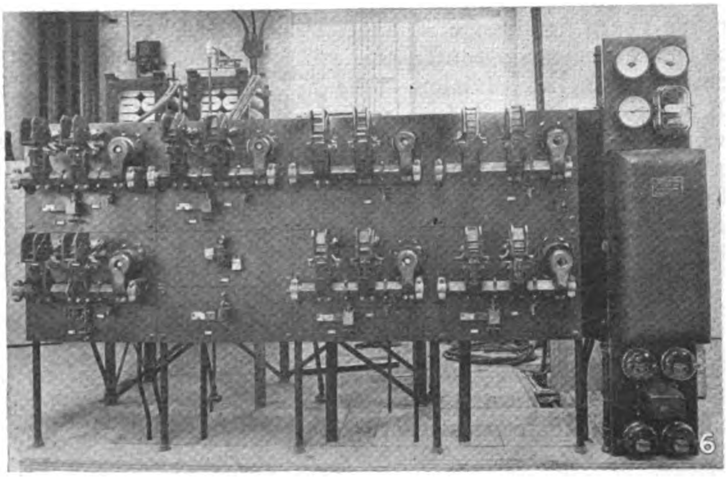












No. 1—Plastered brick building for automatic substation at Wilmington.

No. 2—Interior of the Wilmington automatic substation.

No. 3—Switchboard and control apparatus in Wilmington substation.

No. 4—1000-kw. rotary converter and automatic control equipment in Slauson Junction automatic substation.

No. 5—Rotary converter, transformer and automatic control equipment in Torrance substation.

No. 6—Front view of the switchboard in the Torrance substation.

Automatic Substations on the Pacific Electric

Three of 1000-Kw. Capacity Are Now in Service with Two Others Under Construction—Load Uniformity and Increased Power Economies Are Secured

THE Pacific Electric Ry. has recently put in service three automatic substations, and has two more under construction. The three already completed are of 1000-kw. capacity and are located at Wilmington, Slauson and Torrance. Of the other two, that at Hermosa will be 1000 kw. and that in Los Angeles will be 1500 kw. This construction programme was given in the ELECTRIC RAILWAY JOURNAL for Sept. 6, 1919.

These stations are all arranged to start up automatically whenever cars in their vicinity cause the trolley voltage to drop below 450. They automatically shut down when the load has decreased to less than 500 amp. for ten minutes. These control limits can be varied as desired from 250 to 750 amp. and from two to twenty minutes. In case the load at any time during operation exceeds that which it is safe for the equipment to carry, resistance is automatically inserted in the circuit to reduce the load, or if a bad flashover occurs on the commutator the station automatically shuts down.

The station at Slauson transforms 15,000-volt, 50-cycle, three-phase alternating current to 600-volt direct current, using a 1050-kva., 15,000 to 430-volt transformer and a 1000-kw., six-phase, 430-volt synchronous converter. The building is of brick with plaster exterior and is fireproof throughout. On account of the automatic operation of the equipment, high windows only were installed and ventilation is provided through the roof and at the base of the walls.

At Wilmington the substation is similar to the one at Slauson except that a 1000-kw., 15,000-volt, three-phase, 50-cycle alternating current to 600-volt direct current motor-generator set is used instead of a synchronous converter and transformer. At Hermosa and Maple Avenue the same equipment will be used as at Slauson except that at Maple Avenue the capacity will be 1500 kw.

HOW THE APPARATUS OPERATES

The accompanying illustrations show in detail all the automatic equipment at the Torrance station except the oil circuit breaker which is on the high-tension side of the three-phase transformer located on the balcony above the switchboard. In this station the control circuits are set so that if the voltage drops below 450 and remains there for two seconds the station starts up automatically, provided the alternating current voltage is not below a predetermined amount. The order of operations is as follows: The oil circuit breaker on the high-tension side of the transformer closes, then the starting switch closes. The polarized relay starts to operate and if the voltage of the rotary builds up on the proper polarity, connections are made which drop out the starting switch and allow the running switch to close. The brush lifting device then lowers the brushes onto the commutator, the direct current contactors close and the machine is connected to the trolley and feeder circuits.

The starting panel, located just in front of the transformer, carries the starting and running switches and the field-reversing switches. The brush-lifting device for alternating current starting is mounted on top of the converter frame. When the station shuts down this device immediately lifts the brushes and is in starting position.

The small box-like arrangement on the commutator end of the converter and armature shaft is an overspeed relay. On the pedestal on the opposite end of the rotary is the small cylinder containing the bearing thermostat with which each bearing is provided. Overspeed relay and thermostats are connected in the control circuit so that either an overspeed or a hot bearing will close down the station. When shut down in this way the station does not start automatically until an attendant comes and closes the control circuit.

At the left of the switchboard there are three contactors in the generator circuit. The four on the two panels to the right are in the feeder circuit. Still further to the right is the control panel. This carries at the top direct current voltmeter, ammeter, reactive-factor meter and watt-hour meter. The major portion of the control relays are under the cover. Below this are the low-voltage relay, reverse-current relay and overload relay. The resistors to be inserted in the direct-current circuit of the rotary and the feeders in case of excessive overload are behind the switchboard.

ACTION WITH WRONG POLARITY

When the rotary starts, in case the direct current voltage comes up at the wrong polarity a relay reverses the field. If the voltage comes up wrong three times in succession the alternating-current starting switch trips out momentarily to allow the rotary to slip a pole. It continues to reverse the field and open the starting switch until the voltage does come up at the right polarity, and until this occurs the running switch cannot close.

The contactors for connecting the rotary to the control and feeder circuit cannot close until the brush-lifting device has allowed the brushes to come down solidly on the commutator. In addition to the thermostats in the bearings, others are located over the resistors in the feeder and rotary converter circuits. In case a load comes on to the rotary over a certain predetermined amount, contactors on the panels open and insert resistance in the circuit for holding down the load on the rotary. If this overload continues a sufficient length of time to warm up the resistance sufficiently to make these thermostats operate, they will cut the machine off the line entirely. After the resistance has cooled down sufficiently to allow thermostats to cool off, the machine will come back on the line automatically.

In case a sustained overload on the rotary causes the temperature of the machine to rise above a certain point, a thermostat opens the control circuit and shuts down the station. When the thermostat has had sufficient time to cool off, the station will automatically start again. In case the alternating-current voltage is

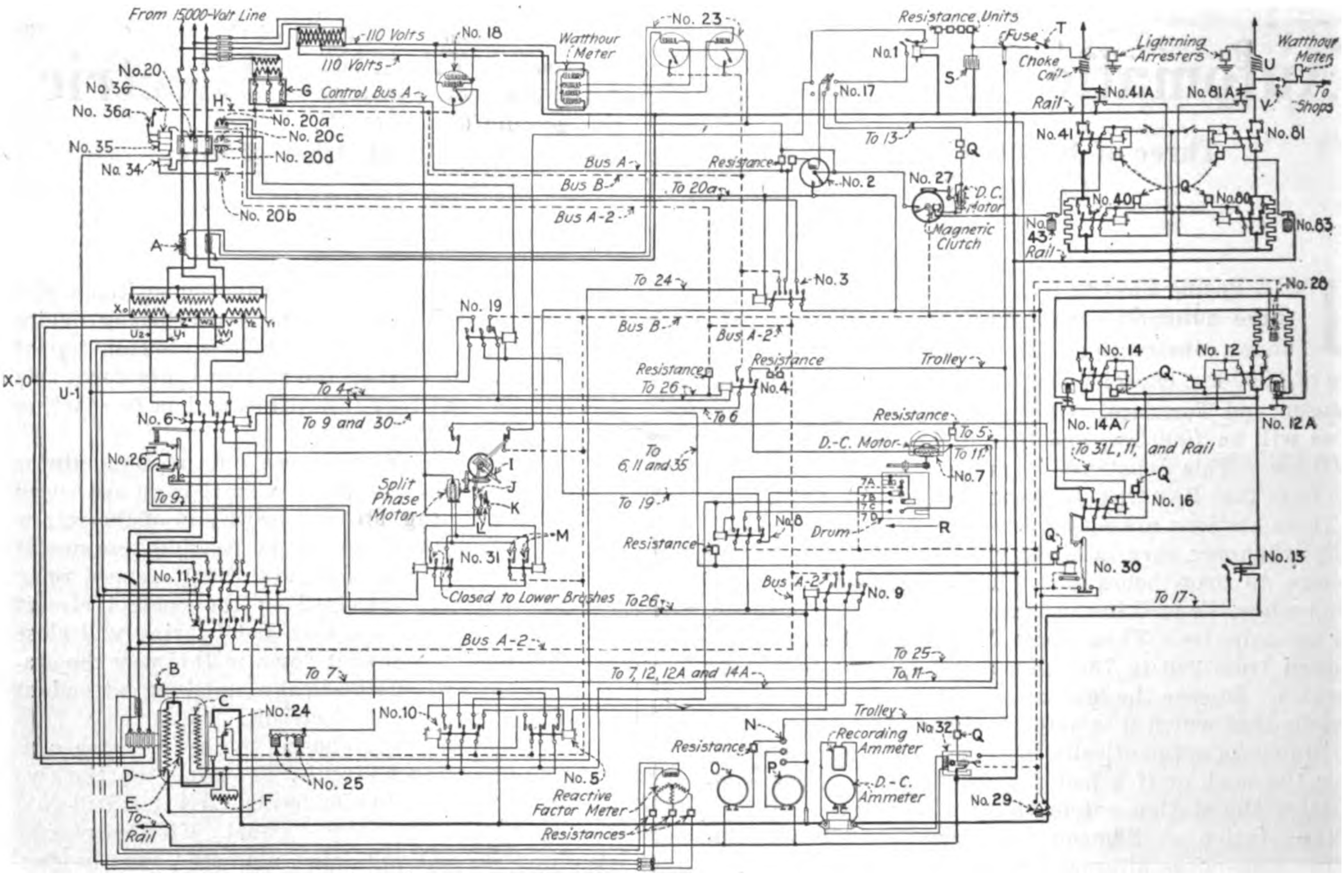

From 15000-Volt Line
110 Volts
110 Volts
Control Bus A
No. 18
Watthour Meter
No. 23
Resistance Units
Fuse
T
Lightning Arresters
Watthour Meter
To Shops
No. 1
S
Choke Coil
U
No. 41A
No. 81A
V
Rail
No. 17
No. 20
No. 36
No. 36a
G
H
No. 20a
No. 20c
No. 20d
No. 35
No. 34
No. 20b
Bus A
Bus B
Bus A-2
To 20a
Resistance
No. 2
To 13
Q
No. 27
D.C. Motor
Magnetic Clutch
No. 41
No. 81
No. 40
No. 80
No. 43
No. 83
Rail
A
To 24
No. 3
No. 28
X
U2
V1
W1
Y2
Y1
X-0
U-1
No. 19
Bus B
Bus A-2
Resistance
Resistance
To 26
No. 4
Trolley
No. 14
No. 12
No. 12 A
No. 14A
To 31L, 11, and Rail
No. 16
No. 6
To 4
To 9 and 30
To 6
Resistance
D.-C. Motor
To 5
To 11
No. 7
No. 26
To 9
Split Phase Motor
I
J
K
L
M
To 6, 11 and 35
To 19
Resistance
No. 8
Drum
R
No. 31
No. 30
No. 13
No. 11
Closed to Lower Brushes
To 26
Bus A-2
No. 9
To 17
Bus A-2
To 25
To 11
To 7
To 7, 12, 12A and 14A
B
C
No. 24
No. 10
Trolley
N
Recording Ammeter
No. 32
Resistance
O
P
D.-C. Ammeter
No. 25
D
E
To Rail
F
No. 5
Reactive Factor Meter
Resistances
No. 29

DIAGRAM OF ELECTRIC CONNECTIONS FOR THE TORRANCE AUTOMATIC SUBSTATION OF THE PACIFIC ELECTRIC RAILWAY

Key to Numbers and Letters on Diagram

No. 1. Direct-current contact-making voltmeter, contact closed on low voltage.

No. 2. Alternating-current relay.

No. 3. Alternating-current relay.

No. 4. Alternating-current relay.

No. 5. Main shunt-field switch.

No. 6. Main alternating-current starting contactors.

No. 7. Polarized-motor relay.

No. 8. Alternating-current relay.

No. 9. Direct-current relay.

No. 10. Reversing field switch.

No. 11. Main alternating-current running contactors.

No. 12. Direct-current resistance-shunting contactor.

No. 12A. Direct-current load-limiting relay. Controls No. 14.

No. 13. Low direct-current output relay. Controls No. 27.

No. 14. Direct-current resistance-shunting contactor.

No. 14A. Direct-current load-limiting relay. Controls No. 16.

No. 16. Direct-current resistance-shunting contactor.

No. 17. Double-pole, double-throw knife switch. Automatic or hand control.

No. 18. Reverse-phase and low-voltage relays. Stops or prevents starting of converter by shunting coil of No. 3.

No. 19. Alternating-current relay.

No. 20. Main alternating-current oil switch.

No. 20A. Interlock in holding circuit of No. 3 relay. Closed when No. 20 is closed.

No. 20B. Interlock in coil circuit of resetting magnet valve. Closed when oil-switch mechanism is not reset.

No. 20C. Interlock in coil circuit of No. 19. Closed when oil switch is closed.

No. 20D. Interlock in coil circuit of resetting magnet valve. Closed when oil switch is open.

No. 23. Alternating-current overload relays. Stops converter by shunting coil of No. 3.

No. 24. Overspeed cut-out and reset. Stops converter by opening coil circuit of No. 3.

No. 25. Bearing thermostats, hand reset. They stop converter by shunting holding coil of No. 3.

No. 26. Field-reversal, polarity-correction relay, reset by opening of No. 6.

No. 27. Low-direct-current-load motor relay controlled by No. 13.

No. 28. Thermostat automatic reset.

No. 29. Direct-current overload thermal relay. Stops converter by shunting coil of No. 3.

No. 30. Lockout relay. Reset by closing No. 16. If No. 16 does not close, No. 30 must be reset by hand after A-2 has been energized three times.

No. 31. Brush operating device.

No. 31L. Closed when brushes are down.

No. 31R. Closed when brushes are up.

No. 32. Reverse direct-current relay. Stops converter by shunting holding coil of No. 3.

No. 34. Resetting magnet-valve coil for oil-switch mechanism.

No. 35. Closing magnet-valve coil for oil switch.

No. 36. Low alternating-current-voltage trip on main alternating-current oil switch.

No. 36A. Interlock in series with closing magnet coil No. 35.

No. 40. Direct-current feeder-resistance-shunting contactor.

No. 41. Direct-current feeder contactor.

No. 41A. Direct-current feeder-load-limiting relay.

No. 80. Direct-current feeder-resistance-shunting contactor.

No. 81. Direct-current feeder contactor.

No. 81A. Direct-current feeder-load-limiting relay.

No. 83. Thermostat automatic reset. Controls No. 81.

A. Series transformers.

B. Shunt-field rheostat.

C. Shunt field.

D. Series field.

E. Interpole field.

F. Series-field discharge resistance.

G. Triple-pole, single-throw fused switch (fuses inclosed).

H. Control bus D.

I. Bus-lifting arm.

J. Contacts closed when brushes are up.

K. Contacts closed when brushes are down.

L. Limit switch.

M. Contacts closed to raise brushes.

N. Voltmeter switch (plug receptacles).

O. Recording voltmeter.

P. Direct-current voltmeter.

Q. Resistance.

R. Drum. Direction of rotation when polarity is correct is as indicated by arrow.

S. Condenser.

T. Snap switch.

U. Choke coil.

V. 800-amp. circuit breaker.

too low, a relay prevents the station from starting. A lockout relay is set to lock out the station in case the machine tries to start up three times in succession and is prevented from getting on to the line due to any trouble arising before all three direct-current contactors close. If the station should be locked out due to this cause, it cannot start automatically until an attendant comes and resets the relay. A reverse current relay opens the control circuit and cuts the rotary off of the line in case of reversal of current.

All of the equipment in the automatic substation at Torrance was supplied by the Westinghouse Electric & Manufacturing Co. That in the other stations mentioned was furnished by the General Electric Co.

Recognize the Accounting Department

The Accounting Officials Are In Possession of Information Which They Would Be Pleased to Place Before Their Associates

BY I. A. MAY

President American Electric Railway Accountants' Association and Comptroller the Connecticut Company, New Haven, Conn.

FROM inquiries and observation it has become increasingly evident to me that executives and operating heads of electric railway companies throughout the United States do not secure the maximum possible assistance from their accounting departments and accounting officials.

Too long have the accounting officials been more or less overlooked in the councils and in the affairs of the companies. The operating men, not all of them but some, will perhaps say in answer to this, that the accounting official and his staff are of secondary consideration. Let me call the attention of those men to the fact that certain features of accounting and financing were considered before their road could even be built.

Accounting is the very foundation of successful business. If not, why is it common to read in a report concerning the failure of a business that certified public accountants are now working on the books and not until they have completed their work can anyone learn the exact status of the business venture?

The very art of intelligent economy, which every executive and operating street railway man is endeavoring to apply each day, is, in my opinion, dependent upon scientific accounting. In this advanced day of the art of excellent street railway accounting there is no other official of the corporation who has a clearer mental picture of the road and its affairs in general than the accounting officer, with the exception of the president or general manager. On many roads there are from two to a dozen officials other than the two mentioned above who would probably be consulted before the accounting officer in conferences, meetings, inspection trips, etc. With proper recognition at all times of the accounting official I believe the tasks of other officers of the company would be easier and the corporation would profit thereby.

To illustrate, in a very simple way, some of the thoughts expressed above let us take the case of a contract. Contracts and agreements are invariably submitted to the legal department, or to a lawyer retained by the company, who very properly passes upon the form of the contract and its legal aspects. Then, as a usual thing, the contract is signed by the parties concerned. Seldom is it submitted to the accounting official. He, perhaps, might not have any suggestions to make from his standpoint, but the chances are that he would have helpful comment to make.

For instance, an article in a certain contract reads: " . . . to pay the railway company the sum of $1,712 per annum, this representing the interest and depreciation on the transmission line at 6 per cent based on its first cost of $28,525." There is no other reference in the contract to this payment, and the first question that naturally comes to the accountant's mind is as to the date on which this payment is to be made. That is, was a prepayment contemplated, or was the payment to be made at the end of the year, or in quarterly or semi-annual installments?

If this contract or a copy of it had been submitted to the accounting officer, there would no doubt have been a provision inserted to cover this very point. This would have saved considerable correspondence and possibly have saved the company further expense from lawsuits or otherwise.

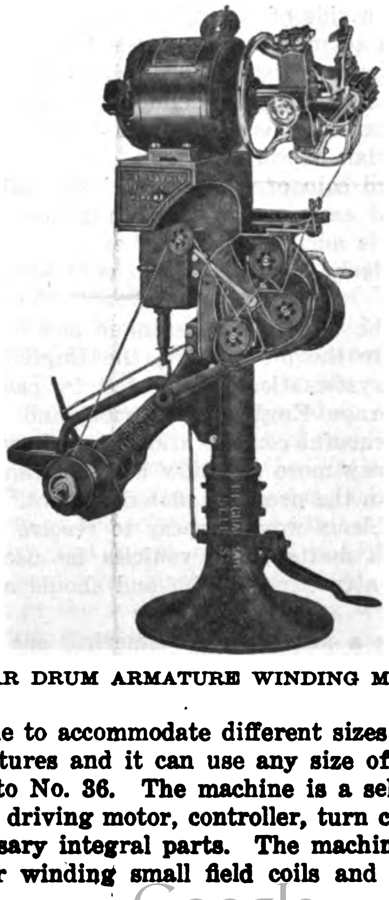
Many similar questions arise in the every-day routine of electric railway companies, and if executive and operating officials will utilize the knowledge of their accountants, they will not only find their own work very much lighter, but will have performed a service to their corporation in saving it money. Moreover, they will have assisted in bringing about the proper recognition of the accounting profession.

Each executive, of course, will have to work out his way of bringing about the desired results. The chief executive of the company with which I am connected holds what are known as staff meetings and all officers and heads of departments are notified to sit in at these meetings where questions of all kinds are discussed helpful to all concerned.

If there are executives in the country who do not agree with my views of the importance of scientific accounting or the proper recognition of the accounting official, it would be a pleasure to read their replies in later issues of this paper.

Machine for Winding Small Armatures

A SMALL winding machine suitable for winding the armatures of small motors such as are used by electric railways for ventilating fan equipment or electrically driven heating systems has been placed on the market by P. E. Chapman, St. Louis, Mo. The model is adjustable to accommodate different sizes of bi-polar drum armatures and it can use any size of wire from No. 20 up to No. 36. The machine is a self-contained unit with a driving motor, controller, turn counter, and other necessary integral parts. The machine may also be used for winding small field coils and relay coils.



BI-POLAR DRUM ARMATURE WINDING MACHINE

Impressions of the English Melting Pot

The One Penny Coin, Like the American Nickel, Is an Obstacle to Higher Fares—Possibilities in the Way of Improved Equipment

By W. Tuke Robson

Recently General Manager and Engineer, Southampton Corporation Tramways, England

THE tramway fare problem in England presents a very interesting, if disquieting, problem at the present time.

When the war came upon us in 1914, English managers anticipated a bad slump in traffic receipts, but like so many other things which happen in times of war, precisely the opposite occurred, and the opening of 1915 found practically every British tramway undertaking facing an altogether different problem, that of providing an adequate service for a vastly increasing traveling public with a sadly depleted staff and labor market. The introduction of female labor helped to solve this, and one of the outstanding successes of British tramway war measures was the woman motorman, who proved herself to be equally as careful and handy as the average motorman and a good deal more so than the casual male employee available during the war period.

In this way practically every British tramway undertaking found things fairly booming and enjoyed higher receipts per car-mile than ever before. The gradual but ever-increasing growth in wages and material, however, made itself felt by the end of 1918, and further wage advances, together with the natural falling off in receipts after Armistice Day, made increased fares on most systems inevitable.

While it is true that the larger undertakings which were giving a ride of several miles for one penny could easily afford to increase the fares, the same cannot be said of the smaller systems whose limited mileage meant the existence of a clearly-defined dividing line beyond which the careful passenger would not go but would take pedestrian exercise instead.

A standard coin of somewhat higher value than one penny would ease matters, but until decimal coinage in England is adopted, the smaller tramway undertakings particularly are faced with a very serious condition indeed.

Just as the American passenger has been carefully trained up to the 5-cent fare, the English passengers have been systematically educated to pay one penny for the average English tram ride, and it became a matter for careful consideration as to how he is to be induced to pay more and how his ride can be made to cost less than the present inflated amount. The answer to both problems would appear to resolve itself into a rolling stock matter; the vehicles he uses should be made more attractive to him and should also cost less to operate.

In paying a first visit to America, one must admit that cushioned seats and easy access offer more attraction to the elusive passenger than the narrow staircases and hard unyielding boards on which we expect our clients to hurt themselves over crossings and switches. On the other hand, we cater for the short-distance rider in a way entirely unknown in America, and we leave an ever-open door instead of greeting a belated would-be passenger with a sudden and disquieting air-closed entrance and a bewilderingly vanishing step. Also, in England, we cater to the smokers, and the almost universal practice of providing a lightly constructed saloon on the top of the car has invariably led to an increase in revenue, particularly in the winter.

The pipe-smoking English passenger strongly objects to knocking out his pipe when boarding a car, and on a damp or windy day it is undoubtedly a great source of revenue to provide a commodious smoking compartment for him to finish his matutinal pipe on his rides to business.

The methods of both countries have their points and I hope in a future article to give an Englishman's impressions of the American melting pot, which, judging by the unholy glee shown by press articles on the possibilities of restoring 5-cent fares on those fortunate systems which have secured higher rates, is not entirely non-existent.

To return to English practice, in the writer's opinion, it is quite evident that the situation may be saved by bringing about a reduction in working costs and at the same time induce a greater popularity by improving the cars themselves. It is obvious that people are becoming more and more used to luxury in traveling, owing to automobiles, taxis and comfortable motor *chars-a-banc*, and the time has come when our English tramcars should be made much more comfortable, both in seating, ease in boarding and alighting, and even in an esthetic sense. The old practice of passengers sitting on hard wood and staring across at each other should give place to transverse spring rattan seats, and nice photographs, which can be well used to advertise the routes traversed by the cars, could adequately be substituted for the usual "Please do not spit" and other objectionable signs and tokens of our street car interiors. The writer has introduced such photographs with success on two English systems, and an experiment in spring seating resulted in passengers asking what time the car so fitted would be coming along, as they preferred to wait for it.

In a word, popularity is what we should seek to install on every street car system.

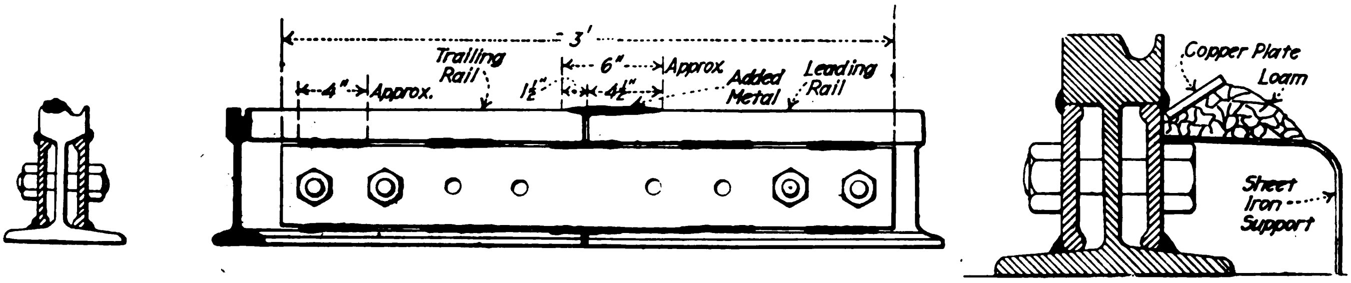
English fare collection methods leave much to be desired, and although zone fares and a very awkward coinage make any radical change difficult, a visitor to America cannot but be impressed by the great avoidance in lost fares, fraud, and platform accidents brought about by the pay-as-you-enter and pay-as-you-leave methods. As a time-saver, the latter appeals to the writer most, as passengers are obviously in a better position to disinter the shekels in the car than when making a wild, automobile-dodging rush across a busy roadway.

Pre-purchase of tickets by issue of books at flat or discount rates have been and are being used on some English systems, but the slogan of the "direct cash transaction" has rather tended to discountenance these. Moreover, tickets formed such a small proportion of the whole that they naturally fell into some disuse, but they will probably reappear with increased publicity methods, now that the gold mine era has disappeared. The writer has personally more faith in the street kiosk sale of tickets as used in some Continental towns, and the establishment of compulsory kiosks at all busy boarding points would relieve the conductor of much of of his work and would enable him to be at his proper place, the boarding platform. The avoidance of accidents and missed fares by this means would probably adequately meet the additional expense involved. For small systems and on the quieter routes of large undertakings, light-weight one-man cars are the obvious remedy, and it is not surprising that many of these smaller towns are considering their adoption.

Using the Metallic Arc for Track Welding

Rail Ends Are Welded Together, Low Joints Are Built Up and Fish Plates Are Welded to the Rail

IN THE London *Electrical Review* for Sept. 5, 1919, Cyril J. Hopkins, A. M. I. E. E., described the practice used for several years past by the Sheffield Corporation Tramways of welding its track rails by means of a carbon arc by fusing a metal rod into the spaces around the joints. Since the publication of this article Mr. Hopkins has furnished the ELECTRIC RAILWAY JOURNAL with some additional information which has been incorporated herein. The company has recently changed to the metallic arc for this work and uses covered metal electrodes. A portable motor-generator installed on a covered wagon is used for supplying the welding current at a potential of 70 to 75 volts.



AT LEFT, END SECTION OF WELDED JOINT. IN CENTER, SIDE VIEW SHOWING ARRANGEMENT OF WELDS. AT RIGHT, METHOD OF SUPPORTING COPPER PLATE FOR WELDING UPPER EDGE OF FISH PLATE

The accompanying illustrations show end and side views of a repaired rail joint before grinding. Fish-plates are welded to the rail in five places along their upper edges and five places along their lower edges. These fish-plates have a length of 3 ft. and the length of each of the five welds is about 4 in. Two fish-plates are used per joint, so there is a total of twenty 4-in. welds to be made at each joint. Each weld requires about 1½ ft. of electrode, which is No. 4 S. W. G. Where wear has taken place at the joints, metal is added so as to bring the surface somewhat above the standard height, and it is then ground down to an approximately level surface by motor grinders.

Before the surface is built up, the joint in the rail head is cut out to form a V-shaped groove. For this cutting a current of 200-250 amp. is used. The groove is carried to a depth of not more than ½ in. Before the arc is struck, the rail surface is peppered with a chemical preparation of manganese dioxide to compensate for the material in the rail which the arc would otherwise burn out, so that the hardness of the rail is maintained. This chemical preparation is made to adhere to the surface of the rail by first smearing the latter with oil, so that the approaching arc does not blow it away.

To facilitate the work of making the side welds on the fish-plates, a copper plate is supported just below the seam to be welded in order more readily to hold the fusing metal in position. The bar of copper is placed on a sheet-iron support covered with loam and supported on the fish-plate bolts. Two layers from the fused electrodes are added to the upper and lower edges of the fish-plates. As the flux from the electrodes is less viscous than the fused metal, the former runs to the low point at the plate under the influence of the arc, so that no chipping off of the slag from the upper surface of the welds is done before adding the second layer.

Previous to the use of electric welding, the rails were connected by two copper bonds. One of these copper bonds is still retained after welding, more as an assurance against possible defects than as a necessity. The effect of welding the fish-plates to the rail end is to produce smooth operation over the joints and prevent the usual hammer blows occurring. Two operators work with one motor generator, and each operator can weld four joints per day allowing for traffic interruption with a 10-min. service. In a week of 5½ days, 22 welded joints can be made. Allowing for bad weather an average of about 15 such joints will be completed in that time. Assuming an average wage of $14.60 per week, this would give 97 cents per joint as the labor cost, excluding grinding. The following is a summary of the cost per welded joint: Electrodes (bare), $1.57; labor, 97 cents; electrical energy, 61 cents; motor-generator and supplies, 50 cents; total, $3.65.

Endowment for the National Research Council

THE Carnegie Corporation has announced its purpose to give $5,000,000 for the use of the National Academy of Sciences and the National Research Council. It is understood that a portion of the money will be used to erect a home in Washington for the two organizations. The remainder will be placed in the hands of the Academy, which enjoys a federal charter, to be used as a permanent endowment for the National Research Council. The members of the latter body are chosen by some forty of the scientific and engineering societies of the country, and it was organized in 1916. Its efforts during the war were mostly confined to assisting the government in the solution of pressing war-time problems involving scientific investigation.

The Street Railway Bureau of the City of Tokyo, Japan, has designed a new type of car, in which the exit is at the center and entrances are at the two ends. The police authorities have given the bureau permission to omit the safety fender formerly prescribed, and this has permitted an increase in the length of the body.

Association News

Manufacturers Association Adjourns Sine Die

AT A MEETING of the executive committee of the American Electric Railway Manufacturers' Association, held at the Hollenden Hotel, Cleveland, Ohio, Thursday, Jan. 8, 1920, a resolution was passed instructing the turn over to the American Electric Railway Association for the use of the Committee of One Hundred and the funds remaining in the treasury of the Manufacturers Association an damounting to $717.33. It was further resolved that the Manufacturers Association adjoin *sine die* and that the secretary notify all members of the association of this action.

In compliance with a resolution adopted at the Atlantic City meeting of the association on Oct. 7, the bylaws of the American Association previously had been amended so as to provide for the election of five representatives of manufacturer member companies of the American Electric Railway Association to serve as members of its executive committee with equal power with railway members, and these five representatives have been duly elected.

Personnel of Transportation Association Committees Announced

SECRETARY BURRITT of the Transportation & Traffic Association announces the personnel of the committees formed to date for the investigation and report on the subjects to be presented to the 1920 convention. The subjects as approved by the executive committee were outlined in our issue of Oct. 11, 1919.

Committee on Code of Traffic Principles—H. B. Flowers, United Railways & Electric Company of Baltimore, chairman; W. H. Maltbie, United Railways & Electric Company of Baltimore; Judge Fielder Sanders, City Street Railroad Commissioner, Cleveland, Ohio; Paul E. Wilson, Cleveland (Ohio) Railway. Sponsor, A. Gaboury.

Committee on Collection and Registration of Fares—W. J. Harvie, Auburn & Syracuse Electric Railroad, Auburn, N. Y., chairman; R. D. Beatty, Cleveland & Eastern Traction Company, Cleveland, Ohio; N. W. Bolen, Public Service Railway, Newark, N. J.; L. D. Pellissier, Holyoke (Mass.) Street Railway; E. C. Spring, Lehigh Valley Transit Company, Allentown, Pa.; C. W. Stocks, ELECTRIC RAILWAY JOURNAL, New York; A. Swartz, Toledo & Western Railroad, Toledo, Ohio. Sponsors, T. C. Cherry and J. K. Punderford. The Accountants' Association has appointed the following members to work jointly with those of the T. & T. Association: W. A. Doty, Denver (Col.) Tramway; John J. Duck, Chicago (Ill.) City Railway; M. W. Glover, West Penn Railways, Pittsburgh, Pa.; G. W. Kalweit, The Milwaukee Electric Railway & Light Company; I. A. May, The Connecticut Company, New Haven, Conn.; F. E. Webster, Massachusetts Northeastern Street Railway, Haverhill, Mass.

Committee on Express and Freight Traffic Facilities and Costs—A. B. Cole, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., chairman; P. P. Crafts, Eastern Massachusetts Street Railway, Boston, Mass.; J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; E. W. Fowler, Illinois Traction system, Peoria, Ill.; R. B. Hull, Conestoga Traction Company, Lancaster, Pa.; F. D. Norviel, Union Traction Company of Indiana, Anderson, Ind.; W. D. Rodger, Detroit (Mich.) United Railways; C. E. Thompson, Chicago, North Shore & Milwaukee Railroad, Highwood, Ill. Sponsors, G. T. Seely and G. H. Clifford.

Committee on Schedules—Edward Dana, Boston (Mass.) Elevated Railway, chairman; James P. Barnes, Schenectady (N. Y.) Railway; H. F. Fritch, Eastern Massachusetts Street Railway, Boston, Mass.; Herman E. Hicks, New York State Railways, Rochester, N. Y.; Alexander Jackson, Public Service Railway, Newark, N. J.; J. A. Stoll, United Railways & Electric Company of Baltimore, Md. Sponsors, L. H. Palmer and W. H. Collins. This committee is the first to get down to actual work. Its first meeting is to be held at the office of the chairman on Saturday, Jan. 31.

One-Man Cars Discussed at Providence

J. C. THIRLWALL, General Electric Co., was the speaker at the meeting of the Rhode Island company section held on Dec. 11. He traced the history of the development of the safety car and explained the economic features of its operation. He also gave illustrations of the application of the car, stating that in one city in Texas the revenue had increased 70 per cent since the installation of one-man cars, which are operated at a cost slightly greater than that of the former heavier cars. The speaker was bombarded with questions after his address. The entertainment features of the meeting comprised violin, piano and orchestra music, and a collation served by a local caterer.

Problems of Our Business the Subject at Newark

PRESIDENT T. N. McCARTER, Public Service Corporation, on Jan. 15, spoke before the Public Service company section at its regular meeting. Mr. McCarter took as his subject, "Some Problems of Our Business" and emphasized the importance of each employee doing "just a little more" toward toning up the business in an endeavor to secure the good will and co-operation of its railway patrons. At the conclusion of his remarks he was given a rising vote of thanks and pledge of heartiest support by the 300 present.

Following Mr. McCarter's remarks the motion picture "Comrades of Success," one of the safety educational films of the company, was shown by A. J. Van Brunt.

W. H. Shepard presented his report on membership, which showed that during the past year 116 new members had been secured and that the total membership, as of the date of the meeting, was 369.

Water Front Plans Discussed at Chicago

MR. TAYLOR, Chicago Plan Commission, was the speaker at the Jan. 27 meeting of the Chicago Elevated Company section. In his talk, which was illustrated with stereoptican slides, he outlined the plans the commission had in view for the greater utilization and beautification of the water front. The illustrations shown also covered accomplishments in this same direction by foreign municipalities.

Bulletin News Page

Summary of the Principal Happenings of the Industry of Current Interest Since the Last Issue of this Paper Was Published

PRINTED JANUARY 30, 1920

The receivers of the Memphis (Tenn.) Street Railway ask an 8 per cent return on the value of the property of that company.

The surface railways in Chicago are doing better. The earnings, however, are still materially behind those of 1916.

John A. Beeler has presented his second report with reference to traffic conditions in Kansas City, Mo.

The spirit of Francis Scott Key is reflected again in the courageous stand of the Public Service Commission of Maryland in defense of the rights of the public utilities of the State. The opinion of the commission in the Baltimore fare case is one of the most salutary of commission statements ever made. It is a declaration of independence by a public body issued in an age of political pandering.

The increase in the fare of the International Railway, Buffalo, N. Y., from 5 cents to 7 cents, has been indefinitely postponed.

The Boston (Mass.) Elevated Railway earned $343,333 net in December. The operating cost per passenger averaged 8.897 cents, of which labor costs were 4.377 cents.

Only one road in the twelve paid a dividend in New York in 1919. In three years the operating ratio has increased from 66.49 per cent to 81.27 per cent.

A decision of Supreme Court Justice Finch restraining Lewis Nixon, Public Service Commissioner for the First District of New York, and the receivers of the Manhattan & Queens Traction Corporation from taking steps to increase the company's fare, has been sustained by the Appellate Division of the Supreme Court.

A general rearrangement of the railway lines in San Diego, Cal., followed the introduction of the zone system on Jan. 1. Service was suspended on a number of pieces of track no longer considered essential under the new arrangements.

The Public Service Commission for the Second District has authorized the United Traction Company, Albany, N. Y., to raise its fare to 7 cents.

The inquiry which the New York City Board of Estimate is conducting into the affairs of the traction companies of that city, was resumed on Jan. 28.

The service-at-cost arrangement in Cleveland, Ohio, has proved so satisfactory that there is no desire in that city for municipal ownership. This is the opinion of none other than Mayor Davis.

A report on the cost of maintenance and upkeep of track and equipment of the Charleston Interurban Railway has been submitted to the Public Service Commission of West Virginia by George E. Taylor, chief engineer of the commission.

The city of St. Louis, Mo., wants the entire mill tax of $2,400,000 against the United Railways made payable at once, the company having defaulted in the regular quarterly installment.

The Illinois Public Utilities Commission has issued an order directing the Chicago Elevated Lines to sell two tickets for 15 cents. The cash rate will remain at 8 cents.

Following the hearings before the State Public Utilities Commission into the zone system in effect on the lines of the Connecticut Company, the commission has ordered the various parties interested to submit briefs to it by Feb. 24.

The Ministry of Transport in England has, according to cable advices, been asked to take over all the transportation systems in London and administer them along the same lines as those under which the government is now controlling the main line railroads.

The City Council of Seattle, Wash., has passed a resolution favoring the continuance of the present 5-cent fare charged by the Seattle Municipal Street Railway.

The ways are being soaped for launching Detroit's municipal ownership.

A report on the present financial condition and the prospects of the Interborough Rapid Transit Company, submitted by Stone & Webster, indicates that a higher fare is imperative.

Judge McGoorty has denied the application of the city of Chicago, Ill., for a temporary injunction restraining the Chicago Surface Lines from collecting fares in excess of 5 cents.

General Manager Menden of the Brooklyn Rapid Transit Company has been acquitted in connection with the Malbone Street disaster in which more than ninety persons were killed.

Owing to the large number of cases of influenza and pneumonia in New York City, Health Commissioner Copeland has ordered the opening and closing of offices, manufacturing plants and other industries at such hours as will most relieve congestion on the subway, elevated and surface lines.

The superintendent of Seattle's municipal railway wants to spend $1,500,000 in improving the property.

The national associations representing the operators of the electric railways, the electric light plants and the gas works are all protesting against increased prices for coal. It was not their understanding that the strike settlement contemplated a price advance.

There will be no hearing at present before the Rhode Island Supreme Court on the complaints of nine towns concerning the present 6-cent fare in effect on the company's lines.

An interesting contribution toward securing better public relations has been made by the United Light & Railways in publishing a handsome illustrated booklet describing the work of the company and presenting the case of the utilities. The publication will be widely distributed.

The *Railwayan*, official publication of the Kansas City (Mo.) Railways, has compared conditions existing in Kansas City and Philadelphia, Pa., which are responsible for the difference in the rate of fare in the two cities.

The Public Service Commission of the Second District of New York has approved the one-man car only after assurance that the company proposing to use it will install latest improvements for this type of equipment.

Under a recent court decision the Milwaukee Electric Railway & Light Company will be required to obtain interurban franchises from the city of Milwaukee or to cease operating interurban cars within the city limits.

The Federal Court at Toledo has formally extended indefinitely the time for the presentation of plans for the settlement of the Toledo controversy. The company there must give fourteen days' notice of intention to withdraw service.

James R. Pratt, vice-president of the United Railways & Electric Company, Baltimore, Md., has resigned to accept the presidency of the Federal Finance & Credit Company.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Extension at Toledo

More Time Allowed to Draw Up the Toledo Railways & Light Company Settlement Ordinances

Federal Judge Killits at Toledo, Ohio, has made an order extending the time for the inquiry into the proposed franchise settlement plans in the interest of the Toledo Railways & Light Company. It had been announced previously that he would do this. The date set originally for the presentation of plans expired on Jan. 15.

MUST NOTIFY OF DISCONTINUANCE

The present arrangement is practically an open-end one, the order of the court providing that the company cannot at any time discontinue railway service without first giving fourteen days' notice in writing to the Mayor and the federal court.

Another important development in connection with the Toledo case was the defeat in the House of Representatives of the Brach bill, which was intended to confer specifically the authority upon cities to issue general credit bonds to buy or build transportation systems.

Meanwhile arrangements have been made by which the State Supreme Court will grant a hearing probably not later than Feb. 10, and render a decision by March 1 in the city's test case to determine the rights of municipalities to issue general credit bonds under existing laws to acquire street railway systems. This is in the interest of the section of the commission charged with presenting an ordinance providing for municipal ownership.

The service-at-cost division of the street railway commission charged with developing plans for the settlement of the railway matter has resumed the work of going over the tentative ordinance section by section. It was expected that Chairman Ashley of the municipal ownership division of the commission would call a meeting of that body for Jan. 26.

THE COURT'S STATEMENT

The new order of Judge Killits and the memorandum explaining it follow:

> This cause having been heard on Jan. 15, 1920, upon the application of the defendant, the city of Toledo, to modify and extend the dates in the order in this cause entered on Dec. 4, 1919, and it having been agreed in open court by the parties hereto that whatever order in that behalf the court might direct should be entered as of the date of Jan. 15, 1920, now comes the defendant, the Toledo Railways & Light Company, proposing that there be added to the said order of Dec. 4, 1919, a provision effective as of the date of Jan. 15, 1920, being the provision hereinafter recited. It is ordered by the court that said order of Dec. 4, 1919, be and the same is hereby modified and amended by adding thereto as of the date of Jan. 15, 1920, the following:
>
> Provided, however, that the Toledo Railways & Light Company shall not in any event cease operation of its car service in the city of Toledo, except by discretion of the court, until it shall have delivered a written notice of its intention so to do to the Mayor of the city of Toledo and shall have filed a copy of such notice with the clerk of this court at least fourteen days prior to such proposed cessation of service.

The memorandum:

> The defendant, the Toledo Railways & Light Company, has tendered the court a consent which effects a practical extension of time within which may be considered more deliberately and satisfactorily a possible franchise settlement. Reading the provisions in the order of Dec. 4, 1919, the construction must be that with this court rests the responsibility of continuing car service until hope of a reasonable and fair adjustment of the question must be abandoned, if ever, as unrealizable, for should a notice of intent to remove be given by the company to the city, the latter is competent to bring the situation to the court for its consideration.

COURT AGAINST DURESS

> With this understanding, the court is accepting the proposition and is making it a part of the original order. It is obvious that the dates of the original order are now rendered of no consequence whatever. The court is not friendly to a plan which makes it something of a dictator relative to the continuance of car service, and the burden is assumed only because so to do seems to conduct to an earnest effort on all hands to bring the controversy to an end as soon as possible, while affording opportunity to give better consideration to the difficulties of the municipal ownership division than the old limits afforded.

It was reported by telegraph from Toledo on Jan. 30 that the valuation figures covering the railway property of the company had been presented for use in the present negotiations.

Mutual Savings Plan at Atlanta

The 3,500 employees of the Georgia Railway & Power Company, Atlanta, Ga., have organized a mutual savings, investment and building association, naming J. F. Trazzare, superintendent of the employment department, as temporary chairman of the organization committee.

Development of thrift among the employees and the encouragement of home building are the primary objects of the new association. Each employee will be allowed to deposit any portion of his earnings, $1 or more, each week or month as desired, receiving interest thereon. The aggregate deposits will be used to make loans on homes to be built by members of the association, operating along the same lines as ordinary building and loan associations but with the objectionable features eliminated.

Any employee of the company is eligible to membership in the association. The funds will be handled entirely under the supervision of company officials. The permanent organization will be effected at another meeting to be held in the near future, at which time an election of officers will be held.

Palatable Publicity

Case of the Utilities Ably Presented by United Light & Railways Company in Booklet

Frank T. Hulswit, president of the United Light & Railways Company, Grand Rapids, Mich., has had a brochure prepared describing the growth of the company. In it Mr. Hulswit sets forth the policies of the company and tells of a long list of rate increases he has obtained without the least friction. Mr. Hulswit invited the public into his confidence and with its assistance secured fair treatment for his corporations.

FORTY-PAGE BOOKLET

The booklet is entitled "A Progressive Utility." It is 8 in. wide by 11 in. high and contains forty pages and cover. The presentation is extremely artistic from the standpoint of typography and the subject matter is so well presented that the brochure deserves wide distribution among public utilities in general as an excellent piece of public relations work.

Mr. Hulswit is convinced that the public utilities henceforth must be allowed to earn at least 10 per cent, and they should be permitted to earn 12 per cent on the present value of their property in order that the standard of good service may be continued and additional capital be attracted in order to obtain funds for the expansion of property in the many growing communities of this country. Unless this is done it is his opinion that capital will refuse to flow in the direction of public utility investments and the companies will be obliged to get along the best they know how with the equipment in hand, and will not have the funds for expansion of property, no matter how much the community may desire it or be entitled to it.

WIDE DISTRIBUTION PLANNED

In regard to his plans for the distribution of the brochure Mr. Hulswit says:

> We intend to place this brochure in the hands of every commercial banker and investment house in New York, Chicago, Philadelphia and Boston and encourage and foster the gospel of not only a fair but liberal deal for public utilities so that they may prosper and help the growth of the community, for if the public utilities are stunted in their growth we will have the same evil effects that resulted in the trammeling of the railroads of this country to a point where funds were no longer obtainable and railroad managers were compelled to get along as best they could with the equipment in hand, which is rapidly deteriorating so that to-day there is an enormous shortage of freight equipment which cannot be replaced for years to come.

The booklet is profusely illustrated with halftone engravings of the territory in which the company operates and of the company's property.

Seattle Improvement Plans

Mr. Murphine, Municipal Railway Head, Recommends $1,500,000 Be Spent in Improving System

Recommending an appropriation to enable the board of public works to make a careful study of plans for a terminal station in the vicinity of the Denny Hill regrade district and to prepare plans and estimates for a subway extending from this station to the vicinity of Washington Street, Thomas F. Murphine, superintendent of the public utilities department of Seattle, Wash., has submitted to the City Council a program of extensions and betterments to the street railway system aggregating in estimated cost almost $1,500,000.

The improvements suggested by Mr. Murphine constitute the 1920 construction program of the railway department. They were reported to the Council in conformity with a resolution passed by that body calling on all utility departments of the city government to submit estimates of the amount needed for capital expenditures, betterments and improvements in their respective departments during the year 1920.

$1,472,234 IN IMPROVEMENTS

Track extensions and betterments recommended by Mr. Murphine aggregate in cost $662,234 and outlays for equipment $710,000, bringing the total aggregate expenditure proposed to $1,472,234. In addition to these estimates, Mr. Murphine states that in event the Council decides to repave First Ave. and First Ave. South from Pine St. to Atlantic St., an additional outlay of $365,000 will be necessary. It is suggesed that all the expenditures be financed by an issue of utility bonds.

Chief among the items proposed in the new equipment is an appropriation of $500,000 for the purchase of new cars made necessary by the additional trackage that will result from the installation of the extensions recommended in the report by the increase in the city's traffic. An appropriation of $150,000 for remodeling the present type of cars into one-man cars and adding the necessary safety appliances and $60,000 to acquire a location and to construct and equip a carhouse in the vicinity of West Spokane St. complete the list.

National Bodies Protest Coal Price Change

G. W. Elliott, secretary of the National Committee on Gas and Electric Service, addressed a letter under date of Jan. 13 to Mitchell A. Palmer, attorney General of the United States, and to H. M. Robinson, chairman of the National Coal Commission, protesting against proposed increases in the price of coal. Similar action has been taken by the representatives of the public utilities in Indiana in a letter to the President. This protest was referred to in the ELECTRIC RAILWAY JOURNAL for Jan. 24, page 212. The committee of which Mr. Elliott is secretary represented the American Electric Railway Association, the National Electric Light Association and the American Gas Association throughout the fuel emergency.

In concluding his letter of protest Mr. Elliott says:

> The public utilities of the country annually consume approximately 50,000,000 tons of coal, and their serious financial difficulties at the present time, particularly in the case of the electric railways, are quite generally understood and appreciated. They are unable to pass along increased costs of operation owing to the fact that their charges for service are fixed by statutory enactment, franchise provisions or by public service commissions and other regulatory bodies.
>
> If the price of coal under contracts made previous to the settlement are to be subject to increase because of the 14 per cent increase in miners' wages, a very large part of the increase in miners' wages will thereby be passed along to the public, contrary to the general understanding which prevailed at the time that the settlement was made. Had the utilities been advised that such a serious additional burden was to be placed upon them, they would certainly have registered a formal protest at that time to both the Washington authorities and to the local commissions under whose jurisdiction they are conducted.
>
> We would be glad to receive from you a definite statement, which can be forwarded to the utility companies which we represent, as to the policy which the Washington authorities are proposing to pursue pending the final report of the National Coal Commission appointed by the President, in the matter of prices for coal under contracts antedating the strike settlement.

General Manager Menden Acquitted

William S. Menden, general manager of the Brooklyn (N. Y.) Rapid Transit Company, and formerly chief engineer of the New York Municipal Railway, operating the rapid transit lines in the Brooklyn Rapid Transit System, was found not guilty by a jury at Mineola on Jan. 27 of a charge of manslaughter brought against him as a result of the Malbone Street wreck on Nov. 1, 1918, in which ninety-one persons lost their lives. The verdict was brought in by the jury acting under instructions from Supreme Court Justice Callaghan.

The prosecution attempted to prove that a time element signal control should have been installed at the Malbone Street curve to give a proper amount of safety to the passengers. Justice Callaghan ruled that the evidence failed to show that Mr. Menden was criminally negligent in failing to install such apparatus and that an ordinary degree of foresight would not have prevented the accident.

The acquittal of Mr. Menden ends the fourth trial of the six indictments found after the wreck. Edward Luciano, motorman of the train, was the first arraigned. After a long trial he was acquitted. John J. Dempsey, superintendent of transportation, was the second brought to trial. The jury in his case disagreed. Thomas F. Blewitt, superintendent of the Brighton line on which the wreck occurred, was tried and acquitted.

Colonel Timothy S. Williams, president of the B. R. T., and John H. Hallock, president of the New York Consolidated Railroad Co., which operates the Brighton line, were also indicted, but have not been tried.

Detroit Measure Advanced

Street Railway Commission Passes Back to Council Ordinance for City-Owned Railway

The members of the newly appointed Street Railway Commission of Detroit, Mich., after conferring on the provisions of the Castator railway ordinance, referred the ordinance back to the City Council with their recommendations. The commission favors the passage of the ordinance and the submission of the proposition therein contained to the voters at the election on April 5.

PLAN COMPLIES WITH CHARTER

The commission studied routes provided for in the ordinance, its financial features and such other data as they considered necessary to arrive at a judgment in the matter, and as a result the ordinance was recommended with only some minor amendments in the wording of the routes described.

The recommendation voiced the opinion of the board members that the plan proposed in the ordinance complies with the charter requirements and at the same time it presents an independent, unified, self-sustaining system of railways which will, in addition, pay for itself so that it will be no expense to the taxpayers. It will afford relief to both downtown and congested factory districts, and has the merit of avoiding duplication of existing lines, and also provides adequate service for districts now without any, so as to meet the needs of the Greater Detroit, the Board states.

In commenting on the Castator ordinance, which was introduced for Mayor Couzens, the fact is emphasized that the present time is the most auspicious that has been presented to the taxpayers during the history of the railway controversy for the people to acquire and own their own lines. The Supreme Court of the State of Michigan and the Supreme Court of the United States have both fixed the status of the expired franchises of the Detroit United Railway, and the remaining franchises are nearing expiration.

The present plan is believed by the board to be the best solution of the transportation problems facing Detroit to-day, avoiding, it is believed, expensive law suits or dickering with the present company.

ORDINANCES PUBLISHED

The ordinance with the amendments suggested by the board was laid on the table and published in the proceedings of the Council. It is entitled:

> An ordinance relative to acquiring, owning, maintaining and operating a street railway system upon the surface of the streets, avenues and public places of the city of Detroit and within a distance of 10 miles from any portion of its corporate limits that the public convenience may require for the purpose of supplying transportation to the city of Detroit and the inhabitants thereof, within and without its corporate limits, and to submit to the electors of said city of Detroit a proposition to authorize and empower the city of Detroit to acquire, own, maintain and operate a street railway system, and to borrow money upon the credit of the city of Detroit to an amount not to exceed $15,000,000 by the issuance of its public utility bonds therefor, and to call a special election to vote thereon.

Interborough Needs Higher Fares

Financial Report by Stone & Webster Shows Large Deficit With Five-Cent Fare

A report by Stone & Webster on the financial condition and prospects of the Interborough Rapid Transit Company has just been submitted to James R. Sheffield, trustee of the Interborough Consolidated Corporation, the holding company. The report covers 103 pages of text and includes 110 plates.

In regard to earnings and expenses the report says (1) that the increase in earnings of both the Subway and Manhattan Divisions will be at substantially the same rate during the coming five years with the enlarged system as during the first five years with the original subway system. (2) That the cost of labor and materials will remain substantially the same as at present. (3) That no notable economy will be made in unit operating costs. (4) That the properties will be maintained in the future at the same high standard of excellence that they have been in the past but that about $865,000 in maintenance items not needed for the safe operation of the road can be eliminated. (5) That during the next five years no considerable track extensions will be built which would become a financial burden to the company. (6) That new money will cost 7 per cent.

Based on these conditions the report estimates that for the five years ending 1924 the effect of an increase in fare respectively to 6 cents, 7 cents and 8 cents would be as follows:

	1921	1922	1923	1924
Six-cent fare				
Increase in gross earnings	$7,424,000	$7,840,000	$8,258,000	$8,672,000
Balance after fixed charges	(*d*) 2,897,000	(*d*) 1,126,000	332,000	1,834,000
Seven-cent fare				
Increase in gross earnings	12,992,000	14,700,000	15,480,000	16,260,000
Balance after fixed charges	1,491,000	4,347,000	6,108,000	7,917,000
Eight-cent fare				
Increase in gross earnings	18,096,000	20,580,000	21,672,000	22,764,000
Balance after fixed charges	5,478,000	8,996,000	11,017,000	13,087,000

(*d*) indicates deficit.

In regard to the insufficiency of the five-cent fare the report finds that the cost of a passenger ride during the years from 1917 to 1920 (inclusive estimated) has been respectively 4.94, 5.52, 6.68 and 7.33 cents for the Manhattan division and 4.17, 4.79, 6.15 and 6.60 cents for the subway division.

In order to earn the amount of money shown in the estimate of earnings and expenses above additional construction expenses will be required. These for the next five years covering shops, cars, power stations, substations, cables and tie lines amount to a total of $42,700,000 of new money which will be needed for operating deficits and construction requirements.

For the fiscal year ending June 30, 1919, the Manhattan Division showed an actual cash loss to the Interborough Company of $4,102,711 which will be increased to $6,402,700 in 1920 by the August, 1919, wage increase. The burden thus imposed by the lease of the Manhattan Company is said to be entirely due to the inadequacy of the fare charged to meet the greatly increased cost of operation. It is estimated that the competition of the Brooklyn Rapid Transit Company after the opening of the Montague Street Tunnel will amount to $65,000 a month loss in gross earnings. However, the further entrance of the Interborough into Brooklyn with the Eastern Parkway Line considerably offsets this competition.

The report states that with the exception of a very small amount of deferred maintenance, estimated at $409,000, the properties were found to be operated and maintained at a very high degree of efficiency.

$8,000,000 Loss on London Buses

Cable reports from London, England, dated Jan. 24, state that the traffic combine, comprising all the local and metropolitan railroads, including the subways and motor omnibuses, has asked the Ministry of Transport to take over these traffic systems and administer them along the same lines as those under which the government is now controlling the main railroads of the country.

According to the *Mail*, the Ministry is willing to take over the railroads, but not the omnibuses, and is preparing to adopt measures for the control of the former.

The application to the Transport Ministry is said to be in consequence of the prospect of a large loss for the year. This prospect led to the recent proposal to ask Parliament to sanction legislation enabling the combine to double the statutory maximum fares. This resulted in a great popular outcry.

The combine with its petition submitted to the Ministry details of revenue and expenditures and estimated the loss for the coming year £2,600,000.

The advisory committee of the Ministry, after examining the figures, came to the conclusion that of this loss £1,600,000 was sustained through running the omnibuses.

City Quiet on Purchase Offer

No action has been taken by the city of Columbia, S. C., on the offer of the Columbia Railway, Gas & Electric Company, Columbia, S. C., to sell its railway property to the city, and the matter has apparently been dropped. The offer of the company was referred to previously in the ELECTRIC RAILWAY JOURNAL. The letter of the company offering to sell to the city bore almost exclusively on the paving question, the offer to sell being based on the theory that should the representatives of the city insist upon paving the company would dispose of the property to the city. There was no question of fares involved. Under the charter of the company it has the right to raise fares without permission of the municipality and the company did raise its fares from 5 cents to 7 cents effective July 1 last.

Kansas Anti-Strike Law

Commission Can Operate Properties if Necessary and Punish Those Who Strike

The Kansas Legislature, called in special session by Governor Allen to adopt laws for settling disputes between capital and labor, has passed the Industrial Court bill recommended by the Governor. Briefly it reorganizes the Public Service Commission by adding to its duties that of passing on labor disputes in certain industries to the extent of taking over the property and operating it if the orders of the commission are not obeyed. The industries thus included are the manufacture of food products, manufacture of clothing, mining and production of fuel and the transportation of any of these products. Penalties are provided for those who refuse to work when ordered to do so by the court and for those who foment strikes.

Mill Tax Payment in Default

Circuit Judge Falkenhainer has ordered the United Railways, St. Louis, Mo., to pay to the city the entire amount which it owes under the mill tax, which is a city levy on passengers carried, or about $2,400,000. The order followed a motion presented by City Counselor Daues. The motion was presented to the court after the United Railways on Jan. 14 had defaulted in payment of an installment of $239,632, with accrued interest amounting to $143,779.

City Counselor Daues said the action was taken to protect the interests of the city, but that no further steps would be taken until the United States Circuit Court of Appeals passed upon the validity of the appointment of Rolla Wells as receiver. If the action of Judge Dyer in appointing a receiver is upheld, Mr. Daues will file a claim for the amount with Special Master Lamm. If the appellate court overrules the appointment, Mr. Daues will then file an intervening petition in the pending suits in the United States District Court.

Under the mill tax settlement entered into last January the company agreed to pay the full amount of the judgment in thirty-six quarterly installments. If a receiver was appointed for the company or a payment defaulted, the entire amount was to become due at once. The city failed to exercise its option when the receiver was appointed, but when payment was defaulted it asked that the entire amount be declared due.

Bus Service for Hartford

A company which is said to have a capital of $1,000,000 has declared that it will start running jitney buses in Hartford, Conn., beginning on Feb. 15, with 5-cent fares and transfers costing 1 cent. Under the State law which went into effect on Jan. 1 of this year the small jitney was put out of business and the buses must be bonded in at least $5,000 each.

The new corporation, which is to be called the Riverside Motor Company, says it will put fifty buses in the field and will maintain service at 15 minute intervals on nine lines from 5 a.m. to 11 p.m., seven days a week. The officers of the concern are: President, Aaron Oevsner, 1725 Fulton Ave., New York City; secretary and transportation manager, William H. Lacey, Hartford; vice-president and general manager, E. H. Newton.

News Notes

Buffalo Wage Payments Made.—The International Railway, Buffalo, N. Y., just before Christmas made the last payment to its employees under the wage award which gave the men a retroactive increase.

Asks Commissioner for Recommendations.—The Senate of New York on Jan. 19 called upon Lewis Nixon, Public Service Commissioner for the First District, to make definite recommendations looking to the solution of the railway situation in New York City.

Practical Public Relations. — After business firms had installed corner boxes for traffic men on the principal street corners to protect them from cold, C. P. Billings, manager of the Wheeling (W. Va.) Traction Co., had electric heaters installed in the boxes.

Bus Service Planned in New Brunswick.—The Middlebux Omnibus Company, recently incorporated under the laws of New Jersey with $2,000,000 capital, expects to begin operation in New Brunswick on March 1. The new company plans to operate 180 buses in New Jersey with New Brunswick as the terminal.

Snow Stops Baltimore Buses.—The snowstorm which swept the eastern part of the country on Jan. 22 and 23 stopped the service of the Charles Street buses in Baltimore, Md., for two complete days. In fact, it stopped practically all of the automobile traffic in that city, few cars venturing to go out. There was no interruption, however, in the electric railway service of the United Railways & Electric Company.

Ohio Road Abandoned.—The Cincinnati & Columbus Traction Company, with an electric railway connecting Cincinnati, Norwood, Milford, Fayetteville and Hiltsboro in Ohio, ceased operations on Dec. 31, 1919, in pursuance to an order from the Public Utilities Commission. The property, which had been in the hands of receivers since April 12, 1913, was sold at foreclosure on Feb. 15, 1919, to holders of the first mortgage notes for $200,000.

Anti-Strike Bill Reappears.—A petition for the continuity of service on all electric railways owned in part or controlled by the Commonwealth of Massachusetts has been presented to the Massachusetts Legislature and referred to the committee on legal affairs. This petition embodies the recommendations of the special committee on street railway matters with regard to continuity of service, generally called the anti-strike bill.

Pushing Public Ownership Plan.—Mayor Thompson of Chicago, Ill., is proceeding with his plans for public ownership of the traction properties. His commission has been holding weekly meetings, but has not yet made a selection of an engineer. The following candidates are said to have been invited to a consultation with a view to the selection of one of their number: L. C. Fritch, H. A. Strauss, C. K. Mohler, R. G. Francois, A. L. Drum, Delos F. Wilcox, Robert P. Woods and C. E. Smith.

Co-operative Stores Proposed. — Plans are being formulated by the employees of the United Railways, St. Louis, Mo., for a co-operative food-store to buy food direct from the producers and sell it at cost to workers. Mathew True, a vice-president of the local union, will put the question to a vote of the members in the near future. The plan is to raise capital through membership fees, and establish one or more stores. Many of the conductors and motormen want the corporation also to enter the coal and ice business.

Rotating the Division Superintendents.—Operating officials of the United Railways, St. Louis, Mo., have decided upon a plan of transferring division superintendents from time to time in an effort to promote efficiency and acquaint the district superintendents with the whole system. The plan has been placed in effect with the transfer of superintendents in the fifth, fourth and eighth divisions. George F. Trotter goes from the fifth to the fourth; Robert E. Lee from the eighth to the fifth and John P. Rice from the fourth to the eighth.

No Need for Municipal Ownership in Cleveland.—Mayor Harry L. Davis of Cleveland, Ohio, in an interview in the Toledo *Blade* of Jan. 17 was quoted as stating that the operation of the municipally-owned water works and electric light plants in Cleveland has been successful, and that, possibly, the time may come when there will be a demand for a city-owned railway system, but, that with the service-at-cost plan in successful operation, there has yet been no demand in Cleveland for purchase of the railway lines by the city.

Bill to Protect Jitney Passengers.—A bill designed to protect patrons of jitneys operating in New Jersey has been presented in the New Jersey Legislature. The measure provides that any insurance company bonding jitneymen in New Jersey must deposit with the State Commissioner of Banking & Insurance the sum of $50,000 for the benefit of any person or persons who may be injured by a jitney. Jitneymen in New Jersey are for the most part insured by companies in New York, with the result that any one injured by a jitney in New Jersey would be forced to sue in the New York courts to secure the money awarded him.

Mr. Twining Urged to Remain.—It is known that Mayor Moore is anxious to have William S. Twining, director of city transit of Philadelphia, Pa., continue at his post permanently if he can be induced to do so and if not, for several months. The Mayor and Mr. Twining have discussed the matter of the latter's continuing as director of transit throughout the administration. It was said that no definite settlement had been reached, but that the director "might stay for some time." If Mr. Twining decides to continue as the head of the transit department he will take a vacation, as he had planned at the end of the Smith administration.

Long and Faithful Service Recognized.—At the beginning of the new year, Bejamin Lyons, motorman and dispatcher on the Coronado Division of the San Diego (Cal.) Electric Railway, was presented with a gold watch by the company, in recognition of the completion of twenty years of service in the employ of the company. In the back of the case is engraved: "Presented by the San Diego Electric Railway, commemorating twenty years of faithful service, 1920." Mr. Lyons has been on the Coronado run ever since entering the employ of the company twenty years ago, operating a car between the Hotel del Coronado and the ferry. The San Diego Electric Railway has made it a practice to present each employee with a watch on the completion of twenty years of service.

Program of Meeting

1920 Foreign Trade Convention

The Seventh National Foreign Trade Convention will be held in San Francisco, Cal., on May 12-15, 1920. It will be the first of these important conventions to be held on the Pacific Coast. In deciding on San Francisco for the convention city, the National Foreign Trade Council was influenced by the growing importance of the Pacific Coast in the foreign commerce of the country, and by the enthusiastic support which the Far West has given all previous foreign trade gatherings.

While the convention itself will be held in San Francisco, it will really be a Pacific Coast gathering, and the cities of Seattle, Tacoma, Portland, and Los Angeles will share with San Francisco in the attention of the visiting delegates.

Financial and Corporate

Service Suspensions

San Diego Company Makes Many Changes Following Installation of Zone Fares

Beginning on Jan. 1, the same day the change of fares became effective, the San Diego (Cal.) Electric Railway made changes in routing of cars, so that all cars now have their terminals downtown. This facilitates the collection of fares under the newly adopted zone plan, and also improves the efficiency of the service in the opinion of the company's operating officials.

Many Lines Changed

The Woolman Avenue and Old Town line, formerly known as Route No. 8, which ran from Woolman Avenue, in the southeast part of the city, through the business district and to Old Town, in the north part of the city, has been cut in two. One of the new routes retains the old No. 8, while the other will be known as No. 5. The new route 8 runs from Third and Broadway in the business district along Broadway, State and India Streets to Old Town (Ramona's home). The now route 5 runs from Third and Broadway in the business center to Fifth, along Fifth to Market Street, thence along K Street to Twenty-fifth, and along Twenty-fifth to Woolman Avenue. The mileage of the two routes is the same as was included formerly in the one.

Service was suspended over what was formerly known as route No. 5, extending along F Street from Twenty-fifth to Arctic, a distance of about 1.7 miles. This route paralleled largely that portion of the old No. 8 route which is now operated as route 5.

Service was also suspended over a portion of route 13, which formerly operated from First and Washington along Third Street to Spruce, then on Spruce to Fourth and on Fourth to Broadway. One block of track was laid on Spruce to carry the cars to Fifth, on which routes 1 and 3 operate, and route 13 also runs from Spruce through the downtown district to L Street on the Fifth Street tracks. Service was suspended on Fourth from Spruce to Broadway, dispensing with the use of 1.5 miles of track. The service on route 13 was increased, however, from a twenty-minute to a ten-minute service.

Beach Line Discontinued

Operation of 2 miles of track on the Ocean Beach line was also discontinued, the cars now stopping at Ft. Foe and Santa Cruz, Ocean Beach, instead of continuing around the Ocean Beach loop constructed by the Point Loma railway. With the change the Point Loma company ceases to be an active operating company, such of its track as is used being paid for on a flat rental basis by the San Diego Electric Railway.

Service was also discontinued for a few blocks on B Street by changing the routing of East San Diego cars to Broadway and the union depot loop instead of B Street.

According to information obtained from the office of M. J. Perrin, manager of transportation, the changes simplify the operation of all the lines.

The company issued a printed bulletin describing the changes in service, which was distributed on the cars and to every residence in the districts served.

$962,546 Net for Standard

This Result Achieved Without Considering Any Profits from Company's Oil Properties

The Standard Gas & Electric Company, Chicago, Ill., earned in excess of 7½ per cent on its common stock in 1919 after the payment of all charges and preferred stock dividends. The foregoing results are without considering any part of a substantial surplus of Shaffer Oil & Refining Company, which has been put back into that property in carrying out its extensive construction program and none of which has been declared out in the form of dividends on its common stock, of which Standard Gas & Electric Company owns the majority.

Earnings of Standard Gas & Electric Company for 1919 were as follows:

Net revenue	$2,960,896
Interest charges	993,781
Balance	$1,967,114
Preferred cash dividends	939,568
Amortization of discounts	65,000
Balance	$962,546

Standard Gas & Electric Company has had the best year in its history with every prospect of further marked improvements in 1920. The Shaffer Oil & Refining Company is carrying out an extensive construction and drilling program on its large acreage in Louisiana, Texas, Kansas and Oklahoma, which it is anticipated will more than double the production of that company during the coming year. The apparatus for the cracking process to be installed at the company's refinery at Cushing is now approaching completion and it is anticipated that this large cracking plant will be in full commission by July 1 this year. This will still further increase the revenue of the Shaffer Company, due to the greatly increased production of gasolene.

It is said that the utility, oil and other properties of Standard Gas & Electric Company enter the new year with the most satisfactory conditions in their history.

Net Income Increase $225,403

Details Are Presented of Earnings of Capital Traction Company for Year Just Ended

The Capital Traction Co., Washington, D. C., reports earnings as follows for the year ended Dec. 31, 1919:

			Increase
Passenger revenue		$4,516,185	$1,025,485
Special car revenue		74	74
Mail revenue		170	*335
Total revenue from transportation		$4,516,430	$1,025,224
Revenue other than transportation		19,230	*19,417
Railway operating revenue,		$4,535,661	$1,005,806
Operating expenses		2,831,159	748,099
Net operating revenue		$1,704,501	$257,706
Taxes assignable to railway		313,334	26,343
Operating income		$1,391,167	$231,362
Non-operating income		12,941	*738
Gross income		$1,404,109	$230,624
Deductions from gross income—			
Interest on funded debt	$280,300		
Interest on unfunded debt	412		
Rent of leased roads			4,569
Miscellaneous debits	4,134		
License free, trackage space	1,200		
		290,616	5,221
Net income		$1,113,492	$225,403
Dividends		720,000	
Surplus for year		$393,492	$225,403
Profit and loss adjustments—			
Credit:			
Balance at beginning of year		497,493	
		$890,986	
Debits:			
Loss on buildings and equipment retired	$390,482		
Uncollected accounts written off	3,067		
Material and supplies adjustments	81		
		393,630	
Profit and loss balance at end of year		$497,355	$138

* Decrease.

Boston Net $343,333 in December

A financial statement for the month of December made public by Chairman James F. Jackson of the board of trustees of the Boston (Mass.) Elevated Railway, shows the company's receipts in excess of expenditures for the month were $343,333.

Chairman Jackson points out that travel is always greater in December than in any other month. The cost of operation during that month is at a minimum.

There was little if any expenditure in December for reconstruction or tracks. There were no snowstorms in December.

From fares alone the company received $2,915,130 and the total receipts from all sources were $2,971,317. The operating expenses were $1,930,386. Of this amount $1,292,919 was for wages.

The total cost of service was $2,627,983. The company hauled 29,538,204 revenue passengers. The company received an average of 10.059 cents from each of these passengers and the cost of hauling them was an average of 8.897 cents each, of which labor costs were 4.377 cents each.

$2,785,000 in Dividends on $250,719,000 of Fixed Capital

Many Significant Facts Brought to Light in New York Commission's Résumé for Year—Only One Company in Twelve Paid Dividend

There are sixty-nine electric railways operating under the jurisdiction of the Public Service Commission for the Second District of New York, using 3,019 miles of single track. Increased rates of fare are in effect in thirty-one cities with increased mileage rates generally outside of cities and villages.

ONLY SIX COMPANIES PAY DIVIDENDS

There were seventy-two companies in operation in 1915 as against sixty-nine in 1919, including seven in the hands of a receiver. Of these companies, eighteen declared dividends in 1915 and six in 1919. The total investment or fixed capital represented in these properties is $250,719,000, upon which the dividends paid in 1915 totalled $2,785,000. The dividend appropriation for the first nine months in 1919 was $176,124. It was $259,555 in 1918.

Results of operating these companies for the first nine months in 1918 and 1919 follow:

	1918	1919
Operating revenues..	$27,273,268	$30,230,430
Operating expenses..	21,614,104	24,360,146
Net operating revenue	$ 5,659,164	$ 5,870,284
Tax accruals.......	1,719,859	1,778,098
Operating income...	$ 3,939,305	$ 4,092,186
Gross income......	$ 4,438,375	$ 4,837,380

The net corporate deficit, after payment of interest charges on bonds and other debts and not including dividends or betterments to rolling stock or tracks in 1918 was $2,498,754 and in 1919 $2,180,801.

An analysis of reports of companies shows that from 1915 to 1918 operating revenues of railroads increased 13 per cent, while operating expenses, including wages, increased 41.6 per cent and taxes 14.8.

These percentages show increased cost of operation in nine months in 1919 over 1918. Operating revenues increased 10.9 per cent, but in the outgo column operating expenses, principally wages, increased 12.7 per cent and tax accruals 3.4 per cent. Net revenue from railroad operation increased 3.7 and the gross income 9 per cent. A decrease of $317,953 was reported in the net corporate deficit of the lines, $2,180,801 in 1919 as against $2,498,754 in 1918. There was a falling off in dividend appropriations of the six companies of $83,431, or $259,555 in 1918 and $176,124 in 1919.

REVENUE PASSENGERS INCREASE

Revenue passengers carried in 1918, 403,427,091, jumped to 425,661,163 in the corresponding nine months in 1919, but there was a falling off of 1,948,864 in revenue car-miles operated.

The operating ratio increased from 66.49 per cent in 1915 to 81.27 per cent in 1918. The ratio of transfers to revenue passengers in 1915 was 25.76 per cent and in 1918 25 per cent, showing that one out of every four passengers was transferred and carried on another line for a single fare.

In its report to the Legislature the commission said:

> That electric railroads are a necessity to the well being and advancement of communities is demonstrated by the fact that from 1915 to 1918 passengers carried on cars increased 40,771,000. This increased use of electric railroad transportation indicates necessity which, it is believed, can not be satisfactorily met by any other present means of transportation.
>
> The net results of operation on electric railroads in this Public Service district, as well as throughout the country, in the past have been such as to threaten the existence of the industry. A number of companies have been forced into receivers' hands and the value of the securities of nearly all the companies has been impaired to such an extent as to make it difficult for them to secure funds to make necessary additions, betterments and improvements.
>
> There are a number of causes to which this result can be attributed, one being establishment of the 5-cent fare in cities during the early days of electric railroad transportation and its continuance through successive periods of so long a duration that the public has come to consider this basis a proper one regardless of conditions affecting the earnings of these companies.
>
> This condition exists in places to the extent that serious consideration has been given the replacement of street railways by other means of urban transportation rather than permit companies to increase fares to provide for increased operating expenses including necessary facilities for proper service.
>
> The use of the privately-owned automobile has had a detrimental effect upon the earnings of railroads within city limits and the competition of automobiles operated for revenue outside of cities, has been an important factor in the impairment of revenues on interurban railroads.

The reason why the net results of operation have approached a disastrous condition, the report continues, can be largely attributed to the abnormal increase in operating expenses and taxes, reports showing that during 1915 and 1918 operating revenues increased 13 per cent, the operating expenses 41.6 per cent and taxes 14.8 per cent.

"Fair Present Value"

Maryland Commission Says This Must Be Basis for Rate Values —A Truly Constructive Policy Necessary

The opinion accompanying the decision of the Public Service Commission of Maryland in passing upon the recent far case in Baltimore is a remarkable commission document, in that the commission states unequivocally that if rates are to be based on value, they must be based upon "fair present value."

The commission further holds that "with the end of the war the time has come when we can no longer be satisfied merely to preserve the *status quo ante* of utilities subject to our jurisdiction." "Rather," says the commission, "has the time come for the inauguration of a truly constructive policy in the case of business enterprises of all kinds, our public utilities included."

PUBLIC VITALLY INTERESTED

The order of the commission in the fare case of the United Railways & Electric Company was referred to in the ELECTRIC RAILWAY JOURNAL for Jan. 10, page 124. The opinion of the commission follows in part:

> If rates are to be based upon value, they must be based upon "fair present value," and conditions are still so far from normal that we would not feel justified at the present time in accepting present-day prices as conclusive of that fair value which should be used as the basis for the making of rates to remain effective for any considerable period in the future.
>
> On the other hand, we would not feel justified in continuing longer to fix rates upon the "war emergency" basis, since the theory of that method of rate-making was merely to preserve the *status quo ante* of the property and business during the period of the emergency created by the pendency of the war. . . .
>
> With the intimate knowledge of the company's affairs, acquired through a period of what is now nearly ten years, this commission is firmly convinced that the present and future welfare of this community requires the preservation of the property of the company, and its continued operation in the service of the public not only unimpaired, but in a position to meet all reasonable demands incident to the growth of the city and community.
>
> While the property of this company nominally belongs to its stockholders, subject to mortgages held by its bondholders, the public itself is interested even to a greater extent than either the stockholders or bondholders in the continued operation and maintenance of such property.
>
> In the case of operation, the public is the first to suffer from inadequate service. Inasmuch as proper service can never long be rendered in any line of business enterprise without reasonable compensation, it is incumbent upon the public to pay for the kind of service it desires, and such public cannot justly complain if it does not receive a character of service better than that for which it has paid.
>
> But the requirements of the public will be by no means fully met merely by a satisfactory operation of the company's present property and equipment.
>
> The city of Baltimore is one of the most important commercial and industrial centers in the country. This growth during the past twenty years has been regular and consistent, and has kept pace fairly well with our other large cities. During this period it has been necessary for the railways company to add to its service equipment and property in order that it might keep up with the community which is has undertaken to serve. During the war the advantages of Baltimore as a commercial and industrial center, and as a place of residence as well, came to be appreciated to a greater extent than ever before with the result that a new impetus was given to our city and it has now fully entered into an era of prosperity and growth the like of which it has never enjoyed at any time in the past. But the city cannot continue to grow to advantage unless the railway system continues to grow as well and keep abreast in all respects with the community which it serves.
>
> It appears by the petition of the company that it now has under consideration plans for the expenditure in the near future of $3,000,000 to $4,000,000 in the purchase of some 300 to 350 cars, the improvement or reconstruction of approximately 40 miles of track and the general improvement of service.
>
> This money is to be expended for the benefit of the public. The surplus which the company accumulated in pre-war times, together with the depreciation reserves which had been accumulated under more favorable conditions, has been exhausted. Therefore the company has no funds at the present time with which to make these improvements. Hence this large sum must be borrowed, and in order to borrow the same the company must have credit with the investing public.
>
> Companies with assets in some instances of a value several times in excess of their outstanding obligations and with assured earnings three, four, five and six times their interest charges, are offering 6 and 7 and in some instances as high as 8 per cent for the use of funds with which to further develop their business.

With such a demand for the use of money, investors are demanding substantial security for their loans, and are insisting that there be both a substantial equity in the property over the amount of funded securities and assured earnings largely in excess of the aggregate interest charges thereon. If less than this is offered, the investors will either decline to make the loan upon any terms whatsoever, or will insist upon an abnormally high rate of interest in order to compensate them for the additional risk taken in making the investment. This last means either that the interest rate itself must be abnormally high or that the securities be sold at a discount which will yield the desired rate.

SECURITY HOLDERS MUST BE PROTECTED

In the case of a public utility, where securities are sold at a discount with the consent of the State regulatory body, the utility is entitled to charge the public in addition to what would otherwise be the cost of the service, the amount necessary to amortize such discount during the life of the security. Where, on the other hand, the interest rate is made abnormally high with the consent of the State regulatory body, good faith requires that the purchasers of such securities be protected in their investment by the fixing of rates which will enable the utility to pay such abnormally high rate of interest.

Thus, in either event, the public is the one to suffer most where the financial credit or any of its utilities is so far impaired, that it is obliged to pay abnormally high prices for the loan of funds to be used in improving its property or service for the benefit of the public. It follows that the prospective investors shall be given reasonable assurances of earnings materially in excess of the company's interest charges.

Pending the establishment of fares based upon a valuation of the company's property or the adoption of a plan, under which fares will be more or less automatically established upon a basis of actual cost of the service rendered, it is the belief of this commission that an earning capacity of one and a half times the fixed charges of the company is reasonable and necessary and in the interest of the public. A portion of the responsibility for earning such balance to surplus should be placed upon the company, and this responsibility can and should be met by the exercise of all reasonable economies and efficiencies on its part. But the commission is not to be understood as undertaking to establish in the future rates and fares estimated to yield such a balance to surplus of $1,500,000, or to increase existing rates in order that they may yield such amount. We merely mean that it is not our intent to refuse such earning capacity, provided the company, by diligent, sensible, economies and good service can produce such surplus. If, in time, the balance to surplus under any existing rate of fare, should come to exceed such $1,500,000, the commission, of its own initiative, will proceed to consider the propriety of reducing rates of fare then in force.

Pending the institution and coming into full effectiveness of such economies and increased efficiency, it was at the date of the original opinion and is now the view of this commission that the rates of fare authorized to be charged by the company should be such as may reasonably be anticipated to yield a balance to surplus of approximately $1,000,000 after the payment of the company's operating expenses, taxes, fixed charges, and the making of reasonable allowances for the maintenance of the property and of its accident and depreciation reserves.

COMMISSION MAY RECONSIDER

In other words, if, after exercising what may seem to the commission to be a reasonable economy and efficiency in the operation of its property, it appears that the company is unable to earn under the established rates such a balance to surplus of approximately $1,000,000 the commission stands ready, upon request of the railway, to reconsider the estimates set forth in its original opinion, and also the rates of fare authorized to be charged by our Order No. 5120 passed pursuant thereto.

But in fixing $1,000,000 as the minimum balance to surplus which the company should be permitted to earn under existing conditions, this commission is not to be understood as undertaking to guarantee such balance to surplus at the expense of the public and at any and all hazards.

It will be noted that we have conditioned our conclusion as to such balance to surplus, first, upon the exercise of reasonable efficiency in the operation of the property, second, upon the exercise of reasonable economies, and, third, upon the expenditures of no more than reasonable amounts for the maintenance of the property and of its accident and depreciation reserves.

$161,536 Deficit in Des Moines

In spite of the fact that the Des Moines (Ia.) City Railway carried 2,169,200 more passengers in 1919 than it did the year previous the company has a deficit of $161,536 on its year's business.

These figures are gained from the annual report of the company made to the City Council by Scott Goodrell, city car supervisor.

Gross receipts for the year were $1,856,097. Operating expenses were $1,492,542.81. The number of revenue passengers increased by more than 2,000,000, but the free passenger list was cut from 1,064,068 in 1918 to 859,889. The number of transfers taken up during the year was 5,604,616. The total number of passengers carried during the year was 41,878,777.

The deficit was caused by the increased wages paid to the trainmen. The amount paid to trainmen in 1919 was $623,851, an increase of $154,240 over the previous year. The trainmen's wages equaled 33.61 per cent of the company's gross earnings. The operating cost per passenger is shown by the report to be 4.6 cents.

Arranging to Resume in Wellsburg

There is a possibility that local railway service will be restored in Wellsburg, W. Va., in a few weeks at the most, according to a letter received by City Solicitor C. J. Jacobs, of Wheeling, from C. P. Billings, general manager of the Wheeling Traction Company.

Mr. Billings has informed the city solicitor that the matter was being taken up with the union relative to the operation of one-man cars in Wellsburg. Under the circumstances it is not thought that the union will insist on the company placing two men on a car from Wellsburg.

A list of stops on both the Pan Handle line and the S. W. & W., to be eliminated will also be submitted by Mr. Billings. In all probability the company will receive the most favorable consideration on this question.

Through the action of the railway in trying to work out a plan to restore the local cars, possibility of court action or the Public Service Commission is eliminated.

Seattle Made $10,659 in Seven Months

According to a report filed by Thomas F. Murphine, superintendent of public utilities, with the Mayor and City Council of Seattle, Wash., the municipal railway, during the first seven months of its operation as a city-owned utility, made a net profit of $10,659. The total gain or profit cleared by the railway between April 1 and Oct. 31, according to Mr. Murphine's report, was $527,883. From this was deducted $460,237, interest on utility bonds; $53,499 being the estimated amount of industrial insurance; and $3,487, which is in addition to damage claims already paid out during the period, on the assumption that the damage claims will total approximately $7,000 a month. The total revenues of the system for the period mentioned are placed at $3,177,365; operating expenses, $2,649,481; total car-mileage by city cars, 9,692,032 miles. The employees' wages have been increased approximately thirty-three per cent, while their working day has been standardized to eight hours.

Receivers Want to Earn 8 Per Cent on $13,158,000 Valuation

The receivers of the Memphis (Tenn.) Street Railway, at a hearing before the Public Utilities Commission of that State on Jan. 16, formally applied for an allowance of $13,158,000 as an amount invested upon which they should earn, and upon that amount they asked a rate of return of 8 per cent and upon additional capital invested hereafter a rate of return equal to the rate upon which such capital is secured.

The receivers placed the present day replacement value of the property at $19,000,000. They further declared that a renewal and replacement reserve should be accumulated from the earnings upon the premium of 4 per cent of the value of the depreciable property. This they contended aggregated $7,761,000.

The receivers also asked for an 8-cent fare. They declare such fare is essential to meet the allowances applied for to render first-class service in Memphis.

The reports of the engineers covering the appraisal of the property of the company were referred to at length in the ELECTRIC RAILWAY JOURNAL for Jan. 10, page 120.

Chicago Traffic Increasing

A statement issued by the Chicago (Ill.) Surface Lines shows the earnings, expenses and passengers carried for December. An interesting feature of this report was the showing as to operating ratio, including taxes, for December, 1919, 1918, 1917 and 1916, the figures being 77.48 per cent, 77.29 per cent, 68.33 per cent and 64.03 per cent respectively.

Comparing December, 1919, and 1918, there was an increase of $1,311,522 in gross earnings, $1,021,953 in operating expenses and taxes, and $313,854 in the receipts which are divided between the city and the companies. Comparing the divisible receipts with a normal period, however, there was a decrease of $98,234 as against December, 1916.

Total passengers for December, 1919, and 1918, were 111,226,671 and 102,679,918 respectively. The average fare per passenger, including revenue, transfer and free, was 3.85 cents against 2.90 cents. Trainmen's wages were $1,470,248, compared with $1,024,705, and total of all wages was $2,229,960, against $1,549,832.

Public Utility Business Is Your Business

The Illinois Committee on Public Utility Information is carrying on in that state a helpful campaign for fair play toward the corporations which furnish public service. The committee has recently distributed thousands of pamphlets entitled "A Letter About Your Business." The letter is addressed to "Mr. and Mrs. Security Holder." It points out that there are approximately 230,000 owners of utility securities in Illinois, and more than 2,000,000 indirect owners or persons who have an interest in the prosperity of savings banks and insurance companies. It also sets forth that fully 70 per cent of the $1,000,000,000 of public utility securities of Illinois corporations are owned within the State.

With these facts as a basis, the security holders are urged to be more active in the safeguarding of *their* property. Comparison is made with the owner of a grocery store, who, if anyone attempted to injure his business, would immediately seek redress. As a part owner in the utility business, the security holder is reminded of his duty to answer unfair charges and let the newspapers know that the corporations which render public service have some friends. He is also told of the helpful effect of writing commendatory letters to public utility commissions and other regulatory bodies upon the rendering of unprejudiced decisions.

Financial News Notes

Bond Issue Proposed in Chicago.—The Chicago (Ill.) City Railway has filed a petition with the Illinois Public Utilities Commission for permission to issue $1,928,000 of 5 per cent first mortgage gold bonds.

I. R. T. Wants Tenders of Bonds.—The Interborough Rapid Transit Company, New York, N. Y., is calling for tenders of its first and refunding mortgage 5 per cent gold bonds due Jan. 1, 1966, to exhaust the sum of $248,218.03, now on deposit in the sinking fund.

New Directors for Warren Street Railway.—Robert H. Jackson and Warren M. Preston, Jamestown, N. Y., have been elected directors of the Warren Street Railway. Mr. Jackson has been counsel for the company for several years. Mr. Preston is vice-president of the company.

Conference on Valuation. — Tusca Morris and A. J. Colburn, attorneys, Fairmont, W. Va., and Chief Engineer Cline, Parkersburg, representing the Monongahela Traction Company, held a conference on Jan. 5 with the engineering department of the Public Service Commission relative to valuation of the properties of the company in Parkersburg to be made by the commission.

Car Trust in Indiana.—The Interstate Car Trust Company, Indianapolis, Ind., incorporated with a capital stock of $225,000, will supply the Interstate Public Service Company with eight new interurban cars for service between Indianapolis and Louisville. The usual car trust certificates will be issued, but the details of the transaction have not been announced.

Car Trust for Trenton.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., has made application to the Board of Public Utility Commissioners for approval of a plan of financing under which the company proposes to buy forty new cars at a total expense of $240,000. The cars will be bought from the J. G. Brill Company and $60,000 must be paid at the time of the placement of the order and the remainder on installments. All the indebtedness for the cars would be secured under the familiar car trust plan.

Court Approves Car Purchase Details.—Judge Julius M. Mayer in an order in the Federal District Court has approved and confirmed contracts made by Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, from the J. G. Brill Company for 200 safety cars. Of the new cars, 108, costing in the aggregate $672,685, are to go to the Brooklyn Heights Railroad; seventy-three cars, costing $454,685, to the Nassau Electric Railroad, and eleven cars at a cost of $68,514 for the Brookly City Railroad. The Brooklyn, Queens County & Suburban Railroad will receive eight cars, costing $49,828.

Ordered to Restore Service.—The City Council of Wellsburg, W. Va., in special session on Jan. 5 ordered C. P. Billings, vice-president and general manager of the Wheeling Traction Company, to restore railway service there immediately. Cars were stopped in Wellsburg six weeks ago, the company taking the position that the local system was not a paying proposition. It was announced that the equipment that had been removed would be used to perfect the service of the company between Wheeling and Steubenville. Mr. Billings said that he would not carry out the order of the Council, but would take the matter up with the State Public Service Commission.

Request to Issue Bonds Withdrawn.—The Public Service Commission for the Second District has closed the application of the International Railway, Buffalo, N. Y., for permission to issue $3,000,000 in ten-year debenture bonds. This action was taken at the request of attorneys for the International Railway asking that the application be withdrawn or discontinued. The present management of the company, it was stated, has come to the conclusion that it is not now practicable to carry out the scheme of financing, as stated in the application, and that some new plan for meeting obligations and expenses outlined in the company's application must be devised. The city did not object to this action by the company.

Illinois Property Transferred. — The physical property of the Southern Traction Company of Illinois, recently sold for $400,000 to C. B. Fox, president of the Aluminum Ore Company, East St. Louis, Ill., has been turned over to the purchaser by William Trautman, receiver. The transfer took place at the Southern Traction Company's offices in East St. Louis. It enables the purchaser to proceed with the work of erecting terminals and improving the road generally. A payment of $200,000 was made when the road was bought. On Feb. 15, $50,000 is to be paid and the final payment of $150,000 is to be made on March 15. The road runs southeast from East St. Louis. It taps valuable coal property, some of which is owned by the Aluminum Ore Company.

Dispute Over Service.—Further testimony was taken on Jan. 26 before Supreme Court Justice Cropsey in Brooklyn, N. Y., to determine whether or not the service effected recently on Harry J. Blackham, general superintendent of the Staten Island Midland Railway, had been legal. The purpose was to determine whether the officers of the company were in contempt of court for alleged violation of the injunction which restrained the officials from discontinuing service on the line. After hearing several witnesses, Justice Cropsey ordered both counsel for the city and the company to submit briefs and adjourned the matter until Jan. 29. The abandonment of service by the company was referred to in the ELECTRIC RAILWAY JOURNAL for Jan. 24, pages 218 and 222.

Bonds of California Road Offered.—A syndicate composed of Blyth, Witter & Company, San Francisco, the Harris Trust & Savings Bank, Chicago, and E. H. Rollins & Sons, New York, have underwritten $840,000 San Francisco-Sacramento Railroad first mortgage 6 per cent gold bonds. The company owns and operates a modern electric passenger and freight railroad of about 100 miles of main and branch lines extending from Oakland to Sacramento, with through trains connecting with ferries, giving direct service to San Francisco. This $840,000 issue represents the entire bonded indebtedness of the company and will be secured by a first and only mortgage on all property. The company showed total interest charges earned 5.88 times for twelve months ending Nov. 30, 1919, and for the past five years the interest charges have been earned in excess of four times. The bonds are of serial issue, maturing 42,000 for 1921 to 1940 inclusive, and are offered at prices to yield from 6¼ to 6⅜ per cent. The bonds are due serially until 1940.

Traffic and Transportation

Court Upholds Fare

Appellate Division in New York Says Legislature Alone Can Authorize Increase in Rates

The Appellate Division of the Supreme Court sustained on Jan. 23 the decision of Justice Edward R. Finch of the Supreme Court restraining Lewis Nixon, Public Service Commissioner for the First District of New York and Receivers William R. Begg and Arthur C. Hume from increasing the rate of fare charged on the lines operated by the Manhattan & Queens Traction Corporation.

The opinion of the court was written by Justice Frank O'Laughlin, all of his associates concurring. The court holds as did Justice Finch, that a contract is a contract; that neither the Public Service Commissioner nor any one else has authority to authorize the railway to charge more than a 5-cent fare, in view of the terms of its agreement with the city, and that relief in the line of increased fare, if needed, must come from the Legislature.

LEGISLATURE HAS FARE POWER

Justice O'Laughlin declares that the necessary permission to lay out and maintain a traction system was granted by the Broad of Estimate & Apportionment on July 15, 1912, being embodied in a formal contract between the city and the South Shore Traction Company, the Manhattan & Queens company's predecessor in interest, the city exacting payments of specified percentages of the gross receipts of the company annually, with a provision for a fixed minimum sum each year, and providing that the company should not charge any passenger a greater fare than 5 cents for one continuous ride from any point on the railway or any line or branch operated in connection therewith, to any other point thereon or on any connecting line or branch thereof within the limits of the city, and that the rate of fare upon the local bridge cars or on through cars entitling passengers to ride once across the bridge should not exceed 3 cents for the bridge transportation. Also that the company should sell bridge tickets at the rate of not more than 3 cents for one, and 5 cents for two, and should carry free all members of the Police and Fire Departments when in full uniform. Subdivision thirteen of section five provides for a forfeiture for any violation or breach or failure to comply with any of the provisions of the grant of contract.

Admitting that the Legislature has power to increase the rate of fare, Justice O'Laughlin said in his opinion:

"Whether the Legislature could deprive the city of its reserved right to declare the grant forfeited for charging a greater rate than that prescribed" should be taken to the Court of Appeals for prompt decision.

In commenting on the decision Lewis Nixon, Public Service Commissioner for the First District of New York, said:

> In all my talks I have stated with all the emphasis I could command that the responsibility was up to the city in the matter of fair increases. In the Manhattan and Queens case a hearing was called merely to bring out the facts. Obtaining a writ of prohibition was one way for the city to avoid responsibility for acting.
>
> When I have the power in any instance no one will accuse me of hesitancy in using it. Let us hope that the decision of the Appellate Division will result in having the law construed so that all will understand it.

Service by Interurban in City May Be Stopped

The city government of Milwaukee, Wis., has procured a court decision that the Milwaukee Electric Railway & Light Company has no right to render interurban service on its Milwaukee city lines, without first obtaining a city franchise for that business, except on certain parts of the city lines where the court found that the company has interurban franchise rights.

In consequence the residents of that city face the prospect of losing after Feb. 1, a service which has been supplied by the company for more than twenty years. Although the service has been a big factor in building up Milwaukee, it has never earned a profit for the company. The company says it can not afford to ask for or accept the interurban franchise on which the City Attorney insists.

The details of the changes in the interurban service necessitated by the decision of the court have not yet been fully arranged, but the company has stated that the changes will be announced in time so that all affected by them may make proper plans in their own interest.

In the decision in favor of the city the court, following an old decision of the State Supreme Court in a similar case, has indicated that damages might be collectable. The company says:

> So doing the city government has set an example which thousands of other owners of abutting property might be expected to follow, if the company, accepting a franchise, should expose itself to that danger. Operating without formal franchise the company cannot be sued for damages. All that it can be made to do is to discontinue supplying interurban service over city streets. This, under the court's finding in the city's suit, we are required to do, beginning Feb. 1. The company is eager to serve, but cannot risk being bankrupted by thousands of damage suits, in order to continue serving for no profit.

The company has signified its willingness to sell to the people of Milwaukee any time the people are ready to buy. The case of the company is being widely advertised by the company itself in its own interest.

New York Case Dragging

Effort Fails Which Was Made by Surface Railways to Speed up Traction Inquiry

The inquiry by the city officials of New York into the need of the traction companies there for additional revenue was continued during the week ended Jan. 31. The city is adhering to the program which it laid down for the conduct of the inquiry by continuing the sessions on the Interborough Rapid Transit Company before taking up the affairs of any of the other companies.

Following the adjournment of the hearings last week Mayor Hylan announced rather blatantly that the city had proved its case against that company. In consequence counsel for the receiver of the New York Railways on Jan. 28 requested that the city proceed to consider the affairs of that company. To this the Mayor demurred. The desire of the railway was to prevent the proceeding from dragging out to interminable length, particularly if the city had nothing more to prove with respect to the Interborough.

In consequence of the request from the New York Railways a lively tilt ensued as to the right procedure to follow, in which the Mayor exercised his prerogative as director of the inquiry by ordering both the receiver for the New York Railways and counsel for the receiver to be seated.

ADDITIONAL TESTIMONY OF AUDITOR

Edward F. J. Gaynor, auditor of the Interborough, was recalled on Jan. 28 and identified documents relating to the financial affairs of the Interborough which were offered in evidence. One of the documents was the expense sheet, which showed that the payroll of the lines had increased from $4,593,324.35 in 1905 to $17,309,974.35 up to June 30, 1919. The reports did not contain a valuation of the I. R. T. properties, which James L. Quackenbush, general counsel of the company, said was due to the fact that Stone & Webster, employed by committees representing the security holders of the railroad, had pursued their examination along their own lines.

Corporation Counsel Burr asked where the receipts from note and bond issues had gone. The attorney replied that the statement accounted for $74,980,460, the bulk of which, he declared, had not been diverted to outside securities, but had gone into the equipment of the subway.

Corporation Counsel Burr again brought out at this session the fact that the company had paid out more than $20,000,000 in dividends between 1913 and 1917. In this connection Mr. Burr suggested that while the company was applying to the Public Service Commission for leave to issue notes it was at the same time distributing this "royal largess" in the form of dividends aggregating $20,000,000. James L. Quackenbush, counsel for the company, objected to the use of the term "royal largess."

Connecticut Case Closed

Objections Confined Largely to Zone Details Rather Than to General System

The Connecticut Company's rebuttal to charges of various towns in the State that its new zone system is inequitable was finished on Jan. 23. The Public Utilities Commission ordered the various parties interested to submit briefs to the commission before the close of business on Feb. 24. Oral arguments on the briefs will be made on March 2. The commission informally stated after the session on Jan. 23 that a decision in the matter would be reached probably some time in April.

Richard T. Higgins, chairman of the commission, said to a representative of the ELECTRIC RAILWAY JOURNAL after he had consulted with his colleagues of the commission on the question as to when a decision might be expected:

> This is a matter of great importance, not only to the people of Connecticut, but to the entire United States, which is looking to Connecticut for a decision as to the practicability of a zone system.
>
> The hearing has covered a great deal more ground than the 6-cent hearing did and we shall go very carefully. If we should decide in favor of the zone system there might be some adjustments necessary. The decision may be looked for in April.

Attorneys for some of the towns attempted to have the commission rush the hearing to a completion, but Joseph F. Berry, the company's lawyer, said that he would have to have two weeks after getting a transcript of all the evidence before his brief would be ready for printing. Mr. Berry has to answer arguments from fourteen towns which have protested the system. There has been virtually no opposition to the zone system as such, but in nearly every case the length of rides has not been sufficient, the petitioners claim. Commutation tickets used to be sold on one line, but the company says it has given up that idea for good. It also has decided against all forms of tickets, because of the temptation to potentially dishonest conductors.

Some of the petitioners have indicated that they will argue for segregation of parts of the system. For instance, the city of Bridgeport says it would like to buy the Connecticut Company's lines within the city limits, feeling that it can make a 5-cent fare pay. The commuters of Manchester think that the Hartford division lines pay well enough to warrant a reduction of rates and they would have the 187 miles of line in that division operated as a separate unit.

Seattle Sticks to Five Cents

At a special meeting of the City Council of Seattle, Wash., recently, that body adopted a resolution favoring the continuance of a 5-cent fare on the municipal railway. The Council also passed a resolution limiting the expense the system should bear for paving in business and residential districts. The resolution provides that "any deficits resulting from railway operation will be met in some other way than by increasing fares beyond 5 cents."

Councilmen who opposed the resolution assert that it is "political piffle," and does not bind the Council, or any future Council, to the low fare policy outlined, since the present Council could, if it felt so minded, rescind the resolution at its next meeting.

City Loses Again

Chicago Receives Set Back in Effort to Restrict Fare and Impound Revenues

The city of Chicago, Ill., lost another inning in its fight for a restoration of the 5-cent fare on the Chicago Surface Lines when on Jan. 22 Judge McGoorty of the Circuit Court refused the plea for a temporary injunction against a higher rate. The court also denied the city's request for an order impounding revenues collected in excess of that produced by a 5-cent fare. The hearing on the application for a permanent injunction was continued until March 9, and it is expected that before that date the Illinois Supreme Court will have passed on the question of the utilities commission's right to change the rate fixed by a contract ordinance.

The municipal authorities have been contending that a change in the ordinance terms concerning rates of fare constituted a breach of contract and that the agreement as to right of operation purchase price and a 5 per cent return on investment was thereby nullified. On this point the court said:

> The right of the companies to operate their lines, the agreement to divide the net receipts between the companies and the city, the right of the companies to a 5 per cent return on their capital accounts, and the option given the city to purchase the railway properties in the manner described in the ordinances are questions on which neither the State nor the Public Utilities Commission has any control by virtue of the police power.

WANTS COMMISSION'S POWER CURTAILED

The city also urged that if the commission has the power to increase rates in spite of the Chicago ordinance, such increase should be limited to such rate as would allow the companies to meet only operating expenses, not including a return on investment. The court held that "if it is once conceded that the commission has the power to regulate rates, it follows that such rate should be sufficient to include a reasonable return upon the present fair value of the property employed by such corporation in the public service."

The city also made much of the contention that when the Circuit Court of Sangamon County remanded the 7-cent fare case to the commission, the authority to collect such rate was annulled, and the appeal of the companies to the Supreme Court did not operate as a stay order. Judge McGoorty said the position of the city is not in accord with decisions of the Supreme Court. He, therefore, held that his court had no authority to issue an injunction or to give the other relief prayed for.

Kansas City vs. Philadelphia

Kansas City Railways Points Out Wherein Two Cities Differ in Service and Obligations

In a comparison between the fares and operating conditions of the Kansas City (Mo.) Railways and the Philadelphia (Pa.) Rapid Transit Company, the *Railwayan*, the official publication of the Kansas City Railways, notes that the statement that the fare in Kansas City is 7 cents, while in Philadelphia it is 5 cents, is very misleading. The *Railwayan* says:

> In the first place, Philadelphia car riders have to pay 3 cents for a transfer at 580 out of 900 transfer points in the city, and can get only one transfer at that, for if they do not reach their destination on that transfer they pay another nickel or walk. In Kansas City, on the other hand, there are free universal transfers, and you can use as many as necessary to continue your journey in the same general direction. In 1918 more than 50 per cent of the Kansas City car riders used free transfers, and in 1919 just 47.42 per cent of them rode on transfers. In Philadelphia 21.35 per cent used transfers.

It is pointed out that the average paid by all passengers of the Philadelphia Rapid Transit Company is 3.98 cents, while the average fare paid by Kansas City riders was 3.94 cents in 1919, and 3.32 in 1918. From 1915 to 1919, inclusive, the average fare in Kansas City has been 3.39 cents. The average length of car ride in the two cities is said to be practically the same. It is also pointed out that the Philadelphia Rapid Transit Company does not clean, pave, repave, or maintain the paving on its right of way, while in Kansas City the railway pays the whole of this burden.

In support of a contention that service in Kansas City is better than in Philadelphia, the *Railwayan* states that there were carried per trainman in Philadelphia last year 412 passengers, while in Kansas City only 360 passengers were carried per trainman daily. In continuing the article states:

> There isn't a railway company in the country—privately owned and operated—that would not like the chance and privilege of doing what Philadelphia does. And it isn't just to any company in the United States to make comparisons with Philadelphia unless all the facts of the situation are set forth.

Fare Increase Deferred in Buffalo

Thomas E. Mitten, Philadelphia, president of the Philadelphia Rapid Transit Company, and a member of the bondholders' protective committee of the International Railway, Buffalo, N. Y., was in Buffalo for several days during the week ended Jan. 24 inspecting the properties of the company with a view of recommending changes in the personnel of the operating staff.

While in Buffalo Mr. Mitten conferred with Buffalo bankers and members of the bondholders' committee relative to a plan to reorganize the Buffalo, Niagara Falls and Lockport lines. Mr. Mitten said that plans are also under way for the restoration of owl car service on about fifteen local lines. The owl car service was discontinued more than a year ago.

It is reported that Mr. Mitten is opposed to putting the 7-cent car fare authorized by the Public Service Commission in force in Buffalo just at the present time. Mr. Mitten's opposition to the 7-cent fare has been the sole reason why the higher fare has never been put into effect. It is said that the company's income at present is sufficient under a 5-cent fare to pay operating expenses. If the owl car service is restored, it is probable that the 7-cent fare may be made applicable to those who patronize the owl cars.

An inventory of the property of the International Railway is being made by Mr. Mitten with a view of determining the value of the company's property.

Staggered Hours Again in New York

After a twenty-four-hour increase of 2,361 influenza cases in New York City on Jan. 24 with nearly as many persons stricken in Manhattan as were reported in the entire city during the preceding twenty-four hours, Health Commissioner Copeland took action to relieve congestion on the city's transportation lines to check the spread of the disease.

After long conferences with representatives of the railways, retail dry goods stores, motion picture and theatrical enterprises and the Public Service Commission, Dr. Copeland arranged for the opening and closing of offices, manufacturing plants, stores and places of amusement at such times as would permit the distribution, over a longer period, of railway traffic during rush hours.

The changes became effective at 1 A. M. on Jan. 28 and will be continued as long as is deemed necessary by the Health Department.

Fare Protest Case Still Pending

Neither the Rhode Island Company, Providence, R. I., nor any of the nine or more cities and towns that appealed to the Supreme Court from the fare rates put into effect by the consent of the Public Utilities Commission has filed a brief either for or against the continuance of the fares now charged for rides on the cars.

After the matter was threshed out orally before the Supreme Court last fall, the cities of Pawtucket and Cranston and the towns of Warwick, West Warwick, North Providence, East Greenwich, Cumberland, Burrillville and Johnston were allowed until Dec. 1 and the Rhode Island Company was allowed until Dec. 22 to file briefs.

Later the time was extended until Dec. 15 for the appellant cities and towns and to Jan. 9 for the railway company, and finally to Jan. 12 for the appealing municipalities and to Feb. 2 for the railway. The dates for further hearing on the appeals were changed from Dec. 29 to Jan. 16, and finally to Feb. 9.

It was said on Jan. 16 that there will not be any hearing before the court until the opportunity has been given for the Legislature to take some action looking toward the solution of the railway company's difficulties.

The successive postponements of the hearing have apparently been made by the consent of all parties.

Second Kansas City Traffic Report

John A. Beeler has presented the second of his traffic suggestions as the result of the study which he is making for the Kansas City (Mo.) Railways. The report deals with conditions on Eighth Street. The previous report dealt with Twelfth Street. It is said that the application of the suggestions made previously by Mr. Beeler has speeded up traffic materially. A summary of the latest suggestions by Mr. Beeler follows:

Reduce number of car loading stops on Eighth St. between Broadway and McGee St. to four. Eight stops are now in effect.

An overhead system or viaduct should be considered in the near future from Wyandotte St. to Grand Ave. This would eliminate vehicular interference.

Reroute trams to reduce number now turning into and out of Eighth St.

Use the pre-payment plan of fare collection at the Main St. and principal elevated stations on Eighth St. during the period of heavy loading.

Lengthen the elevated platforms and the one at Main St., to enable four cars, two in each direction, to load simultaneously when necessary.

Raise the platforms so as to reduce the difference in level between the station platform and the car stop to assist in loading and unloading.

Steps should be taken to eradicate or at least minimize the short "kinks" in the elevated structure.

Follow general "double-berthing" plan now employed on Twelfth St. Eliminate vehicular parking on Eighth St.

Chicago Elevated Fare Reduced

The Illinois Public Utilities Commission in an order issued on Jan. 29 directed the Chicago Elevated Lines to reduce their straight 8-cent fare by selling two tickets for 15 cents. The cash rate will remain at 8 cents. The order will become effective on Feb. 1.

Under the commission's order the fare to Evanston and Wilmette from Chicago is reduced from 14 cents to 12 cents, and within the Evanston city limits it remains at 6 cents. In complying with the order the company will issue paper tickets.

The commission authorized the straight 8-cent fare on the Elevated Lines several months ago, at the time when it permitted the Chicago Surface Lines to raise their fare to 7 cents. The fare on the Surface Lines has since been reduced to 6 cents by order of the commission.

Seven Cents in Albany

The United Traction Company, Albany, N. Y., has been authorized by the Public Service Commission of the Second District to increase its fares. On all the city lines in Albany the fare will be 7 cents. The fare will also be 7 cents in Rensselaer. To Troy, Watervliet, Cohoes, Green Island and Waterford the fare will be 14 cents.

Zone A, in which the 7-cent fare will be charged, includes Rensselaer and Albany as far as Garbrance lane. Zone B includes Troy, Watervliet, Green Island, Waterford and Cohoes, and 7 cents will be charged for urban and interurban traffic.

The same transfer privileges as those granted under the 6-cent fare will continue. The financial condition of the company was given by the commission as its reason for granting the increase, together with the fact that all materials going to make up the trolley system and its operation have increased since the 6-cent fare was granted in August, 1918.

Labor increases alone since the 6-cent fare was granted totaled $184,000. The decrease in the number of passengers carried under the 6-cent fare from the old 5-cent rate averaged 4.25 per cent. The commission considered the question of the company selling six-ride tickets for 40 cents as an inducement to keep the future number of passengers carried as at present.

The decision was rendered on Jan. 22. It was expected that the Commission would file at once a new tariff of rates coinciding with the rates noted in the commissions order. The new rates become effective five days after the filing of the new tariff.

Reports on Costs in Fare Case

George E. Taylor, chief engineer for the Public Service Commission of West Virginia, has reported to the commission on the cost of maintenance and upkeep of the track and equipment of the Charleston Interurban Railway.

A short time ago the commission ordered its technical experts, Mr. Taylor and Mr. Nease, to investigate the costs of operation of the company and its earnings, with reference to its rate application to increase the rates from 5 cents to 7 cents in the city limits of Charleston, W. Va.

The report of Mr. Nease has been filed, and with the receipt of the conclusions of Mr. Taylor, the case promises to be settled in the near future.

Mr. Taylor's report dealt altogether with the proper charges for the maintenance of the rolling stock and equipment and for the renewal of track.

For the upkeep of the physical condition of the trackage, $39,370 should be charged annually, of which $32,213 should go to the city lines proper, the report states. A total of $8,000 should be charged to equipment maintenance, of which $3,742 should go to the city lines.

For the maintenance of rolling stock, $50,200 should be charged to lines of which $28,120 should go to the city lines proper. The total cost of city line maintenance is $64,075.

There are 10.12 miles of track in the city, Mr. Taylor estimates, and of this mileage 0.8433 miles should be renewed annually, he estimates. This will make an annual cost of $67,080, of which $54,885 should be charged to the city lines proper. A mile of track costs $79,545.

Transportation News Notes

Asks Seven Cents in Penn's Grove.—The Salem & Penn's Grove Traction Co., Penn's Grove, N. J., has applied to the State Board of Public Utility Commissioners for a 7-cent fare. The fare is now 5 cents.

Will Discontinue Transfers.—The Wichita Falls (Tex.) Traction Co., announces that it will discontinue transfers. Explanation is made that this action is taken as a means of increasing revenues, as the lines are now being operated at a loss.

Wants Zone Increase.—The Board of Public Utility Commissioners held a hearing on Jan. 24 on the application of the Shore Fast Line, Atlantic City, N. J., for permission to raise the fare 1 cent in each zone and increase the price of commutation tickets. Decision was reserved.

Reduced Ticket Rate in Williamstown.—The Lykens Valley Railway, Williamstown, Pa., operating in parts of Dauphin, Lebanon and Schuylkill Counties, has filed with the State Public Service Commission notice of decrease in rates for books of tickets to be sold at 5⅓ cents per zone instead of 8 cents, the cash fare.

Decision Reserved in Fare Case.—There was a hearing before Public Service Commissioner Thomas F. Fennell on Jan. 23 upon the proposed increase in the rate of fare, 5 cents, by the Black River Traction Company between Glen Park and Watertown, N. Y. Decision was reserved.

Right to Charge Six Cents Extended.—The electric railways operating in Dayton, Ohio, have been authorized to continue charging a straight 5-cent fare indefinitely. They were to have gone back to a basis of six tickets for a quarter on Feb. 22 if they did not merge by that time. Merger plans have been declared impossible.

One-Man Cars in Rutland.—For the past two weeks a new one-man safety car has been in operation on the South Belt line of the Rutland Railway, Light & Power Company in Rutland, Vt. The car has worked out a great deal better than had been expected. A new Birney car is ready for shipment, and as soon as it arrives, it will be placed in service on the North Belt line.

"Punch" Tickets at Reduced Rates.—A reduction in fares on certain lines of the Eastern Massachusetts Street Railway, Boston, Mass., was announced on Jan. 21 by the public trustees. The 10-cent fare is being reduced to sixteen rides for $1 on a punch ticket. The lines affected are Woodlawn to Chelsea Square, Broadway and Eastern Ave. to Chelsea Square, and County road and Malden Street to Chelsea Square, Chelsea.

Seven-Cent Zone Desired.—The Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa., operating between Morrisville and Torresdale, Pa., has filed with the Public Service Commission of Pennsylvania a new tariff of passenger rates, increasing the zone fare from 6 cents to 7 cents. The fare was increased to 6 cents about a year ago. The new rate of fare will go into effect on Feb. 14. There are seven zones between Trenton and Torresdale.

Eight-Cent Fare in Ossining.—The Public Service Commission for the Second District, has granted authority to the Hudson River & Eastern Traction Company to charge an 8-cent fare on its main line in Ossining with free transfer to the Spring Street line and a 5-cent fare on the Spring Street line with a 3-cent transfer charge to the main line, during the winter months for a two years' period as authorized by the Ossining trustees.

Discontinues Commutation Fares.—The Bristol & Plainville Tramway Company, Bristol, Conn., has announced the discontinuance of all commutation fare books on its lines. The company is the only electric railway in the State which had maintained a 5-cent fare during and since the war. Commutation books have been sold, reducing the rate to 4 cents on the lines between Bristol, Plainville and Terryville. No change in the regular fare is contemplated, it is stated.

Seven Cents in Cosmopolis.—Application for increase in fares in the cities of Hoquiam, Aberdeen and Cosmopolis is made by the Grays Harbor Railway & Light Company in a new tariff filed with the Public Service Commission on Jan. 20. The company asks for a 7-cent fare within the cities and 10 cents between cities. School tickets would be sold at the rate of 3⅓ cents to the school board for distribution to pupils. Free transfers would be granted on lines in Aberdeen and Hoquiam. The new tariff will become effective on Feb. 20.

Change in Interurban Rates.—The Public Service Commission of Missouri has granted a rate of 1.3 cents per mile between terminal point and intermediate suburban towns over the Kansas City, Clay County & St. Joseph Railway. The present rate is 2 cents a mile. The new rates will become effective on Feb. 15. The points benefited will be from Kansas City to Liberty, from Kansas City to Ferrel View and from St. Joseph to Dearborne. Intermediate towns will pay the old rate. The company has a mileage of 83 miles. Its property was valued by the commission at $4,800,000.

Another Increase in Centralia.—The North Coast Power Company has applied to the State Public Service Commission for permission to increase rates on railway between Centralia and Chehalis. The present rate is 10 cents, with a 5-cent fare to the fair grounds, the half-way mark. The proposed new rate from Centralia is 5 cents to the city limits, 10 cents to the fair grounds and 15 cents to Chehalis, and the same from Chehalis to Centralia. Unless the increase is protested, the new rates, which are the same as were in effect before jitney competition forced the traction fares down, will go into effect on Feb. 16.

M. & S. Rate Changes.—Niles and Warren in Trumbull County have granted new franchises to the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, in which the 5-cent fare has been raised to 10 cents and the ticket rate established at seven for 50 cents with the proviso that these rates shall obtain for three years. After that time the rates will be determined on a service-at-cost basis, with the provision that they shall never exceed the specified rates. Under the old franchises a 5-cent fare was specified for hauls between the various cities of approximately 5 miles, with the ticket rates eleven for 50 cents.

Appeal to the I. C. C.—C. P. Billings, general manager of the Wheeling (W. Va.) Traction Company has notified the Council of Steubenville that the company has applied to the Interstate Commerce Commission for a new rate schedule on the Steubenville-Brilliant line of the Wheeling Traction System, stating that this action was taken after efforts to arrange a conference with the Councils of Steubenville and Mingo Junction had failed. The council has placed the matter in the hands of Solicitor Ralph Levinson, who will decide whether to go before the commission with the city's side of the case or take up the subject with the company.

City Refers Fares to Commission.—The City Council of Olympia, Wash, has put up to the Public Service Commission the matter of an amendment of franchise, permitting an increase of fares in the city from 5 cents to 7 cents on the lines of the Olympia Light & Power Company. The City Council adopted the report of the franchise committee instructing the city attorney to refer the railway to the commission for verification of its contention that increased fares are necessary, contending that the Public Service Commission is better equipped than the Council to determine the necessity for the increase.

No More Smoking in St. Louis.—The Public Service Commission of Missouri has issued an order authorizing Rolla Wells, receiver for the United Railways, St. Louis, to forbid smoking on cars at all times. The order becomes effective on Feb. 8. Under present rules passengers may smoke on the three rear seats when the weather permits the car windows to be open. The ruling is a result of a hearing on Jan. 8, at which both smokers and non-smokers were heard. The hearing was requested by Col. Albert T. Perkins, general manager under the receiver, who asked that the previous order—providing for smoking on the three rear seats—be rescinded.

Personal Mention

Dr. Hunt Retires

Dr. Charles Warren Hunt, after twenty-five years of service as secretary of the American Society of Civil Engineers, has requested that he be relieved from active duty in connection with that office. In compliance with his request, the board of directors on Jan. 21 passed a resolution appointing Dr. Hunt secretary emeritus of the society at a salary of $9,000 for the coming year, and a salary of $6,000 a year thereafter. It was also unanimously voted that Dr. Hunt be granted a leave of absence for six months, and that his services as secretary emeritus begin when his successor takes office.

At the annual meeting of the society in New York City on Jan. 21 and 22, Arthur Powell Davis was elected president. Mr. Davis is best known in connection with his work as director and chief engineer of the U. S. Reclamation Service. The other officers elected were: Vice-presidents R. A. Cummings and F. L. Stuart; treasurer, A. S. Tuttle, and directors Carlton Greene, C. W. Hudson, J. A. O'Connor, J. C. Hoyt, Anson Marston, and D. C. Henny.

The annual report of the board of direction indicated a net increase in membership for the year of 475 as compared with 343 for the previous year. The total membership on Jan. 1, 1920, was 9,408.

Mr. Tulley Acting President

H. C. Tulley, vice-president of the Philadelphia (Pa.) Rapid Transit Company, has been elected acting president of the International Railway, Buffalo, N. Y., to succeed Edward G. Connette, resigned. Mr. Tulley's appointment was recommended to the directors of the International Railway by the bondholders' protective committee of which Elliott C. McDougal, Buffalo, is chairman.

James W. Samuel has been relieved of his duties as assistant secretary and treasurer of the United Railways, St. Louis, Mo., by Receiver Rolla Wells as in the best interests of the company. Mr. Samuel is about forty years old. He has been with the railway about twenty-five years, having entered the employ of the company as a clerk. He was a protege of the late Robert McCulloch, who preceded his son, Richard McCulloch, as president of the company. Mr. Samuel occupied in turn many important positions with the company. For many years he was chief clerk in the office of the treasurer and four years ago was elected to the office of assistant secretary and treasurer. In addition to his connection with the United Railways, Mr. Samuel was interested with William V. Brumby, of the publicity department of the railway, in the publication of the pamphlet "Know St. Louis," devoted to advancing the interests of the city.

Mr. Pratt in New Field

Vice-President of Baltimore Company Resigns to Head New Finance Company

James R. Pratt, who has been a vice-president of the United Railways & Electric Company, Baltimore, Md., for several years and one of the best known and most popular of Baltimore's business men, on Jan. 21 severed his connection with the railway in order to accept the presidency of the Federal Finance & Credit Company, a new organization with executive offices in the Munsey Building, Baltimore.

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JAMES R. PRATT

In announcing his resignation Mr. Pratt said that it was only natural that he should have many feelings of regret in severing his relations with the United Railways & Electric Company. The people and the press of Baltimore have been very kind to Mr. Pratt during his connection with the railway and he took occasion in announcing his new connection to express his grateful appreciation of the courtesy and co-operation which he has always received at the hands of the public and the press.

As president of the Federal Finance & Credit Company Mr. Pratt believes that he will have an apportunity for greater personal advancement and in aiding in the progress of Baltimore by giving it a new financial institution. Baltimore has made marked advance commercially in the last few years and being interested in the commercial growth and development of the city Mr. Pratt has long been anxious to assist in helping to take care of the finances of the steadily increasing volume of business being done in the city.

As president of the Federal Finance & Credit Company Mr. Pratt will have associated with him A. J. Fink, as vice-president; W. L. Rigger, as treasurer, and until recently secretary and assistant treasurer of the Finance & Guaranty Company, and as directors the following gentlemen: Dr. M. H. Carter, of the Resinol Chemical Company; Len M. Frailey, capitalist, formerly officially connected with the Campbell Soup Company; George N. Reed, capitalist, of Reedville, Va.; Roland R. Marchant, city solicitor of Baltimore; W. H. Winstead president of the W. H. Winstead Company, Inc.; and Addison E. Mullikin, attorney-at-law.

Mr. Pratt went to Baltimore from Talbot County when a young man and secured a position with the railway, then the Baltimore Traction Company. He started as conductor and later served as motorman, from which position he was taken into the claim department as an investigator. While working as an investigator he studied law, graduated and was admitted to the bar. He was later made assistant claim agent and later assistant to the general manager, claim agent; assistant general manager, second vice-president and general manager and vice-president in the order named.

In commenting on Mr. Pratt's change the Baltimore *American* said editorially:

> James R. Pratt, is a fine example of a man who, by industry and energy, directed by a clear brain, made himself a master of his work. For a quarter of a century Mr. Pratt has been connected with the United, rising by sheer force of worth and ability from the place of conductor to that of vice-president and general manager of the corporation. His promotion was gradual, but sure and steady as his ability was quickly recognized and the company made good use of his talents. Mr. Pratt is a Marylander, an Eastern Shoreman, and is proud of it. His success in his new financial field is assured. Men of his type do not fail.

C. R. Gowan, general passenger agent of the New York State Railways, Syracuse-Utica lines, has resigned to enter the life insurance business. He has been connected with the local lines in Syracuse and their predecessors for fifteen years, since leaving the public schools of his native town, Little Falls. He began, in Utica, as clerk to W. J. Harvie, then electrical engineer of the Utica & Mohawk Valley Railway and the Oneida Railway, and three years later became chief clerk to C. Loomis Allen, vice-president and general manager of these lines. Mr. Gowan's duties were increased by his appointment as general passenger agent, first of the above lines in 1910 and two years later of the Syracuse Rapid Transit Railway also. His headquarters were transferred to Syracuse where he had direct charge of Mr. Allen's office, and of that of B. E. Tilton, who became general manager in March, 1912. He retained the same title and duties in the New York State Railways, organized in November, 1912. Mr. Gowan's new affiliations are with the Syracuse office of the State Mutual Life Assurance Company, Worcester, Mass.

A. J. Johnstone has been appointed auditor of the Portland Railway, Light & Power Company, Portland, Ore.

F. I. Fuller has been promoted to have charge of operation of the Portland Railway, Light & Power Company, Portland, Ore., with the title of first vice-president.

John H. Van Brunt has resigned as vice-president and general manager of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., after thirty-one years of continuous service.

R. W. Shepherd, formerly auditor of the Portland Railway, Light & Power Company, Portland, Ore., is now general auditor and assistant treasurer of the Portland Railway, Light & Power Company, Portland, Ore.

B. C. Adams, manager of the Empire District Electric Company, Joplin, Mo., has been appointed to succeed John H. Van Brunt with the St. Joseph Railway, Light, Heat & Power Co., St. Joseph, Mo. Mr. Adams has been a member of the Doherty organization, which controls the St. Joseph property, from its earliest days, and has been general manager of the Lincoln, Spokane, Montgomery and Empire District (Joplin) properties.

Col. Diedrich Schindler, managing director of the Ateliers de Construction Oerlikon, Zurich, Switzerland, who has been in this country in attendance at the International Labor Conference, has returned to Switzerland. In connection with his visit to this country Col. Schindler took the opportunity to spend a few weeks in Cuba. His company is active in electrification matters in Europe and has at present a large number of electric locomotives under construction.

James F. Hamilton, president of the New York State Railways, Rochester, N. Y., was in New York City on Jan. 28, to take over the management of the Fourth and Madison Avenue surface railway at the request of the New York & Harlem Railroad, the original owners, to whom the lines were returned when they were separated from the New York Railways system by order of Federal Judge Julius M. Mayer on Jan. 21. The New York & Harlem Company is a subsidiary of the New York Central Railroad, which also controls the New York State Railways. The order of separation becomes effective at midnight on Jan. 31, and the independent operation of the lines under the direction of the Harlem company will begin at that time.

B. J. Yungbluth has resigned as general storekeeper of the Pittsburgh (Pa.) Railways to accept a position with the Mitten Management Co., Philadelphia, Pa., Mr. Yungbluth started his railway career with the Duluth South Shore Railroad where he rose to the position of storekeeper of the Hancock (Mich.) stores. He was connected with that company for seven years. He then became storekeeper for the New York Central Lines at Lima, Ohio, which position he held for four years. He became affiliated with the Pittsburgh Railways in 1909 as general storekeeper and held that position until his present change. During this time he has greatly improved the methods of storekeeping and brought the department to a high degree of efficiency. He has contributed several articles to the ELECTRIC RAILWAY JOURNAL bearing on the efficient management of the stores department.

M. T. Montgomery to Direct Pittsburgh Stores Department

M. T. Montgomery has assumed the duties of general storekeeper of the Pittsburgh (Pa.) Railways. Mr. Montgomery entered the electric railway field in 1898 as a conductor with the United Traction Company, now a part of the Pittsburgh Railways, subsequently becoming dispatcher and, later, manager of the traffic department. In 1908 he was appointed superintendent of the Mexican Tramway, Mexico City, Mexico. Six years later he was made manager of railways of the Monterey Railway, Light & Power Co., Monterey, Mexico.

M. T. MONTGOMERY

Owing to the unsettled condition of Mexico he resigned his connection with the last-named company in July, 1919, and, returning to the United States, became special assistant to the general manager of the Pittsburgh Railways. As general storekeeper he succeeds B. J. Yungbluth, whose resignation is noted elsewhere in these columns.

C. L. Proctor, general manager of the Danbury & Bethel Gas & Electric Light Company, Danbury, Conn., will succeed at Joplin, Mo., B. C. Adams, who goes with the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo. Both are Doherty properties. Prior to his connection with the Danbury company, Mr. Proctor was new business manager of the Empire District Electric Company and general superintendent of the Athens Railway & Electric Company, Athens, Ga.

J. F. Sloan has been appointed assistant purchasing agent of the Interborough Rapid Transit Company, New York, N. Y., and assistant purchasing agent for the receivers of the New York (N. Y.) Railways. Mr. Sloan has long been connected with the Interborough. He was formerly chief clerk in the office of the purchasing agent.

R. S. McDougall, claim agent of the New York State Railways, Rochester, N. Y., has been named by James F. Hamilton to be general manager of the Fourth and Madison Avenue lines in New York City, separated from the rest of the system of the New York Railways by the federal court as noted elsewhere in this issue. Mr. McDougall has been claim agent of the Rochester lines of the New York State Railways for a number of years. He was recently promoted to claim agent of the entire system of the company. In 1916 Mr. McDougall was elected acting president of the association by the executive committee at the mid-year meeting in Chicago on Feb. 4. He is now president of that association.

David W. Ross, vice-president of the Interborough Rapid Transit Company, New York, N. Y., in charge of contracts and supplies since 1908, has resigned effective Jan. 31. Mr. Ross previous to accepting the position as vice-president of the Interborough, was in the supply business in New York City. For a considerable number of years he was connected with the steam railroads, and before becoming a resident of New York was director of purchases of the Isthmian Canal Commission. He was born on Nov. 9, 1869, at Mineral Point, Wis. He moved to Chicago in September, 1887. In March, 1888, he entered the service of the Illinois Central Railroad as clerk in the telegraph department, serving with the company in various capacities until June 1, 1905, when he entered the service of the government. During his connection with the Illinois Central Railroad Mr. Ross was in turn secretary to the general superintendent, secretary to the general manager, secretary to the assistant of the vice-president, secretary to the second vice-president, chief clerk to the second vice-president, then purchasing agent, and finally superintendent of transportation. Mr. Ross has several proposals under consideration for reentering business, but will not announce his plans until they are fully matured.

Obituary

George F. Rand, chairman of the board of the Marine Trust Company, Buffalo, N. Y., who made an offer to purchase the property of the International Railway several months ago, was killed in an airplane accident near London. He was on his way via airplane from Paris at the time of the crash. He was fifty-five years old. The body was brought to Buffalo for burial.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Machinery Center Opened

Fifteen Firms Unite in Permanent Plant Equipment Display in New York City

Allied Machinery Company of America recently opened an Allied Machinery Center occupying 30,000 sq.ft. of exhibition and office space at Center and Walker Streets, New York City. The center has been established as part of an educational and sales promotion plan in the field of heavy plant and machinery construction, encouraging sound construction economies. Both export and domestic purchases are served. The following companies are represented: Austin Manufacturing Company; Austin-Western Road Machinery Company; Barber-Greene Company; Carbic Manufacturing Company; C. H. & E. Manufacturing Company, Inc.; Clyde Iron Works; Cook Motor Company; A. B. Farquhar Company, Ltd.; Hydraulic Pressed Steel Company, Lakewood Engineering Company; Parsons Company; Sterling Wheelbarrow Company; Thew Automatic Shovel Company; Western Wheeler Scraper Company; Wyoming Shovel Works.

At a luncheon given Jan. 27 to celebrate the opening of the Allied Machinery Center the speakers included Joshua W. Alexander, Secretary of Commerce, Senator Edge, W. L. Saunders, George Edward Smith, president of the Royal Typewriter Company, and former Secretary of Commerce W. C. Redfield. The chairman at the luncheon was Charles F. Lang of the Lakewood Engineering Company.

Year's Lightning-Arrester Business Shows Increase

Season Prolonged by Heavy Fall Buying—Shipments Made in Reasonably Short Time

Regardless of the time of year, reports from manufacturers of lightning arresters indicate that during the past fall sales have been rather large. Current business is increasing, while sales for the month of October were especially high. In one case sales during that month were almost equal to those during the past spring and summer months and were about 100 per cent greater than for the same month in 1918. Another manufacturer sold at least 50 per cent more in October than in any previous month of last year.

Although it has not been possible to get figures from all manufacturers, it is generally agreed that 1919 sales will exceed those for 1918. Some reports have been received showing increases in sales of from 17 to 32 per cent over the previous year. In one case this increase has come entirely in the last six months.

Deliveries are good and run from stock to six weeks. In one case they are given as good or bad, depending on the kind of product, with the expectation that in 1920 they will be good. Where stock cannot be accumulated, shipments are running up to six weeks, depending upon the requirements of the customer and the voltage ratings of the arresters. Even six weeks is considered rather short time for filling orders. One manufacturer who can fill orders in from ten days to two weeks has been materially assisted in this by the standardization of the product and a large stock of raw materials.

It is not expected that any increase in price will come into effect within the near future. Advances in the neighborhood of 15 per cent in the past six months have been reported on account of increasing prices of labor and materials.

Increased business is looked for in view of the general business outlook and some new power and line developments. The future seems much brighter than the immediate past because it is believed that most companies now have more time and more money to devote to the question of lightning arresters than under conditions prevailing a year ago. At the same time, one manufacturer finds that the smaller utilities are buying more equipment. Taken all in all, the lightning-arrester season has been extended beyond normal, and increased business for the whole year has been satisfactory.

Active South American Demand for Electric Railway Supplies

Total of Thirty-three Cars Placed Recently for Cuba and South America—Good Sales of Track and Roadway Equipment Expected

Manufacturers of electric railway supplies and accessories are making preparations to do a considerable amount of exporting business during the year. Although present rates of exchange will hold down sales from a European standpoint, much business is expected from South American countries, where rates of exchange are more nearly equal. In the case of Argentina, the rate of exchange is slightly against the United States. For the past half year, a number of manufacturers have had agents in Europe and the Latin-American countries finding out what the business is, and how it can be financed. These men are sending back promising reports and for certain lines it is assured that there will be a considerable amount of business.

MARKETS BECOMING BETTER IN CUBA

Cuba has become a rather active market for rolling stock and railway supplies since the sugar shortage commenced. American interests are now going into Cuba on a large scale, clearing the land, putting up power houses, building railways and erecting sugar mills. This has been reflected immediately in the railway market, for during the last quarter of 1919 the Hershey Cuban Railway placed orders for sixteen steel motor cars, in addition to a considerable amount of other material. Thirteen of these interurban cars are 47 ft. long and of semi-steel construction, ten being passenger and three being combination passenger and baggage cars. About the same time, the Matanzas Electric Railway placed an order for fifteen 28-ft. steel safety cars. Orders are expected from Havana and other sections of the island.

SOUTH AMERICA OFFERS GOOD MARKET

Manufacturers are now totaling their sales for the past year for the Latin-American countries and especially for the South American field to get an idea of what the business has been. One of the largest manufacturers reports that its business in South America will amount to considerably more than that of 1918, although this includes electrical equipment from power and industrial sources as well as from the electric railways. Reports have been received that an electric street railway will be built in Barranquilla, Colombia, during the year. In Chili much railway work is contemplated. The government expects to electrify the lines from Valparaiso to Santiago, and some of the work will probably be done this year. Business as a rule has slackened quite considerably in Chili on account of the lessening of the demand for nitrates since the close of the war.

Better connections will naturally be established with South American ports in the near future by the laying of a cable from Rio de Janeiro to Cuba. This will have connection with the United States at the Barbados. Also communication with Chili is expected to be made in the near future by the Western Union Telegraph Company, which is planning a line from the Canal Zone along the west coast of South America to Santiago, Chili.

In Brazil there is great activity in all lines. The government is planning to electrify the Central Railway and it is known that American firms will bid on some of this work. One railway, Cia de Traccao luz e Forca, Brazil, has placed an order in the United States for two 55-ft. motor baggage and passenger cars of the semi-steel type.

Spikes, Bolts and Nuts Active

Increased Production Needed to Supply Demands—Deliveries Lengthening Because of Heavy Railroad Buying

Demands for spikes, bolts and nuts are increasing daily. Western railroads which recently placed rail orders up to 300,000 tons are now in the market and are buying up all available stocks. The delivery situation is gradually growing poorer. Present deliveries are three to four weeks on moderate quantities. It is estimated that 25,000 kegs of spikes have been placed by the railroads and producers are booked ahead for two to three months. Prices vary considerably, ranging from $3.35 to $3.85 per hundred pounds in carload lots.

Bolts and nuts are reported sold out for the first quarter with a considerable volume of business placed for the second quarter. Railroads are the principal buyers and purchases have been heavy of late. Trade bolts are quoted at $6.50 base with carload lots 1c. a lb. less. Deliveries range from 45 to 60 days now but it is believed that by April, deliveries will range from 75 to 90 days.

Tie plates and angles are also in good demand and are quoted by several producers at 3c. a lb. at the mill for February and March delivery.

Paint and Varnish Prices to Advance Soon

Raw Materials Up—Inquiries Good with Volume of Business Fair—Deliveries Good

Price advances are being marked up regularly in raw materials entering into the manufacture of paints, varnishes and enamel. There have been three advances recently in the pigment market with another increase expected at any time. Turpentine is now quoted at $1.97 a gallon. It has been fluctuating since the last of December at which time it was quoted at $1.79. The most recent increase of 11 cents a gallon during the past two weeks, according to reports, is due to heavy demand, both export and domestic. The supply generally is unsatisfactory, and it is not expected that there will be surplus stocks in the market until after the new crop comes in in April. Linseed oil is quoted at $1.93 to $1.95. White lead, which was fairly stable up to Jan. 1 at 14 cents, is now quoted at 14½ cents. Other raw materials are stable.

In the better grades of varnish used in railway work, prices have been advancing because of the higher cost of turpentine, which is used largely in its manufacture. Prices of varnishes now range on an average from $2.30 to $6 per gal. The present discount is 25 per cent off list price, but varies according to quantities ordered and is subject to other conditions. Most paints are up according to the price trend in pigments. Furthermore no general decline in prices is expected for some time to come. Prices now range from $1.50 to $6 per gal. net. The demand is not heavy at the present time in the railway field but is gradually picking up. Enamels now range in price from $2.75 to $6 per gal. net.

Brushes are a gauge of the manufacturers' troubles. There is much difficulty in securing brush makers and the situation is becoming more serious all of the time. According to several large distributers, an advance in price is expected shortly on account of the acuteness of the bristle market. Stocks are badly broken and prospects of replenishing are poor.

Cans and containers for paints and varnishes have advanced from 30 to 60 per cent. In addition, deliveries on certain sizes are and have been quite uncertain. The cost of paper used in making labels for cans has not increased appreciably, but the printing of the labels has advanced considerably.

Deliveries of paints, varnishes and enamel are good and no trouble has been met up to the present time in this respect. From all predictions this spring and summer will experience demand of paints and varnishes in practically every line, not only in new work which will open up in the building trades, but also in all branches of the railway industry.

Rolling Stock

Pekin (Ill.) Municipal Railway is in the market for three cars.

Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., has placed an order with the Cincinnati Car Company for eight cars.

Spokane & Inland Empire Railroad, Spokane, Wash., plans the expenditure of $60,000 for conversion of present two-men cars to the safety type.

Franchises

South Covington & Cincinnati Street Railway, South Covington, Ky.—W. T. Rossell, superintendent of the South Covington & Cincinnati Street Railway has announced that the trackage plans for and approaches to the new Dixie Terminal have been completed and the company now is negotiating for the purchase of equipment to be installed on the lower floor of the new building. Newport cars are to enter the terminal on the first floor, until the building is completed; Covington cars also will use the first floor. After the completion of the terminal building the Covington division cars are to enter from the Suspension bridge to the second floor and are to make a loop on the first floor, Mr. Rossell added. The loops are planned to hold several cars, and passengers entering the receiving stations will be required to purchase tickets for their respective lines at a ticket office to be placed at the entrance of the loop.

Recent Incorporations

Warren Street Railway, Jamestown, N. Y.—This company will erect a new freight station in Jamestown to cost about $10,000.

San Francisco & Sacramento Rail-Road, San Francisco, Cal.—The articles of incorporation of the San Francisco & Sacramento Railroad were filed at San Francisco on Dec. 31, 1919. The new company, which is the successor to the Oakland, Antioch & Eastern Railway, is capitalized at $8,000,000. Incorporators are: Hugo Arnstein, Walter Arnstein, L. L. Levy and Jesse H. Steinhart, all of San Francisco; H. E. Mitchell, William E. Garvey, S. T. Marr and H. J. Sutherland of Oakland, and S. P. Westinghouse of Alameda.

Power Houses, Shops and Buildings

Reading Transit & Light Company, Reading, Pa.—The Reading Transit & Light Company's Roadway Department is making plans for carrying out a general rehabilitation of suburban lines during 1920, practically all of the work done in 1919 having been confined to city lines.

With the holiday rush of traffic over, the company is enabled to give more attention to repairs to cars and other equipment. Considerable work in this direction has been done during the past ten days and will be continued until equipment is placed in the very best condition possible.

Marshall (Tex.) Electric Co. This company has announced that $85,000 will be spent at once in installing new machinery in its power plant. The new equipment is needed for the proposed increased railway service and also for the additional power which this company will furnish to new industries. Two new boilers and two turbo-generators of 950 kw., will be installed.

Bamberger Electric R.R., Salt Lake City, Utah.—The Bamberger Electric R.R. plans to build a station at Kaysville during the present year.

The Wheeling (W. Va.) Traction Co. plans to construct a warehouse at Wellsburg, W. Va., for the storage of freight.

Track and Roadway

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway is laying tracks along the waterfront in San Pedro east of the present tracks, preparatory to the construction of a new passenger station.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The California Railroad Commission has ordered the city of Richmond, the San Francisco-Oakland Terminal Railways, and the Southern Pacific Railroad to make improvements to the MacDonald Ave. subway, Richmond, to the extent of $50,000. The San Francisco-Oakland Terminal Railways must rearrange and properly construct its track so as to have one track in each barrel of the subway.

Sarnia (Ont.) Street Railway.—Engineers of the Ontario Hydro-Electric Power Commission are conducting a survey of the system of the Sarnia Street Railway with a view to the purchase of the latter by the city.

Trade Notes

Henry Ford & Son, are at work on their new gasoline car and expect to make a trial run some time in March.

Roi B. Woolley, who has been director of publicity of the Society for Electrical Development, Inc., for the past two years is now with Thomas F. Logan, Inc., advertising agency, New York.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that J. G. Miles has been appointed supply division manager of the Seattle office, succeeding C. V. Aspinwall, now the company's representative at Spokane, Wash.

Mr. Miles has served several years as the head of the insulation section, and has been responsible for the exploitation of bakelite and bakelite micarta products, as applied to insulation and gears.

Duff Jack Sales Company, Ltd., 245 Oxford St., London, England, has been formed to represent the Duff Manufacturing Company of Pittsburgh in the British Isles, and has been given the exclusive agency in this territory for Duff and Barrett jacks.

Wolverine Tube Company, Detroit, Mich., has moved into its new plant at 611-625 Central Ave., comprising two and one-half acres of land with 30,000 sq.ft. of floor space in the factory, which will afford greater facilities for producing brass and copper tubing.

Joyce-Cridland Company, Dayton, Ohio, manufacturer of Joyce jacks, announces the opening of its New York office on the fifth floor of the Grand Central Palace at Forty-fifth St. and Lexington Ave. Arthur S. Beattys, Eastern Sales Manager, is in charge.

Lieut. L. M. Clark has recently become associated with the Railway Improvement Company, New York, in the sales department. Lieut. Clark was formerly master mechanic of the Indianapolis Street Railway and the Terre Haute, Indianapolis & Eastern Traction Company.

Harper, Bean, Ltd., London, England, has been formed in London to include A. Harper & Sons & Bean, iron founders; Vulcan Motor & Engineering Company, Swift, the British Motor Trading Corporation, Steel Manufacturers of Sheffield and a number of subsidiary manufacturers of electric lighting and starting sets.

General Electric Company, Schenectady, N. Y., has added 40,000 sq.ft. to its factory at Windsor, Conn., which was purchased about fifteen years ago from the Eddy Electric Company, then in bankruptcy. About 150 employees will be added. Small motors and other supplies of lighter character are produced at Windsor, with Arthur A. Bailey as general manager.

W. Jerry Stanton has accepted a position with the Ohio Brass Company. Mr. Stanton has been identified with the electrical industry for the past twenty years, having started with the General Electric Company. For eighteen years he remained with them in their testing, engineering and sales departments. Since that time he has been with the Railway Improvement Company and the National Railway & Appliance Company.

Pacific Auto Railcar Company, Sacramento, Cal., reported to be a million dollar industry, has completed plans for its factory along the Twelfth St. road, just north of Sacramento, and will soon start construction work. When finished the plan will cover eight acres and is expected to provide employment for 400 workers. Railway motors cars and automobile bodies will be manufactured. A. R. Meister is in charge of the affairs of the company.

Economy Electric Devices Company, Chicago, has recently closed an order with the Indiana Union Traction Company for the equipment of the 105 high speed interurban cars of that company with Economy meters. These meters will be furnished with the special inspection dials which are a popular feature of the Economy meters. Other recent orders of the Economy Electric Devices Company are with the Rochester & Syracuse Railroad for meters for all classes of interurban cars belonging to that company and with the Stark Electric Railroad for a complete installation of meters for its city and interurban cars.

Vickers, Ltd., London, England, and Brown-Boveri & Company, Paden, Switzerland, have made working arrangements which cover not only British business but also the British colonies and certain European countries. The Vickers company has acquired the sole British and colonial rights in all the patents of Brown, Boveri & Company, Ltd., and the latter firm undertakes to conduct no direct business in any part of the British Empire. In addition, direct combination is to take place between the subsidiary undertakings of both companies in France and Italy. Vickers, Ltd., has also purchased shares in the Brown, Boveri Company to the amount of £280,000. The arrangement will lessen the risk of competition of continental firms, as there are now only two neutral manufacturers who are capable of building large generating sets such as those required by the Edinburgh Corporation.

Stone & Webster, Boston, Mass., has announced the addition of six new partners all of which have been connected with the organization for long periods. These are: Frederick P. Royce, a graduate of Massachusetts Inst. of Technology of the class of 1890 and long connected with the development, financing and management of public utilities and recently in the analysis and investigation of the Brooklyn Rapid transit and Interborough Railway system; George O. Mulfield, a graduate of Cornell, 1897, and affiliated with the construction department, specializing in hydro-electric development; Henry B. Sawyer, formerly treasurer of several companies managed by the Stone & Webster Corporation and recently engaged in the construction of a 30,000 kw. hydro-electric plant in Japan; Frederick S. Pratt, Harvard 1894, engaged in the development of chemical projects and formerly in charge of the Puget Sound Traction, Light and Power Co.; Harry H. Hunt, a graduate of Massachusetts Inst. of Technology, 1889, connected with the management of various public service companies under the control of Stone & Webster Corporation, and Howard L. Rogers, a graduate of Massachusetts Inst. of Technology, 1893, a member of the division of engineering and construction for many years.

New Advertising Literature

V. V. Fittings Company, Philadelphia, Pa.: Inserts for catalog No. 21 on new types of Safety Switches.

C. H. Whall Company, Boston, Mass.: A booklet on the character, uses and possibilities of hard fiber.

Underfeed Stoker Company of America, Detroit, Mich.: A thirty-one-page booklet containing much interesting information regarding coal from various geographical sections of the country.

Cutler-Hammer Manufacturing Co., Milwaukee, Wis.: A booklet "Electrical Operation of Gate Valves" which contains an address given by Peter Payne Dean before the Metropolitan Section of the American Society of Mechanical Engineers.

Portable Machinery Company, Inc., Passaic, N. J.—Bulletin on portable belt conveyors for handling material horizontally or at a slight incline. In addition to handling coal, sand, crushed stone, etc., they are also being used for conveying manufactured products, such as cement, etc., affording a flexible, and automatic conveying arrangement.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 55 New York, Saturday, February 7, 1920 *Number* 6

Find the Way or Make One

IN THE issue of this paper for Jan. 24, we present an abstract of a report made in 1918 upon the comparative merits of lag screws in place of bolts in framed timber structures. It appears that the time-honored custom of using bolts and nuts in such structures is at last giving way to economy and progress. The economy lies in the two important factors of all construction work—namely, material and labor. In these days of inflated costs and depleted income, there is a source of gratification in every such instance of increased economy resulting from study and experiment, and our interest in seeking further economies is greatly stimulated thereby.

The spur of necessity has ever fostered inventive effort, and we believe that the times through which we are passing will prove a blessing in disguise in so far as they have emphasized the necessity for finding every possible economy both in labor and material. Labor need have no fear of either machinery or any other labor-reducing agency, since history has shown that it has always been some other force or influence than machinery which has created a surfeit in the labor market.

There are many fields open to the managements of electric railways in which to effect such economies. A journey over almost any property, other than the few roads which have either been recently built or rehabilitated, will show even an outsider that what is needed most is a complete investigation into the depot and shop facilities. Many depots are now badly located with respect to time required to keep the line supplied with cars. Pull-ins cost more than they should. Shops which were probably designed for the repair of, say, fifty cars per year are trying to do economical work on 100 cars now with the same equipment and arrangement and with very high labor costs. Centralization of such work in modern, well-lighted, properly planned shops will work wonders.

Car equipment still needs modernization on many roads, some of which are still using cars of the vintage of 1908, very heavy, costly to operate and having no fare-collection devices whatever. Such equipment probably loses, by evasion and by theft, about as much money daily as would pay the interest on equipment trust certificates for modern cars which would get the money and help keep it. The ways and means for obtaining modern equipment can be found if an earnest attempt is made to do so.

Some very large companies doing a very heavy summer resort business still persist in getting along without prepayment areas, while they own the necessary property and have no apparent obstacle in the way of the ready establishment of such areas.

The tendency to hang on to franchises and to operate and maintain tracks and routes which originate little or no business but seem necessary as parts of through and long-haul routes also persists to a marked degree. Such tendencies must be overcome, and consolidation of routes and abandonment of unprofitable franchises must be faced. They are contributing factors to many of our recent receiverships.

Truly, there is work for men of vision and resource in the situation here outlined. We have no doubt as to the results which will be had when these problems are fully appreciated and an earnest effort is made toward their solution. With faith and the will to do, the ways and means can be found to put every one of our electric railway systems back upon a paying basis, except the comparatively few which never had any strategic value or intrinsic worth.

Don't Half-Install the Safety Car

THE safety-car plan embodies two objectives, neither of which can be safely divorced from the other. The two objectives are to give more frequent service and to lessen operating costs. It is a mistake to install safety cars on a basis of accomplishing only the second half of the plan.

We have a case in mind where safety cars were installed on a car-for-car basis with no change in schedule speed and no improvement in the service visible to the public. The company cut the platform expense almost in two and saved further on energy and maintenance, but the public gained nothing but the feeling that its service had been cheapened. It grumbled and criticized. Finally, after several months of this operation, there was a combination of circumstances—one of those accidents that just happen without the blame falling on anyone—whereby a safety car was hit by a locomotive and badly smashed though no one was seriously injured. Forgetting that only a year or two before a two-man car had met with a similar though more disastrous accident at the same point and that the blame had been clearly fixed upon the conductor, the public immediately condemned the safety car as being responsible for the accident because of its one-man operation and began clamoring for its removal from the service.

And why should it not clamor thus? It had nothing to lose by a return to the older cars. The safety cars had been installed in a manner which brought no gain for the public. It was only natural that the first opportunity should be seized to discredit the small cars when nothing had been done to "sell" the public on the better, faster, more frequent service which the safety-car plan makes possiible. Had a return to the older cars meant going back to a fifteen minute headway instead of ten minutes; twenty-five minutes to get down to work instead of twenty minutes, and perhaps a 6-cent fare instead of 5, then it is quite probable that the protest against the safety car after the accident would have been very mild if any, and that the safety car could very promptly have been cleared of responsibility for the accident, as it really was.

How the Work of the Association Has Expanded

IN THESE days of high expenses and low net receipts of electric railway companies it may seem to some an inopportune time for the American Electric Railway Association to increase its dues. Actually, it is the condition just mentioned which has brought about the increase because it has developed the necessity and opportunity for more co-operative action through the Association.

If the companies were more prosperous the same need might not have been felt. But the very extremity of the crisis has obliged them to utilize every means to assist themselves and this has emphasized the necessity for a central bureau where data can be collected and problems which concern every road can be worked out for the assistance of all.

The growth of the association in usefulness is described in one of the feature articles in this issue. As Mr. Clark points out, its greatest development has occurred only during the last few years. In its early life the association was little more than a debating society. No centralized work was taken up until 1905 and only gradually after that. Now the work done between conventions constitutes by far the greater part of that accomplished by the association and obviously, where so much research work has to be done, it can be carried out more cheaply and effectively by one organization than if the same effort were made by each company separately.

Not Everybody Goes Out to Work

WE HAVE all heard the expression: "Everybody has gone to the country" when the fact is that but 5 per cent of the population is doing that pleasant thing at any one time. In a lesser degree we get the impression that 'most everybody goes to work. As a matter of fact, a great many more people must be at home than in the factories and offices, since for each breadwinner there are three or four dependents. If we are to do much in the way of building up off-peak riding, it is important to know who the stay-at-homes and go-to-schools are and what their habits are. A certain number, we will find are the grandmothers and grandfathers who sally forth after 9 a.m. with a market basket to do some neighborhood shopping. Then there are the wives and domestics on the same or more extended errands; the school children who may travel during the luncheon period as well as morning and mid-afternoon; the many visitors to the afternoon movie shows and, in addition, off-peak riders who are breadwinners, such as agents, solicitors, plumbers, carpenters, delivery boys, etc. It is plain, then, that off-peak travel does not drop so low because everybody is at some fixed job in factory or office, but because the majority that remains has no such specific inducement to ride.

Broadly speaking, most rush-hour riders are compulsory riders; most off-peak riders are voluntary riders. Therefore, our sales efforts must really be directed toward turning the casual rider among the "stay-at-homes" into a frequent rider through devices like wholesaling tickets, limited-ride weekly tickets, unlimited ride passes or the like. Only then can we feel sure that most of the cash riders really are infrequent riders. In any such campaign a railway company should have the hearty support of the local storekeepers and theater proprietors as they get most of their business from riders during the off-peak hours. Indeed, it might be possible in some cities to get the more enterprising retail storekeepers to revive the one-time popular plan of giving to each purchaser of more than a certain amount one or two single-ride trolley tickets. If the storekeeper wanted to limit this bonus so as to encourage morning shopping, which all stores prefer, he could supply tickets only to those who made their purchases before noon or 1 p. m., just as some merchants now give double trading stamps to morning shoppers. Such a plan would certainly not meet with objection from the railway company for the morning shopper would usually leave home after the early morning rush and would return before the evening rush.

Undoubtedly there are many ways by which mid-day or evening riding can be stimulated. It is certainly worth going after.

The Claims Account Demands Attention

MORE claims are made, more claims are settled, they cost more, expenses are higher and suits pending are increasing, in spite of increased claim-department efficiency. That sums up in a few words the present status of the accident account of the electric railway industry, as reported to us by a well-known claims agent who has recently been examining the accident records of the past two years, of a number of the largest companies in the country. If this condition is general, it is one which demands attention and broad, effective concerted action to stem the tide.

There are many conditions which would tend to bring about such a state of affairs. The great increase in the number of automobiles is the first thing that comes to mind. This should mean not only a corresponding increase in number of accidents but probably an even larger increase because of the greater congestion in the streets. Another and perhaps almost equally important contributing cause for the growth in the accident record is the general reckless abandon which has seemed to sweep the country over and which is probably a direct outgrowth of the war. It has permeated the shops and the street and brought reductions in the care with which owners and chauffeurs drive their automobiles, with which pedestrians watch their own safety, and probably also in the care with which motormen operate their cars. Then there has been a slackening of the interest and activity in safety work, both public and private, due, no doubt, to its subordination to the demands of the war, and this has contributed by its omission to the increasing number of accidents.

So much for the number of accidents and the causes, but what of the increased cost of accidents—the increased cost per accident.

In both accident and liability claims, the trend of the attitude of the courts is distinctly toward making the corporation pay for a larger proportion of all the accidents and to pay higher awards to compensate for depreciated money value. Each new legislature in almost every state adds more to the requirements of the corporation and gives more rights to the injured. Fifteen years ago, $2,000 was a common upper limit which a state supreme court would award against a common carrier. Now there is no limit, except in fatalities, and it is not rare for an award as high as $15,000 or $20,000 to be paid to an individual. All but fifteen states now have workmen's compensation acts which leave a company few legal defenses so far as its own employees are concerned.

There is no sovereign remedy for this condition, but at least one thing can be done. This is to revive the safety-first work of two and three years ago—perhaps under some new name with new slogans and new methods. Too much cannot be said of the accomplishments by previous safety campaigns, but much of their effect has now been lost. To re-establish them in perhaps a different form but in no less effective a way is one of the principal matters which should be taken up by electric railways and particularly by their claim agents throughout the country.

Kansas Establishes Industrial Peace Precedent

KANSAS has had its fill of strikes. So has most every other state; but Kansas is making a determined effort, led by Governor Allen, to eradicate from the future these crimes against the public welfare. The Legislature has enacted a law at the Governor's behest which compels arbitration and outlaws strikes and lockouts in certain named essential industries, including transportation and other public utilities. Whether she has found the final solution or not, Kansas is certainly to be commended on making a determined attack upon the problem. She has had the nerve to do what nearly every other state has wanted to do. She had a fight, for approval of the Governor's plan was not won in the Kansas Legislature without having to overcome considerable opposition.

This advanced piece of industrial legislation is the outgrowth primarily of the coal strike, but it covers the entire field of industry the essential character of which is generally accepted. It apparently has certain features of the Australian compulsory arbitration laws. It provides state operation of establishments covered by the act in the event of refusal by one or both parties in a dispute to obey the order of the industrial court which has been created for the purpose of hearing and deciding controversies over wages, hours, conditions of work, or relations between employer and employee. The act recognizes collective bargaining, forbids picketing, limits right of discharge and even empowers the industrial court to amend the employment contract which has unjust and unreasonable clauses.

The act abolishes the former public utilities commission, and places all of its work on the shoulders of the newly created Court of Industrial Relations. Looked at from this angle, it merely extends the definition of "public utilities" and extends the regulatory authority of the state over them until it includes regulation of labor, and relations of labor to employer, as well as the more usual financial and operating features of such concerns or businesses. In general, there should be nothing repugnant in this idea. The public is entitled to uninterrupted economical service from a public utility supplying a necessary community service. If regulation is necessary to obtain this, that regulation is worthless if it stops short of including all elements likely to interfere with this service, and labor is one such element. Some statement of the power of the state to assume the regulation of labor relations in such industries is thus to be expected, but it may develop that this power need be exercised only in extreme cases.

The present Kansas act must be considered as entirely experimental from both the legal and practical standpoints. Other efforts to compel industrial peace have been largely futile but this one may be more successful. If so, it will furnish a precedent for a similar step in other states. The purpose is a worthy one.

We Are Outgrowing Our Travel Ways

HOT on the heels of the Broadway Association's vote for the motor bus as against the electric car, discussed in our issue for Jan. 24, comes the announcement that automobile traffic on Fifth Avenue, New York, has grown to such overwhelming proportions that a serious effort is to be made to turn this 55-ft. highway into a one-way street during the busier hours at least! It is but a few months since the City of New York paid nearly one and one-quarter million dollars for reconstruction and easement rights on Park Avenue, two blocks distant, in the hope of relieving Fifth Avenue. Yet the diminution of traffic on Fifth Avenue for the time being has been only 6 per cent while traffic on Park Avenue has increased 170 per cent. The Broadway Association, so eager to emulate on its narrower highway the trackless and "busful" condition of Fifth Avenue, well might ponder the following from the *New York Times* for Jan. 31:

> "This paralysis (the impassable jams) frequently has extended for blocks, particularly between Thirty-fourth and Forty-second Streets, with the buses of the Fifth Avenue Coach Company, limousines and smaller cars caught tight in the immovable tangle at just the time that their occupants were in a hurry to get home or to work."

We are not going to pretend that a trackway on Fifth Avenue would be the solution, although double-deck cars would certainly offer greater capacity in a given space than double-deck buses. We merely point out that the conditions on Fifth Avenue prove that nothing would be gained by substituting buses for cars on Broadway or any other busy highway which is already provided with electric railway tracks. If pressed for a real solution, we are led to agree absolutely with the statement of Lord Ashfield of Southwell (Sir Albert H. Stanley), made in London in mid-January, that special underground roadways for vehicles as well as for railways must be built to meet the new conditions introduced in cities by the enormous growth of self-propelled vehicles. An aspect of this problem as regards non-city roads is revealed by the suggestion of a British highway board to build one kind of highway for fast-moving traffic and another for slow-moving traffic. Again, in a recent personal communication, one of Britain's leading consulting engineers writes that he has found that conditions on highways which are still underloaded favor the use of the motor-bus, but that in the case of heavier traffic, he has been forced to the conclusion that the better, cheaper and permanent solution is the construction of electric railways on private right-of-way. Since new highways must be built in any event, it is simply a question of using the new arteries in a way that will produce maximum capacity at minimum cost, and in many cases that way will be the rail-way.

Operating London's Underground Railways

How the Differential Fare Works Out on the Rapid Transit Lines of the Greatest City in the World—Why Former Flat-Fare Lines Changed to Graduated Fares, Beginning at a Lower Rate—Intensive Utilization of Double-Track Lines Through Non-Stop and Skip-Stop Trains—Enormous Total Increase in Traffic Despite Shortage of Equipment and Increases in Fare, Due to War and Demobilization Activities

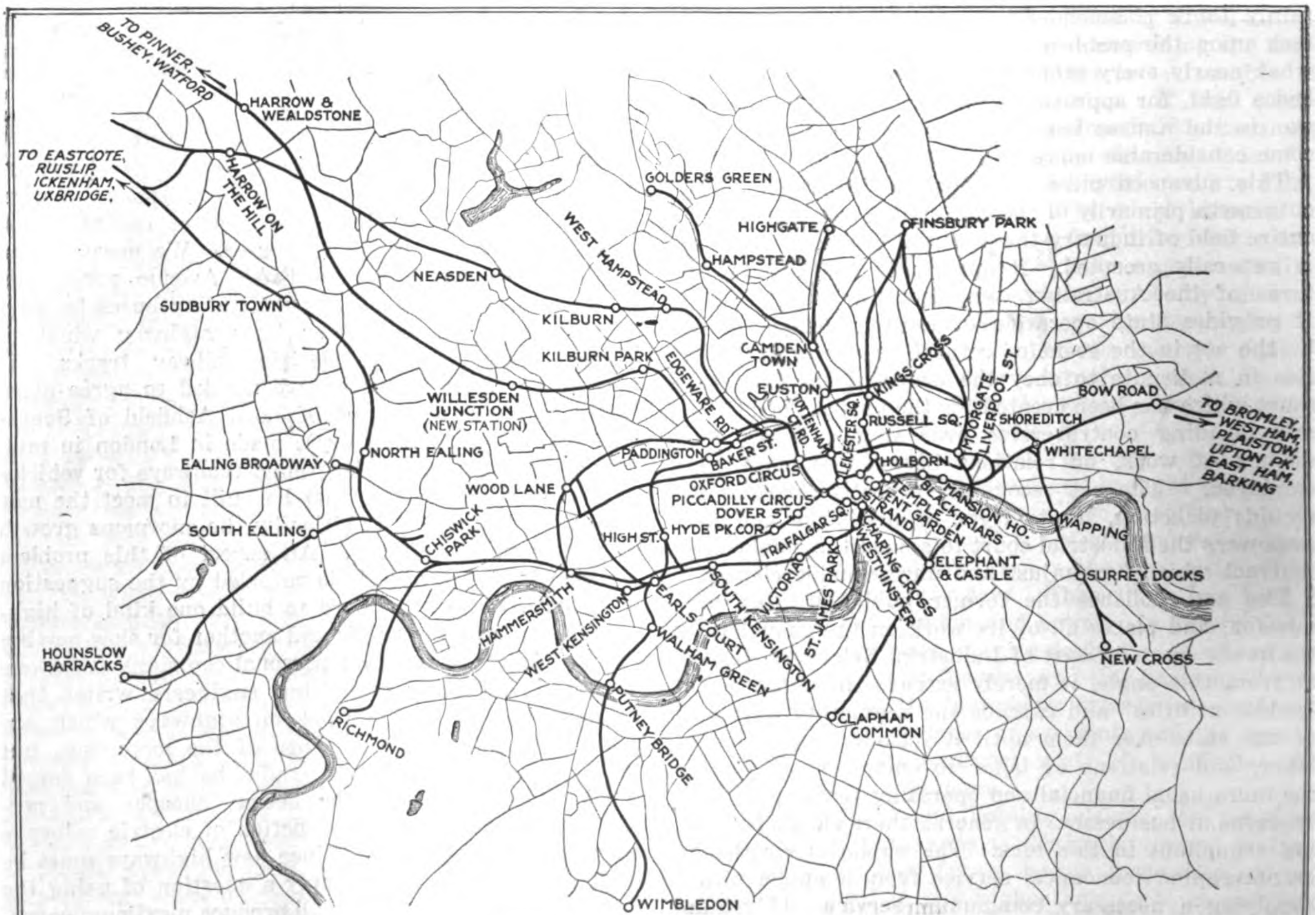
BY WALTER JACKSON

DURING the past four and one-half years, traffic in London has been so abnormal that it would be useless to attempt to ascribe the changes to any particular system of fares. For the period mentioned, London has been both a great workshop and the main clearing house of the military and naval forces of the Empire. Up to the spring of 1919 its population was augmented by nearly 1,000,000 transients, and the most common pastime was hunting for a bed.

Therefore, the transportation facilities of London would have been taxed most severely in any event. Add to this increase of activity and population the commandeering of 1,319 buses for war purposes, the practical cessation of all maintenance but that absolutely necessary, the withdrawal of 16,000 experienced men to enter the fighting and munitions services, the scarcity of fuel of all kinds, the darkening of the streets against air raids, etc., and it is clear enough that the management of the London Underground Electric Railways (the managing company) had its work cut out for it.

While the traffic increases or decreases for the war and demobilization period bear no particular relation to the principle of charging by distance, an analysis of the traffic carried by the different transportation mediums will reveal how well the underground lines have developed long-distance riders, whereas the buses show a preponderance of short riders, many of whom come from or go to the stations of rapid transit lines and who use the surface vehicles to save themselves a walk of half a mile or less.

As to the relation of fares to dwelling locations, it is, of course, quite impracticable to discuss the housing conditions of a world city in detail. One can state only in a broad, general way that the Englishman, if he can afford it, almost invariably prefers to live in a house by himself. The proportion of apartment houses in London is obviously smaller than it is in large


TO PINNER, BUSHEY, WATFORD
HARROW & WEALDSTONE
TO EASTCOTE, RUISLIP, ICKENHAM, UXBRIDGE
HARROW ON THE HILL
GOLDERS GREEN
WEST HAMPSTEAD
HIGHGATE
FINSBURY PARK
HAMPSTEAD
NEASDEN
SUDBURY TOWN
KILBURN
KILBURN PARK
EDGEWARE RD.
CAMDEN TOWN
KINGS CROSS
MOORGATE
LIVERPOOL ST.
BOW ROAD
EUSTON
TOTTENHAM CT. RD.
LEICESTER SQ.
RUSSELL SQ.
SHOREDITCH
TO BROMLEY, WEST HAM, PLAISTOW, UPTON PK., EAST HAM, BARKING
WILLESDEN JUNCTION (NEW STATION)
WHITECHAPEL
PADDINGTON
BAKER ST.
HOLBORN
NORTH EALING
EALING BROADWAY
OXFORD CIRCUS
TEMPLE
BLACKFRIARS
MANSION HO.
WOOD LANE
PICCADILLY CIRCUS
DOVER ST.
COVENT GARDEN
STRAND
WAPPING
SOUTH EALING
CHISWICK PARK
HIGH ST.
HYDE PK. COR.
TRAFALGAR SQ.
CHARING CROSS
ELEPHANT & CASTLE
VICTORIA
ST. JAMES PARK
WESTMINSTER
SURREY DOCKS
HAMMERSMITH
WEST KENSINGTON
EARLS COURT
SOUTH KENSINGTON
WALHAM GREEN
NEW CROSS
HOUNSLOW BARRACKS
PUTNEY BRIDGE
CLAPHAM COMMON
RICHMOND
WIMBLEDON

MAP OF THE LONDON UNDERGROUND RAILWAYS SYSTEM

American cities where a universal 5-cent fare has prevailed for so many years. It is true that tens of thousands of London houses ought to be destroyed and replaced by sanitary and more comfortable dwellings, but few people place the blame for this condition on the cost of transportation.

Despite the great augmentation of traffic hereinafter detailed, the operating and schedule speeds have remained at the high level of pre-war days. The oldest system, the City & South London Railway, is the slowest, with a schedule of 13.65 m.p.h., then follow the Bakerloo with 16.32, the Central London with 16.90, the Piccadilly with 17.20 when all stops are made and 19.05 during rush when alternate trains stop at alternate stations (skip stop!), the Hampstead with 17.36, and finally the District Railway which averages 17.61 m.p.h. on the main-line section between South Kensington and Mansion House and 29.98 m.p.h. over the entire system. The following particulars on operations and fares are due largely to the courtesy of the late W. E. Blake, superintendent of the Line Underground Railways, who died not long ago from blood poisoning resulting from a slight accident on the line.

The ideal headway which the company tries to maintain for the greater part of the day is two and one-half minutes. Such an interval assures the encouragement of underground travel for much shorter distances than would be the case with longer trains at longer intervals. To put the matter another way, the company is more anxious to secure passengers than economize on motormen. Table I on page 278 shows that the maximum rush service is forty-three trains (272 cars) an hour on the District Railway.

It will be seen from this table that the normal unit

No. 1—In one of the beautiful suburbs.
No. 2—Eaton Square, London, S. W.
No. 3—City of Westminster dwellings on Regency St.

No. 4—Moreland buildings (apartments), City of Westminster.
No. 5—Type of dwelling in a poorer quarter of London.

CITY AND SUBURBAN DWELLINGS OF LONDON

TABLE I—SCHEDULED TRAIN SERVICE GIVEN ON THE DIFFERENT LINES AT RUSH AND NON-RUSH PERIODS, JULY, 1919

	Rush Period						Non-Rush Period					
	Through Service		Local Service		Total		Through Service		Local Service		Total	
	No. of Trains per Hour	No. of Cars	No. of Trains per Hour	No. of Cars	No. of Trains per Hour	Cars per Hour	No. of Trains per Hour	No. of Cars	No. of Trains per Hour	No. of Cars	No. of Trains per Hour	Cars per Hour
District:												
Circle	10	44*	..	..	10	44*	10	44*	..	..	10	44*
Wimbledon	8	62	..	..	19	116	3	...	6	32	6	32
Putney Line	2	12	9	42			..	...	4	12	4	12
Richmond	5	32	..	..	5	32	4	24	..	..	4	24
Ealing	10	68	..	..	10	68	6	36	..	..	6	36
Hounslow	4	24	6	22	10	46	..	...	6	12	6	12
Harrow	1	6	5	11	9	24	..	...	3	3	4	4
Uxbridge	..	...	3	7					1	1		
Hammersmith	..	...	..	..	..	...	2	12	..	..	..	...
Main Line, Total	40 12x8 18x6 4x5 6x4	248	..	..	..	...	22 4x5 6x4 12x6	116	..	..	..	...
Bakerloo:												
Watford	4	23	..	..	..	...	4	20	..	..	..	...
Queen's Park	24	120	..	..	..	...	16	48	..	..	..	...
Main Line, Total	28 3x6 1x5 24x5	143	..	..	..	...	20 4x5 16x3	68	..	..	..	...
Piccadilly	24x5	120	..	..	..	...	24x3	72	..	..	..	...
Aldwych	..	...	15	15	..	...	..	...	5	15	..	...
Hampstead:												
Highgate	19	95	..	..	..	...	12	36	.	..	..	...
Golders Green	19	95	..	..	..	...	12	36	..	..	..	...
Main line, total	38x5	190	..	..	..	...	24x3	72	..	..	..	...
Central London	24x6	144	..	..	..	...	24x3	72	..	..	..	...
City and South London	25x5	125	..	..	..	...	13x5	65	..	..	..	...

*District Circle trains made up to five cars temporarily.

on the Central London, Bakerloo, Piccadilly and Hampstead lines is a three-car train, made up usually to five cars, or occasionally to six, excepting on the Hampstead lines. Rolling-stock limitations make five-car trains standard at all times on the City & South London Railway. Trains on the District Railway range in length from a single car on a branch line to ten cars on the main line. In pre-war days, ten-car trains at reduced rates were exceptionally popular for school parties which were handled between peaks. Reduced round-trip fares, as for shoppers, were less successful, for though the ticket could not be used before 10 a.m., the user could not be prevented from delaying her return to coincide with the evening rush.

Another pre-war traffic development was the running of through trains between the extremes of the system, Southend and Ealing, a distance of 47.43 miles. During the war this special service for the long-distance commuter had to be curtailed, but it was so popular that it is sure to return. Incidentally, the charge-for-distance fare did not prevent the rapid growth of this service(namely, from a trial train on July 22, 1909, to four through Southend trains in each direction daily and five on Sundays. The Ealing-Southend trip has been made in ninety minutes, corresponding to a rate of 31.6 m.p.h.

ENGINEERING LIMITATIONS ON SERVICE

On the Piccadilly, Hampstead, Bakerloo and Cental London lines, the platforms are still one car length in excess of the longest trains run. On the District Railway the limit has been reached so that various expedients have had to be devised to permit the operation of trains longer than platforms. In June, 1914, a nine-car train was inaugurated, the idea being to carry in the rear coach only passengers for Charing Cross and Mansion House stations from Ealing and stations to Hammersmith, as these passengers would not require any platform accommodation until arrival at Charing Cross and Mansion House. This scheme had to be withdrawn on the outbreak of the war, owing to the difficulty of finding an extra guard to look out for the special loading and unloading of the ninth car. To use Mr. Blake's expression, the idea of a Season Ticket Holders' Club Car caught very well.

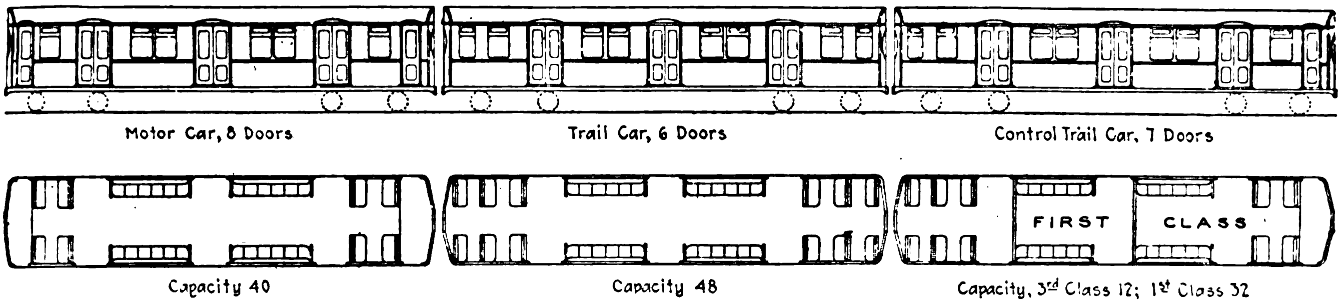
Another means of securing longer trains was to make

As operating manager of the London Underground Electric Railways and the London General Omnibus Company, Ltd., H. E. BLAIN is chief officer of the greatest city transportation concern in the world, co-ordinating underground rapid transit lines, surface tramways and motor buses in one splendid system. Although he began his railway career at Liverpool, following his employment in other municipal departments, Mr. Blain has been a resident of the London district since 1903. It was in that year that he became the first manager of the West Ham Corporation Tramways. He saw at once that the greatest handicap to the full usefulness of the tramway systems in the different political subdivisions of the metropolis was the absence of through running arrangements. Upon reaching the boundary of a borough, passengers had to get out and board a car belonging to another tramway system. This condition was the result of the restrictive laws regulating the construction of tramways and the right of municipal tramways to extend beyond the boundaries of the corporation. With the working out of through running arrangements as early as 1904, these restrictions were largely overcome at a great benefit to the public and the undertakings concerned. To-day, through-running agreements are well-nigh universal throughout the United Kingdom. Mr. Blain held the management of the West Ham Corporation Tramways for ten years, being President of the Municipal Tramways Association in 1911 and entered upon his broader duties with the London Underground Electric Railways in the year 1913.

Mr. Blain has taken a prominent personal interest in all matters affecting relationships with the staff, and the welfare work of the Underground Group has been especially noticeable. He is vice-president, as representing employers, of the Industrial League, an organization whose objects are to improve the relationship between employers and employees, its president being the Rt. Hon. G. H. Roberts, M.P., Minister of Food, and its Employees' Vice-President being Mr. G. J. Wardle, M.P., Parliamentary Secretary to the Ministry of Labour.

Mr. Blain has also been responsible for the organization, in Great Britain, of the "Safety First" movement, being the Hon. Secretary of the London "Safety First" Council, which has specially dealt with traffic matters, and of the British Industrial "Safety First" Association, which is rapidly extending the movement into the factories and workshops of Great Britain.

Prior to his connection with the Underground Group, Mr. Blain had considerable experience as an expert witness on traction matters, both in the law court and in the Parliamentary committee rooms.


Motor Car, 8 Doors
Trail Car, 6 Doors
Control Trail Car, 7 Doors
FIRST CLASS
Capacity 40
Capacity 48
Capacity, 3rd Class 12; 1st Class 32

NEW SIDE-DOOR CARS, LONDON UNDERGROUND LINES

a combination of the facilities which existed on the line east of Whitechapel (to Barking) to accommodate infrequent long trains, and the capacity of the railway west of Whitechapel to accommodate shorter but more frequent trains. In this way, two of the trains leaving East Ham about 8 a.m. were made up to ten or eleven cars and these trains were split at Whitechapel into six and four (or five) cars. This arrangement is still in use.

When the District Railway is at its maximum of forty-three trains an hour, an average interval of less than eighty-four seconds must not be exceeded between the departure of successive trains from a station. Hence if a District train stops only thirty seconds, maintenance of the schedule demands that there can be between successive trains an interval of less than fifty-four seconds from the time one train actually starts until the next stops.

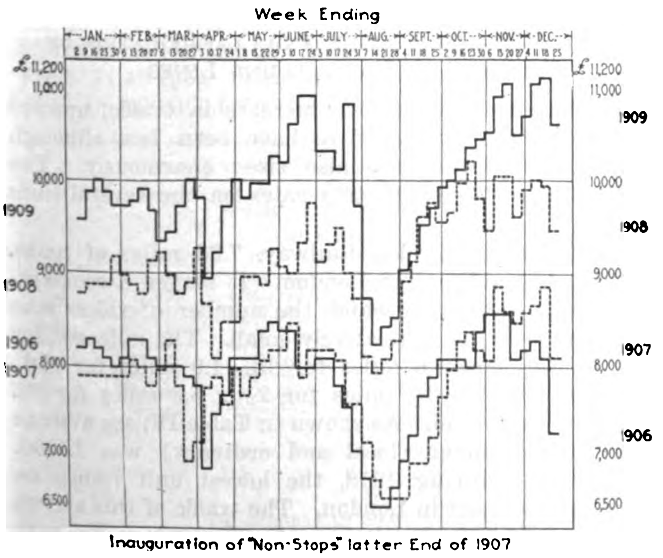
The actual time that elapses between the first application of the brakes and the bringing of a District train to rest is about twelve seconds; while the number of seconds occupied in starting a train and bringing it to a maximum speed in the tunnel section is thirty to thirty-six seconds. Of the latter period, about twenty seconds is occupied in clearing the block joint just immediately beyond the starting signal. On the Tube Railways. the rate of retardation has been cut to nine seconds by the use of the Frood non-metal brakeshoe, but this brakeshoe is not so suitable for the District Railway's long stretches in the open. Therefore, the District Railway is experimenting with electro-pneumatically controlled brakeshoes by means of which the braking period has been cut to ten seconds. Considerable improvements have also been made in the signal system, as through the increase of home signals. The post-war period will see further improvements.

SIDE-DOOR CARS FAVORED

To reduce the passenger interchange period at stations, it is likely that future rolling stock will be provided with center doors in addition to end doors or with cars having three doors per side, as shown in the accompanying drawing of the first 100 cars reproduced from the ELECTRIC RAILWAY JOURNAL for Aug. 16, 1919. These cars will be 50 ft. instead of 49 ft. long and 9 ft. 6 in. wide instead of 8 ft. 6 in. wide. Three-car and eight-car (three motor cars) combinations will be used for slack and rush hours respectively. At present, only the District cars have center doors. During the war the shortage of guards often made it necessary to use one end of a tube car for entrance and another for exit. Another war-time measure was the barring of platform stairways as soon as the platform was filled more than comfortably.

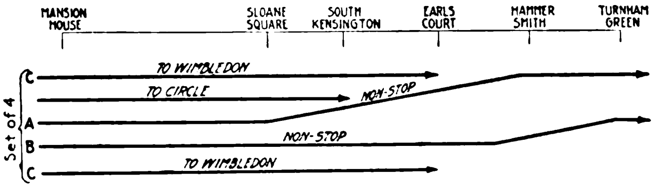
One of the most commendable features for accelerating proper loading is the use of illuminated train indicators which advise the passenger what train is due next or what train is standing in the station. This scheme also saves the passenger whose train has not arrived from being jostled needlessly, because he can stand back until his train does come in. The illuminated destination sign at the head of the train is also more satisfactory than sole dependence on marker lights, which mean little to the regular rider and nothing to the stranger.

Mr. Blake noted that in New York barriers had been



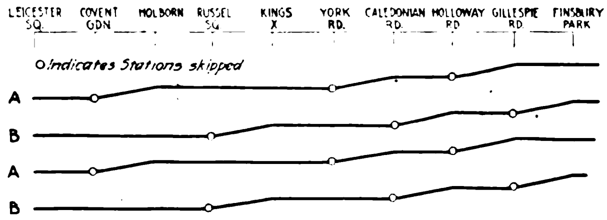
Inauguration of "Non-Stops" latter End of 1907

INCREASE IN GROSS RECEIPTS OF DISTRICT RAILWAY, FOLLOWING INAUGURATION OF NON-STOP OR EXPRESS TRAIN SERVICE


MANSION HOUSE
SLOANE SQUARE
SOUTH KENSINGTON
EARLS COURT
HAMMER SMITH
TURNHAM GREEN
TO WIMBLEDON
TO CIRCLE
NON-STOP
NON-STOP
TO WIMBLEDON
Set of 4
C
A
B
C

Upward Inclination Shows Space Gained by Non-Stop Trains

HOW JUNCTIONS ON A DOUBLE-TRACK LINE ARE UTILIZED TO OPERATE AN EXPRESS SERVICE


LEICESTER SQ.
COVENT GDN
HOLBORN
RUSSEL SQ.
KINGS X
YORK RD.
CALEDONIAN RD.
HOLLOWAY RD.
GILLESPIE RD.
FINSBURY PARK
O Indicates Stations skipped
A
B
A
B

The upward Inclination Shows Interval Gained by Non-Stop Trains

DIAGRAM SHOWING SKIP-STOP OPERATION ON THE DOUBLE-TRACK PICCADILLY TUBE WITH NO JUNCTIONS AVAILABLE erected on station platforms to segregate passengers for different destinations. This plan has been adopted for a number of heavy traffic stations in London, although there are two disadvantages—that passengers tend to alight too leisurely and that human nature makes motormen more likely to miss a fixed stop when they are expected to make it than if they are not asked to do so. Queues have been tried to a still slighter degree because limited platform space makes them impracticable except where all trains are headed for a single destination.

A comparative test disclosed the interesting fact that bus passengers in the favorable queue formation could be interchanged at the rate of one and one-half seconds per passenger; whereas the same rate for underground cars would cut the hourly maximum of trains from forty-three down to twenty-six.

The greatest handicap of the London underground lines is the absence of tracks for express service. Yet where there's a will there's a way. The non-stop trains, inaugurated on the District Railway in 1907, are a most admirable proof of this proverb. How greatly the public appreciated this means of giving higher speed with fairer loading is shown by the gross receipts graph on page 279. From the operator's viewpoint such trains also mean lower energy consumption and more miles per diem. Fundamentally, this has been made possible on the District Railway by utilizing the junctions to get the effect of four tracks as shown on page 279.

On the Piccadilly tube the skip-stop principle obtains, as shown in the diagram on page 279. Succeeding trains pass alternate stations except those of heavy traffic. On the Bakerloo line the long through runs to Watford are non-stop trains.

TWO TUBES TRIED AND DISCARDED THE UNIVERSAL FARE

It must not be supposed that British operators have had no experience with the universal fare. They appreciated the simplicity of the system but appear to have concluded that simplicity alone does not get the traffic. The case of the West Ham Corporation Tramways has been referred to in an earlier article; that of two tubes of the London underground system will now be considered.

The first part of the Central London Railway was opened on July 30, 1900, and to Wood Lane Station on May 14, 1908, with the alluring and alliterative title of the "Two-penny Tube." Table II is a history of results in pasengers and earnings for typical winter and summer months, together with brief explanations of any changes that influenced travel:

TABLE II—TRAFFIC AND EARNINGS, CENTRAL LONDON RAILWAY

	Passengers	Earnings		Passengers	Earning
January, 1904....	3,924,272	£30,665	July, 1904.....	3,523,255	£27,114
January, 1905....	4,057,507	31,765	July, 1905.....	3,456.319	26,548
Competing District Railway Electrified in July, 1905					
January, 1906....	3,985,216	31,073	July, 1906.....	3,313.618	25,462
January, 1907....	3,698,267	28,723	July, 1907.....	2,883.621	24,058
January, 1908....	3,397,936	27,944	July, 1908.....	3,897,164	32,765
Foregoing increase in traffic due to Franco-British Exhibition and extension into grounds via Wood Lane station. In July, 1907, also, a 3d. fare was introduced for the longer rides. In March, 1909, the 1d. and 1½d. fares were introduced, thus definitely marking the abandonment of the universal fare principle.					
January, 1909....	3,089,676	£24,839	July, 1909.....	3,291,852	£24,217
January, 1910....	3,404,559	24,247	July, 1910.....	3,393,404	24,887
January, 1911....	3,511,565	24,163	July, 1911.....	2,965.198	20,835
Extension to Liverpool Street Station Opened July 28, 1912					
January, 1912....	3,365,676	23,111	July, 1912.....	2,658,186	19,059
January, 1913....	3,620,860	24,940	July, 1913.....	2,909,729	19,408

There was no exhibition in the year 1913

The foregoing record would hardly look like a recommendation for the graduated fare were it not for the fact that the operators are convinced that the results would have been much worse had the universal 2d. fare been retained. Their reason is that the coming of the motor bus made it absolutely necessary to give a special fare to hold underground shortriders. Thus the introduction of the graduated fare on this route had the merit of retarding an unavoidable decline in traffic.

The Bakerloo line also began business as a 2d. universal fare line. When opened in March, 1906, it was so American that ticket choppers were employed. At that time the road extended from Westminster Bridge Road to Baker Street, a distance of 3.12 miles. In August, 1906, a 0.54-mile extension was made to Elephant & Castle; in March, 1907, there followed a 0.32-mile extension from Baker Street to Great Central; in June, 1907, a 0.27-mile extension to Edgware Road and in December, 1913, the important 0.46-mile extension from Edgeware Road to the railway station at Paddington. Earnings for typical weeks follow in Table III:

TABLE III—BAKERLOO LINE

Traffic Figures, 1906 to 1914, Inclusive, for Single Weeks
Universal Fare of 2d. Replaced by Graduated
1d., 1½d. and 2d. Fare, March, 1909

	Receipts	Passengers Carried	Pence per Passenger
1906 Week ended March 17................	£1,763	220,287	1.927
1906 Week ended July 14................	1,440	188,840	1.84
1907 Week ended Jan. 12................	2,226	352,759	1.52
1907 Week ended July 13................	2,549	339,942	1.8
1908 Typical week of January..............	3,206	422,740	1.8
1908 Typical week of July..............	3,049	403,048	1.8
1909 Typical week of January..............	3,375	549,885	1.47
1909 Typical week of July..............	3,365	551,893	1.46
1910 Typical week of January..............	3,555	579,366	1.48
1910 Typical week of July..............	3,450	580,151	1.43
1911 Typical week of January..............	3,890	727,032	1.28
1911 Typical week of July..............	3,180	579,789	1.32
1912 Typical week of January..............	3,740	677,620	1.32
1912 Typical week of July..............	2,940	557,854	1.2
1913 Typical week of January..............	3,570	652,122	1.31
1913 Typical week of July..............	3,005	551,127	1.3
1914 Typical week of January..............	3,515	640,529	1.32
1914 Typical week of July..............	3,095	561.417	1.32

During the period of the universal fare, the actual average per passenger was not 2d. but 1.8d., owing to workmen's rates and interline tickets. Although the average return per passenger dropped to 1.47d. with the coming of the graduated fare, the increase in travel brought enough to bring a substantial rise in total receipts.

COST OF TRANSPORTATION AND CLASSIFICATION OF RIDERS ON UNDERGROUND LINES

Because of the enormous increase in traffic, upward changes in the rate of fare have been few although operating expenses have also risen enormously. The following are the single-trip rates on the several lines named:

City & South London Railway, 7.28 miles of route, is the oldest subway of London. It serves a comparatively poor district in which the number of riders who pay more than 2d. is relatively small. The mileages for a given fare are 1.6 miles for 1d., 1.9 miles for 1½d., 3.3 miles for 2d., 3.7 miles for 2½d., 5.3 miles for 3d. and 7.3 miles for 4d. As shown in Table IV, the average fare per passenger (local and ordinary) was 1.590d. (3.80 cents) during 1918, the lowest unit return on rapid transit lines in London. The traffic of this system rose from 17,347,871 (local and ordinary) in the year 1915 to 24,838,206 (local and ordinary) in the year 1918.

TABLE IV—CITY AND SOUTH LONDON RAILWAY

Local and "Common Fund Through" Traffic by Fares, 1914 (to July, Pre-War period), 1915, 1916, 1917, 1918

PASSENGERS

Fare	1914 (to July)	1915	1916	1917	1918
1d.	2,278,273	5,997,959	7,056,566	8,460,279	8,445,200
1½d.	829,551	2,058,745	2,257,742	2,576,419	2,451,958
2d.	2,150,253	5,057,513	5,815,924	6,395,376	7,271,873
2½d.	832,678	1,711,671	1,980,696	2,204,417	1,988,042
3d.	895,909	1,848,355	2,110,664	2,489,787	3,359,771
3½d.	112,057	181,884	212,556	242,837	273,545
4d.	216,786	419,064	492,242	622,162	876,848
Over 4d.	57,616	72,680	91,682	120,371	170,969
Total,	7,373,123	17,347,871	20,018,072	23,111,648	24,838,206

AVERAGE FARE PER PASSENGER

1914 (to July)	1915	1916	1917	1918
1.92d.	1.83d.	1.83d.	1.82d.	1.90d.

PASSENGERS IN PERCENTAGES

	1d.	1½d.	2d.	2½d.	3d.	3½d.	4d.	Over 4d
1914 (to July)	30.9	11.2	29.2	11.3	12.2	1.5	2.9	0.8
1915	34.5	11.9	29.1	9.9	10.7	1.0	2.4	0.5
1916	35.3	11.3	29.1	9.9	10.5	1.0	2.4	0.5
1917	36.6	11.1	27.7	9.5	10.8	1.0	2.7	0.6
1918	34.0	9.9	29.3	8.0	13.5	1.1	3.5	0 7

Central London Railway, 6.76 miles of route, enjoys considerable traffic from its nearness to the Oxford Street shopping district. Its average fare per passenger is 2.01d. or practically 4 cents. The mileages for a given fare on this railway are: 1.2 miles for 1d., 1.5 miles for 1½d., 2.5 miles for 2d., 2.7 miles for 2½d., 4.7 miles for 3d. and 6.7 miles for 4d. As shown in Table V, the 1d. passengers on this line, as on the City & South London, average 32 to 33 per cent of the total, which is a little below half the 1d. ratio on the bus lines hereinafter presented. The traffic of the Cental London Railway increased from 24,153,697 (local and ordinary) in the year 1915 to 35,169,985 (local and ordinary) in the year 1918, or approximately 45 per cent (local and ordinary).

London Electric Railway, comprises the three most modern tubes, namely, Bakerloo, (20.8 miles), Hampstead, (6.33 miles to Golder's Green and 4.67 miles to Highgate) and Piccadilly, (9.23 miles). As a whole this system serves many attractive suburban communities as well as the theatrical and shopping center of London. The average fare per passenger is now 2.12d. or in excess of 4 cents, and as Table VI indicates about 28 per cent of the non-season local and ordinary passengers pay more than 2½d. or 5 cents. On the Piccadilly line, which may be regarded as typical of this group, one may ride 1.1 miles for 1d., 1.6 miles for 1½d., 2.6 miles for 2d., 3.1 miles for 2½d., 5.3 miles for 3d., 7.2 miles for 4d., and 8.9 miles for 5d. The increase of traffic on the London Electric Railway lines has been from 71,486,362 (local and ordinary) passengers in 1915 to 109,969,665 (local and ordinary) passengers in 1918. Even this record will be exceeded by that of 1919.

TABLE V—CENTRAL LONDON RAILWAY

Local and "Common Fund Through" Traffic by Fares, 1914 (to July, Pre-War Period), 1915, 1916, 1917, 1918

PASSENGERS

Fare	1914 (to July)	1915	1916	1917	1918
1d.	4,384,013	7,366,993	8,012,237	10,518,625	11,336,389
1½d.	190,829	1,061,267	1,185,873	1,390,909	548,652
2d.	6,789,527	10,132,078	10,782,926	12,080,578	12,675,356
2½d.	450,520	722,125	812,796	1,491,504	2,267,779
3d.	2,675,102	4,175,979	4,476,270	5,189,433	5,943,734
3½d.	73,799	149'667	165,837	215,001	212,844
4d.	268,474	467,699	516,206	1,116,825	2,062,196
Over 4d.	31,388	77,889	66,896	72,931	123,035
Total,	14,863,652	24,153,697	26,019,041	32,075,806	35,169,985

AVERAGE FARE PER PASSENGER

1914 (to July)	1915	1916	1917	1918
1.94	1.91	1.91	1.92	2.01

PASSENGERS IN PERCENTAGES

	1d.	1½d.	2d.	2½d.	3d.	3½d.	4d.	Over 4d.
1914 (to July)	29.5	1.3	45.7	3.0	18.0	0.5	1.8	0.2
1915	30.5	4.4	41.8	3.0	17.3	0.6	2.0	0.4
1916	30.8	4.6	41.5	3.1	17.2	0.6	2.0	0.2
1917	32.8	4.4	37.7	4.6	16.2	0.7	3.4	0.2
1918	32.2	1.6	36.0	6.5	16.9	0.6	5.9	0 3

Upon examination of the relations between fares and distances, it will be observed that the long-distance rider is favored so far as is consistent with service costs. For examples, the initial ride for 1d. on the South London and Central London tubes is but 1.1 and 1.2 miles respectively, but the 4d. passenger gets 2 miles for his fourth penny. So, too, the Piccadilly passenger who gets but 1.1 mile for his first penny receives 1.9 miles for his fourth and 1.7 miles for his fifth penny. In sum, after due allowance has been made for the proper initial fare in handling a passenger, he is given a constantly increasing mileage for each increment of fare paid.

Furthermore, the suburbanite is entitled to ride without an increase in fare to any one of a number of stations in the business district. For example: A passenger from the Golder's Green terminus of the Hampstead Tube pays 4d. to the terminus at Charing Cross downtown. From that station, however, he may travel eastward on the District Railway to Temple, Blackfriars and Mansion House or westward to Westminster, St. James' and Victoria; or if he leaves at the Leicester Square station of the Hampstead Tube he may use the Piccadilly Tube to Piccadilly Circus, Dover Street, Down Street and Hyde Park Corner in one direction and to Covent Garden, Holborn and Russell Square in the opposite direction. The holders of the season tickets hereinafter described have the same neutral zone privileges. In addition to assuring liberal treatment for the long-distance rider, this arrangement helps to simplify the ticket system.

TABLE VI—LONDON ELECTRIC RAILWAY COMPANY

Local and "Common Fund Through" Traffic by Fares. 1914 (to July, Pre-War Period), 1915, 1916, 1917, 1918

PASSENGERS

Fare	1914 (to July)	1915	1916	1917	1918
1d.	9,235,039	19,917,432	23,137,364	28,979,798	28,765,305
1½d.	3,222,555	5,754,718	6,550,914	8,470,656	9,607,943
2d.	11,932,092	22,184,036	24,521,416	29,784,247	32,467,965
2½d.	2,132,523	4,587,478	4,631,552	6,092,891	7,852,171
3d.	8,262,671	14,353,329	15,458,847	18,599,043	22,596,006
3½d.	317,115	924,496	1,156,157	1,338,257	1,586,391
4d.	1,688,613	3,240,739	3,446,985	3,867,036	4,995,392
Over 4d.	260,238	524,334	939,872	1,287,191	2,098,492
Total,	37,050,846	71,486,362	79,743,107	98,419,119	109,969,665

These figures do not include foreign through passengers or season tickets.

AVERAGE FARE PER PASSENGER

1914 (to July)	1915	1916	1917	1918
2.04d.	2.05d.	2.04d.	2.02d.	2.12d.

PASSENGERS IN PERCENTAGES

	1d.	1½d.	2d.	2½d.	3d.	3½d.	4d.	Over 4d.
1914 (to July)	24.9	8.7	32.2	5.7	22.3	0.8	4.5	0 9
1915	27 9	8.0	31.0	6.4	20.1	1.3	4.5	0 8
1916	29.0	8.1	30.7	5.8	19.4	1.4	4.3	1.3
1917	29.4	8.6	30.2	6.2	18.9	1.4	3.9	1.4
1918	26.1	8.8	29.5	7.2	20.6	1.4	4.6	1.[illegible]

As a further inducement to the suburbanite, all of the railways named issue season (commutation) tickets, which character of fare amounts to 5.5 per cent of the total carried by the City & South London, 8 per cent of the Central London and 8.5 per cent of the London Electric Railway. By comparing these percentages with those of the ticket riders given in the preceding tables, it will be apparent that more long riders use "seasons" than individual tickets. The following examples will bring out the principle upon which the season ticket charges are based:

If a person within the 1d. zone wishes to buy a season ticket the cost to him for three months would be 15 shillings, whereas if he rode twice a day, six days a week, thirteen weeks a quarter year, the cost on a ticket-per-journey basis would be only 13s. In all probability, however, the 1d. short rider will use his ticket not twice but four times a day because of going home for lunch, etc. Hence he is the winner in the end.

On the contrary, a rider within the 3d. zone can purchase a three-months' season ticket for 32s. 6d. as against 39s. for single-trip tickets. In addition to this saving, all riding that he does beyond the two trips a day costs him nothing.

Season tickets are sold up to periods of twelve months at any ticket office. A reduction of 10 per cent on two season tickets and 15 per cent on three or more season tickets is made when members of the same family reside in the same house and ride between the same stations. Season tickets are also issued at half-price for use by children under fifteen years of age, and for use by students, pupil teachers, apprentices, clerks, etc., under eighteen years of age. Monthly season tickets are also sold to a limited extent.

TABLE VII—UNDERGROUND RAILWAYS

Season and Workmen Traffic
Per Cent of Total Traffic for May, June, July, 1915 and 1918

	Ordinary Passengers	Seasons (Passenger Journeys)	Workmen
DISTRICT RAILWAY			
1915:			
May, June, July	19,874,176	3,446,196	2,788,218
Per cent of total	68.6	17.4	14.0
Average fare	....	2.42d.	1.52d.
1918:			
May, June, July	27,791,969	6,013,488	3,778,896
Per cent of total	64.8	21.6	13.6
Average fare	....	2.59d.	1.70d.
LONDON ELECTRIC RAILWAY			
1915:			
May, June, July	24,057,379	1,436,628	5,356,610
Per cent of total	71.7	6.0	22.3
Average fare	....	1.82d.	1.14d.
1918:			
May, June, July	36,262,669	3,087,240	6,732,476
Per cent of total	72.9	8.5	18.6
Average fare	....	1.76d.	1.20d
CITY AND SOUTH LONDON RAILWAY			
1915:			
May, June, July	6,799,612	314,768	1,932,556
Per cent of total	67.0	4.6	28.4
Average fare	....	1.50d.	1.17d.
1918:			
May, June, July	9,100,394	499,148	2,511,993
Per cent of total	66.9	5.5	27.6
Average fare	....	1.48d.	1.19d
CENTRAL LONDON RAILWAY			
1915:			
May, June, July	7,193,911	573,210	977,230
Per cent of total	78.4	8.0	13.6
Average fare	....	1.77d.	1.04d
1918:			
May, June, July	9,832,494	799,240	862,004
Per cent of total	83.1	8.1	8.8
Average fare	....	1.88d.	1.06d

From the accounting viewpoint, the season ticket is a source of prolific clerical labor. On the other hand, it reduces labor at the booking offices and saves the printing of hundreds of tickets per passenger per annum. It is also reasonably certain that the holder of a season ticket will prefer the tubes when taking out members of his family.

Again, if a certain portion of the line is saturated from a traffic standpoint, nothing would be gained by attracting additional traffic through a decrease in fare, but there have been several occasions in the past where it has proved more profitable to charge a 1d. fare than a 1½d. fare. Possibilities of this character have not been developed lately because the war crowding made it out of the question to create new business.

That *bête noir* of the British railway, the workman's reduced rate ticket, is not absent from the London underground lines. Tube rates for workmen vary according to franchise conditions. The general principle is that of one-way rates for a round trip, the first half of which must be taken before 8 a.m. and the second half after 12 o'clock noon. As it is impracticable for the ticket seller to discriminate, anybody who rides before the last workman's train enjoys the lower rate. Children get half rates, either through special tickets or one-half of the regular ticket.

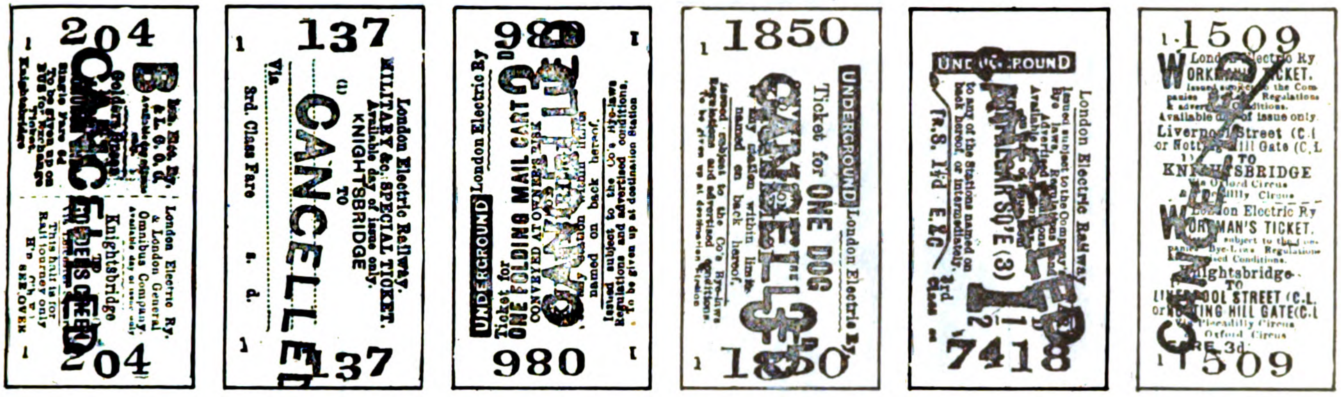
The District Railway conditions differ in some respects from the other rapid transit lines, as the District is an electrified steam system and as such is at present under government control. According to the general order of Jan. 1, 1917, a 50 per cent increase in fares became effective except within the bounds of London as represented by Acton Town on the west and Bow Road on the east. Within these limits the old fares obtain. Season tickets on this system, comprising 28 miles in itself, amounted to fully 21.6 per cent of the total traffic during May, June and July of the year 1918, two and one-half to four times the percentage of the shorter underground railways. On the other hand, the proportion of workmen's travel is less on the District, 13.6 per cent, than on all the others except the Central London. The relative proportions and grand totals of local passenger traffic on all the underground railways are detailed in Table VII.

SUBWAY TICKETS AND THEIR COLLECTION

All passengers except those holding season tickets or passes must purchase a separate ticket for each trip. This ticket bears the rate of fare paid and the name of the farthest station to which the passenger is entitled to ride. An important feature of these tickets is that they carry any required transfer or interchange information on the back. For example, if a passenger at Golder's Green calls for a ticket to Paddington, he will find that the ticket bears instructions for him to transfer first at Tottenham Court Road from the Hampstead to the Central London Railway and then at Oxford Circus from the Central London to the Bakerloo line. To minimize the number of varieties of tickets that this system, so helpful to the passenger, necessitates, the instructions may relate to several destinations. For instance, the 1½d. ticket from Trafalgar Square tells the traveller how to reach stations on five different tubes. In spite of all the ingenuity expended on the simplification of this system, the Underground Electric Railways still have to print a great number of different kinds of tickets, according to the number of through booking facilities in operation with the steam railways.

To relieve the ticket sellers as much as possible, slot machines are available to the experienced passenger for the purchase of 1d. and 2d. tickets. The 1d. machine can issue up to fifteen tickets a minute. Machines for issuing 3d. tickets were not a mechanical success. The total percentage of tickets sold via slot machines is not readily determined, but at some stations the ratio is as high as 40 per cent. Several efforts in the way of a ticket-printing machine have been tried but without success as the machines are not reliable or the printing sufficiently clear. It is a matter for admiration that the ticket sellers can handle such a variety of fares and tickets at the rate of twelve to fifteen per minute, although this is hardly one-half of the speed readily attained with single fare tickets.

In addition to the full-price tickets illustrated, a workman's two-part or round-trip ticket is shown; also a two-part ticket used for a single trip emanating, in this case, on an underground line and ending on a



SPECIMENS OF LONDON UNDERGROUND TICKETS

No. 1—Combination of tube and bus ticket.

No. 2—Special ticket issued as a courtesy to military forces, etc.

No. 3—Ticket for inanimate baggage—a mail cart.

No. 4—Ticket for animate baggage—a dog.

No. 5—Front and back of 1½d. ticket, showing directions on back.

No. 6—Workman's lower rate ticket with return coupon.

connecting bus. The underground portion is given up, on leaving the tube, just like an ordinary ticket; the bus portion is exchanged for the customary fare receipt on boarding the bus. Similar combination or through tickets are used with connecting tramways. Baggage tickets are also issued, as for dogs, folding carts, etc., as illustrated.

No matter what kind of ticket for single (or round) trips the passenger purchases, he must show the same to the ticket examiner for punching before reaching the station platform, and he must give up the ticket to a ticket collector as he leaves the station of exit. At the more important stations, a cash register is used to ring up excess fares from passengers who have over-ridden their length of journey for the fare paid. The tickets taken up at exit are not required as a check on the number sold and consequently are destroyed as turned in. Even if the inspector at the entrance station failed to notch the ticket, the likelihood that the inspector at the exit station could make corrupt use of it is small as this would call for collusion with many others for trifling amounts.

Compared with a universal fare rapid-transit line, it will be seen that the examiner at the entrance corresponds to the American ticket-chopper or fare-box watcher, but that the collector at the exit is an addition due entirely to the use of differential fares. However, this increase in personnel in relation to the enormous traffic (about 1,000,000 a day) carried is by no means serious.

It would be unfair to assume that the great number of tickets required is due to the graduated fare system in itself. Rather is it the result of combining a variety of lines all built without any reference to one another. A true perspective could be obtained only by a study of the ticket practice on the Berlin and Hamburg subways which have been laid out on a consistent plan. For this reason, it is not necessary to describe the ticket auditing practice of London's tubes in detail.

A GLANCE AT EMPLOYEES WELFARE WORK

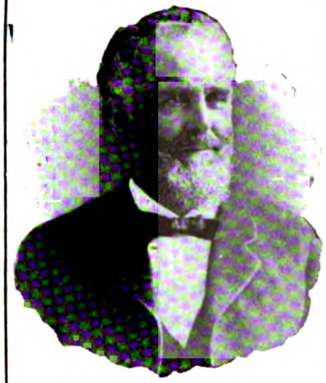
The social and athletic activities on the railway side of the Underground group are very marked. The District Railway has an excellent building as a center, attached to Hammersmith Station, and known as the Albert Stanley Institute, the female head office staff has a thoroughly up-to-date luncheon and social club in a large house at Earl's Court, the female uniform staff has a similar suite over the Brompton Road Station, while there are institute and mess rooms in connection with each of the Tube lines.

Football, cricket, swimming, boxing, ambulances, first-aid, fishing, dancing, billiards, chess, shooting, orchestral and choral work—indeed, practically all forms of entertainment or benevolent activity have their clubs. Sports meetings, concerts, fancy dress and ordinary balls are regular features. As an exemplification of the size of the welfare activities, it may be stated that the mess-room receipts for 1918 were £16,000 on the railway side and £66,000 on the bus side.

ELECTRIC COOKING KITCHEN OF UNDERGROUND FEMALE STAFF CLUB, EARL'S COURT

CORNER IN READING ROOM OF FEMALE STAFF CLUB, EARL'S COURT

H. H. LITTELL
President, 1882-1883


WILLIAM H. HAZZARD
President, 1883-1884

CALVIN A. RICHARDS
President, 1884-1885

JULIUS S. WALSH
President, 1885-1886

THOMAS W ACKLEY
President, 1886-1887

Presidents of the American Street Railway Association

1882 to 1896

CHARLES B. HOLMES
President, 1887-1888

GEORGE B. KERPER
President, 1888-1889

THOMAS LOWRY
President, 1889-1890

HENRY M. WATSON
President, 1890-1891

JOHN G. HOLMES
President, 1891-1892

D. F. LONGSTREET
President, 1892-1893

HENRY C. PAYNE
President, 1893-1894

JOEL HURT
President, 1894-1895

H. M. LITTELL
President, 1895-1896

The American Electric Railway Association—Its Record and Possibilities

A Survey of Its Three Periods of Development, a Tribute to the Individuals Who Have Contributed to Its Growth and a Plea for the Co-operation Which Is Essential to the Extension of Its Usefulness to Meet the Growing Needs of the Electric Railway Industry

BY HARLOW C. CLARK
Editor of *Aera*

THE history of the American Electric Railway Association may be divided into three distinct periods, each distinguished by its own characteristics as they relate to organization activities. The first began with the birth of the organization in 1882 and continued until its rejuvenation, under the presidency of W. Caryl Ely, in 1905. During this time, the association was little more than a debating club, with annual meetings at which various subjects connected with the financing, management and operation of the roads were discussed, but which made no attempt to formulate policies or assume leadership. Committee work, as it is now understood, was then unknown. Such committee reports as were presented were in nearly all cases the work of one man, and attempted nothing further than a more or less desultory discussion of the subject assigned. Co-operative effort in working out common problems was not attempted and the main purpose served by the conventions of the organization was to bring the executives of member companies together for such exchange of ideas and experiences as usually occur when two or more men interested in the same subject get together.

The value of these meetings and the association's work in connection therewith should not, however, be underestimated. United in the association, the men of the industry were learning to know each other, were being taught to recognize that many of the same problems confronted all of them and that these problems could be better solved by mutual counsel than by individual effort. It was not until 1888 that the electric railway became a recognized commercial possibility and during the years that intervened between this date and the re-organization of the association, its development was largely a matter of individual initiative and individual experiment, so that it is doubtful if at any time before 1905 the industry was really ready for more complete organization. That it was ready at the time of reorganization, is plainly indicated by the success of Mr. Ely's efforts.

SPECIALIZATION IN THE ORGANIZATION BEGAN IN THE EARLY NINETIES

In 1903, the second phase of the association's development began. Six years earlier the Street Railway Accountants' Association of America had been organized at a meeting held in Cleveland. In the spring of 1903, the American Railway Mechanical & Electrical Association had been formed in the same city. It was evident that the technical problems of the industry were becoming so many and so diverse, that the time was ripe for their assignment to organizations of the men directly interested, leaving to the executives of the properties the consideration of the broader matters of policy and public relations. This view was adopted by the executive committee prior to the convention of 1903, and in discussion upon the floor of the convention met with no opposition. A year later at the St. Louis convention, President Ely, urging that the various organization activities of electric railway officials be centered in one parent organization and such subsidiary organizations as might seem desirable, declared that the attention of the association had for too long been devoted to comparatively unimportant things while the most fertile field for its efforts had remained practically untouched.

"The confusion of laws throughout the country affecting our corporations is a matter to which we might well devote attention," he said. "There are also such great questions as taxation, municipal ownership of street railways; franchise rights and obligations; statutory laws affecting our class of companies, municipal laws and ordinances and other questions of importance to which your minds will readily refer. The collection and preservation of data tending to throw light upon the problems of great importance that confront us are also matters deserving of attention, and in this regard it would seem that through the medium of the secretary's office, and of appropriate standing committees, an invaluable collection of data could be made and permanently preserved in such form as to be conveniently accessible to any member of the association merely upon request to the secretary."

W. CARYL ELY'S WORK EARLY BORE FRUIT

The development of the ideas thus expressed by Mr. Ely fully occupied the time of the association between the year 1904 and the entrance of America into the War in 1917. In 1905 the Accountants' Association and the Engineering Association were amalgamated with the parent association. At the St. Louis Convention in 1904 the Claims Association was organized and in 1905 was affiliated. Four years later, at a meeting in New York City the Transportation & Traffic Association came into being as an affiliated organization. The technical problems of electric railway management and operation were confided to these subsidiary organizations with good effect.

When it is considered that almost the entire work accomplished was performed by voluntary committees serving without remuneration and devoting to their tasks only such time as could be spared from their railway duties, the accomplishments of the twelve years must be regarded as remarkable.

During this period, the standard classification of electric railway accounts was worked out by the accountants in connection with the Interstate Commerce

ROBERT MC CULLOCH
President. 1896-1897

ALBION E. LANG
President. 1897-1898

CHARLES S. SERGEANT
President. 1898-1899

JOHN M. ROACH
President. 1899-1890

WALTON H. HOLMES
President. 1900-1901

Presidents of the American Street Railway Association and Its Successors, the American Street & Interurban Railway Association and the American Electric Railway Association

1896 to 1913

H. H. VREELAND
President. 1901-1902

JERE C. HUTCHINS
President. 1902-1903

W. CARYL ELY
President. 1903-1906

JOHN I. BEGGS
President. 1906-1907

CALVIN G. GOODRICH
President, 1907-1908

JAMES F. SHAW
President. 1908-1910

ARTHUR W. BRADY
President. 1910-1911

THOMAS N. McCARTER
President. 1911-1912

GEORGE H. HARRIES
President, 1912-1913

Commission; standard codes of operating rules for both city and interurban companies were framed by the Transportation & Traffic Association, while the Engineering Association framed, and the association promulgated thirty-seven standards, thirty-two recommendations, and forty-four suggestions as to miscellaneous methods and practiees, covering all phases of electric railway engineering—way and structures, power generation, power distribution and equipment.

At the same time there was carried on, under the direction of the committee on determining the proper basis for rates and fares, and its successor, the committee on the cost of passenger transportation service, an investigation of the economics underlying electric railway fares, culminating in a report on the cost of urban transportation service, prepared by F. W. Doolittle, under the direction of the committee. This is undoubtedly the most authoritative work on the subject in existence. In co-operation with other interested organizations, specifications for the joint use of poles by public utilities have been prepared, while an equally valuable work has been done in connection with underground. and overhead line construction.

Mr. Ely's prophecy as to the value to the industry of properly equipped headquarters for the collection and dissemination of information has been more than fulfilled. The modest office, opened at 60 Wall Street, in 1905, in charge of a secretary, with one stenographer as an assistant, has expanded until today, the headquarters staff consists of twenty-two persons. From files practically bare of information concerning the details of electric railway management and operation, the association has accumulated the most complete and thorough collection of data anywhere in existence. From the sending out of infrequent and desultory circulars of information, the informational activities of the association have grown, until for the year ending Sept. 30, 1919, forty-six compilations of general interest, covering all phases of operation were prepared and 1021 inquiries, queries concerning details of engineering, traffic, transportation, and the general adminstration of street railways, were answered. Moreover, the association has in addition been able to furnish for the industry the first available series of monthly statements of earnings and expenses, showing the trend of operating costs and revenues.

The saving in time and money to electric railways made possible by having in the association a clearing house of information cannot be easily calculated. That it is considerable is evident. A large number of the requests received come by telegraph and are from companies that are in immediate need of the data asked for. Without an organization which has the information already at hand, it would be manifestly impossible for companies to secure the information desired. Emergencies confront all railway companies. Quick decisions on questions of policy and practice are often necessary and can be rightly made only if there is available correct information upon which to base them. The experience of other companies is, under such circumstances, valuable. The action of public service commissions, city councils and other authorities having jurisdiction over street railways, is many times directly influenced by what has been done under like circumstances in other communities. It is not only expensive and slow for any single company to attempt on the spur of the moment to secure such information, but in many cases it is impossible. Hence the importance of having an agency such as is the association, through which the desired data can be quickly secured.

First under Secretary Bernard V. Swenson, then under Secretary H. C. Donecker and finally under Secretary E. B. Burritt, the association's facilities for securing and distributing information have been developed and amplified, until today there is no organization in the United States which is in a position to be of more service to its members in this important respect.

SPECIALIST IN INFORMATION WORK APPOINTED IN 1918

In 1918, the executive committee of the association, recognizing the great value of this branch of the association's work, adopted the suggestion of Secretary Burritt and appointed James W. Welsh, as special engineer in charge of this work of information and service. Under his direction, the records of the association are being constantly amplified, and the service further extended.

Another development of the second period of the association's activities, is to be found in the work of the committees, both of the parent and the affiliated associations. The *Proceedings* for the years between 1906 and 1917 contain in the reports of these committees the record of the evolution of the electric railway art. The progress of every improved method, practice and change in apparatus and equipment can be found in these pages. The recommendations of the best equipped men in the industry as to ways and means of improvement are contained therein. Because of the work of these committees, it was possible for the Committee of One Hundred truthfully to say in its brief to the Federal Electric Railways Commission: "The electric railway industry of this country, as represented by the association, has not been lacking either in foresight or in the effort to adjust itself to the evolution and development of local transportation, both as it affects the relations of the public and the companies, and as it affects the system of charges and the practical operation of the properties."

This can be said of the second period—that it marked the progress of the association from an organization which, while of value to its membership, made nc attempt to perform for it direct service and which did little more than bring the representatives of its member companies together in annual meetings, to a strong, virile, active business organization, that had sought and found its place in the economics of the industry and was furnishing with ever increasing efficiency a service, essential and necessary to the most efficient and economical operation of the railways of the country.

MANUFACTURERS TAKEN IN WITH FULL MEMBERSHIP PRIVILEGES

It was during this period also, under the presidential administration of Charles L. Henry, that full recognition was given to manufacturers of electric railway apparatus and supplies as full partners in the enterprise. The development of the physical side of the art has been very largely due to these manufacturers. They have performed a notable work in behalf of the industry in the past and its future physical progress depends in large measure upon their efforts. President Henry believed that their place in the association was alongside the operators of the property, that in the determination of standards of construction and equipment they should participate on terms of equality and that in the promotion of the general interests of the industry they should be called upon to bear a full share.

With that end in view, the constitution of the association was amended at the mid-year meeting of 1916, held in Chicago, so as to permit membership of manufacturer companies on exactly the same plane as railway companies. Since that time, representatives of manufacturer members have taken their places upon the various committees both of the parent and of the affiliated associations and have made valuable contributions to their work.

The third period of association history saw it firmly grasp an opportunity presented for putting the requirements of the industry before the people of the United States in such a way as bids fair to revolutionize the attitude of the public towards the utilities which the association represents. The question of public relations, in its modern aspect, was practically unknown to the industry in the days before the association's re-organization. Between 1882 and 1906, out of a total of 149 papers and reports presented at twenty-three association conventions, but ten dealt with subjects other than the technique of operation and management. In 1889 a committee on the public and state treatment of corporations was appointed and made a report both that year and the year following. In 1897 a committee on municipal ownership reported, or rather, P. F. Sullivan, later president of the Bay State Street Railway, presented a paper embodying his investigation of municipal ownership abroad. There were occasional papers on other public aspects of the industry, notably one by the late Charles T. Yerkes on "Investments in Street Railways: How They Can Be Made Secure and Remunerative," but perhaps because the problem was not acute little attention seems to have been given to the question of the relations of the companies and the public.

Increased Interest in Public Relations Forced Change in Proceedings

Between 1906 and 1910, thirteen of the thirty papers and addresses, and eight of the thirty-four committee reports (other than those made on strictly association matters) to the American Association dealt with public relations; between 1910 and 1917, thirty of the forty-one papers and twenty-six of the fifty-six reports, presented were devoted to the same topic. In 1906, a committee on public relations was made one of the standing committees of the parent association, and its work was continued during the following years. In 1912, under the presidency of Thomas N. McCarter, occurred the famous "swing round the circle," when Mr. McCarter, accompanied by O. T. Crosby, Charles C. Peirce and Secretary Donecker, during the entire trip, and by a number of other prominent electric railway men during parts of the trip, visited and spoke in some thirty cities between New York and San Francisco, putting the case of the electric railways directly before the business men of the various communities.

The association was "finding itself" in its new task of informing the people, during those days. The far-seeing men, who directed its policy, were fully alive to the danger that impended unless the public could be

Presidents of the American Electric Railway Association 1914 to Date

CHARLES N. BLACK
President, 1913-1914

C. LOOMIS ALLEN
President, 1914-1915

CHARLES L. HENRY
President, 1915-1916

L. S. STORRS
President, 1916-1917

JOHN J. STANLEY
President, 1917-1918

JOHN H. PARDEE
President, 1918-Date

brought to a keener realization of the part that electric railways played in its affairs and the necessity of giving to the companies such treatment as would foster instead of discourage their development. The task was, however, a difficult one. The electric railway is by its nature a "local" utility. Its immediate relations are with the people whom it directly serves and its relationship to the economic and business structure of the nation is not so easily to be understood. Only in so far as the public has insisted on a universal standard of fares, regardless of conditions of operations has there been, until recently, any recognition of the industry as a national industry, of such importance that its welfare has a direct bearing upon the welfare of the entire people.

With the war came the association's chance to impress upon the people of the country the national aspect of the industry. At the mid-year meeting held in Boston in 1917 there was universal recognition by the delegates of the fact that the country was shortly to enter the war, and a universal willingness to assume on behalf of the industry, its share of the duty and responsibility that participation in the war was bound to put upon all business. The railroad system of the country was breaking down under the strain put upon it and there was necessity of using to the utmost limits every means of transportation that the country possessed. No one knew what the fortunes of war might lead to in the matter of sea control, and there was immediate necessity of putting our coast defenses in order.

WILLIAM J. RICHARDSON
Secretary, 1882-1895

T. C. PENINGTON
Secretary, 1895-1905

BERNARD V. SWENSON
Secretary, 1905-1909

H. C. DONECKER
Secretary, 1909-1913

E. B. BURRITT
Secretary, 1913-Date

When on Feb. 16, 1917, President L. S. Storrs, on behalf of the association wired to President Wilson pledging its "patriotic support of all measures which you may take in upholding the dignity and honor of our country and the rights, property and persons of its citizens on land and sea," something more than mere perfunctory loyalty was meant, as was shown by the immediate service rendered by the association in mapping the coast line of the country in order that the War Department might know the full possibilities of electric railways in connection with coast fortifications.

In November, 1917, at a meeting called by President John J. Stanley, the organization of a war board to represent the industry at Washington during the period of the war was decided upon, and the third period of association activities was thus inaugurated.

The primary purpose of the war board was to act in *liaison* between the national government and the electric railways of the country. It was constituted as a medium through which the needs of the government in connection with work to be performed by the electric railways could best be fulfilled. The government asked of the electric railroads, at the same time, both increased service and increased economy in operation. Exerting its full war powers over the operation of the properties, in the matter of enforcing wage increases, increases in material costs and increases in service, it considered itself to be without power to assist the companies in the matter of increased revenue, upon which its ability to properly carry out the government's wishes depended.

Confronted by this situation, the association's war board inaugurated that work of education which finally ended in the appointment of the Federal Electric Railways Commission. To Messrs. McCarter, Storrs, Brady and Bradlee, of the board, much credit is due, but these gentlemen have frequently united with the industry generally in agreeing that to P. H. Gadsden, the fifth member of the board and its resident member, is due the awakening of the administration to the precarious condition of the industry and that through this awakening came the more general recognition of the public to the impending crisis.

It was the war board that opened the eyes of the National War Labor Board, to the inevitable effect upon the finances of the companies of the wage increases which that body was awarding in an effort to keep labor satisfied, and which induced the representations to the administration by Messrs. Taft and Walsh, its joint chairmen, which secured the co-operation of the Secretaries of Commerce and of Labor. It was the war board that secured, from the President of the United States, the Secretary of the Treasury and the Comptroller of the Currency, statements which had a marked effect upon state and local authorities having jurisdiction over the regulation of rates. And it was the war board that secured the inclusion in awards made by the National War Labor Board of recommendations that relief be given the companies in the way of increased rates.

All of these efforts tended to make possible the wide publicity given at a later date to the financial and operating conditions of the industry. The street railway problem which, as a purely local question, was exceedingly difficult of adjustment, was being given a national aspect and its solution hastened. Moreover, the industry itself was being aroused to the possibilities of united action and the way prepared for that splendid co-operation between the various interests which was later manifested.

The appointment of the Federal Electric Railways Commission was made in May, 1919. The commission was without power; it was without a guide as to procedure; its means of securing publicity were to a large extent non-existent; it could easily have been lost sight of in the multiplicity of governmental activities.

Under the circumstances it was fortunate for the industry that in the association it had a representative ready and equipped to present to this commission appointed by President Wilson, and through the commission to the people of the country, a true picture of the condition of the industry, and that the association had, in the person of its president, John H. Pardee, a man of vision sufficiently broad to see the opportunity that was offered and of sufficient ability as an organizer to create the machinery, for which may, perhaps, be said to be the most effective presentation of a similar cause before a public body that has occurred in the history of public utilities. The organization of the Committee of One Hundred was the work of Mr. Pardee. With General Guy E. Tripp, its chairman, and J. K. Choate, H. L. Stuart, L. S. Storrs and O. D. Young, chairmen of its sub-committees, he shares the credit of putting the case of the electric railways before the commission in such a way that there has been a marked change of attitude towards these companies and very general recognition of their needs.

THE ASSOCIATION'S AIMS AS COMPARED WITH PERFORMANCE

This new activity of the association, developed since 1917 and during the administrations of Presidents Storrs, Stanley and Pardee, fulfills another of the objects of the association as set forth in its constitution. These objects are: "The discussion and recommendation of methods and practices. The acquisition and dissemination of information. The promotion of a spirit of co-operation between its members. The encouragement of friendly relations between the public and the railways. The safeguarding of the interests of electric railways."

It seems plainly evident that the American Electric Railway Association is today fulfilling each of the objects for which it was organized in a way that is affording to its members and to the industry the maximum of usefulness at the minimum of cost. Certainly there is no other organization of the kind that is doing more and, just as certainly there is opportunity for more extended work of even greater benefit.

The measure of association utility must necessarily be the limits of the things which electric railways can do better collectively than they can individually. The relationship of the electric railway companies to the organization should be based on consideration of the fact that the activities of the association are but an extension of the activities of the company, that the functions performed by it are a part of the functions which in its absence would attach to the company itself, and that the association is as necessary to the proper operation of the company as are any of its own departments. In other words, if an organization chart of an electric railway is properly drawn, there will be assigned to the American Electric Railway Association, as a component part of the organization, certain functions which it can perform better than any of the company's own departments.

To get down to details, it is evident that the association's greatest usefulness to its members is along three general lines—policy, research, and information and service—and that along these lines the future development of the association will take place.

"Policy" is used for the lack of a better word to express just what the association has been doing in the lines of public education, in the consideration of franchise, regulatory and taxation conditions and in its dealings with the federal government, both as to laws proposed or passed by Congress, and as to relations with government departments, as illustrated by the mail pay case. In the shifting industrial conditions of the war, it includes as well the all important matter of labor.

"Research" is equally important. No two subjects are of greater moment to the industry at the present time than those of fare systems and charges, and motorbus transportation. The need of a period of experimentation in which various suggestion methods of fare charges and collection can be worked out was emphasized in the testimony of many witnesses for the Federal Commission and it is recognized by all electric railway operators. No one can today safely prophesy what the development of motor transport will lead to. The necessity of closely observing this development and of its co-ordination with existing transportation systems is apparent. Common-sense standardization of apparatus and equipment is a move in the interest of economy and efficiency. With the manufacturers and railway companies on equal footing, the association is in a position to carry out this important task, and to make its standards effective.

The association has already done much towards the classification of the principles that should govern valuation. Much remains to be done if a correct concept of the subject is to be established. The use of the one-man car is still in its infancy, the proper application of many suggested operating economies is still to be determined, a correction of traffic conditions is necessary in nearly all communities, the problems of fare collection under new systems of charges are many, there are many problems of accounting that require study—all of these are matters which can better be handled by the association, through its various committees than through any one company.

"Information and service" means first the presentation to member companies, frequently, completely and accurately, of data upon subjects of general interest, such as concern fares, wages, conditions of employment and kindred topics, and quick response to requests for detailed information upon subjects of special interest to the companies. There is not a department of an electric railway company that is not in almost daily need of such information. During the fiscal year 1918-1919, 114 requests of the kind covering engineering topics, 267 requests covering transportation and traffic subjects, and 640 requests covering general subjects were answered by the association. Various phrases of eighty-nine different topics were covered. The demand for this service is increasing daily so that the association is now answering such requests at the rate of more than 3,000 a year.

Under these circumstances, and with the increased use being made of association facilities by member companies, there is imperative need of strengthening the organization, both financially and in the matter of membership.

The association has proved itself to be necessary to the industry. Its further usefulness depends upon the character of the support that it shall receive.

American Methods in Italy

Can Prepayment and Safety Operation Solve the Many Riddles of Street Railway Service in Continental Europe?

BY MARIO MANDELLI
Manager Rome Mechanical Works, Rome, Italy

THE unbalancing which the war has brought in all different branches of human activity will certainly, more than anything else, help the introduction of better operating methods and of a more rational system of car construction in Continental Europe.

Although the writer has for a number of years been advocating the adoption in Italy of door and step control and of fixed-point fare collection as the only sensible way of increasing revenue and decreasing expenses, his has been the proverbial "voice in the wilderness." It has remained for the unsettling conditions created by the great struggle to impel some Italian street railway operators to want to see American operating methods enter and gain a foothold in continental Europe.

The financial failures and the great deficiencies of service which are to be found, to a greater or less extent, in every country of Europe, caused by the high cost of labor and materials and the lack of maintenance and new construction of industrial plants during the war period, can certainly be minimized by a careful analysis of conditions, tending to a reduction of the cost of car operation.

Barring a few noteworthy exceptions, the rolling stock operated on most of the tramways in central and southern Europe is similar to that of a quarter of a century ago and long condemned as obsolete in the United States. Small motor cars, with small trailers, close reminders of horse-car days, are wasting both electric and human power, while complicated methods of fare collection and poor car design encourage the stealing of rides during the rush-hour periods, while the total absence of safety devices even of the cruder sort, materially assists the Reaper to collect his harvest of accidents and fatalities.

The road to salvation for many of the street railway systems on this side of the ocean seems to be the adoption of American constructional standards, slightly modified collection methods and automatic devices, both to speed up schedules and to make street car transportation safer for the riding public.

Our Italian cars, generally speaking, are still built with wooden bodies on heavy steel underframes. This gives us a weight of about 300 kg. (660 lb.) per passenger carried at maximum car capacity, as against American standard cars with 350 lb. and Birney safety cars with as little as 240 lb. per passenger carried.

The design of the cars, while it generally provides a very good opportunity for anyone who wishes to do so to avoid paying fare especially during the rush hours, seems to invite any number of dangerous habits on the part of the riding public, ranging from boarding and alighting from moving cars, to hanging onto bumpers, couplers, air hose and the like, in the hope of getting a free ride. Some roads estimate that during rush hours at least 30 per cent of the riders thus escape the payment of their fare and, incidentally, increase materially the risk of accidents and of consequent claims and expense. Platform and step accidents are very frequent and make up a large part of the total number of casualties in street railway operation.

"Prepayment," with its usual complement of door and step control, would absolutely stop the ride-stealing habit and actually decrease the very high percentage of platform accidents. At the same time it would create very much better working conditions for the car crews and limit their responsibility to their own actions, instead of being, as now, stretched to cover that of hare-brained individuals who do not seem to realize the danger of boarding and leaving rapidly moving cars.

That the Italian riding public takes very kindly to any novelty in street car operation, has been sufficiently proved by the growing interest which the prepayment cars operated in Rome are creating. The passengers are complaining and criticizing the management's action only in one respect: In that it has not used a magic wand to remodel all of its rolling stock at a single stroke.

In the writer's opinion, only by applying American improved methods of operation and by the standardization of construction of new rolling stock along three lines, pay-as-you-pass double-truck cars, prepayment single- or double-truck cars and trailers and one-man safety cars, depending on the operating conditions, will it be possible to put tramway undertakings on a new financial basis, both in this and in other countries of the European continent.

Unfortuately, modern American street railway practice is worse than Greek for many of our street railway operators, and it is probable that a well-planned educational campaign, which should also enlist the co-operation of the supervisory authorities, will have to be conducted to discourage the construction of new rolling stock of more than obsolete pattern and help the street railways to rise from the state of prostration in which they have been thrown by the world's greatest struggle.

The United Traction Company, Albany, N. Y., reports that its pit wheel grinder has been of great assistance this winter in returning cars to service promptly which were sent to the shop for having flat wheels. Eighteen pairs of wheels have been ground per day on numerous occasions.

How Do Fares Affect Traffic?

Experience of United Railways of St. Louis for Three Months Indicates No Appreciable Reduction in Traffic Following Fare Increase

THE United Railways of St. Louis inaugurated on Sept. 20, 1919, an increased fare, whose effect upon traffic conditions was naturally of much concern. So much has been said and written about the effect of increased fare being to decrease the number of car riders that the experience in St. Louis is not only interesting and instructive but also reassuring.

C. E. Smith, consulting engineer of St. Louis, has made an analysis of the situation, the results being shown graphically in the accompanying set of curves. It should be explained that the St. Louis system consists of so-called "city" and "county" lines—the former, as the name signifies, serving the urban district and the latter reaching out into the surrounding country and drawing on suburban and rural traffic. This with the half-rate fare for children made it desirable to subdivide the passenger fares on the system into four classes as shown. Furthermore, any study of number of riders for only a part of a year would be useless without comparison with the corresponding season of the preceding year, so the curves were drawn from June, 1917, to allow analysis of any cyclic changes in the number of passengers.

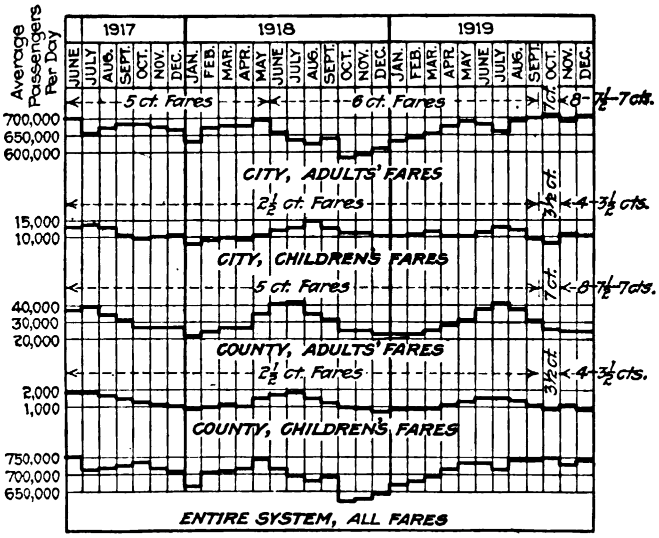


DIAGRAM SHOWING NUMBER OF PASSENGERS AND OTHER STATISTICS UNITED RAILWAYS OF ST. LOUIS

Five cent fares were charged on all city and county lines until June 1, 1918; from June 1, 1918, to Sept. 20, 1919, the city lines charged 6 cents, while the county lines continued to charge 5 cents. From Sept. 20, 1919, to Nov. 1, 1919, both city and county fares were 7 cents. Since Nov. 1 the fares on both city and county lines have been 8 cents each or two tickets for 15 cents or 50 tickets for $3.50.

The statistics of revenue passengers as plotted by Mr. Smith do not of themselves indicate that increased fares have had any appreciable effect in decreasing the number of passengers. In fact, since the increased fares became effective Sept. 20 and Nov. 1, 1919, the traffic has held up better than in the similar months of 1917, when fares were 5 cents. In detail, his conclusions are as follows:

1. The inauguration of 6-cent fares on the city lines, June 1, 1918, did not decrease the revenue passengers materially. This is best indicated by the fact that adult fares in the county, where the 5-cent fare was continued, decreased over 40 per cent in the three months from July to October, 1918; whereas, the adult fares on the city lines decreased only about 15 per cent from May to October, 1918.
2. The adverse conditions during 1918, such as the drafted men leaving home, the cessation of building operations and the influenza epidemic, are reflected by a considerable reduction of revenue passengers during the latter part of 1918, the decrease having been more apparent on county lines where fares were not increased, than on city lines where fares were increased.
3. Since the latter part of 1918 there has been a steady growth in the revenue passengers, especially adult passengers, in the city. There is nothing to indicate that the inauguration of the 7-cent fare Sept. 20, 1919, had any appreciable effect on the car riders; the city adult fares continued to increase. There was a reduction of adult fares in the county from July to October, 1919, but it is practically a duplicate of the reduction that took place in the same months of 1918 under the 5-cent fare. As about half the reduction this year took place before Sept. 20 and half since that date, the results do not of themselves indicate that the increase in fares reduced the number of car riders.
4. Undoubtedly increased fares do cause some who would otherwise ride short distances to walk, and others to seek other means of transportation if available. At St. Louis, however, where the traveling public is dependent almost entirely on the street railway system, and the great majority of the rides are long rides and there are practically no jitneys, the decrease in revenue passengers due to the fare increase has been inappreciable, and any estimate of a material reduction from that cause is not warranted.

Accountants Meet at Columbus

In Its Annual Meeting the Central Electric Railway Accountants' Association Elects Officers and Sets Date for Next Meeting

THE Central Electric Railway Accountants' Association held its annual meeting at Columbus, Ohio, on Saturday, Jan. 24. The only paper presented was the address of President A. C. Van Driesen. In addition the convention was addressed by Hon. John Price, attorney-general of the State of Ohio, and Hon. D. J. Ryan, chairman of the Ohio Tax Commission. There were informal discussions on the questions brought up.

In his address President Van Driesen expressed his gratitude to the association for having elected him president during the past year and said that it had been a great pleasure to him to assist in pulling the association out of the "slough of despond."

President Van Driesen outlined the work of the association during the past year. No formal meetings were held, but the question box was revived. This was productive of much good, and it is believed that if the hesitancy on the part of many to ask questions could be overcome, this item could be made a very valuable adjunct to the work of the association. The quarterly meetings have proven feasible and have assisted largely in putting the association on its feet. At the meeting of the association held in Fort Wayne in February, 1919, a committee was appointed to draft the new constitution and by-laws, which were adopted at the meeting in Springfield in May of last year. At the meeting at Toledo in August the convention was addressed by E. R. Kelsey, of the Toledo Railways & Light Company. At that time a day of real rest and relaxation was enjoyed at Toledo Beach. The meeting at Lima in November was addressed by "Father" Carpenter and James Dugan.

The policy of the association has been to send letters to all managers at the same time that announcement of the meetings are mailed to members of the association. It was suggested that if the managers could realize the amount of good each member of the Accountants' Association received from the meetings, the managers would insist upon attendance. It is up to the members of the association to convince the railway managers that the association is alive and necessary.

President Van Driesen said that one of the mistakes which he had made during the past year was in appointing on the various committees a member from each state. He believes now that the best policy would be to appoint all members of one committee from localities closely connected, in order that meetings of the committee could be held without compelling a member to travel any considerable distance. When committee members are appointed from each state, it is sometimes necessary to hold meetings through the mails, and the benefit resulting from personal contact is lost.

The question of depreciation has been a much mooted one for years, but now that the American Electric Railway Association has decided upon a depreciation reserve policy, in accordance with the resolutions adopted at the Cleveland meeting on Jan. 8, the proper method of handling the matter must be worked out, and as accounting officials, President Van Driesen believes that the Accountants' Association should be prepared. Every accountant has his own ideas of the method he would use, and practically every road has a different problem to solve relative to the creation of such a reserve. The Accountants' Association had considerable work in connection with the classification of accounts, and a great many of its decisions have been upheld by the Interstate Commerce Commission. The clearing house question was bequeathed to the president-elect. President Van Driesen believes that this is a question which can be worked out to the mutual benefit of all roads.

The following new officers of the Accountants' Association were elected: President, C. B. Kleinhans, auditor Toledo & Indiana Railroad; first vice-president, A. R. Baxter, auditor Indianapolis & Cincinnati Traction Company; second vice-president, Irwin Fullerton, auditor Detroit United Railway Company; and secretary and treasurer, A. L. Neereamer.

The executive committee consists of the elected officers and E. O. Reed, auditor Western Ohio Railway; Homer Ruhl, auditor Fort Wayne & Decatur Traction Company; F. K. Young, auditor Scioto Valley Traction Company, and Karl A. George, auditor Indiana Railways & Light Company.

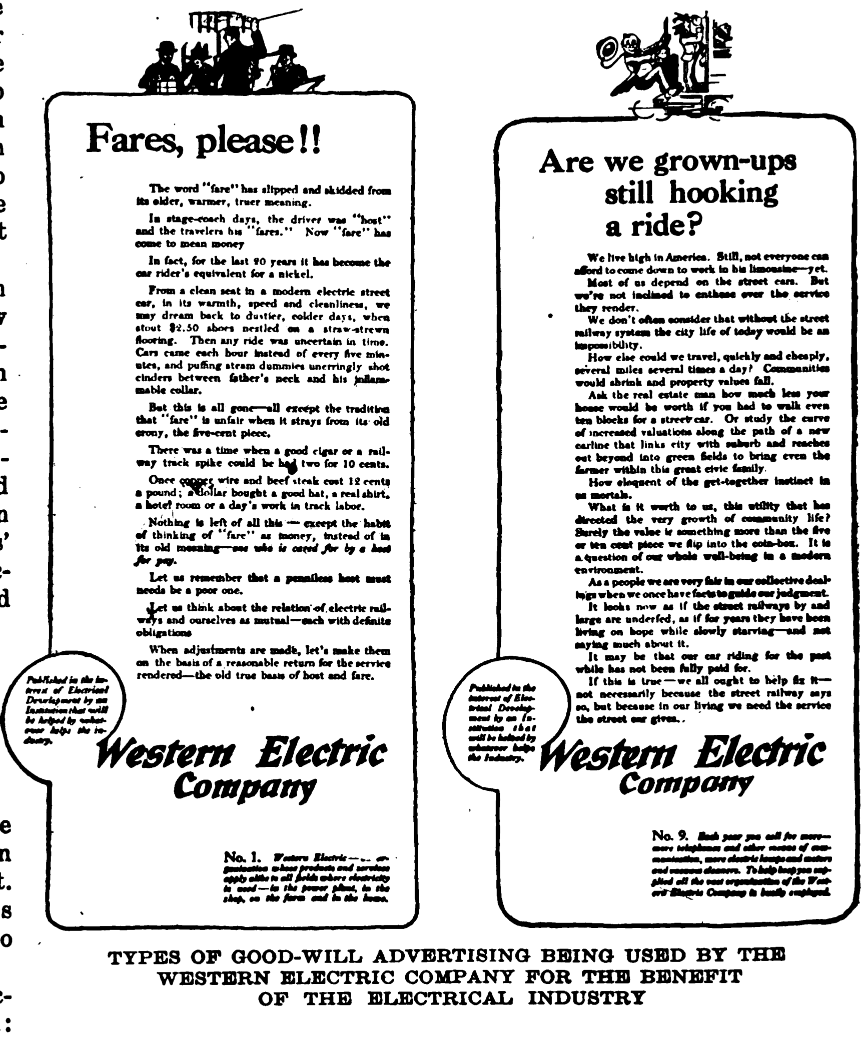
It was decided to hold the next meeting of the association at Indianapolis on April 24, 1920.

Good Will Advertising

Western Electric Begins National Advertising Campaign to Help Electrical Industry

During the past month the readers of this paper have undoubtedly seen in many of the popular magazines advertisements of the Western Electric Company devoted not to the merits of its own apparatus, but to explaining the pressing needs of the electric railway industry.

These advertisements are part of a campaign begun by the Western Electric Company to help make the problems of the electric railways and of the other branches of the electrical industry better known to the public. They form what the company calls "a little adventure in good will," and are published on the theory that only to the extent that the company serves the whole electrical industry can it share in the hoped-for and deserved prosperity of that industry as a whole.



Fares, please!!

The word "fare" has slipped and skidded from its older, warmer, truer meaning.

In stage-coach days, the driver was "host" and the travelers his "fares." Now "fare" has come to mean money

In fact, for the last 20 years it has become the car rider's equivalent for a nickel.

From a clean seat in a modern electric street car, in its warmth, speed and cleanliness, we may dream back to dustier, colder days, when stout $2.50 shoes nestled on a straw-strewn flooring. Then any ride was uncertain in time. Cars came each hour instead of every five minutes, and puffing steam dummies unerringly shot cinders between father's neck and his inflammable collar.

But this is all gone—all except the tradition that "fare" is unfair when it strays from its old crony, the five-cent piece.

There was a time when a good cigar or a railway track spike could be had two for 10 cents.

Once copper wire and beef steak cost 12 cents a pound; a dollar bought a good hat, a real shirt, a hotel room or a day's work in track labor.

Nothing is left of all this — except the habit of thinking of "fare" as money, instead of in its old meaning—one *who is cared for by a host for pay.*

Let us remember that a penniless host must needs be a poor one.

Let us think about the relation of electric railways and ourselves as mutual—each with definite obligations

When adjustments are made, let's make them on the basis of a reasonable return for the service rendered—the old true basis of host and fare.

Published in the interest of Electrical Development by an Institution that will be helped by whatever helps the Industry.

Western Electric Company

No. 1. *Western Electric—an organization whose products and services apply alike to all fields where electricity is used—in the power plant, in the shop, on the farm and in the home.*

Are we grown-ups still hooking a ride?

We live high in America. Still, not everyone can afford to come down to work in his limousine—yet.

Most of us depend on the street cars. But we're not inclined to enthuse over the service they render.

We don't often consider that without the street railway system the city life of today would be an impossibility.

How else could we travel, quickly and cheaply, several miles several times a day? Communities would shrink and property values fall.

Ask the real estate man how much less your house would be worth if you had to walk even ten blocks for a street car. Or study the curve of increased valuations along the path of a new carline that links city with suburb and reaches out beyond into green fields to bring even the farmer within this great civic family.

How eloquent of the get-together instinct in us mortals.

What is it worth to us, this utility that has directed the very growth of community life? Surely the value is something more than the five or ten cent piece we flip into the coin-box. It is a question of our whole well-being in a modern environment.

As a people we are very fair in our collective dealings when we once have facts to guide our judgment.

It looks now as if the street railways by and large are underfed, as if for years they have been living on hope while slowly starving—and not saying much about it.

It may be that our car riding for the past while has not been fully paid for.

If this is true—we all ought to help fix it—not necessarily because the street railway says so, but because in our living we need the service the street car gives.

Published in the interest of Electrical Development by an Institution that will be helped by whatever helps the Industry.

Western Electric Company

No. 9. *Each year you call for more—more telephones and other means of communication, more electric lamps and motors and numerous devices. To help keep you supplied all the vast organization of the Western Electric Company is busily employed.*

TYPES OF GOOD-WILL ADVERTISING BEING USED BY THE WESTERN ELECTRIC COMPANY FOR THE BENEFIT OF THE ELECTRICAL INDUSTRY

The series prepared consists of ten advertisements of which the two relating to electric railways are reproduced. Use of these advertisements is offered to railways and other public utilities by the Western Electric Company, but it requests the privilege of using them first and that proofs be sent to the company after publication.

The Safety Car from the Mechanical Man's Point of View

While a Firm Believer in the Modern One-Man Car, the Author Cautions the Industry Against the Mistake of Ignoring the Item of Upkeep in Estimating the Savings Which It Will Produce

By D. NEWHALL

THE increasing popularity of the safety type of car is good evidence that its merits are great and that there are many fields to which it is entirely suited. Like every good thing, however, it is apt to be treated as a cure-all and to have more expected of it than is reasonable. Hence, it may be well to consider for a minute just what it is and wherein its usefulness lies. In a few words, the so-called safety car is a short, light-weight car, so equipped as to reduce accidents to a minimum, and to require the minimum of effort on the part of the driver in operating his car and collecting fares.

But these represent only what might be termed the negative qualities of the car, and the full use of its positive qualities demand that it shall be considered as a revenue producer by the operation of more units, so that the casual passenger and short rider may be induced to ride instead of walk, by the fulfillment as nearly as possible of the slogan "a car always in sight." The effect of the adoption of this policy on the revenue and the reduction in operating costs due to reduced platform charges and power charges, are proved and need no further argument.

But the result on the cost of maintenance is not so clear at first glance, and there is a tendency on the part of the mechanical man to feel somewhat that he has been sold another of the proverbial lemons of which he, in his time, has had full measure, and which threatens to give him chronic dyspepsia.

The management, of course, looking at the total operating expense and gross revenue per car-mile, is not greatly concerned if there is a slight increase in the cost of maintenance for a line equipped with safety cars as compared with that for a line with the older types of car. The savings in directions other than maintenance are so great that a little extra cost in upkeep is readily absorbed. The superintendent of equipment, however, needs to have his attention directed to this point if peradventure he finds that inspection and routine repairs cost more than they formerly did.

In the first place, he finds that there is considerably more apparatus to look after than he has been accustomed to, and he finds that the piece of apparatus has not yet been invented that does not require maintenance, and as he awakes to the realization of this fact he sets up a mighty roar and demands to be given back his old-fashioned and crude but simple car. To add to his agony he next discovers that the apparatus belongs to a class with which the men he has are not acquainted, and that it is difficult to train men for the work and to hold them when they are trained. But the end is not yet, for he may find he is having more cars coming into the shop and that his present shop room and facilities will not take care of the work. And notwithstanding the manifold comforts and convenience supplied to the driver, he soon discovers that collisions still occur (even Homer was said to nod occasionally), and that a slight bump which the old heavy car would not notice puts a decided crimp in the face of the "safety."

And so the mechanical man arises in his wrath and damns Birney and his safety car with a great damnation and wishes that some day he could "murder the buglar" and spend the rest of his life in bed, lulled by the clanging and droning of the old and, as he calls it, "real" car.

Now the life of the mechanical man is not the most alluring, even at best, and those who add to the burdens of the man who is paid the indivisible minimum himself and who is allowed the indivisible minimum for an appropriation, must show cause why they do it, or the safety car will not obtain its full measure of success. It is axiomatic that success is impossible without co-operation, and if the mechanical man feels that the management in its usual senility has again foisted on him one of the aforesaid lemons, wherein can co-operation be hoped for?

NOW FOR SOME SPECIFIC ILLUSTRATIONS

Having thus regarded assiduously the hole in the doughnut, let us now attempt to ascertain if there be any dough at all around the hole. Then, if it appear attractive in car safety, consign it to our stomach with some degree of hope for its speedy assimilation.

It is unquestionably true that the new car carries more apparatus than the old one. To begin with, the old single-truck car seldom had an air brake. Therefore, we have added a compressor, governor, brake cylinder, various valves, and an increased number of brake levers and rods. With these are also the folding doors and steps themselves, the air engines and valves which control them, the air sander, air-operated fender and air-operated fare register. And as often happens when new equipment is purchased, apparatus is added which, though it cannot be blamed on the safety car, throws an added load on the mechanical department. Among these items may be mentioned contactors, deadman's valve, emergency brake valve, and fare box, provided prepayment was not previously in vogue.

To determine the effect of these matters we may consider first the normal distribution of mechanical department expenses, which are roughly as follows:

APPROXIMATE DISTRIBUTION OF EQUIPMENT ACCOUNTS

	Per Cent
Department overhead	15
Car bodies, including paint	25
Trucks, including brakeshoes	15
Brakes, excluding brakeshoes	10
Electrical apparatus	35
	100

In a very able and interesting paper read before the Wisconsin Electrical Association in March, 1919, H. L. Andrews of the General Electric Co. makes the following statements:

"The average operating cost for a two-man car on eleven representative roads operating in the smaller cities of the Middle West is for maintenance of equipment 2.14 cents per car-mile. Actual records of maintenance from several roads which have been operating safety cars for a sufficient length of time to obtain the maintenance costs indicate that the maintenance will not be more than 1.2 cents per car-mile. This amounts to a saving of 0.94 cent per car-mile or 43.9 per cent."

It would seem to the writer that caution should be exercised in the use of such figures as a basis for prognosticating the value of the safety car. In the first place, it is questionable if any safety cars now operating are in the condition of senile decay of the older types of car representing the equipment on many roads. In other words, it is fair to suppose that the maintenance rate of the safety car is bound to increase with age, the same as any other thing in this world, animate or inanimate. Secondly, the reduced weight of the car seems hardly to justify the maintenance saving which is claimed.

Looking at our original table, we may eliminate the item of overhead as being unaffected by weight. This leaves a balance of 85 per cent, which at a total cost of 2.14 cents per car-mile amounts to 1.8 cents and at 1.2 cents for the safety car, 1.02 cents.

With the two-man car weighing 30,000 lb. and the safety car 16,000 lb. these figures amount, respectively, to 0.12 cent per ton-mile for the large car and 0.127 cent for the small car, which leaves a margin of only 0.007 cent per ton-mile or 0.56 cent per car-mile to take care of the additional apparatus on the safety car.

The upkeep of an average air-brake equipment runs around 0.2 cent per car-mile, and it seems probable that the other additional apparatus on the safety car would cost in the neighborhood of 0.15 cent per car-mile.

Taking, therefore, a fundamental cost of 0.12 cent per ton-mile for average operation, a 16,000-lb. car, without air brake or special apparatus, would cost:

Maintenance, and without overhead......	0.96 cent per car-mile
Air brake	0.2 cent per car-mile
Special apparatus	0.15 cent per car-mile
Department overhead	0.3 cent per car-mile
Total safety car	1.61 cents per car-mile
Total two-man car..........................	2.14 cents per car-mile
Difference	0.53 cent per car-mile Or 24.7 per cent.

It would therefore seem that it is fairer to consider that the maintenance cost per car-mile will be about 25 per cent less than that of the two-man car.

Now it must be remembered that between 50 and 60 per cent of the cost of maintenance, say 55 per cent as an average, is for material, making labor costs as follows:

Two-man car	0.968 cent per car-mile
Safety car	0.725 cent per car-mile
Difference	0.238 cent per car-mile Or 24 per cent.

That is, the work of the mechanical department should be 24 per cent less with the safety car than with the two-man car.

But at this point the mechanical man is met with two facts that more than nullify this saving. The first is that the car, being lighter, is more easily damaged than the two-man car if struck, and the frequency of collision is a matter entirely out of the control of the mechanical man and to a certain extent of the motorman. A heavily loaded 5-ton motor truck, careering the streets in the fashion to which we are becoming accustomed, is just as likely to bump into a safety car as it is into a two-man car, and the severity of the blow is in no wise lessened by the safety equipment. The second matter, and the more important one, is that, as pointed out by Mr. Andrews: "Experience in the application of these cars has demonstrated that they are more than a means of reducing the cost of producing service, and that the best results can be obtained by applying them in the ratio of three safety cars to two cars of the old type. In most cases the schedules can be increased 10 per cent or more with the safety car, and by operating 30 per cent more care on a 10 per cent higher schedule a 40 per cent better service can be given with no increase in the operating costs. The 40 per cent better service means 40 per cent more mileage per day. Consequently if we are to have 40 per cent more mileage, each mile requiring 24 per cent less maintenance than with the safety car, it follows that the mechanical department is going to have a net of 5 per cent more work to do each day, as may be seen from the following simple equation:

Let x = old work per car-mile
m = old mileage
Then total old work $= mx$
total man work $= 1.4\,m \times 0.75\,x$
$= 1.05\,mx$

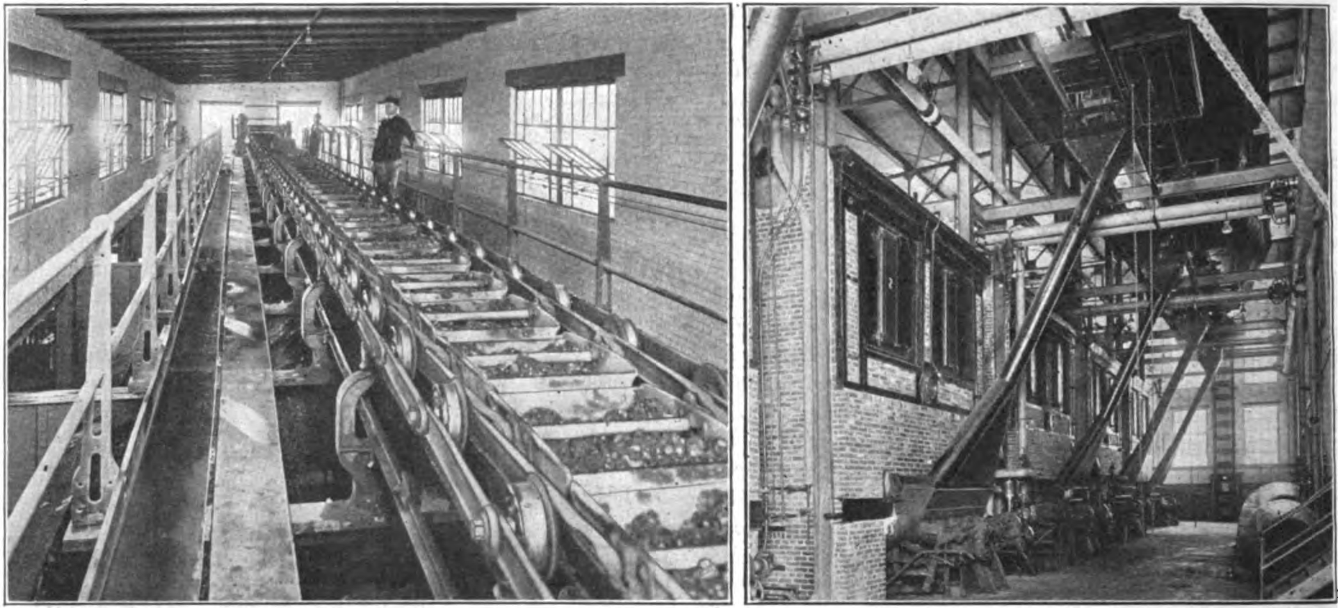
$$\text{Per cent increase} = \frac{0.05\,mx \times 100}{mx} = 5 \text{ per cent.}$$

It should therefore be remembered that in any comparison made of the efficiency of conducting the mechanical department before and after the operation of safety cars, that the department must show a small increase in its total operating costs per year, that it will require as many or more men, that it may need additional shop space, and that it will do well if its cost per car-mile shows a decrease of 24 per cent.

These things are not said in criticism of the safety car, for the writer believes thoroughly in its desirability and general economic features, but it is not well to expect too much of it, nor of the mechanical force that is responsible for its upkeep.

Statistics on Engineers' Salaries

From a wide variety of sources covering the entire ocuntry, the American Association of Engineers estimates that the average salaries paid to engineers are are as follows: Tracers, $125 per month; detailers, structural, mechanical, and electrical, $175 to $200, a few companies paying up to $225 per month for experienced men; designers on all classes of work, $250 a month and up; estimaters and checkers, $300 per month; rodmen and levelmen, $125 to $150 a month; instrumentmen, $175 to $200 a month; assistant engineers, $200 and up per month; map draftsmen, $200 a month; surveyors, $175 a month; research engineers, $275 per month and up. The salaries of engineers who have reached the executive class depend entirely upon the specific organizations with which they are connected. The salaries of production engineers, chief draftsmen, chief engineers, and superintendents of construction range anywhere from $3,000 to $15,000 per annum and more in the large corporations.



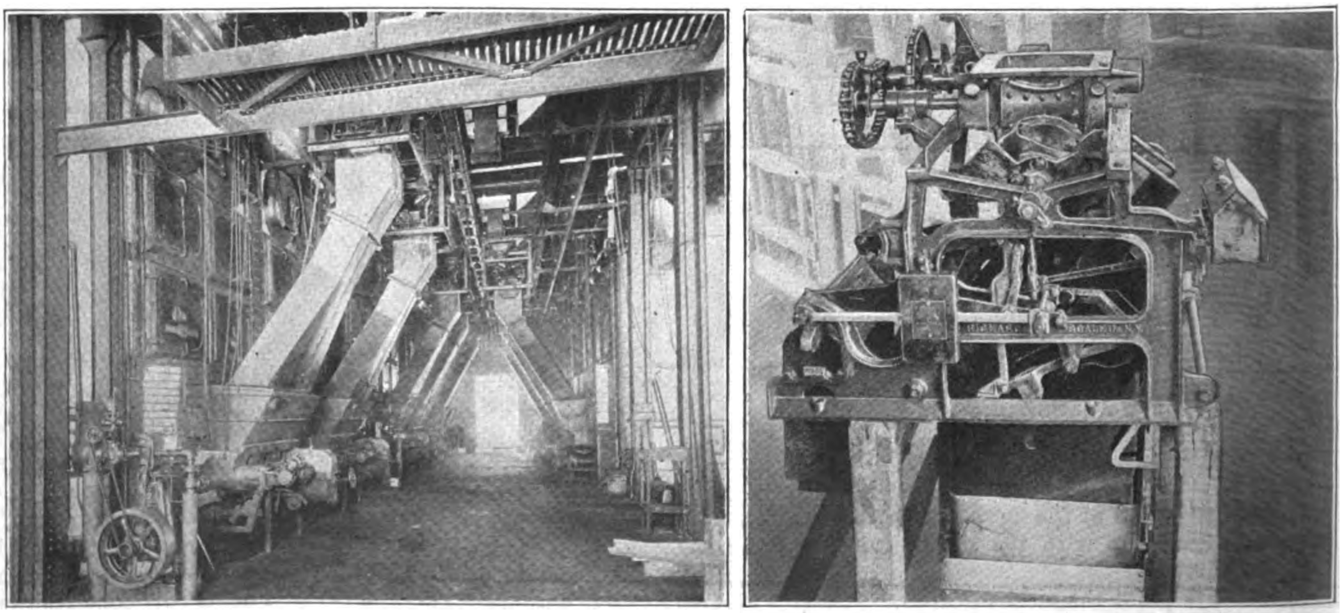
AT LEFT, CONVEYOR DISTRIBUTING COAL TO OVERHEAD BUNKERS IN BOILER ROOM. AT RIGHT, FIRING AISLE OF BOILER ROOM SHOWING "DOWNCOMERS" FROM OVERHEAD BUNKERS

Coal Handling in the Power Plant

IN THE issue of this paper for Dec. 27, page 1047, an abstract was given of the paper on "Economy in Steam Generating Stations" read by S. M. Finn, American Engineering Co., Boston, Mass., before the New England Street Railway Club on Dec. 4. When the abstract was printed the pictures with which the speaker illustrated his remarks were not available. This week it is possible to reproduce several of these, showing characteristic coal-handling installations. One of these is a "Link Belt" conveyor, distributing coal to the overhead bunkers in a boiler room. Another shows the "downcomers" from the overhead bunkers to Taylor underfeed stokers in the same plant. The elevator leg of the conveyor can be seen in the wall in the background of the picture. A third illustration shows a typical boiler-room arrangement, with provision for weighing the coal as it is distributed to the stoker hoppers. The scales used in this case are of the Richardson type. The fourth illustration shows a 1919 model of the Richardson coal scale, with an auxiliary spiked-roller agitator.

Digging Pole and Post Holes in Winter

THE digging of pole and post holes when the ground is frozen is a comparatively slow process, but frequently such work is necessary. Post hole excavators cannot be used and picks are of service for only the first few inches of the frozen soil. To meet this condition a low freezing dynamite suitable for use in the open in winter is becoming popular. Its use requires but a two-inch hole in the frozen earth, so that the stick of dynamite can be pushed to the bottom and tamped in. The firing of this breaks up and loosens the soil so that the hole can be dug to the required size in a few minutes.



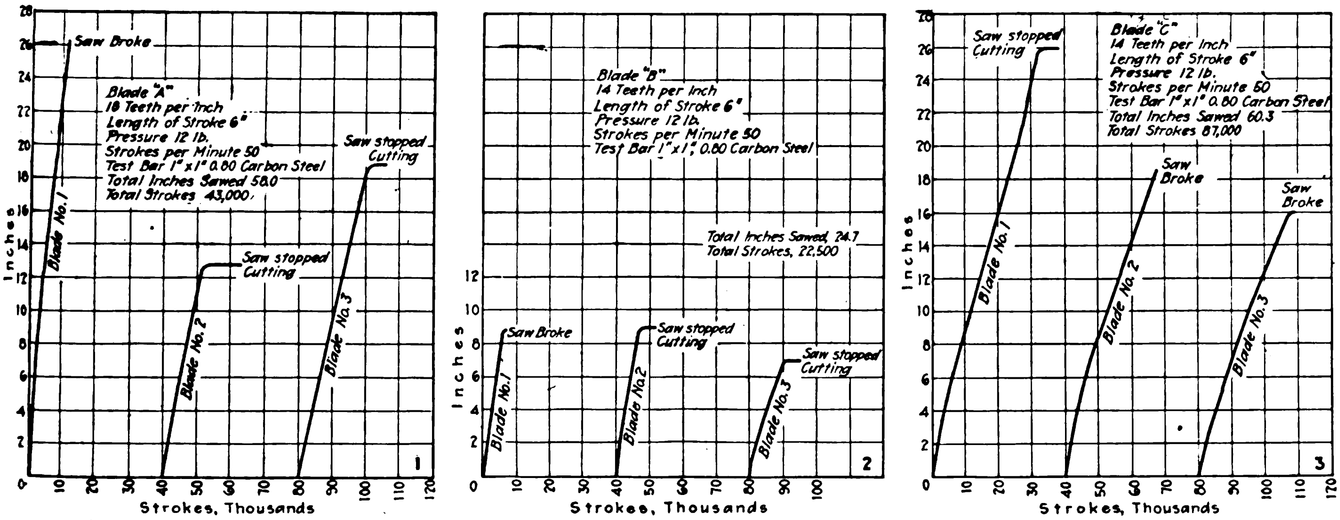
AT LEFT, BOILER ROOM EQUIPPED WITH SCALES FOR WEIGHING COAL DELIVERED TO SEVERAL STOKER HOPPERS. AT RIGHT, COAL SCALE WITH AUXILIARY ROLLER AGITATOR

Testing Hack Saw Blades For Electric Railway Use

Results Are Given for Six Different Makes of Blades Tested to the Point of Failure in an Automatic Machine so that the Personal Element Was Removed

IN THE Jan. 15 issue of the *American Machinist*, Howard H. George, assistant engineer for the Public Service Railway, Newark, N. J., described some tests which were carried out for that company in order to determine the suitability of various types of blades for their use. An abstract of this article is given herewith.

Many companies submit samples of the hacksaw blades they are using or contemplate using to so-called tests, but the latter are too often made in such a way as to have no real value whatever. As a general thing such testing is limited to a distribution of the samples among the various roadmasters to be "tried out." These men, in turn, hand them to various foremen who turn them over to a track laborer to use. "Reports" are then transmitted to the superintendent showing the "results" of the test, and it is but rarely that two reports agree as to the merits or value of the same blades. The reason for such diversity of opinion should, of course, be obvious, as should also the worthlessness of such "tests" for comparative purposes.



FIGS. 1 TO 3—AUTOGRAPHIC TESTS OF SAWS D, E AND F

A hacksaw blade, in itself, may seem like a very trivial article and not one on which very much money might be saved, but a careful analysis of its use should prove that this is not true, and that an occasional test is well worth its cost in order to insure the purchase and use of the blade which will cut the most metal in the quickest possible time. For in these days of high labor rates, this item will generally amount to more than the value of the blade itself.

Some time ago, during a visit to the factory of a manufacturer of testing machines, the writer was shown a machine for the automatic testing of files in which an autographic record of the result of the tests was obtained. The large number of hacksaws being used on the property on which he was employed had previously appealed to him and the thought occurred that such a machine could easily be adapted to the requirements of a suitable test for hacksaw blades. The proposition was put up to the firm which agreed to equip the machine and make the tests and, the approval of the railway company's management having been obtained, they were arranged for.

There are many different ways in which comparable tests of hacksaw blades may be made, but it is the writer's belief that the most scientific method and the one which gives the only satisfactory and conclusive results, is one in which the blades are all of the same dimensions, have the same number of teeth per inch, or as nearly the same number as possible, and where every blade is tested to the point of destruction; that is, where the blade no longer cuts. To obtain comparable results, all the blades must be tested in the same machine, at the same length and rate of stroke, the same tension, the same pressure, and must cut the same cross-section of metal from the first stroke till the last. It would also seem desirable that the metal upon which the test is being carried out should approximate, as closely as possible, the characteristics of that in the rail or other steel on which the saws are to be used in actual practice. A saw that would give entirely satisfactory results on an ordinary rail might fail miserably on some tool steels.

In the actual tests referred to, every effort was made to eliminate the personal element and the greatest care was taken to insure uniform conditions throughout, so that any part of any test could be duplicated at any time. Manufacturer's samples, with but one exception, were not used but the blades tested were either taken from our own stock or were purchased from jobbers' stocks. In the exception referred to, the test of these

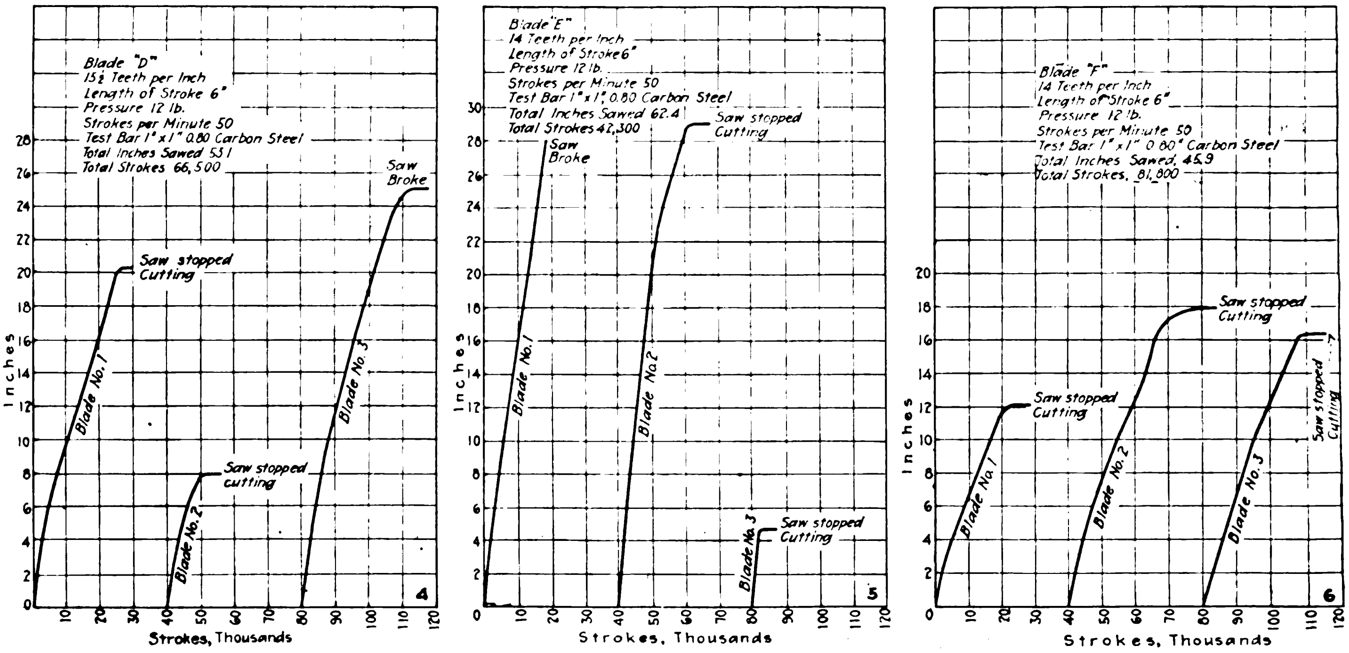
COMPARATIVE ANALYSIS OF RESULTS OF TESTS OF HACKSAW BLADES

Make of Blade	Total Inches Sawed	Total Number of 6-in. Strokes	Average Cut per Stroke in Inches	Total Cost of Blades	Cost of Blades per Inch Cut	Total Time Consumed in Minutes	Time in Minutes per Inch Cut	Total Labor Cost at 18½c. per Hour (Rate Assumed)	Labor Cost per Inch Cut	Total Cost per Inch Cut	Relative Cost per Inch Cut (Cheapest = 100%)	Relative Amounts Cut by 3 Saws (Max. Cut = 100%)
"A"	58.0	43,000	0.001349	$0.11979	$0.00207	860	14.83	$2.6511	$0.04571	$0.04778	109.31%	92.95%
"B"	24.7	22,500	0.001098	0.11811	0.00478	450	18.22	1.3875	0.05617	0.06095	139.44	39.58
"C"	60.3	87,000	0.000693	0.11250	0.00187	1740	28.85	5.3650	0.08899	0.09086	207.87	96.63
"D"	53.1	66,500	0.000798	0.13188	0.00248	1310	24.67	4.0386	0.07606	0.07854	179.68	85.09
"E"	62.4	42,300	0.001475	0.11901	0.00191	846	13.56	2.6085	0.04180	0.04371	100.00	100.00
"F"*	45.9	81,800	0.000561	0.11500	0.00251	1636	35.64	5.0450	0.10991	0.11242	257.19	73.56

* Special Tungsten Alloy Steel.

blades showed them to be the least efficient of all, so there could be no claim made that the blades developing the highest efficiency were "doctored samples" especially prepared for the test.

Six different makes of blades were tested, three of each being tested to the point of failure. The pressure was obtained by means of a weight suspended over a pulley and its amount was determined by a few preliminary experiments. In each case, the cutting was done on the forward stroke only, the saw being automatically raised on the backward stroke. Care was taken to see that the tension was the same in all cases. The test specimen was a steel bar 1-in. square having as nearly as practicable the same chemical analysis as our rail, the same steel being used for every blade. The cut was made lengthwise of the bar so that all saws were at all times cutting through a 1-in. section of metal. This insured that the rate of cutting at any time would be comparable in the case of every saw tested, and permitted the test of all blades to be made on the same bar. The length of stroke and the rate was kept uniform, and the number of strokes was recorded by a counting device attached to the machine. The autographic chart was adjusted around a vertical drum so connected as to rotate uniformly a fixed amount for each stroke. The pencil point was held in a device which moved upward on the chart at a rate depending directly upon the rate of cutting of the blade. In tabulating the results, for obvious reasons, the names of the makers of the various blades have not been referred to, the different manufacturers' blades being designated by a letter, individual blades being numbered.



FIGS. 2 TO 4—AUTOGRAPHIC TESTS OF SAWS A. B AND C

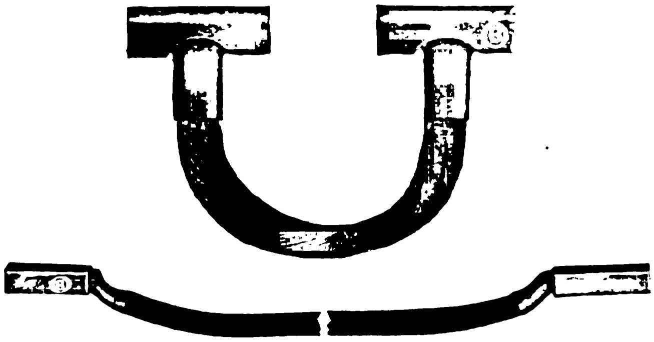
It is believed that the test itself showed the relative efficiency of the various blades submitted to it beyond question. In comparing the results obtained, a value of 100 per cent. was assigned to the blade making the best average showing and the value of all the others was reduced to this basis, as shown in the accompanying table. The cost of the blades was based upon actual quotations at the time of the test, based upon an order for all the saws required for a year. In order to apply the results of the test to actual field conditions to determine as closely as possible what the amount of saving would be by using the most efficient saw, a number of observations were made in the field to determine approximately how long the old make of blades were serviceable before being discarded. The average time was in this way fixed at about 30 min. of actual cutting. The rate paid for labor at the time of the test was 18½ cents per hour, and upon this basis it was determined that, other things being equal in both cases, the use of the most efficient cutting saw (based upon a total requirement of 455 gross per year) would result in a labor saving of over $5000 per year.

The test showed that the blade making the best showing did the same amount of work as that with the poorest record and more than two and one-half times as quickly (see column 8 of table); therefore, it is evident that the difference in time would represent the labor-saving due to the use of the most efficient blade. In addition, the saw showing the greatest efficiency cut a total of 36 per cent. more metal than the saw with the lowest efficiency. This means that the same amount of work could have been done with the most efficient saw which in the case referred to would have meant the saving of the cost of about 120 gross of saws per year. In order to see that the saws being supplied continue up to the standard of the specimens used in the tests, additional tests of blades taken from stock should be made from time to time; but this is true of all tools or materials and is not peculiar to saw blades.

New Arc Weld Bond for Electric Railways

ELECTRICALLY welded bonds are growing in popularity, and to meet this demand the Ohio Brass Company has developed a new arc-weld bond.

The bond is made in two types, designated as AW-2 and AW-3. Essentially, these two types are alike, but differ in form of terminal. The body is of copper strand and the terminals are of copper protected by a steel sleeve. This steel sleeve is mechanically and electrically united with the copper in the factory. On the job the operator welds "steel to steel with steel."



TYPES OF ARC WELD BONDS. ABOVE, AW-2 BOND, BELOW, AW-3 BOND

Another fundamental arc-welding principle is embodied in the bond, in that the weld is built up in a 90-deg. angle. This is to prevent the arc from playing against one side of the groove and preventing a real union in the bottom of the weld, the important place in rail bonding.

Uniformity in Accident Reports Is Needed

IN AN ARTICLE published by the National Safety Council, Dr. Royal Meeker, United States Commissioner of Labor Statistics, makes a plea for the proper use of statistics in accident reduction.

In this connection he says that the most important contribution that could be made to the further development of the safety movement would be the adoption in all the states of the Union of uniform accident reporting blanks. These blanks should call for the essential facts which safety men and factory inspectors must know to determine the causes and results of accidents. These uniform accident reports should be tabulated on the tabular form adopted and according to the rules laid down by the committee on statistics and compensation insurance cost of the International Association of Industrial Accident Boards and Commissions. Information regarding accident occurence and results collected in a uniform way from all industries and plants throughout the country and tabulated in a uniform manner would be most valuable to employers, employees, and factory inspection departments. The safety movement could then be intelligently directed toward the reduction or elimination of the more severe accidents in the industries and occupations with the highest severity rates.

Association News

Protest Against Higher Coal Cost

IN THE name of the association, Secretary Burritt has filed a protest with H. M. Robinson, chairman of the Bituminous Coal Commission, against any advance in the price of coal to electric railways, because of the recent increase to the miners. His letter says, in part:

> It is the understanding of this Association, based on published statements, that in the settlement of the coal strike it was provided that the additional cost occasioned by the 14 per cent increase in wages was to be absorbed by the operators and not passed on to the consumer.
>
> We are informed that in some cases public utility companies have already been advised by the operators that coal prices will be increased 25 cents a ton, possibly more. Electric railway companies in the United States consume about 16,000,000 tons of coal annually. An increase of 25 cents a ton will add $4,000,000 to their annual operating expenses and the possibility of having to bear this heavy additional burden in the present critical condition of the industry is viewed with grave apprehension by the executives of electric railway properties. The unfortunate financial condition of the electric railway industry is well known. It is recognized by the President of the United States who has appointed a commission to inquire into the situation and to report its findings to him.
>
> Under the conditions prevailing throughout our industry any increase in the price of coal must of necessity have the effect of either an impairment of essential service to the public or some arrangement whereby this additional charge may be passed on and collected from the car rider. The first contingency is to be avoided. The second from the nature of our operation can only be brought about after long delays. The American Electric Railway Association therefore, urges your Commission to prevent any increase in the price of coal because of the 14 per cent increase in wages granted the miners.

Committee on Schedules Holds Preliminary Meeting

ON Jan. 31, 1920, the first conference of the committee on schedules was held at the office of Chairman Dana, in Boston, to organize the work for the coming year. Those in attendance, in addition to the chairman, were James P. Barnes, Schenectady, H. F. Fritch, Boston, J. A. Stoll. Baltimore, and L. H. Palmer, sponsor.

The committee decided to devote special study in its report to the relation of dead time to live time in schedules, a topic which was felt to be most important. Each member agreed to prepare, prior to the next meeting, a statement showing how these matters are handled on his property.

Code of Instructions Issued

ALL committeemen of the Engineering Association have been furnished, by Secretary Burritt, with a copy of the code of instructions and regulations governing the style to be followed in the preparation of specifications as well as the rules of the association for the adoption of standards and recommendations.

This information is in pamphlet form and arranged for insertion in the Engineering Manual Binder. Each committeeman is urged to familiarize himself with the contents of this pamphlet, for by so doing much of the editing work at the secretary's office in connection with the printing of the committee reports can be reduced to a minimum.

Toledo Section Holds "Stag Party"

NEARLY 500 of the 1,200 members of "joint section" No. 11 of four national public utility associations attended the first large function held in the "Rail-Light" building in Toledo, Ohio, on Jan. 30. The program comprised the presentation of a charter to the section from the N. E. L. A. by A. D. Elsberry, secretary Union Gas & Electric Company Section, Cincinnati, Ohio; an address on the past, present and future of the electric railway business by H. H. Norris, ELECTRIC RAILWAY JOURNAL, and a number of entertainment features. M. H. Sommerville, section chairman, introduced as the honorary chairman Frank R. Coates, who presided during the more serious part of the program. A substantial luncheon was served at the close of the meeting.

Letters to the Editors

A Manufacturer Comments on Track Spikes

DILWORTH, PORTER & COMPANY, INCORPORATED
PITTSBURGH, PA., Jan. 29, 1920.

To the Editors:

I have read with considerable interest the editorial "Will the Screw Spike Replace the Cut Spike on Electric Railways?" and also the article by Howard H. George, Assistant Engineer, Public Service Railway of New Jersey. Our experience has been such that we agree in the deductions in regard to the screw spike as expressed.

In regard to the experiments made at the Civil Engineering Laboratory at Columbia University, indicating the value of pre-boring the holes for spikes, this was demonstrated years ago, but the difficulty seemed to be that no one would go to the trouble to do it.

In regard to the arguments in favor of the Goldie point: These same ideas were advanced over thirty years ago. The Goldie point was offered at the nominal cost of 5 cents per hundred pounds over the price of common spikes, and notwithstanding the increase in the number of spikes per keg, due to the Goldie point, and the recognized merits, only a few of the railroads would permit of this additional expense. We would not venture to say what success would now attend such an effort, with the labor of producing the point over three times as much as it was thirty years ago.

In regard to the specifications: The writer of the article is correct in his premise, but the difficulty again arises in the lack of a uniform specification and drawing that is practical and within the limits of manufacture on a commercial basis. The pitch of the head, the length of the head, the width, reinforcement in front or in back—all vary within a range limited only by the number of engineers who have this matter in charge for their various companies.

It is with interest we read Mr. George's statement, namely—"In order to obtain the material the company frequently found that it was absolutely necessary to purchase from manufacturers of iron spikes"—because it is now about thirty years since iron suitable for the production of spikes became difficult to obtain. This was on account of the constantly increasing production of steel, which naturally was reflected in the iron production. We do not mean to state that there was not suitable iron for the production of spikes available in this period, but not sufficient for an operating proposition on any considerable scale.

It may interest you to know that iron spikes were first made from old iron rails. This continued until iron rails went out of use.

Coincident with the lack of iron rails commenced the use of so-called iron fagots, which first consisted of four pieces of muck bar, making a box, with the interior filled with miscellaneous small iron scrap. With the increasing cost of muck, which was not reflected in any increase in the selling price of spikes, the boxes were made of two sides of muck, with top and bottom wood, the interior filled with miscellaneous scrap as before. Then came the condition that muck bar was so high, and a scarcity of small iron scrap again reflecting the increasing use of steel, so that it no longer became a matter of choice but of necessity to abandon the small and uncertain supply of iron available for spikes and to change our equipment for the use of new steel. And when you consider that this was forced upon us thirty year ago, you can appreciate that Mr. George's statement above cited is of considerable interest, for at no time in the writer's experience covering the period cited has there been a time when real iron has not sold for more than spikes, less the conversion from bars to spikes.

By all means let us have a uniform specification, and, above all, uniformity of design.

The design of spike of the Public Service Railway of New Jersey is of the best type—a spike produced by two operations. This in itself adds to the expense and would preclude its use by many corporate bodies.

W. F. SCHLEITER,
Vice-President and Secretary.

Carrying Capacities of Buses and Cars

165 BROADWAY
NEW YORK CITY, Jan. 29, 1920.

To the Editors:

I have read with interest the editorial in your January 24 issue under the caption, "Other Things the Broadway Association Overlooked," and observe there is one other "thing" which you did not mention and which is of primary importance.

I use the Fifth Avanue bus line frequently, and one very serious difficulty is that I cannot get on the bus at all. In the rush-hour peak, and often for a considerable period on either side of it, the buses are loaded near their terminals and pass blandly by with crowds of waiting passengers at every street corner all through the congested district. This is not an occasional occurrence but a regular daily condition and is due to the fact that, although the street is almost filled with buses, they have no space for standing room and enforce a rule that no passengers may board a bus if all the seats are occupied. This fact at once suggests that a comparison in the seating capacity between the bus and street car is misleading and does not represent by any means the relative carrying capacities of the two forms of vehicles. Whatever may be said by way of objection to the overcrowding of street cars by their carrying too many standees, there is probably no one who would not prefer to stand and get home rather than wait on a street corner for half of an hour or more.

CALVERT TOWNLEY.

Recent Happenings in Great Britain

Sale by Speyer Confirmed—Glasgow Has Its Pressing Problems—Bills Being Promoted to Increase Fares

From Our Regular Correspondent

Although street tramways are not included in the arrangement, considerable interest to all concerned in transportation work attaches to an announcement made by Sir Eric Geddes, Minister of Transport, in reference to the railways (including the electric railways) of the country. He stated that, apart from negotiations then going on, questions of wages and conditions of service shall, during the two years' control of railways by the Ministry, be dealt with by a control board consisting of five railway managers and five representatives of the two trade unions concerned. Failing agreement by the control board, the matters in dispute will be referred to a national wages board consisting of four railway managers, four railway workers or their representatives, and four users of the railways, of whom one will be nominated by the Parliamentary committee of the Trades Union Congress, one by the Co-operative Union, one by the Federation of British Industries, and one by the Associated Chambers of Commerce.

CONCILIATION MACHINERY SET UP

This arrangement has been agreed to between the Government and the two trade unions, and the latter have also agreed that no strike shall take place until one month after the question in dispute has been referred to the national wages board. It will thus be seen that an important piece of conciliation machinery is being set up; that the employees are to have a much more effective voice than ever before, and that the possibility of "lightning strikes" is eliminated. All that depends of course on labor adhering to the agreement and not throwing over its leaders as it sometimes does.

Another important step in the direction of giving the workmen more say in railway matters has been announced by Sir Eric Geddes. The Railway Executive Committee, consisting of managers who ran the whole system during the war and since, came to an end with the close of the year, and in connection with the control now exercised by the Ministry of Transport, the Ministry has appointed a Railway Advisory Committee to advise the Minister on matters of railway working. It consists of twelve railway managers and four representatives of the railway men's trade unions. The four representatives have hitherto been prominent leaders in agitation for improved conditions of employment. In these several ways the Government is making an effort to secure peace on the railways in the future.

Early in January the protracted negotiations between the Government and the railway men as to standard rates of pay came to a close, the representatives of the men agreeing to an offer by the Government of an increase of 5s. per week, making a total increase of 38s. per week above pre-war average rates in all grades, along with other valuable concessions. A three-days' conference of delegates of the men, however, ended on Jan. 9 in a blank refusal to accept the terms. Thus the men's leaders were once more thrown over.

Increased rates for goods and mineral traffic came into force in the middle of January. The estimated increase in revenue is £50,000,000 per annum.

The Ministry of Transport's Advisory Committee on London Traffic has started work. It is significant of the methods of the new Ministry that the committee should be hearing evidence in public. Their first sitting of the kind took place on Dec. 18 when Mr. Howard, controller to the London County Council, and Sir Albert Stanley, chairman of the underground railways group, gave evidence on the financial position of the undertakings. The former estimated that for the year 1920 there would be a deficit on working of the Council's tramways of £580,000, owing to the great increase of working expenses, particularly in wages. The only relief he could see, apart from an increase in revenue, would be a reduction of motor omnibus competition. Sir Albert Stanley, speaking for the ten companies—railway, tramway, and omnibus—with which he is associated, put the loss for 1920 on these undertakings at £2,600,000. This was without making allowance for fixed capital charges. There was not the remotest chance of meeting the loss except by an increase of fares. The services carried 1,300,000,000 passengers per annum, and an addition of a halfpenny for each passenger journey would realize £2,500,000 yearly.

A proposal to make a further increase in fares came before a meeting of London County Council on Dec. 16, but was deferred pending the review of the whole subject of London fares by the Advisory Committee on London Traffic.

Two other interesting items in regard to the underground railway group fall to be recorded. One is that the entire holding—and it is very large—of Messrs. Speyer Brothers in these undertakings has been acquired by Messrs. Barnato Brothers, the purchase price being put at £1,000,000. The other is that Sir Albert Stanley, chairman and managing director of the associated companies, has been created a Peer of the United Kingdom. He did much valuable work for the Government during the war and for a time was president of the Board of Trade. He will be remembered in America as having formerly been manager of the Public Service Railway, operating in New Jersey.

The finance and traffic arrangements of Glasgow tramways are in a difficult position. That is something new for Glasgow. The tramways committee recommended to the Town Council on Dec. 11 that fares should not be increased during the present financial year (which ends on May 31 next). This was in spite of a proposal by a finance sub-committee for an increase and of a report by Mr. Dalrymple, the manager. The report stated that for the three months ended Aug. 31 there was a deficit of £19,435. Since then the corporation had granted a further increase of wages which would mean an additional annual expenditure of £75,000. The total wages bill which was £441,000 for the year 1913-14 would reach about £1,140,000 for the current year. As to extending the system, Mr. Dalrymple could not see, if the department could not meet the ordinary working expenses, how it could possibly launch out into large capital commitments. He was satisfied that the first thing to be done was to increase revenue, and for that purpose he recommended the adding of a half-penny to each fare. The Town Council adjourned consideration of the matter. It came up again at a meeting on Jan. 8, when, despite the figures advanced by the chairman of the tramways committee as to the enormous expense pending for track renewals and other matters, it was resolved by a majority that there should be no increase in the fares during the present financial year.

FARE INCREASES DESIRED

In order to meet constantly growing costs, a large number of British tramway undertakings are promoting bills in the coming session of Parliament to enable them greatly to increase their maximum fares. The proposed new figure in many cases is 2d. per mile.

A fine example of the working of the power of veto of local road authorities over tramway schemes comes to light in East London. For ten years the London County Council has wished to reconstruct an old horse tramway on the overhead wire system in the metropolitan borough of Stepney. The Borough Council steadily refused to consent to the use of the trolley wire, and it said that the conduit system should be put in. The County Council refused on the ground that the probable traffic was not sufficient to warrant the heavy capital expenditure on the conduit system. Recently the Stepney Borough Council consented to the use of overhead wires, and on Dec. 19 a proposal was brought forward at a meeting of the County Council to proceed with the reconstruction of the tramway. The estimated cost of work in 1914 was £110,155, while now the estimate is £272,160. It was stated that the working of the line would result in a considerable deficit, but that the Council was committed to going on with it. The proposal was adopted.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Mayor Signs Railway Bill

Ordinance for Municipal System in Detroit Goes Before Voters on April 5

The final step assuring the submission of the railway plan of Mayor Couzens of Detroit, Mich., to the voters was taken when the Mayor signed the ordinance containing his plan after it had been passed unanimously by the Council at the regular meeting on Jan. 27.

MUNICIPAL OWNERSHIP PROVIDED

The Mayor's plan authorizes the city to build and acquire street railway lines. It is designed ultimately to exclude the Detroit United Railway from the streets of Detroit. The ordinance will be presented to the voters for acceptance or rejection at the polls on April 5.

It has been announced that Mayor Couzens is paying the expenses incidental to preparing the plans and maps for his project out of private funds with no intention of asking reimbursement from the city. This amount, however, is believed to be small compared with the cost of previous settlement plans prepared by engineers engaged by the city.

In discussing his plan the Mayor reviewed the facts concerning previous referendums when the voters frequently approved municipal ownership when the abstract question was before them, but had consistently refused to accept it in any concrete form and had rejected various propositions granting franchises to the operating company.

The Mayor believes that when a monopoly is given as for the operation of a transportation system the community should have control, for with public utilities the public has no opportunity to say how they shall be conducted unless they take them over themselves. Although he does not consider his plan a panacea for all the ills incident to railway operation, he believes it will give relief from the present evils of inadequate service.

MAYOR AGAINST TAYLER PLAN

If the proposal is turned down the people will have to work out a plan for themselves or follow a leader who has worked out a plan, and no relief can be had from present conditions for several years.

The Tayler plan as applied in Cleveland, as seen by the Mayor, is a cost-plus plan which contains more evils and pitfalls than any other plan ever submitted. The Mayor's attitude has been construed to mean that he will not permit the Tayler plan to be submitted to the voters during his administration. To adopt it means that a valuation of the company's property must be agreed upon and a valuation could probably not be agreed upon that the people will accept.

The Detroit United Railway maintains that fares within the city of Detroit have averaged 20 per cent lower than those existing in other communities larger than or comparable with Detroit. The Detroit United System is made up of many companies, so a great majority of its customers are daily taking rides for one fare for which the company has had full and ample authority to collect two or more fares. The system has been unified, length of riding zones increased and a broad, liberal system of transfers put into effect which was called for in the original agreement. Except for some trackage in connection with re-routing, the Detroit United Railway has constructed or had under way before snow came, all of the lines and extensions that the civic authorities have permitted it to build.

D. U. R. PLANS IMPROVEMENTS

While the system has been unified and extended, on surface lines alone there is required to-day an investment of not less than $15,000,000 for the extension of the system. The company stands willing to undertake this construction whenever the civic authorities make it possible, through any reasonable arrangement, to attract the capital needed. The Detroit United maintains that if extensions are not built and operated as part of a unified system the responsibility for failure must be charged to others.

Bulletin Page Dropped

With this issue we discontinue the "Bulletin Page", begun while this paper was being printed in Baltimore. At that time it was impossible for the editors to maintain an invariable printing schedule, and sometimes the reading pages had to be made up several days in advance of the time at which the paper went to press. This led to the reservation of one reading page in which a digest of all of the late news was published, dated to indicate the closing day.

We have now resumed our regular printing schedule, with the paper mailed Saturday and the news pages, which are the last to go to press, made up on the previous Friday. The Bulletin Page is no longer necessary, and the space formerly occupied by it will be used for an extension of the news department proper.

Pittsburgh Commissioner Out

Transit Head Removed Following Disagreement With Mayor Over Subway Plans

It was publicly announced in Pittsburgh, Pa., Jan. 28 that Mayor E. V. Babcock had dismissed E. K. Morse, transit commissioner for the city. Mr. Morse has consistently opposed the plan for a $6,000,000 subway terminal loop in the downtown Pittsburgh section, a plan which was personally sponsored by Mayor Babcock and the rest of the administration.

The City Council has shown a distinct inclination to oppose the Mayor in his dismissal, and granted a public hearing to Mr. Morse on Jan. 29, at which he explained his views on the traction situation in Pittsburgh. There will be a further hearing on the matter in Council on Feb. 5.

The Mayor has appointive powers and can name a successor to Mr. Morse, or can continue the position vacant, but the balance of power would seem to lie in the hands of Council, which has the privilege of abolishing the ordinance authorizing traction investigation by the city and can create in its place a similar body under the city clerk, whose choice of an occupant for the position can be dictated from Council.

The first intimation of the dismissal of Mr. Morse came in a letter from Mr. Morse to Council, notifying that body of the Mayor's action. The commissioner said in his letter that he wished to present to Council his transit program before he left the office. The hearing was set for the next day. Meanwhile, Mr. Morse made public a letter he had sent to the Mayor under date of Jan. 27, explaining the progress of the dispute between them. The letter ran, in part, as follows:

> After careful consideration of your request of Jan. 23 that I resign the office of transit commissioner of the city of Pittsburgh, I have reached the conclusion that a resignation at this time would constitute a failure in duty to the public. Your statement, in effect, was that you desired my resignation because I was standing in the way of a proposed subway loop for the downtown district. I am convinced that the construction of such a loop would be exceedingly unwise, would fail utterly to solve or even partially solve Pittsburgh's transportation problem and would render exceedingly difficult, if not prevent, a real solution of the problem in the future. Holding that view of the proposed loop and believing that plans I have worked out would provide a real rapid transit system for Pittsburgh and, for the time being, accommodate all the surface street cars the proposed loop would, I feel that I would not be serving the public interest by tendering my resignation.
>
> You declined last Friday to discuss with me plans I have made recently, which I propose to submit to you and the members of Council. These plans show how the $6,000,000 provided by bond issue could be used to construct a subway in the downtown district that would not be a loop,

> but would be links in two through rapid transit lines which, in my judgment, should be constructed eventually.
>
> In view of the fact that the ordinance governing this office provides for the appointment of a transit commissioner subject to the approval of Council, I have always had a feeling of joint responsibility to the Mayor and Council. I have heard nothing to indicate dissatisfaction in Council with my work. As you have said that you personally have not read the reports of the transit commissjoner or studied his plans for a rapid transit system, I cannot feel that you have taken the steps necessary to enable you to arrive at a proper judgment of the merits of the plans or the work of the commissioner. I will co-operate to the best of my ability with you and with your department heads, but I cannot and will not sacrifice my judgment and honest beliefs to obtain any personal considerations.

In his appearance before the Council, Mr. Morse made no plea for retention, but declared it his public duty to lay before that body the results of his recent three-months study of transit matters which had led him, he said, to a conclusion much more satisfactory than the subway loop. Mr. Morse advocates a rapid-transit system combining subway and elevated and treating the downtown as a district on the through lines. The downtown subway loop advocated by the Mayor treats the downtown as the terminus for lines from all directions.

COMMISSIONER IN OFFICE SIX YEARS.

The commissioner was appointed six years ago to make a survey of the city's transportation systems and to recommend better transportation facilities. Twice Mayor Babcock has vetoed or eliminated from the budget the items providing for the maintenance of the transit commissioner's office, but Council each time restored it.

Sane Commission Rulings Encourage Investment

Harrison B. Riley, chairman of the committee of the Chicago City & Connecting Railway Collateral Trust, Chicago, Ill., in a letter to shareholders of that company, declared that recent rulings of the Public Utilities Commission, backed by the decisions of the State Supreme Court and the U. S. Supreme Court, should prove an incentive for capital to invest permanently in Illinois.

Mr. Riley finds that under the court decisions the theory that an ordinance contract made in the distant past and now impossible of fulfillment except by bankruptcy of the utility company and a wastage of its capital has been definitely abandoned and will have no further part in the relations between the community and the utility. His letter in commenting upon the court decision says:

> One limitation seems to exist to the activities of a public service commission, and that is, the rate of return to a public utilities corporation shall not be confiscatory but, on the other hand, shall be so fair, reasonable and assured that the operating organization may command capital for additions and extensions in fair competition with other safe investments. These principles have been announced by the commission and sustained by the Supreme Court of the United States. The committee feels, therefore, that however long the battle and however vicious the assaults, the companies are on a firm ground and will ultimately obtain justice.

Proposed Union Terminal for Los Angeles

The Railroad Commission of California has issued a 600-page report on its investigation of a union terminal in Los Angeles. The investigation was begun in December, 1917, and has been directed by Richard Sachse, chief engineer of the commission. Twenty-four of the commission's engineers and draftsmen have been engaged on the work. In the main its recommendations are that most of the grade crossings be eliminated; that a union passenger terminal be built on what is known as the "Plaza" site; that a union freight yard be provided, and that a subway and elevated line be built on which electric trains may reach the Sixth and Main Street depot without using the city streets. The subway and elevated line would be operated by the Pacific Electric Railway and would cost $5,741,566.

Municipal Line Organizes

The annual meeting of the Norton, Taunton & Attleboro Street Railway was held at Attleboro, Mass., on Feb. 2, 1920. The following officers were elected: Lee Coughlin, Mayor of Taunton, president; William P. McDermott, chairman of the Board of Selectmen of Mansfield, vice-president; Robert W. Hewins, Attleboro, clerk. Mr. Hewins was appointed manager and superintendent of the system for the year of 1920. It was recommended at the meeting that an increase to the employees of the road be granted, on a sliding scale. This increase will give a wage of from 45 cents to 50 cents an hour.

The Norton, Taunton & Attleboro Street Railway is owned by the cities of Taunton and Attleboro and the towns of Norton and Mansfield, having been purchased in 1919. Each municipality has appropriated $3,000 for repairs.

New York Lines Hit by Storm and Coal Shortage

Rapid transit and surface lines in New York City and its vicinity are suffering from the effects of a storm of snow and sleet which has raged along the Atlantic coast for the past week. The subway and elevated roads have been able to maintain service with slight interruptions, but practically all of the surface lines in this city have been tied up.

The crippling of the steam railroads and the presence of much ice in the harbor have made the delivery of coal impossible for a number of days. Several utilities report only a two days' supply on hand. The situation was so grave on Feb. 5 that Public Service Commissioner Nixon called a conference of utility representatives to discuss measures for relief. Following the conference, Mr. Nixon sent a telegram to President Wilson urging that the Federal Railroad administration requisition no more coal en route to the city.

Inquiry at Madison

Mayor George C. Sayle of Madison, Wis., has appointed a committee of five citizens to co-operate with five members of the Common Council to investigate the Madison Railways.

For several years the condition of the railway's finances has been such that the Wisconsin Railroad Commission has refused to permit the company to consider extensions to tap rapidly growing sections of the city. One extension is now under way, financed through the proceeds of non-dividend-paying stock sold to citizens interested in the establishment of a packing plant. The packing company refused to locate in Madison unless railway facilities could be provided for its employees. The sum of $35,000 was raised to build the line.

The inquiry ordered by the Mayor will result in recommendations by the committee as to the best plan to extend the railway service.

Madison has been paying a 6-cent fare with nine tickets for 50 cents for more than a year.

The Railroad Commission has checkers ascertaining traffic distribution.

Des Moines Men Make Demands

As the time draws near for the making of a new working agreement between the Des Moines (Ia.) City Railway and its employees the hopelessness of settling the railway problem at Des Moines becomes more and more evident. A new contract is to be made March 1, when the present agreement expires. While the men have served notice of the new scale which they will demand, Emil G. Schmidt, president of the company, has announced that he will ask for a reduction from the present scale.

The demands of the men would mean an increase of 23 cents, making the top pay 80 cents an hour. Mr. Schmidt, on the other hand, asks for a reduction of 10 cents an hour from the present scale, making the maximum 47 cents an hour. According to Mr. Schmidt, if the demands of the men were acceded to it would mean an increase of 30 per cent in the present operating costs, or a total of $400,000 a year. To meet the demand would mean a further very material cut in service and Des Moines is now suffering from a cut recently authorized by Judge Wade.

In addition to the wage demands the men are asking that all cars be equipped with electric heaters for motormen and conductors; time and a half for Sunday and holiday time; a seven-day vacation on full pay once a year; all employees off every eighth day; waterproof coats and rubber boots for men on wrecking cars; double the number of men on wrecking cars and trucks, and a proportionate increase for men other than the motormen and conductors.

Mr. Schmidt and Ben Wiley, business agent of the union, plan a conference. If they cannot reach an agreement arbitration will follow.

Pittsburgh Will Insist on Paving

The service and surveys committee of the City Council of Pittsburgh, Pa., at a meeting on Jan. 22, affirmatively recommended a resolution of Councilman W. Y. English directing the city solicitor and the special city counsel for railway litigation to institute a suit against the Pittsburgh Railways to compel the company to bear a portion of the expense of paving and re-paving streets traversed by the company's lines.

Mr. English, in making his motion, declared that the railway has accumulated a fund of $1,000,000 to meet these expenses and that it was not drawing on the fund for the reason that the courts had not compelled it to do so. There was no proof submitted in support of this statement. It was pointed out that the railways company already owes the city $240,000 for cleaning streets, for bridge tolls and for other charges.

Under its franchises, the company is committed to the paving, at its own cost, of the space between the car tracks and 1 ft. on each side of the tracks. At the committee meeting it was alleged that the company has expressed a willingness to go to the courts over the matter, confident that it will be able to prove that the Public Service Commission sanctions its stand in refusing to pave streets.

Daniel Winters, a councilman, speaking against the motion, declared that C. K. Robinson, special traction counsel for the city, was opposed to a suit of this nature at this time, and had advised that nothing be done until it could be determined whether the railway really is liable for a part of the paving costs. The proceedings, Mr. Robinson was quoted as saying, would make it easier for the railway to evade payment.

Since the Council of Pittsburgh is composed of only nine members, the actions of committees are usually indicative of the action of the Council itself.

Asks Forebearance

Ralph Peters, federal manager of the Long Island Railroad, recently addressed the patrons of the company as follows:

> The electric trains which we are operating between Jamaica and Brooklyn and the Pennsylvania Station and on the North Shore Division, are in many cases badly overcrowded.
>
> The great increase in the number of commuters using our lines, due to the natural growth and to the acute housing conditions in the city, has placed a great burden upon us this winter. We were unable during the war period to secure new equipment. We now have 100 new cars under construction for 1920 delivery. We have equipped 50 of our summer trail cars with heaters, so that they can be used during the winter, and every car that we own, which is able to run, is in the service every day.
>
> The number of commuters in the month of December was 31,319 as compared with 30,737 in November, and 29,138 in October. As compared with 1918, December shows an increase of 8,404, and as compared with 1917, December shows an increase of 11,761. This means an increase over December, 1918, of 16,808 passengers per day to be handled during the Commission Hours, or more than 100 carloads in each direction, and we are only able to take care of the traffic by doubling back the equipment and using it over again. This frequently occasions delay, which we regret, but cannot always prevent.
>
> Under the circumstances and inasmuch as we are unable to hire or purchase cars which will give us immediate relief, we must ask you to be patient and forbearing until such time as we can relieve the situation by adding new cars to our equipment.
>
> We are sure that if you know the facts, you will sympathize with our difficulties and help us to bear them.

Doherty & Company Optimistic

At the beginning of the year 1919, when all public utilities were faced with the serious problems of readjustment arising from the sudden cessation of hostilities, Henry L. Doherty & Company, operating the Cities Service Company, felt that there must be a period of general depression, but this period was so short that it hardly became a factor worthy of mention, and before the year was over all of the properties were operating on a basis of higher demands and output than ever before in their history. That firm says:

> We feel absolutely confident in saying that the earnings of our public utilities accruing to Cities Service Company for the year 1920 will be the greatest in the history of our organization. In other words, we feel that the utility division is now making progress on a basis that indicates that the handicaps occasioned by the war have been met effectively and that we can look forward to renewed progress in this department of our activities.

Service-at-Cost Suggested for Pittsburgh

A resolution asking consideration of the service-at-cost plan in the operation of the Pittsburgh (Pa.) Railways was adopted by the executive committee of the Allied Boards or Trade, at a meeting in late January. The resolution ran:

> Whereas: Upon the determination of the fair value of the properties of the Pittsburgh Railways, it will become necessary to formulate plans for the reorganization of the system and for the adoption of a definite policy between the railway and the public authorities, and in anticipation of these developments which may be expected in the near future, it is deemed expedient for the executive committee of the Allied Boards of Trade to make a statement of its position in the premises; therefore be it
>
> Resolved: That it is the sense and judgment of the executive committee of the Allied Boards of Trade that, upon a final determination of the fair value of the properties of the Pittsburgh Railways, consideration be given to the adoption of a service-at-cost plan along the lines heretofore adopted by several large cities, namely, Cleveland, Cincinnati and Minneapolis, and that in connection therewith, plans be formulated for closer co-operation between the local authorities and the railway so that matters of service, of maintenance of properties and of extensions may, in the first instance, be under the supervision and control of a local board subject to review by the Public Service Commission of the State and also that the necessary foundation be provided for ultimate municipal ownership, by providing for a definite price upon which the properties of the company may be purchased by the public, either by the present municipal government, or by a metropolitan district duly authorized in the premises.
>
> The executive committee of the Allied Boards of Trade favors ultimately a plan of municipal ownership, with or without municipal operation, and believes that these matters should be provided for in any plan for the future and to this end provision should be made for the acquisition by the public authorities at a fixed price.

The Allied Boards of Trade is the central body comprising all the district boards of trade in Allegheny county.

News Notes

Interurban Increases Wages.—The Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md., on Feb. 2 advanced the wages of its motormen and conductors 10 cents an hour, to 60 cents an hour. The company also will pay the men time and a half after ten hours' work.

Advance for Kingston Men.—The conciliation board, to which was submitted the dispute between the West India Electric Company, Kingston, Jamacia, and its striking employees, has reported that men who have served more than ten years should receive 6 cents per hour extra, those serving more than five years, 5 cents, and others, 4 cents an hour, over the present rates.

New Working Agreement With Employees.—A working agreement for the year 1920 has been entered into by The Northwestern Ohio Railway & Power Company, Toledo, Ohio, with its trainmen as individuals. The trainmen were organized in the Amalgamated Association as a sub-division of the Toledo local, but after careful consideration they decided that it might be detrimental to their interests to insist on an agreement through the union.

Labor Contract Still Being Negotiated.—Although it is reported that several conferences have taken place between the officials of the Georgia Railway & Power Company, Atlanta, Ga., and officials of the trainmen's union relative to the making of a new wage agreement between the men and the company, nothing definite has been given out to the public and neither side will discuss the subject. Included in the new demands of the men are 60 cents an hour—the old pay being 40 cents—time and a half for overtime, Sundays and holidays, two weeks full pay during a vacation of that length, and a closed shop.

Asks $1,400,000 for Buses.—William Wirt Mills, Deputy Commissioner of Plant and Structures of New York City, appeared before the Board of Estimate on Jan. 30 and asked for an appropriation of $1,400,000 to build 200 buses to operate in place of abandoned railway lines. He explained that the previous estimate of $570,000 had to be increased because of the suspension of more railway lines. Mr. Mills stated that forty manufacturers had filed applications for the privilege of constructing buses. In his original application for an appropriation, Commissioner Whalen stated that the cost of maintaining and operating 100 buses a year would be $635,000, and that the net profit ought to be $376 a day. A vote on the matter was put over until the Comptroller could be present.

Financial and Corporate

$7,111,336 Toledo Valuation

Experts for City Find This Amount Based on Prices for Five Years Before 1915

An inventory and valuation of that part of the property of the Toledo Railways & Light Company in Toledo, Ohio, used for railway purposes, not including the power plant, has been completed by Service Director David H. Goodwillie and his associates, Prof. H. E. Riggs, Ann Arbor, Mich., and F. W. Ballard, Cleveland. It places a valuation of $7,111,336 on the property.

Mr. Goodwillie, explained to Mayor Schreiber that the valuation is based upon average prices for the five years preceding 1915 applied to those parts of the property not rebuilt or renewed since Jan. 1, 1915, and to this has been added both renewals and new construction installed during the period from Jan. 1, 1915, to date at present day costs.

VALUATION ON AVERAGE PRICES

Mr. Goodwillie said that reasonable allowances had been made for contingencies and overhead charges. He said it was his sincere belief that the valuation represents more than the actual *bona fide* investment cost in the property. A valuation prepared by the engineers for the company based on a 1919 reproduction cost approximated $17,000,000.

Mr. Goodwillie's report was made public on Jan. 27 after it developed, following numerous conferences between him and Henry L. Doherty, operating head of the Toledo Railways & Light Company, that it would be impossible for the city and the company to agree on a valuation price Mr. Goodwillie said he and H. L. Doherty, operating head of the railway, were unable to agree upon a valuation price or on the theory of making the valuation. The service director said that he had attempted to have Mr. Doherty agree on a method of making the valuation before it was started, but that he had been unsuccessful.

COST OF REPRODUCTION $12,112,437

The experts for the city said they are confident that the valuation of $7,111,336 can be sustained in a judicial proceeding and that they are prepared to furnish any amount of data and information, both as to court decisions and engineering statistics which they believe would substantiate the city's case in court if valuations were being determined for rate making purposes. The representatives of the city place the reproduction cost of the property at $8,313,575, and the actual value, due to depreciation, at $7,111,336. As a matter of information and as a check upon the figure of $17,000,000 given by the company, the city representatives prepared an approximate reproduction cost valuation using 1919 prices as the basis. This indicates $12,112,437 as the cost of reproduction and $10,294,492 as cost of reproduction less depreciation.

RAILWAY DEFRAYS VALUATION COST

Mr. Goodwillie said that it was his personal opinion that a condemnation proceeding in the matter of acquiring the property for the city would result in the city being compelled to pay more nearly present day reproduction costs; in other words, a substantially higher value than could be secured by the city in a judicial action looking toward the establishment of a fair value for rate making purposes over a period of twenty-five years.

The cost of the valuation was $21,000. This expense was defrayed by the Toledo Railways & Light Company.

Texas Electric Railway Has Good Year

According to the annual report of the Texas Electric Railway, Dallas, Tex., as made by J. F. Strickland, president of the corporation, the gross earnings from operation in 1919 were $2,951,511, an increase of 23.9 per cent over the gross earnings for 1918. Operating expenses and taxes increased $302,019, or 21 per cent over those for 1918.

The net income of the company after interest charges for 1919 was $735,454, or at the rate of 2.8 times the annual dividends on all preferred stock. The balance available for common stock was $476,454.

According to the report, regular dividends have been paid at the rate of 7 per cent per annum on the first and second preferred stock and an initial dividend at the rate of one-half of 1 per cent on the common stock for the quarter ended Dec. 31, 1919, has been declared payable on March 1, 1920.

Of the six railway systems operated by the corporation in North and Central Texas, Denison reported the only gain in income after depreciation values had been deducted. At that place the gross revenue was $34,647 for the year. Operating expenses and taxes were $22,286, and depreciation was assessed at $6,783, or an income after depreciation of $5,578. The gross revenue from the Waco railway was $341,518 for the year, with operating expenses and taxes placed at $287,404. Depreciation was given as $75,780, or a deficit in income of $21,666. The deficits at Waxahachie, Corsicana, McKinney and Sherman were given at $7,767, $6,820, $6,107 and $720, respectively.

Harlem Starts Operation

Court Orders Third Leased Line of New York Railways Returned to Owners—Most Transfers Cut Off

The Fourth and Madison Avenue and the Eighty-Sixth Street Crosstown Lines in New York City which had been operated since June 11, 1896, under a 999-year lease were returned on Feb. 1 to their owners, the New York & Harlem Railroad, and will be operated under the name of the New York & Harlem Traction Lines. The order was signed on Jan. 20, 1920, by Federal Judge Mayer, following a demand by counsel for the owner that the rental in arrears be paid or the property returned. No rentals or taxes have been paid by the New York Railways since Oct. 1, 1918.

LEASE TERMINATED

Under the lease, which was terminated, the New York Railways paid a rental of $400,000 a year besides all taxes and $2,500 for organization expenses, making a total yearly rental of $448,850. Based on the allotted outstanding capital stock invested in these lines of $2,850,544, as used by Stone & Webster in their Interborough reports, this rental, which is 4 per cent on the total $10,000,000 capital, actually represents 14 per cent on the stock in the city railway. The New York Central also pays rental for that portion of the line extending from New York to Chatham. Outstanding bonds amount to $12,000,000.

This is the third important surface line that has been returned to its owners since the New York Railways passed into the hands of Receiver Job E. Hedges on March 20, 1919. This road, however, has no carhouses or power houses of its own, but plans have been made temporarily to secure storage facilities and power from the New York Railways.

TRANSFERS CUT OFF

The route of the separated line extended from the Madison Avenue Bridge at East 135th St., via Madison Ave., to East 42nd St., thence to Park Ave., Fourth Ave., and the Bowery, then through Broome St., to Center St., to Park Row to the Post Office at Broadway. Going North the same route was followed except the passage from Center St. to the Bowery was through Grand St. There was also a short branch from the Bowery with a terminal at Astor Place and Broadway. The propriety rights in the Eighty-Sixth Street Crosstown line extended from Madison Ave., to Second Ave. The mileage involved in the lease amounted to 9.2 miles of line, equivalent to 18.394 miles of single track.

Transfers heretofore issued between the Fourth & Madison Avenue line on payment of 2 cents have been abolished at Delancey, Eighth, Fourteenth, Twenty-third, Thirty-fourth, Fifty-ninth, Eighty-sixth and 116th Sts. This affected many passengers for this route alone carried more than 16 per cent of the total passengers that were hauled previously by the New York Railways.

NEW PLAN OF OPERATION

Under the operation of the New York & Harlem Traction Lines two routes will be operated namely, the main line, which extends from Mott Haven at Madison Ave. Bridge to the Post Office as heretofore. The other, which is a crosstown route, will operate from Eighth Ave., through the Transverse Road in Central Park, thence through East Eighty-fifth St. to Madison Ave., to East Eighty-sixth St. to Avenue A to the Ferry Terminal at East Ninety-third St. Arrangements have been made whereby the new operating company will continue to use the franchise in Central Park, owned by the city of New York. It has likewise taken over the joint trackage agreement with the Second Avenue Railroad providing track and power facilities to reach Ninety-third St. Ferry, and with the Third Avenue Railroad providing for track facilities on Forty-second St. between Park and Madison Aves.

Four of the previous transfer points are retained and free transfers will be issued on payment of regular fare good for acceptance at Eighty-sixth St., Thirty-fourth St., Twenty-third St., and Fourteenth St. No transfers will be issued or accepted at 116th St., Fifty-ninth St., Eight St., and Broadway.

The New York Railways has turned over to the new operators 120 cars for the Fourth Ave. & Madison Ave. line and twenty-three cars for the Eighty-sixth St. Crosstown line together with snow sweepers and other service cars and equipment.

Crews to man the cars have also been allotted and temporary arrangements have been made to furnish storage facilities at the Eighty-sixth Street and Thirty-second Street carhouses. It is expected that later some other arrangements will be made for carhouse facilities and shops.

NO CURTAILMENT OF SERVICE

Mr. McDougall, who is the general manager, announces that there will be no immediate curtailment of service, but that cars will be added or withdrawn in accordance with the traffic demands. About 110 cars have been operated regularly in the past during the night rush hour.

The operating organization is under the heads of departments of the New York State Railways with R. E. McDougall as general manager. Local officers are as follows: H. L. Pitner, engineer way and structures; Walter Uffert, master mechanic, and Sigmund Sachs, superintendent of transportation. All purchases will be under the direction of P. J. Honold. C. L. Cadle is chief engineer, J. F. Uffert, superintendent of equipment and J. M. Joel, general auditor.

Temporary offices are located at the Fourth Ave. carhouse at the corner of Thirty-second St.

Former Railway Executive Outlines Reorganization Requirements

Duff F. Sherman, former vice-president of the Rhode Island Company, Providence, R. I., predicts that unless there is a speedy compromise of all interests involved in the reorganization of the company the electric railway system of the State is doomed.

Mr. Sherman declared that the owners must scale down the present valuation of $29,000,000 to $23,000,000 and secure new cash working capital from $1,000,000 to $3,000,000. He said that the reorganized company must be relieved of due and subsequent franchise taxes, "a relic of horse-car days," and cost of street construction and maintenance and other expenses must be cut to the bone under this plan.

As an incentive for efficiency, cooperation and economy by all interests, Mr. Sherman suggests that all amounts earned over 6 per cent on the proposed revised capital investment be divided among operating officials of the company, its employees, the State and the company itself.

Under the provisions of his plan, Mr. Sherman expressed confident belief that the service required would be rendered, the property become self-supporting and the mass of troubles now apparent disappear.

Regarding jitney competition, Mr. Sherman said it has been recognized that the two services cannot survive and it is up to the public to determine which they shall choose. Mr. Sherman did not think that any reorganization could be affected under the act passed by the Legislature last year. He declared it is essential that the system be kept intact and that the act imposes restrictions which would make it impossible for reorganization to be undertaken under its provisions.

Receiver for Pensacola Electric

On complaint of the Old Colony Trust Company, Boston, Mass., Judge Sheppard, of the United States District Court, on Jan. 26 appointed James G. Holtzclaw receiver for the Pensacola (Fla.) Electric Company. Inability to operate at a profit on a 5-cent fare is the principal reason given for the application. Mr. Holtzclaw, the receiver, is superintendent of the company.

Peter O. Knight, general counsel of the company, is quoted as follows:

> The prime cause of the receivership of the property is its utter inability to operate upon a 5-cent fare, and by reason thereof it is also unable to have sufficient credit to borrow any money to pay its debts. It could therefore not pay the indebtedness of the Old Colony Trust Company, and the complainant knowing that the Pensacola Electric Company was unable to pay the interest, amounting to $30,000 on the bonds of the company due on Feb. 1, 1920, and knowing that if such interest was not paid the default would permit the trustees of the mortgage given to secure the bonds to foreclose the same, the result of which would be the probable dismemberment of the railway as a going concern, for its own protection and others in like situation, requested the appointment of a receiver for the purpose of preserving the property for the benefit of the public, the creditors and the stockholders.
>
> I imagine that after the receiver takes charge of the property and goes into the situation fully he will apply to the Florida Railroad Commission, to fix just and reasonable rate for the carriage of passengers of the railway. Such is the course that has been pursued in the Jacksonville Traction Company situation. The Supreme Court of Florida in the Tampa water works case held that section 30 of article 15 of the constitution of 1885, reserved to the Legislature the power to regulate by its own act or through some other instrumentality the rates to be charged by public service corporations and that every charter granted subsequently to public service corporation and every contract made with them by the Legislature of a municipality are granted, made and accepted subject to and in contemplation of a possibility of the subsequent exercise of the power which by that section is declared to be vested in the Legislature.

Fails to Meet Interest Payment

The City & Suburban Railway, one of the subsidiaries of the Washington Railway & Electric Company, Washington, D. C., was unable to meet an interest payment of $43,750 on its first mortgage bonds, which fell due on Feb. 1. The company will have three months of grace, which means that the interest will have to be paid by May 1.

William F. Ham, president of the Washington Railway & Electric System, points to this inability of the City & Suburban to meet its interest charges as further evidence of the urgent need for a 7-cent fare. Mr. Ham has said that he does not think the company can get along without the increase while Congress is considering the bill designed to provide for the merger of the Washington Railway & Electric Company and the Capitol Traction Company.

According to Mr. Ham, the operating expenses of the City & Suburban Railway during 1919 exceeded its earnings. In August of last year the City & Suburban Railways found itself unable to meet the interest on its bonds. Before the three months of grace expired in October, however, the commission granted a rate of four tickets for a quarter. This enabled the Washington Railway & Electric System as a whole to meet the payment.

The City & Suburban Railway runs from the Treasury to Laurel and other Maryland suburbs.

Stock Offered Locally

The Pine Bluff (Ark.) Company is offering its 7 per cent preferred stock for subscription locally through *Public Service*, published by the company in its own interest for circulation among the residents of the city. The company, in announcing the stock for subscription, says:

> **$1,000**
>
> Invested in this stock will earn a quarterly dividend of $17.50 or $70 per year.
>
> The average water bill is about $50 per year, which means that stockholders with $1,000 invested in this stock would not only take care of his light and water expense but would earn a surplus of $20 per year to apply on insurance or other purposes.
>
> We want to pay dividends to the citizens of Pine Bluff and keep this money at home instead of sending it away, and would like to see every citizen of Pine Bluff a stockholder.
>
> Send in your application at once for the number of shares you desire, or call Walter Stovall at the office of the company, 'phone 2810.

Foreclosure Decree Entered

An order has been entered in the United States District Court at Wheeling, W. Va., by Judge Alston G. Dayton directing the sale of the West Virginia Traction & Electric Company's holdings, as a result of a foreclosure suit brought some time ago by Albert M. Cook and others of New York.

At the instance of the New York people, Judge Dayton recently named J. D. Whittemore, then manager, receiver for the company and the matter was referred to Judge Frank Nesbitt, special commissioner, who recently filed his report of the assets and liabilities with the district court.

For some time the road has been unable to pay interest on its bonds and proceedings to force it into bankruptcy were instituted several months ago.

The order affects all of the properties of the company, including the line between Wheeling and West Alexander.

Interborough Income Improving

The comparative statement of income of the Interborough Rapid Transit Company, New York, N. Y., for December and for the six months ended Dec. 31, 1919, is as follows:

December	1919	1918
Gross operating revenue	$4,668,268	$3,782,224
Operating expenses......	2,855,951	2,320,280
Net operating revenue...	$1,812,317	$1,461,944
Total taxes............	228,557	247,006
Income from operation...	$1,583,760	$1,214,938
Non-operative income....	53,988	69,839
Gross income...........	$1,637,748	$1,284,777
Interest, rentals, etc., including Manhattan guarantee............	1,659,918	1,509,381
Deficit...............	$22,170	$224,604
Passengers carried (rev.)	84,771,977	70,780,818
Six months ended Dec. 31.		
Gross operating revenue..	$24,200,226	$19,953,159
Operating expenses......	15,175,220	12,187,428
Net operating revenue...	$9,025,006	$7,765,731
Total taxes............	1,297,517	1,820,297
Income from operation...	$7,727,489	$5,945,434
Non-operative income....	271,930	303,299
Gross income...........	$7,999,419	$6,248,733
Interest, rentals, etc......	9,919,785	8,739,865
Deficit...............	$1,920,366	$2,491,132
Passengers carried (rev.).	445,396,934	374,684,097

Atlanta Officers Re-elected

An increase of 8,144,852 passengers in 1919 over the previous year is shown in the report of Preston S. Arkwright, president of the Georgia Railway & Power Company. The report was submitted at the company's annual meeting on Jan. 27.

The total number of passengers hauled during the year 1919 was 93,596,056. Of this number 76,804,565 were pay passengers; this is a gain of 6,228,972 over 1918. Transfer passengers were 16,704,145, a gain of 1,874,233 over 1918. Passengers on passes were 87,346.

Stockholders of the company decided at this meeting to continue the Tugalo water power development and to have moving pictures made of the work as it progresses. These pictures will be exhibited to the public.

Plans were discussed to arrange a trip to the Burton dam improvement in the spring of the year for the 1,200 shareholders of the company. This dam will be completed about March 1, and power brought into use immediately.

The officers were re-elected.

Properties at Gadsden Sold

The Gadsden Railway, Light & Power Company, Gadsden, Ala., of which R. A. Mitchell, Gadsden, is president, has acquired the railway lines, lighting system and ice and refrigerating plants of the Alabama City, Gadsden & Attalla Railway and the Gadsden Railway. The Gadsden Railway operates to the Gulf States Steel Company's plant, while the Alabama City, Gadsden & Attalla Railway owned and operated the electric lines connecting Gadsden, Alabama City and Attalla, and the ice and refrigerating plants. In all, the new company, which has just recently been organized, acquires between 12 and 15 miles of railway.

E. T. Schuler and associates, the former owners of the Alabama City, Gadsden & Attalla Railway and the ice and refrigerating plants, some time ago offered the property for sale and the new company was organized to take it over. Later on the properties will be transferred to the Alabama Power Company, which has the contract to supply power.

The sale price was not made public, but it is understood to be slightly under $1,000,000. The new company has taken possession of the properties which it has purchased.

Interest Payments Authorized

Judge C. P. Orr, of the United States District Court at Pittsburgh, Pa., on Jan. 10 handed down an order directing the receivers of the Pittsburgh Rys. to pay certain fixed charges consisting of interest on mortgages of companies underlying the Consolidated Traction Company. The interest was due last on July 1, to the Fidelity Title & Trust Company, trustee on the mortgages.

The mortgages affected and the amounts ordered to be paid were: Duquesne Traction Company, $36,750; Federal Street & Pleasant Valley Passenger Railway (issue of 1899), $2,300; Federal Street & Pleasant Valley Passenger Railway (issue of 1892), $26,825; Troy Hill Passenger Railway, $925; Allegheny Street Railway, $675; Allegheny & Bellevue Street Railway, $75; Central Traction Company, $9,375. The Consolidated Traction is one of the subsidiaries of the Pittsburgh Railways system.

The court also granted a rule on the receivers to show cause why they should not pay an aggregate of $151,950 interest due for three semi-annual interest periods to the Maryland Trust Company, trustee for a mortgage of the Second Avenue Traction Company.

Conserving the Company's Resources

The officers of the Lehigh Valley Transit Company, Allentown, Pa., state that they have received no papers in the reported equity suit filed by William F. Doohan to compel the declaration of dividends on the company's capital stock, and that they have no information or knowledge that such a suit had been commenced or is contemplated by Mr. Doohan except as contained in the recent newspaper reports to that effect.

The officers further state that the failure of the company to pay dividends during the past year and a half has been due to the unusual financial situation confronting electric railways in general and the desire to conserve the earnings and cash resources of the company in order to meet the needs of its property.

San Francisco-Oakland Road Sold

The entire system of the Oakland, Antioch & Eastern Railway was sold in the Superior Court at Martinez, Cal., on Jan. 28, to a reorganization committee for $1,200,000, the minimum price set by the court. The sale was really made to the San Francisco-Sacramento Railroad. The sale was made by Commissioner A. E. Dunkel to H. A. Mitchell, chairman of the reorganization committee and traffic manager for the road.

The plans for the reorganization of the company as approved by the Railroad Commission of California have been reviewed previously in the ELECTRIC RAILWAY JOURNAL. The successor company starts with an authorized capital of $1,500,000 of preferred stock and $6,500,000 of common stock. Of the preferred stock $1,330,000 will be issued at this time, while all of the common stock will be issued. There is an authorized issue of $3,000,000 of first mortgage 6 per cent serial gold bonds of which amount $840,000 is to be issued at this time.

New Receiver for Second Avenue Line

Justice Platzek in the Supreme Court on Feb. 5 appointed Charles E. Chalmers receiver of the Second Avenue Railroad, New York, N. Y., to succeed Andrew E. Kalbach, who died on Feb. 2. Mr. Chalmers has been connected with the company for twenty-one years, and since the road went in the hands of a receiver on Sept. 19, 1908, he has served as the receiver's counsel.

With the appointment of the receiver the court signed an order permitting a committee representing the holders of ninety-six of the outstanding receiver's certificates to intervene as co-defendants in the foreclosure action against the company. The total issues of receiver's certificates made between Sept. 26, 1913, and Sept. 26, 1916, amount to $3,140,000. Intervention of the committee was consented to by Brainard Tolles, attorney for Alexander J. Hemphill, and other holders of first consolidated mortgage bonds of the company.

The suit was begun by the Guaranty Trust Company, representing holders of $5,631,000 in bonds. George W. Linch, the first receiver died on Dec. 15, 1915. George W. Beaver, the second receiver, died April 19, 1917, and then came Mr. Kalbach. A recent opinion by the Supreme Court was to the effect that the company was without hope of resurrection.

Service Resumed

On Feb. 1 service was resumed by the New York Railways with storage battery cars on the Spring & Delancey Street Line in New York City, on which service was discontinued last September. The former line as a whole, however, is in only partial operation, the cars running only from Clinton and Delancey Sts., thence through Delancey St. to the Bowery to Spring St. to Broadway, a distance of 0.80 mile, involving 1.70 miles of track.

Transfers will be issued on payment of an additional 2 cents to certain other lines.

The storage battery cars will compete with the buses installed under the direction of Grover Whalen, head of the New York City department of Plant and Structures, when the railway suspended operation.

City Won't Buy Railway for $1

The Wisconsin Valley Electric Company, Wausau, Wis., which operates the 2-mile, four car railway in Merrill, Wis., wanted to discontinue operation with the expiration of its thirty-year franchise on Dec. 31, 1919. It was stated in the notice to the city that the railway could not be made to produce sufficient revenue to pay operating expenses at any reasonable rate of fare. The city objected and the company offered to sell the railway to the city for the consideration of $1. The purchase was refused by the City Council. The company then offered to give the city free power to operate the railway for a reasonable period if it would take over the property. The City Council also refused to do this and in lieu thereof started proceedings before the Wisconsin Railroad Commission to compel the company to operate. The company then agreed with the city to run the road through the winter, or until it could negotiate further with the city. The property is still being operated under this agreement with a 7-cent fare.

Government Control Not Profitable to West Jersey & Seashore

The twenty-third annual report of the West Jersey & Seashore Railroad for the year ended Dec. 31, 1918, just issued, shows the compensation accrued under Federal control for possession, use and control of the property was $952,681. Other corporate income increased the gross income to $1,090,191. Deductions of $403,471 left a net income of $686,719.81, which gave an increase of 2.04 per cent over the previous year.

Actual operating financial figures, however, show that the road was not self-supporting as a unit although the revenue from operation increased $2,044,496, or 24 per cent, due principally to a 26 per cent increase in passenger receipts, that the net income from railway operation decreased $1,059,234 due to an increase of $3,103,730 in operating expenses, equivalent to 44.4 per cent over the previous year. Deducting taxes and rentals the net railway operating income shows actually a deficit of $85,368, as against a surplus of $948,167 the previous year.

Financial News Notes

Sale Under Foreclosure Ordered.—United States District Judge Sater has ordered the properties of the Springfield Terminal, Railway & Power Company, Springfield, Ohio, sold, on the petition in the receivership suit of the Central Trust Company of Illinois and William T. Abbott, trustees.

Voting Trust to Be Dissolved.—The voting trust under which the stock of the Philadelphia (Pa.) Rapid Transit Company is deposited was to have remained in existence until 1921, but it has been decided to dissolve the trust on Feb. 12, the reason advanced being that the arrangement has served its purpose of rehabilitating and refinancing the company.

Wants Receiver Appointed.—C. H. Walsh, Davenport, Ia., has filed suit in United States Court asking the appointment of a receiver for the Rock Island Southern Railway, operating between Rock Island and Monmouth, Ill. He says that the company owes him $6,600 and that other creditors propose to bring suit in an effort to collect sums due to them. The hearing has been set for Feb. 9.

Petition for Receiver Granted.—Associate Justice John A. Marrill at Saco, Maine, has granted a petition of the Belfast Savings Bank for the appointment of a receiver for the Sanford & Cape Porpoise Railway, Sanford, Me. The Belfast Bank is the holder of bonds of the railway to the amount of $25,000. The Poland Savings Bank is also a creditor of the railway. Interest is in default.

Twin City Common Dividend.—The Twin City Rapid Transit Company, Minneapolis, Minn., has declared an annual dividend of $2.50 on the common stock payable on Feb. 20 to stock of record of Feb. 9. Following the directors meeting it was announced that payment of $2.50 on the common at this time was intended as being a disbursement on the junior issue for last year. Twin City Rapid Transit common up to December, 1917, paid dividends at the rate of $6 annually. For the first quarter of 1918 the quarterly disbursement was reduced to $1 and passed at the meeting in June, 1918. A dividend of $1 was paid Jan. 2, 1919, and none for the balance of the year.

Receiver Opposes Sale of Road.—An application has been filed by the Guarantee Title & Trust Company, Pittsburgh, Pa., requiring C. G. Taylor, receiver of the Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio, to appear before the Federal Court at Cleveland, Ohio, on Feb. 14 and explain why an order for the sale of the property should not be granted. It is stated that the majority bondholders desire to sell the property as junk. C. G. Taylor, receiver of the company, says he will oppose an application for abandonment on the grounds that if gasoline coaches are substituted for the electric cars the property can be placed on a paying basis.

Swing Line Sold for Junk.—The property of the Cincinnati & Columbus Traction Company, Cincinnati, Ohio, known as the Swing line, which operates between Norwood and Hillsboro, was sold on Jan. 31 for the account of the bondholders on a joint bid to Joseph Joseph & Brother, New York, N. Y., and the Hyman Michaels Company, Chicago, Ill. The purchasers will dismantle and junk the road. The sale price was not disclosed. The Union Savings Bank & Trust Company, Cincinnati, was trustee for the holders of the bonds of the company. Efforts failed which had been made by residents along the line to raise funds to refinance the road and keep it in operation.

More Car Trust Certificates Offered.—Edward B. Smith & Company, Philadelphia, Pa., are offering on a 6½ per cent basis $114,000 of J. G. Brill Company, Birney safety equipment 6 per cent gold trust certificates, Trust No. 5, Series "A." The certificates are dated Jan. 15, 1920, and mature $29,000 on July 15, 1921, $28,000 on Jan. 15, 1922, $29,000 on July 15, 1922, $28,000 on Dec. 15, 1922. They are redeemable at 100 and dividends on any dividend date, on ten days' notice, in order of the priority of the maturity of certificates then outstanding. The Fidelity Trust Company, Philadelphia, Pa., is trustee of the issue. The certificates are secured by assignments of leases covering Birney one-man safety cars, for which purpose money notes aggregating $187,082 of the Kansas City (Mo.) Railways, to which these cars are leased, have been deposited. The issue of certificates represents about 50 per cent of the selling prices of the cars, the balance having been paid in cash and by an issue of $56,000 of Series "B" certificates maturing in monthly installments from Feb. 15, 1920 to Dec. 15, 1920, both inclusive.

Traffic and Transportation

Increase on Long Island

Supervisors Modify Franchise to Permit Increase in Fare—Matter Before Commission

The Board of Supervisors of Nassau County adopted a resolution on Feb. 2, modifying the several franchises of the New York & North Shore Traction Company, Roslyn, Long Island, permitting an increase of the rates of fare.

At the present time there are four 5-cent zones between the New York City Line (Little Neck) and Mineola and the same number of 5-cent zones between Port Washington and Mineola. Between Mineola and Hicksville there are now two 6-cent zones. Under the new rates of fare 7 cents will be charged in each of the present 5-cent zones and 8 cents in each of the two zones where the fare is now 6 cents.

CAMPAIGN OF PUBLICITY

About two months ago the company started a series of four articles which were published in the local weekly papers in Nassau County for four successive weeks. These articles informed the people as to the financial condition of the company and the necessity for an increase of the rates of fare.

Following the publication of these articles petitions addressed to the Board of Supervisors requesting the modification of the company's franchises so as to permit of the charging the above mentioned rates were circulated in the various communities along the lines of the company in Nassau County and more than 2000 signatures were obtained. These petitions, together with the company's formal application, were filed with the board on Jan. 26. A hearing date was set for Jan. 31. No one appeared before the Board of Supervisors to object, but several prominent citizens appeared who stated that the people were unanimously in favor of the company obtaining an increase of fare. It will be noted that the resolution amending the franchises was adopted just one week after the company presented its application.

COMMISSION'S APPROVAL REQUIRED

A certified copy of the resolution amending the franchises, together with a revised tariff, will be submitted to the Public Service Commission for the Second District, for its approval, and it is expected that the new rates of fare will become effective before March 1, 1920.

The New York & North Shore Traction Company obtained an increase of fare from the Public Service Commission for the Second District, on parts of its line in Nassau County in July, 1917.

The Public Service Commission for the First District issued an order on Aug. 28, 1919, permitting the company to increase its fare in Queens Borough, New York City, under a zone system, instead of charging a flat 5-cent fare. This increase went into effect on Aug. 29, 1919, but the company was compelled to increase the wages of its employees 13 cents an hour the same day the increase of fare became effective, so that additional revenue derived from the advance in rates has only been sufficient to take care of the increase in payrolls.

The officials of the City of New York have been endeavoring to compel the commission to rescind its order, although at three different meetings held in Flushing several hundred patrons of the lines in Queens Borough expressed themselves in favor of the company obtaining an increase of fare, so that operation might be continued. The first meeting in June, 1918, was attended by Mayor Hylan, Comptroller Craig and Borough President Connolly of Queens. Before the company obtained the increase of fare in Queens Borough, several hundred people voluntarily paid a 7-cent fare daily.

Fare Inquiry in Buffalo

A large staff of experts is sorting, compiling and tabulating the transfers issued and received over the various lines of the International Railway in Buffalo with a view of determining how much the revenue would be increased by maintaining the basic 5-cent fare and making a 2 or 3-cent transfer charge.

As stated previously in the ELECTRIC RAILWAY JOURNAL Thomas E. Mitten, president of the Philadelphia Rapid Transit Company and a member of the bondholders' protective committee of the International Railway, of which at one time he was operating head, favors the restoration of the all-night car service in Buffalo and the continuation of the basic 5-cent fare. It is even reported that Mr. Mitten is seeking to have the municipal authorities grant the company the right to make a charge of 2 or 3 cents for transfers if the basic 5-cent fare is retained rather than increase the fare to 7 cents as authorized by the Public Service Commission.

A survey of traction conditions in Buffalo has been made by Mr. Mitten in company with H. G. Tulley, acting president of the International Railway and vice-president of the Philadelphia Rapid Transit Company, and it is reported that he favors the retention of the 5-cent fare despite the objections of other members of the bondholders' committee who seek to put the 7-cent fare into effect at once.

100 Autos to One Car

Toledo Traffic Study Shows Railway's Utility but Emphasises Need for Traffic Separation

Immediate elimination of useless lines in congested districts and the construction at once of connecting portions of belt lines is proposed by Harry C. McClure, engineering commissioner of Toledo, Ohio, in a report submitted to Mayor Cornell Schreiber. Mr. McClure's report was submitted after exhaustive study. He says that a material influence on the report is the necessity for vehicular transportation routes free from all railway influences and steam railway grade crossings.

CHANGES VERY HELPFUL

Ultimately by the changes which have been suggested, twelve things will be accomplished:

1. Big reduction of the areas of the residential portions not now within the one-quarter mile service by approximately 2 miles.
2. A reduction in the street mileage on which cars will be operated by 3 miles.
3. Direct service between the business and residential areas in all possible directions.
4. Short-circuit service to and from the various portions of the residential and outer areas without travel through the congested district.
5. Direct service by belts between the workingmen's districts and the industrial areas, a great deal of which can be accomplished without the necessity of transfers.
6. Three independent connections to the East Toledo district.
7. Two connectons to the West Toledo area with a possibility for a third as this district expands westward.
8. Provides motor traffic arteries free from street car interference or obstruction, thereby relieving street car arteries of a goodly portion of the interfering motor traffic.
9. Possibility of expansion in any direction when the demand arises without interfering with existing direct or belt service, a condition not possible with the belt lines as now operated.
10. Direct service to the present Union station and to the probable location of the Pennsylvania station from both residential and business areas.
11. A reduction in the number of railway grade crossings, not including the Detroit branch separations suggested.
12. An opportunity to force the question of proper grade separations on the railway lines to Detroit without the necessity for property destruction and at no increase in the total cost of probable necessary separations.

WOULD ABANDON SOME LINES

In the new plan, 48.77 miles of the present 67.81 street miles would be used, and 1904 miles would be abandoned. It would be necessary to build 16.04 miles of trackage and this done, saving 3 miles of tracks, 2 additional square miles of territory would be much more adequately served.

An attempt to eliminate railway traffic from narrow streets, with recommendation for widening other streets upon which car traffic is necessary are features of the report.

The fact that in 1920 there are probably 30,000 motor vehicles on Toledo streets, McClure says, makes it imperative that care for this traffic be taken in planning for any car re-routing, as the motors outnumber the street cars by about 100 to 1.

Mr. McClure's research in other cities shows that comparatively few people live more than 1,000 ft. from a car line.

Little News at New York Inquiry

Mayor and Comptroller Go Over Much of Ground Covered in Previous Legislative Inquiry

Frank Hedley, president and general manager of the Interborough Rapid Transit Company, New York, testifying before the Board of Estimate, denied that there was any extravagance in the company prior to the time of his becoming president, but admitted that he was at present economizing by reducing salaries of the office staff and investigating the expenditures of the department of supply. When questioned as to the contracts for third tracking the elevated, he stated that the contracts were made with T. A. Gillespie & Company on a cost-plus-15-per-cent basis, making a total of $10,816,000. The profit on this contract was $1,339,734.

INQUIRY INTO ELEVATED CONTRACTS

Contract for third tracking of the elevated was made with T. A. Gillespie & Company, associated with Terry & Tench, and with Snare & Triest. The Gillespie Company did 10 per cent of the work, receiving $755,905; the other contractors, doing 90 per cent of the work, received $475,000. James M. Quackenbush, counsel for the company, explained the conflict between the evidence of Mr. Hedley and the evidence of Thompson committee by the statement that the Public Service Commission did not improve the percentages in the acutal making of the contract. It did supervise the actual construction of the work. The Interborough Company insisted on the right to hire contractors of its own choosing because the work was extremely hazardous. He stated the Thompson committee, which conducted a legislative inquiry into the affairs of the company several years ago, could find no evil.

In the course of the testimony as to the company's deferential of $6,335,000 under contract No. 3, Mr. Quackenbush pointed out that $3,178,000 could be used for dividends, the rest for fixed charges. Controller Charles S. Craig, estimating the dividends for forty-nine years, stated that the company had driven a very good bargain with the city in the $154,722,000 it would receive.

OLD GROUND GONE OVER

Mayor Hylan demanded from President Hedley whether it was the company's policy to put the profits into the pockets of its stockholders when they were earned, but when there was a deficit it should be paid by the public. President Hedley answered he thought the public should pay as they go, in order to give a return to all parties.

Much of the old ground gone over in the Thompson investigations is again being traversed in the present inquiry. Bonuses are being investigated and inquiry being made into commissions paid for banking help and in banking syndicate operations.

For the most part a general atmosphere of gloom pervades the whole proceedings. Occasionally, however, a lively bit of repartee livens things up. Here is the Mayor solemnly (apparently) asking Mr. Hedley if he knows the difference between waste and thrift, and Mr. Hedley looking surprised. Each is apparently tired of looking at the other's face, but the passage at arms over this incident is couched in such soothing language that one might think that each of the participants was ready to fall upon the neck of the other and weep.

On Jan. 20 Mr. Hedley issued a statement stressing the fact that the transit problem could not be solved by an appeal to the past, but that the future was all-important. Having escaped receivership on the first of the year through grace of creditors and by dint of emergency measures exhausting the company's last resources, the Interborough, Mr. Hedley asserts, faces fresh difficulties. He gives the following analysis of conditions during the next six months:

> The officers of the company are of opinion that the present heavy increase in travel will continue to a certain degree during this period and estimate that the income from passengers for the first six months of the year will be $2,264,000 greater than for the same six months of last year. This passenger revenue, added to its other sources of revenue, would give the company a total estimated value in that period of $26,800,000. Out of this money it must meet all of its expenses for operation and maintenance, together with further taxes and interest on its debts and rentals, as follows:

Payrolls (estimated)	$13,450,000
Taxes	1,279,000
March 1 interest on 7 per cent notes	850,000
April 1, Manhattan interest and rentals	1,880,900
March 31 and June 30 interest on bonds issued by the city for construction of the original subway	950,000
Coal bills and other essential operating supplies and expenses	5,450,000
Total	$23,859,900
Balance	$2,940,100

> On June 30 the company must meet the interest and sinking fund on its 5 per cent bonds, requiring $5,010,000, together with the rental for the use of the Manhattan property of $1,050,000, with interest on the Manhattan Company's second mortgage, requiring $90,500, or a total disbursement for interest and rental on June 30 of $6,150,500, which payment, if not made, would result in a default, and, as herein shown, the company will be short in the sum of $3,210,400, assuming that all current obligations already incurred, recited above, have been met.
>
> On June 30 the company is also obligated to pay the principal and interest of the $2,900,000 note issue made on Dec. 31 last, which represents the amount of money borrowed to weather the crisis of Jan. 1, 1920. It is expected that the contemplated auction sale of real estate will take care of a substantial proportion of this particular debt.

In the course of the inquiry it was brought out that Ivy L. Lee, who is conducting the publicity in connection with the campaign of the company for an increase in fares, was compensated at $12,000 a year. The Mayor was inclined to construe this to mean that the city was virtually paying for advertisments and publicity which were injuring its property. Mr. Gaynor, the auditor of the company, defended the publicity work on the ground that it was in keeping with the spirit of the times.

In his formal statement, Mr. Hedley pointed out that many of the facts brought out at the inquiry were available in the printed reports of the company issued annually.

Barney Frauenthal Gives Views on Public Relations

Barney W. Frauenthal, general traffic agent of the United Railways, St. Louis, Mo., in an article contributed to a recent issue of the *United Railways Bulletin*, the official publication of the company, analyzed the problems confronting employees who come in contact with the public. Mr. Frauenthal, who was formerly general station agent in charge of the Union Station, St. Louis, has had many years' experience in dealing with the traveling public.

The article in the *Bulletin* said in part:

> The misunderstanding of what really constitutes "The Public" is a fruitful source of many of our troubles. A street railway employee who divides the world into two classes, i. e., those who work with his company and those who do not, is one to whom I would especially appeal. When such a person buys a steam railroad ticket to go on a journey he would naturally, and rightfully, resent such a class division, where he plays the part of the "Oppressed Public," and on the other hand the railroad employee who inflicted an injustice upon the street railway employee would naturally and rightfully resent the same treatment he inflicted upon his victim when he in turn became the oppressed party.
>
> Every person who enters a public conveyance expects transportation to his destination in a reasonable scheduled time; he expects clean, comfortable and pleasant surroundings. The street car employee exacts this when traveling on a steam railroad train and the steam railroad employee has the same right to expect it on the street car.
>
> A train crew has to spend about eight hours on a train and for that period it becomes their home. It shall be as clean, as comfortable and as pleasant for themselves and the public as they desire to make it. The personal appearance of the crew, the condition of the vehicle, and the pleasant atmosphere that surrounds it are all matters within control and constitute a direct reflection upon our personality, either for good or for ill.
>
> The point which marks the line where we define one man as a gentleman and another as not is one that calls for fine distinctions in the manner of reckoning today. A gentleman radiates courtesy. If compelled to refuse a request he says "No" with a polite but nevertheless firm conviction. The refusal in such a case rather tends to prejudice the mind of the person asking the favor, but the storms of opposition, prejudice, or anger are often quieted by the demeanor and the tone of the refusal.
>
> Car crews have some trying experiences, unreasonable requests are often made, and some persons are not only impolite, but sometimes insulting in manner or language. It is here when the test of gentlemanly conduct is brought to the straining point. A soft answer turns away wrath and courtesy becomes a mighty weapon for the one who intelligently applies it.
>
> In a car full of passengers there are always a majority of fair-minded people, and when a controversy reaches such a stage as to attract their attention the employee whose conduct and courtesy are above reproach can invariably depend upon the sentiment being in his favor.
>
> The employee who properly attends to his duties and gives consideration to the comfort, convenience, and pleasant surroundings of patrons is not only making friends for himself, but is building up for his company the good opinion of the public, which is the aim of all public service corporations.

Active Safety Campaign

Former Federal Safety Organizer Retained to Head New Department of Georgia Railway & Power Co.

Organization of a safety department that will carry on this work along the same lines as the regional safety departments of the United States Railroad Administration has been effected by the Georgia Railway & Power Company, Atlanta, Ga. To further this work the company has recently appointed George A. Deibert as director of the safety department. For two years Mr. Diebert was assistant supervisor of safety with the United States Railroad Administration in the Southern Region. For twelve years prior to that he was with the Atlanta Coast lines and a part of this time he was actively engaged in safety work.

In the Southern Region the railroad administration carried on its safety work under the direction of three pertinent committees appointed by the regional supervisor of safety. These were known as the Grade Crossing, Educational and Bulletin committees.

It is the plan of the Georgia Railway & Power Company to carry on its safety work and conduct its safety department in the same manner as described above. Special stress will be laid on the latter plan—the appointment of safety committees among the employees in the various shops. There are eighteen of these shops and in each of these the employees will hold a meeting and elect their own safety committees. Each committee will hold a regular monthly meeting at which time the members will discuss every accident that may have occurred during the past month, and suggestions will be offered as to ways and means of avoiding such accidents. These committees will also suggest bulletins which the company will issue and distribute in the various shops. These bulletins will be posted where the employees can see them at all times, thus serving as a constant reminder that carefulness will save life and limb.

What the railroads of the Southern Region have accomplished in safety work during the past year served to impress officials of the Georgia Railway & Power Company with the fact that organization for such work was really a worth-while venture. Mr. Deibert said:

> We confidently expect to reduce accidents in all of our shops by at least 50 per cent in the course of a very few months. Right now our work will be largely a matter of educating our employees in the principles of "safety first," but later we expect to cover all branches of safety work and to spend thousands of dollars in the furtherance of this project.

Statistics show that machinery is the main cause of accidents among employees of the company. There are more "eye" injuries than any other kind. Injuries among employees are confined mainly to the men in the shops. Very few transportation men are injured. At the outset the company's principal safety work will be carried on among the shop employees.

Among passengers the principal cause of accidents is collisions with automobiles and injury to people leaving or boarding cars while in motion. To educate the people who patronize its lines in the principles of safety is another plan of the new safety department. This campaign will be carried on principally through publicity in the newspapers and the issuance of safety bulletins.

Unsentimental Journeys in Staten Island

Three weeks have passed since the Staten Island Midland Railway suspended operation, and the island borough, outpost of New York City's civilization, is settling down to real frontier life. Its worthy burghers are learning to rough it in good old Toledo style. They are becoming seasoned hikers, and don their mufflers and overshoes these frosty mornings with a glow of anticipation at thought of the five-mile tramp to the St. George Ferry, where they are wont to embark for Manhattan or little, old New York, and the office elevator.

True, transportation of a sort is not altogether lacking. Mayor Hylan, guardian of New Yorkers' welfare, has had imported a weird assortment of vehicles which he calls buses. Heatless and lightless, these "mystery wagons," as the quaint islanders term them, career madly through the highways and byways of the borough at the whim of drivers whose chief claim to a knowledge of their present jobs is that some of them were formerly bus boys at Childs'. Cockroaches and pickpockets flourish in the dark recesses of these vehicles, and many a burgher has returned at night to his commuter's shack minus his wallet. Most of the islanders, however, do not get a chance to taste the delights of the Mayor's buses, for these are few and far between. So walking is the chief pastime of the island these days.

Meanwhile His Honor and the other City Fathers are well pleased, for they are championing the people's cause. They would not allow the Midland to rob the taxpayer by charging 7-cent fares. They have given the people an efficient bus system. Now they are beginning to wonder why so many pleas are coming in for the return of the trolleys. They are surprised when the islanders ask for the privilege of paying fares of 7 cents or even 10 cents. They consider the people unappreciative.

Laurence Sterne crying over his dead ass was indeed a pathetic picture. His was a sentimental journey. Here is a whole island crying over its lost trolley cars and making unsentimental journeys in peripatetical buses, sitting in each other's laps and standing on each other's toes while the vehicles seek their uncertain destinations. It's a great life on Staten Island these days. If you don't believe it ask anyone who lives there.

Seven Cents in Auburn

The Auburn & Syracuse Electric Railroad, Auburn, N. Y., has received permission from the Auburn city authorities to raise its fare from 6 cents to 7 cents. The company had applied for an 8-cent fare. Twice the petition of the company for an increase was turned down by the old form of city government in Auburn. The third petition was presented to the new city manager on Jan. 6. He asked permission to go over the books of the company, and a compromise on 7 cents was agreed upon as a result.

The new rate will continue in effect for a period of three years, according to the agreement. If conditions have not improved by that time the agreement provides that the company may petition to the city for another increase. The company's employees have asked for a wage advance of 3 cents an hour in the city of Auburn and 4 cents on the line between Auburn and Syracuse. Wages were increased to 45 cents an hour for city trainmen and 47 cents on the Syracuse-Auburn line following a strike in May, 1919.

Safety Cars Success in Birmingham

Sixteen one-man safety cars were placed in operation by the Birmingham Railway, Light & Power Company, Birmingham, Ala., on Jan. 25, on the Highland Ave. and Lakeview lines. Vigorous protests were entered against the operation of the cars before the City Commission. The local trainmen's union and other union organizations made protests to the commission. Some citizens protested on the ground that the operation of the cars might result in race troubles.

A conference was held on Jan. 24 between the members of the city commission and J. S. Pevear, general manager of the Birmingham Railway, Light & Power Company, and other officials. At the conclusion of the session, the commission announced that it would not interfere with the operation of the cars. It was stated by Commissioner J. Ellis Brown that the company would be permitted to give the cars a thorough try-out, and that if anything developed to make a reconsideration of the matter necessary, the authorities would be ready to act.

Forty-nine thousand persons rode on the new cars during the first seven days of their operation, according to a statement issued by the company. The operation of the safety cars has proved a great success, according to the company's announcement. A five-minute schedule was maintained on each of the lines during the rush hours of the day. There was no race trouble of any kind as a result of the common entrance and exit system. In all, twenty-five of the cars have been ordered. The cars formerly in use on the Highland Ave. and Lakeview lines, have been sent to the company's shops for rebuilding.

Transportation News Notes

Lower Fares in Chelsea.—The public trustees of the Eastern Massachusetts Street Railway, Boston, Mass., have announced a reduction in the fare in the Chelsea district. Sixteen tickets will be sold for $1.

Worcester Six-Cent Fare Stands.—The Massachusetts Department of Public Utilities has notified the Worcester city authorities that, unless objection is raised by the city or the Worcester Consolidated Street Railway, the present 6-cent zone fares in effect on the company's lines, will continue indefinitely. The 6-cent rate was installed early in January, after a trial of thirty days.

Propose Referendum on St. Paul Fares.—The city officials of St. Paul, Minn., are considering submitting to the voters of the city an amendment to the franchise ordinance under which the St. Paul City Railway operates. The amendment will permit of increasing the car fare to not exceeding 7 cents in consideration of which the company must furnish adequate equipment and service.

Would Raise Fare on Washington Interurban.—The North Coast Power Company, Vancouver, Wash., has applied to the State Public Service Commission for permission to increase rates on its line between Centralia and Chehalis. The present rate is 10 cents, with a 5-cent fare to the fair grounds, the half-way mark. The company proposes to raise the fare between the two cities to 15 cents.

Spokane Jitneurs Would Resume.—Jitney operators in Spokane, Wash., who on Jan. 1 ceased to operate their cars under orders from the City Council, have asked permission to resume operation in districts which are not served by electric railway cars. Formerly they operated wholly in competition with the lines of the Spokane & Inland Empire Railroad and the Washington Water Power Company.

No Fare Increase in Westchester.—The Public Service Commission for the First District has issued an order disallowing the proposed increase of fares by the New York, Westchester & Boston Railway, New York, N. Y., for which the company filed a new tariff on Oct. 20, 1919. The new tariff, if the commission permitted it to go into effect, would have increased the fares between stations in New York City from 5 cents to 7 cents.

More New York Transfers Abolished.—Transfers were abolished on Feb. 1 between the lines of the New York (N. Y.) Railways and the Fourth & Madison Ave. and the Eighty-sixth St. Crosstown lines. The latter, formerly a part of the New York Railways system, were returned to their owner, the New York & Harlem Railroad, on that date under an order of Federal Judge Julius M. Mayer, as noted elsewhere in this issue.

Seven Cents on Schenectady Cars.—The Public Service Commission for the Second District on Jan. 28 authorized the Schenectady (N. Y.) Railway to raise its fare from 6 cents to 7 cents where it operates over the lines of the United Traction Company, Albany. The decision covers Schenectady cars operated in Albany, Troy, Green Island and Watervliet. The United Traction Company was recently allowed to raise its fare to 7 cents.

Window Signs Banned in Buffalo.—The International Railway, Buffalo, N. Y., has prohibited the placing of advertising signs on the windows of its cars, including those on the suburban lines. Those signs were placed on the cars free by the company and the nuisance became so great that the latter was forced to prohibit the signs altogether. Announcements of dances, card parties, and other entertainments frequently obstructed the view from a dozen windows in each car.

Tacoma Rise Postponed.—The State Public Service Commission has suspended for a period of sixty days the 10-cent fare which the Tacoma Railway & Power Company, Tacoma, Wash., planned to make effective on Jan. 18. In the meantime, a hearing will be held on the question of granting the increase. Mayor C. E. Riddell and City Attorney U. E. Harmon are negotiating with the company for a plan whereby the city will have a share in the management of the lines.

Forty-Five Passengers Safety Car Limit.—William M. Myers, Director of Public Safety of Richmond, Va., has issued regulations for the operation of one-man cars by the Virginia Railway & Power Company. By order of Director Myers no more than forty-five persons will be allowed on one of the cars at any one time. No passengers will be allowed to stand in the aisles of the cars at any point in advance of the rear of the motorman's seat, thus leaving the platform clear.

Racine Decision Soon.—John Allen, of the Railroad Commission, has returned to Madison, Wis., from Racine where he conducted a public hearing into the service furnished in that city by the local lines of the Milwaukee Electric Railway & Light Company. A decision by the commission in the matter will be handed down within the next three weeks. Citizens protested to the commission following the granting of authority to the railway by the commission to install one-man cars on its Racine lines.

Winnipeg Fights Six-Cent Fare.—The order of P. A. Macdonald, Public Utilities Commissioner of Manitoba, under which the Winnipeg Electric Railway has been charging 6-cent fares, has been attacked in the courts by the city of Winnipeg. The city is seeking an injunction to restrain the company from collecting the increased fares. The commissioner issued the order in October, 1919. The city obtained a temporary stay, but a permanent injunction was refused at that time. The case was argued before Justice Curran on Jan. 26.

Indirect Relief Proposed.—Indirect relief would seem to be in prospect for the Humboldt Transit Company, Eureka, Col. The Eureka **Standard** said recently: "Realizing that the Humboldt Transit Company cannot continue to operate unless income meets at least the expense of operation, public opinion is now rapidly developing toward action which will mean the elimination of the franchise tax now paid by the company. This relief, it is declared, would permit the company to make improvements and maintain its service. Although technicalities are involved in the elimination of the tax, it is believed that heroic treatment is necessary and that it is no longer wise to quibble over legal points when to do so will mean the loss of the entire system."

Permanent Order on Milwaukee Fares.—The Wisconsin Railroad Commission has handed down a permanent order superceding and modifying its provisional order of Oct. 30, 1919, fixing the rate of fare to be paid on the Milwaukee city lines of the Milwaukee Electric Railway & Light Company. The single cash fare remains at 7 cents as fixed on Oct. 30, but the sale of tickets is now to be made on a basis of nine for 50 cents instead of eighteen for $1. Universal transfers have been ordered. The company is also ordered to put on 100 new cars, fifty by Sept. 1, 1920, and fifty more by Nov. 1, 1920. In its permanent order the commission says that the new equipment must be in addition to any now owned and operated by the company in the city of Milwaukee.

Court to Pass on St. Louis Fare.—The city of St. Louis, Mo., on Jan. 25 applied to Circuit Judge Shields for a writ of certiorari to compel the State Public Service Commission to submit to court review its order authorizing the United Railways to collect an 8-cent cash fare. Judge Shields allowed the city ten days in which to file briefs in the case, and the commission ten days additional in which to file its answer. City Counsellor Daues, representing the city, argued that the company could operate profitably on a 6.25 cent fare. He declared that the number of fares had increased 17.5 per cent in 1919 over the figure shown for 1918. Counsel for the company contended that the commission's order had not been ineffect for a sufficient period to determine whether the rate was excessive. The 8-cent cash fare was installed last September. The commission's order provided for the sale of tokens at 7.5 cents each in lots of less than fifty, and at 7 cents in lots of fifty or more.

Legal Notes

CALIFORNIA—*Negligence to Let Trolley Rope Swing Loose*

To operate a trolley car upon a crowded thoroughfare with the trolley rope swinging in a loop, which might strike pedestrians, was itself a negligent act. [Sallee *vs.* United Railroads of San Francisco, 180 Pacific Rep., 74.]

ILLINOIS — *Contract for Power in Perpetuity is Valid.*

A contract by which a manufacturing company transferred to a power company, power created by its dam, in consideration of the power company's agreement that it and its successors should furnish the manufacturer perpetually thereafter certain power agreed upon, is not invalid, as otherwise the manufacturer would be deprived of property without due process of law, there being nothing in such contract injurious to public welfare. [Schiller Piano Co. *vs.* Illinois Northern Utilities Co., 123 Northeastern Rep. 631.]

ILLINOIS—*Injury to Conductor While Ordering Lunch Within Workmen's Compensation Act.*

A conductor's act in stopping his car in front of his home and going there to order his lunch to be carried to the place allowed for the regular lunch period is an incident to his employment, and his injury by a car on another track arises out of and in course of employment, within the workmen's compensation act. [Rainford *vs.* Chicago City Ry., 124 Northeastern Rep. 643.]

ILLINOIS—*Disobedience of Lineman Did Not Relieve Company of Liability.*

Where a lineman was doing his work on top of a tower carrying an electric transmission line, his contributory negligence in failing to observe a direction not to go near certain live wires did not relieve his employer from liability to make compensation for his death under the workmen's compensation act. [Mississippi River Power Co. *vs.* Industrial Commission et al., 124 Northeastern Rep., 552.]

MASSACHUSETTS—*Injury to Passenger Pushed from Car by Crowd.*

Where a passenger is forced out of a car by the pressure of the crowd at a station where the door of the car was properly opened, the railway was not liable for her injuries. [Knowlton *vs.* Boston Elevated Ry., 123 Northeastern Rep., 681.]

MISSOURI—*Injury to Mother Trying to Save Child.*

Where a mother, observing her child close to the track on which a street car was approaching, rushed into the street in an effort to save the child and was killed, the company cannot claim that knowingly, willfully, or wantonly she placed herself in front of a moving car. [Sherman *vs.* United Rys., of St. Louis, Mo., 214 Southwestern Rep., 223.]

NEW JERSEY — *Unauthorized Switch Had to Be Removed After Twelve Years' Use.*

As the State statutes declare that a municipality in granting consent may act only by ordinance and not otherwise, it was held that where a street railway which had obtained permission by ordinances of the township committee and county board of freeholders to construct, maintain and operate its road on a township highway, located a turnout at a point other than that specified on the map, the fact that members of the committee and board of freeholders knew of the change and that no objection was made for twelve years does not stop the township from compelling removal. [Trenton & Mercer County Traction Corporation et al. *vs.* Inhabitants of Ewing Tp. et al., 107 Atlantic Rep., 416.]

NEW YORK—*Injury from Trolley Wire Under Bridge.*

Where a trolley wire passing under a bridge was so placed that no one standing on the bridge or even bending over the parapet could reach it, the company was not liable for injury to a boy who in crossing the bridge swung a wire about 8 ft. long, bringing it in contact with the trolley wire. [Adams *vs.* Bullock, 125 Northeastern Rep., 93.]

PENNSYLVANIA—*Agreement in Lease to Pay Taxes Requires Payment of Federal Income Taxes.*

An agreement in a street railway lease to pay all taxes lawfully imposed upon lessor, or for which lessor would be liable on account of its earnings or profits, is broad enough to include the federal income tax and the war excess profits tax, although such taxes were not in existence when lease was executed. [Philadelphia City Passenger Ry. *vs.* Philadelphia Rapid Transit Co., 107 Atlantic Rep., 329.]

RHODE ISLAND—*Motorman May Assume Persons on Track Will Exercise Reasonable Care.*

A motorman is entitled to act on the presumption that one approaching the track is in possession of all his faculties, and will exercise reasonable care. Hence, where he does not slacken the speed of his car until he sees an automobile will not leave the tracks, and then exercises all reasonable means to stop, the company is not liable, under the last clear chance doctrine. [Halliday *vs.* Rhode Island Co., 107 Atlantic Rep., 86.]

TEXAS—*Accident to Merry-Go-Round Operator from Defective Switch.*

An electric merry-go-round operator, having no experience with electricity and no knowledge that a switch was defective and likely to close the circuit by its own weight so as to start the machine while he was making repairs is not chargeable with knowledge of the danger. [Hutcherson *vs.* Amarillo St. Ry., 213 Southwestern Rep., 931.]

WEST VIRGINIA—*Cancellation of Pass May Be Authorized Under Commission Law.*

Services rendered or materials furnished to a public service corporation subject to the provisions of the Public Service Commission Act must be compensated for by payment in money, not by a pass; and a contract for a pass, though valid when made, becomes illegal and unenforceable under the provisions of the act.

A contract of a public service corporation that conflicts with public duties imposed upon it by law is not within the protection of the constitutional provision inhibiting impairment of the obligations of contracts. [Shrader *vs.* Steubenville, East Liverpool & Beaver Valley Traction Co., 99 Southeastern Rep., 208.]

New Publications

Radio Engineering Principles

By Henry Lauer and Harry L. Brown. McGraw-Hill Book Company, Inc. 300 pages, 6 in. x 9 in., 250 illustrations, eight special plates.

Many electrical engineers connected with electric railways and central stations are taking a new interest in radio, since the successful development of the radio telephone, because of the possibility it offers of solving the trouble with the wire communication system in train and load dispatching. Usually when serious trouble occurs on a power line, the telephone line is also made inoperative. This is the time that an auxiliary radio system would be invaluable. The theory of the radio telephone is fully presented in this new book, which is the first one to cover the important developments in radio communication made during the war. The book is written to serve the purpose of a general textbook on the subject, so that it treats of the principles involved in the older radio apparatus as well as the newer. The theory behind all of the numerous kinds of circuits is clearly presented and the means are pointed out for adapting a circuit to any particular requirements. Little mathematics has been resorted to by the authors, a point mentioned by Major-General George O. Squier, chief signal officer of the army, in a foreword which he wrote to convey his indorsement of the book. In other words, this highly theoretical subject has been presented in a very practical manner.

Personal Mention

H. V. Bozell Joins Staff

Has Specialized in Questions Relating to Valuations and Regulation of Public Utilities

The JOURNAL announces the addition of Harold V. Bozell to its staff as associate editor. For the past three and a half years Mr. Bozell has been assistant professor of electrical engineering at Yale University, and for the time being, will continue this connection, devoting a part of his time to work at Yale.

Mr. Bozell was born in Kansas in 1886. He was graduated from the University of Kansas in electrical engineering in 1908 and in 1915 received the degree of electrical engineer. In the fall of 1908 he accepted an offer from the University of Oklahoma as instructor in electrical engineering and later became director of the School of Electrical Engineering, subsequently established there. This position he held until he went to Yale in 1916. While at Oklahoma, Mr. Bozell was largely instrumental in the organization of the Gas, Electric & Street Railway Association of Oklahoma (now the Oklahoma Public Utilities Association) and was its secretary-treasurer until he left Oklahoma in 1916. He also carried on a consulting practice, for a time having as a partner H. B. Dwight, now electrical engineer of the Colorado Public Utilities Commission. Some of the work of this character consisted of valuations of three or four electric light and power companies as well as rate and financial investigations of public utilities.

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HAROLD V. BOZELL

During the war, Mr. Bozell devoted most of his time to war service, though still conducting necessary instructional work at Yale. He carried on special engineering investigations for the Naval Consulting Board during the entire period; was a consulting electrical engineer to the Bureau of Standards, chiefly on public utility matters, though devoting some time in consultation on the preparation of a radio text for the Signal Corps by the Bureau, and in July, 1918, became supervisor of communication training for the War Department's committee on education and special training. An important piece of this latter work was the School for Signal Corps Officer Candidates (numbering almost 500) which he personally directed at Yale.

In his teaching experience Mr. Bozell has had to handle many subjects, among them electric railways. One of his principal interests, both at Oklahoma and Yale, has been public utility economics, commission regulation, etc.

W. C. Harrington has been elected secretary of the Tyler Traction Company, Sistersville, W. Va.

S. G. Pyle has been elected president and general manager of the Tyler Traction Company, Sistersville, W. Va.

W. J. Neuemchwander, treasurer of the Tyler Traction Company, Sistersville, W. Va., has been elected vice-president of the company.

L. M. Stover, formerly manager of the Baton Rouge (La.) Electric Company, is at present connected with the home office of Stone & Webster, Boston.

Charles M. Durell, formerly superintendent of the Biddeford & Saco Railroad, Biddeford, Me., has been appointed superintendent of the Barre & Montpelier Traction & Power Company, Montpelier, Vt.

Arthur W. Loasby, president of the Auburn & Syracuse Electric Railroad and the Rochester & Syracuse Railroad, has been elected vice-president of the Equitable Trust Company of New York. Mr. Loasby is president of the First Trust & Deposit Company of Syracuse, N. Y.

Henry S. Day, formerly connected with the engineering firm of Sanderson & Porter, New York City, has been appointed equipment engineer of the Kansas City (Mo.) Railways. Mr. Day entered the employ of the Westinghouse Electric & Manufacturing Company in 1907, remaining with that company in various capacities until 1909. In that year he was placed in charge of the shops of the electrified zone of the New York, New Haven & Hartford Railroad, resigning in 1917 to join Sanderson & Porter, for whom he was engaged in the valuation and appraisal of public utilities. He served during the war as a captain with the 37th Engineers.

R. B. Hill Promoted

Appointed Superintendent of Operation of the Los Angeles Railway—Office Recently Created

Robert B. Hill, until recently chief dispatcher of the Los Angeles (Cal.) Railway, has assumed the duties of superintendent of operation of the company. The office which Mr. Hill now occupies is a new one, having been created upon the joint recommendation of the California Railroad Commission and the Los Angeles Department of Public Utilities after an exhaustive investigation of the service and organization of the company. In his present capacity he has charge of the operation of the entire system of the Los Angeles Railway. The company employs approximately 2,500 men and operates 742 cars.

Mr. Hill is a native of Illinois and is forty-six years of age. He has been in the employ of the Los Angeles Railway since 1902, when he entered the company's service as a conductor. In 1905 he was promoted to dispatcher, continuing in that position for four years. From 1912 to 1916 he was employed in the schedule office of the company. In the latter year he was appointed chief dispatcher, holding that position until his appointment as superintendent of operation.

R. B. HILL

Thomas L. Small, formerly secretary and assistant treasurer of the Savanah Electric Company, has been appointed manager of the Baton Rouge (La.) Electric Company, a Stone & Webster property. Mr. Small entered the employ of Deering, Milliken & Company, dry-goods commission merchants of New York City, in 1910. Three years later he joined the Stone & Webster organization. Prior to his appointment as manager of the Baton Rouge Electric Company he was connected with the Stone & Webster properties in Dallas, Tex., Brockton, Mass., and Savanah, Ga.

Mr. Blair Made Head

Has Been Elected Chairman of Board of Operation and President of Chicago Surface Lines

Henry A. Blair was elected chairman of the board of operation, chairman of the executive committee and president of the Chicago (Ill.) Surface Lines at the meeting of the board of operation on Feb. 4. This marks the transfer of the operating responsibility of the Surface Lines from the Chicago City Railway interests to the Chicago Railways interests. Leonard A. Busby, former president, retains a position on the executive committee, but the control of the company is now held by Mr. Blair.

Rumors regarding the election had it that Mr. Blair would be elected president temporarily until an operating head could be secured, but this is in error. Mr. Blair has been elected for the regular term of three years and will continue to hold the three offices to which he has been elected for the full term and probably for the next four-year term, which terminates the operating agreement between the companies in 1927.

There has been a growing dissatisfaction over the operating policies followed by the Chicago City Railway control because it is said that the enmity of the public and public officials has been incurred. This and a clash as to the future operating plans are believed to have brought about the determination of the Chicago Railways intersts to exercise their majority representation on the board, and secure full control.

As a preliminary to the meeting of the board of operation, the board of directors of both companies held meetings and elected officers. Mr. Blair and Mr. Busby were re-elected president of their respective companies. The Chicago Railways elected Mr. Blair, Frederick H. Rawson, John M. Roach and Wallace Heckman as its four representatives on the board of operation of the Chicago Surface Lines, and the Chicago City Railway elected Mr. Busby, Harrison B. Riley and F. O. Wetmore as its three. The only change on the board of operation was the substitution of Mr. Rawson for Charles C. Adsit.

The meeting of the board on Feb. 4 adjourned without electing its remaining officers. These include the general auditor, treasurer, secretary and assistant treasurer, assistant secretary and general counsel. The elections will be made at the next regular meeting of the board, which is on Feb. 23 unless a special meeting is called before then.

Mr. Blair will secure the services of some particularly capable traction man to take direct charge of the operation of the Surface Lines, who will probably be given the title of general manager. Several men are being considered for the place, but it has not been definitely offered to any one except Matthew C. Brush, the former head of the Boston Elevated Railway, up to the time of this writing. Mr. Brush has declined the offer because his present associates in the American International Corporation were not willing for him to leave that organization.

W. M. Weatherwax Resigns

W. M. Weatherwax, for the past six years superintendent of transportation of the Chicago (Ill.) Surface Lines, resigned on Jan. 31. Mr. Weatherwax was born on a farm near Lansingburgh, now Schaghticoke, N. Y., in 1866. He was educated in the country schools and worked on the farm during vacation time. He began street railway work as a conductor on the Troy & Lansingburgh Street Railway, Troy, N. Y., in 1884. He left railway work after a few months' service and went to Chicago.

His first employment in the West was with the Northern Transportation Company, where he advanced successively from watchman to lookout and finally to wheelman of a large lake freighter plying between Chicago and Ogdensburg, N. Y. In 1886 he entered the service of the Chicago City Railway as a driver of tow horses. He was soon thereafter transferred to general carhouse service. He was next made a conductor, in which position he remained until April, 1890, when he was advanced to assistant foreman in charge of cars and trainmen at one of the carhouses. In April, 1893, he was made foreman in charge of one of the carhouses, and later was transferred to what is now known as the Englewood carhouse with the same title.

In 1906 he was made superintendent of transportation of the Chicago City Railway. He held this position for eight years, at the end of which he became superintendent of transportation of the Chicago Surface Lines.

W. A. Ernst has been appointed master mechanic of the Maryland Electric Railways, Annapolis, Md. Mr. Ernst was formerly general electrician for the Newport News & Hampton Railway, Gas and Electric Company, Hampton, Va., and before that was in charge of the electrical department of the Holyoke (Mass.) Street Railway.

L. C. Haynes, vice-president of the East St. Louis & Suburban Railway, East St. Louis, Ill., has retired from active business life after rounding out a quarter of a century of service with public utility properties controlled by E. W. Clark & Company, Philadelphia, Pa. Mr. Haynes will retain his official connection with the utility properties in East St. Louis and his membership on their boards of directors, but will in the future be free for travel and other recreation.

Frederick Nicholas, contributing editor of the *Electrical World*, has resigned. Mr. Nicholas began his service with the McGraw Publishing Company in May, 1908, as a result of the consolidation of the *Street Railway Journal* and the *Electric Railway Review*, forming the ELECTRIC RAILWAY JOURNAL. He had been associate editor of the *Electric Railway Review* and the *Railway Age*, then published by the Wilson Company, Chicago, from January, 1907. His work with the McGraw Publishing Company was at first mainly on the ELECTRIC RAILWAY JOURNAL, with occasional contributions to the *Electrical World*. Later he divided his time about equally between the two papers. For some years his work has been entirely on the editorial staff of the *Electrical World*.

W. Tuke Robson, former manager of the Southampton Corporation Tramways, has returned to Great Britain on the *Empress of France*, sailing from St. John's, New Brunswick, on Jan. 21. During his stay of several months in the United States, Mr. Robson made a first-hand study of American electric railway practices in cities as far west as Chicago and Milwaukee, and as he spent the Christmas holidays in Florida he had the opportunity to see a fair-sized fraction of Uncle Sam's domain. Mr. Robson says that the most impressive feature of American electric railway practice is the one-man safety car for which he sees a good field in the smaller British cities. He is also planning to introduce to his home country a number of other American practices, but he is less enthusiastic about the success of some of the roads he has seen as regards the re-adjustment of contractural relations with their communities. A good deal of what is going on in the latter field made him feel that he was viewing a ten-ring circus!

Obituary

J. T. Voss, pioneer street railway builder of the South, died in Fort Worth, Tex., on Jan. 25. Mr. Voss was born in Tennessee in 1847. He built and owned several street railways in Georgia and Tennessee, and was manager of the Nashville Traction Company in 1895. In that year he went to Forth Worth and bought the 9-mile belt-line of mule cars, later absorbed by the Northern Texas Traction Company. He later became connected with the Fort Worth Light & Power Company, retiring two years ago.

Andrew E. Kalbach, receiver for the Second Avenue Railroad, New York, N. Y., died suddenly on Feb. 2. Mr. Kelbach was formerly general manager and electrical engineer of the New York City Interborough Railway, now controlled by the Third Avenue Railway. He was a graduate of the Annapolis Naval Academy. He resigned from the Navy in 1903 to become assistant engineer for the Rapid Transit Subway Construction Company, New York. He subsequently became connected with the New York City Interborough Railway. He was appointed receiver for the Second Avenue Railroad in 1917.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Car Orders for January and February May Exceed 600

Present Indications Are that Buying Movement Will Extend Throughout Year as the Different Railways Receive Fare Increases—Many Railways Coming Into the Market for Safety Cars

Railways from all parts of the United States are coming into the market for rolling stock and equipment, and if the amount of business placed during the month of January and orders now pending can be taken as an indication, the rolling stock market is now more active than it has been for the past three years. Orders for January and February will probably exceed 400 cars and may even amount to 600 cars if certain large orders now pending, are placed during the next three weeks. Many large railways are in the market for large numbers of cars including subway, elevated, double-truck surface cars and safety cars. Also a far greater number of small railways are ordering safety cars in lots of two, four, five, seven or ten each. Many companies which are not able to purchase safety cars are making extensive plans to remodel their cars to produce more car miles and to increase the revenue per car-mile.

HEAVY DEMAND FOR CARS IN NEW ENGLAND

Conditions in New England are active. The Boston (Mass.) Elevated Railway trustees have authorized the purchase of 100 new cars. Forty of these will be for use on the elevated lines, to replace an equivalent number which have been worn out. Thirty will be of the standard center-entrance double-truck surface type, and will be equipped for train operation. Thirty standard safety cars are also included in the authorization and orders for these have actually been placed with the J. G. Brill Co. The Concord (N. H.) Electric Railway expects to place an order for four safety cars. Biddeford & Saco Railroad Company, Biddeford, Me., has recently ordered two safety cars from the Wason Manufacturing Company. The Connecticut Company, New Haven, Conn., is expected to place an order for safety cars shortly. Other railways in this section are considering plans for financing purchases and as soon as these arrangements are completed, many additional rolling stock orders will be announced.

Demands in the district in and near New York have been for cars of the heavier types. Much interest is now centered in the needs of the Hudson & Manhattan Railroad Company, reported as being in the market for twenty-five cars for the Hudson tubes. With the exception of a few minor changes, these cars will be almost the same as the ones now in use. The Long Island Railroad Company, New York, N. Y., recently has placed orders for 100 cars, of which forty motor-passenger and thirty trailers were ordered from the American Car & Foundry Company and the remaining thirty cars, which are passenger coaches without motors, have been placed with the Standard Steel Car Company.

In addition to demand for heavy cars, safety car orders are plentiful. Trenton & Mercer County Traction Company, Trenton, N. J., has placed an order for forty safety cars with the J. G. Brill Company, which is also reported as having received an order for six safety cars from the Trenton, Bristol & Philadelphia Street Railway. Pennsgrove Traction Company is reported as being in the market for six safety cars. The Empire State Railroad Corporation (Oswego, N. Y.), (city division), which lost its carhouse in Oswego in a recent fire is reported to be in the market for safety cars which will be used to replace the heavier cars destroyed. United Railways & Electric Company, Baltimore, Md., is reported to be in the market for thirty safety cars which are expected to be placed within a short time. In addition, this company is contemplating the purchase of additional rolling stock which will be noted at a future date.

MIDDLE WEST PLANS TO BUY HEAVILY

Indications are that safety cars will be purchased heavily during 1920. Recent reports from Terre Haute to the effect that fifty-six safety cars have replaced twenty-six heavy cars there, one result being that January, 1920, was the best January from a traffic viewpoint in the history of Terre Haute. Other similar cases are receiving a great deal of consideration at this time. Indiana Railway & Light Company, Kokomo, Ind., has purchased ten safety cars from the American Car Company. Tri-City Railway Company, Davenport, Iowa, is reported to be in the market for a number of safety cars. Pittsburgh (Pa.) Railways are expected to be in the market for cars in the near future according to reports received. Hodenpyl, Hardy & Company, New York, N. Y., is expected to be in the market within the next few weeks for a large number of cars for the Northern Ohio Traction & Light Company and other western railways, both city and interurban, which they control. The number of cars is expected to be between fifty and 100.

PACIFIC COAST FAVORS THE SAFETY CARS

Safety cars are still going strong on the Pacific Coast. A number of companies are either planning to purchase safety cars or to remodel the present cars. The Los Angeles Railway has just placed an order with the American Car Company for forty-five safety cars. These cars will be 28 ft. long and seat thirty-two persons as compared with the present cars which are 44 ft. in length and accommodate forty-four passengers.

From reports received from a large number of railways in the United States, the outlook is very promising for a heavier purchasing of rolling stock than has been experienced for the past four years.

Prospects Poor for Car Window Glass

Purchase by Motor Interests of Three Glass Factories Expected to Cut Available Yearly Production About 20 Per Cent

Double-thick window glass and the heavier thicknesses are now scarcer than ever. Manufacturers are heavily oversold, the majority of them being out of the market altogether. Prices are stiffening but little attention is paid to prices, the main object being to increase production. The present cold spell is curtailing production when it is vitally necessary.

Stocks of different jobbers are almost bare with not a bit of $\frac{3}{16}$ in. polished plate glass anywhere to be found. Users are being advised to place orders for their requirements now in order that they may possibly be included in the partial allotments of glass that will no doubt be made in April when some new stock will be available.

Easily the most disturbing matter before glass users today is the announcement that the Fisher Body Company, a subsidiary of the General Motors Company, unable to purchase its glass requirements in the open market, has bought up three plate mills, the Saginaw Plate Glass Company, Saginaw, Mich., the Columbia Plate Glass Company, Blairsville, Pa., and the Federal Plate Glass Company of Ottawa, Ill. According to reports, an unsuccessful attempt was made to buy the Standard Plate Glass Company of Butler, Pa.

Total yearly glass production for the United States is estimated at 60,000,000 sq.ft. of which it is claimed, the above plate mills produce 10,000,000 to 12,000,000 sq.ft.

Rail Capacity in Mills Commandeered

No Prospects For Railways to Obtain Mill Space Until Second Quarter Except for High T and Girder Rails

The Government has issued a war-time order on all of the rail mills asking for 72,500 tons of rail by March 1, in addition to the 42,500 tons which the Railroad Administration placed a short time ago for March delivery. From reports received by the Electric Railway Journal from different steel companies, this order virtually shuts the electric railways out of any mill space for the first quarter with the exception of some little space still available in a number of manufacturers' plants where special work, high T-rails and grooved girder rails are made. This space, however, is very small and at the present rate of business, will be filled within the next few weeks.

Orders for standard rails are showing considerable improvement, and a great rush for mill space for second quarter is anticipated.

Rolling Stock

Tri-City Railway, Davenport, Iowa, expects to be in the market soon for a number of safety cars.

Connecticut Company, New Haven, Conn., is expected to place an order shortly for a number of safety cars.

Los Angeles (Cal.) Railway has placed an order with the American Car Company for forty-five safety cars.

Northern Ohio Traction & Light Company, Akron, Ohio, is expected to be in the market for cars in the near future.

Biddeford & Saco Railroad, Biddeford, Me., has purchased two safety cars from the Wason Manufacturing Company.

Indiana Railway & Light Company, Kokomo, Ind., has placed an order with the American Car Company for ten safety cars.

Hudson & Manhattan Railroad, New York, N. Y., is reported to be in the market for twenty-five cars for the Hudson tubes.

Trenton & Mercer County Traction Company, Trenton, N. J., has placed an order with the J. G. Brill Company for forty safety cars.

Trenton, Bristol & Philadelphia Railway, Philadelphia, Pa., is reported to have placed an order for six safety cars with the J. G. Brill Company.

Long Island Railroad, New York, N. Y., has purchased forty motor passenger and thirty trailers from the American Car & Foundry Company and thirty passenger coaches from the Standard Steel Car Company.

United Railways & Electric Company, Baltimore, Md., is reported in the market for thirty safety cars for outlying lines and for additional equipment to be used in the congested sections. Pittsburgh (Pa.) Railways is reported as considering the purchase of some cars.

Boston (Mass.) Elevated Railway trustees have authorized the purchase of 100 new cars. Forty of these will be for use on the elevated lines to replace an equivalent number worn out. Thirty will be of the standard center-entrance, double truck surface type and will be equipped for train operation. Thirty standard safety cars are also included in the authorization. Orders have actually been placed with the J. G. Brill Co. for the safety cars.

Franchises

Montgomery Light & Traction Company, Montgomery, Ala.—Ray Rushton, receiver for the Montgomery Light & Traction Company, has submitted to the City Commission a proposed ordinance providing for changes in the company's franchise to permit the company to take up some tracks and to relay them in other streets.

Recent Incorporations

Citizens' Electric Company of Valley View, Ashland, Pa.—The Citizens' Electric Company has been organized with a capital of $30,000 to build an electric railway between Ashland and Klingerstown.

NEW YORK METAL MARKET PRICES

	Sept. 16, 1919	Feb. 4, 1920
Copper, ingots, cents per lb	22.12½	19.00
Copper wire base, cents per lb	26.00	22.25
Lead, cents per lb	6.25	8.75
Nickel, cents per lb	41.00	45.00
Spelter, cents per lb	7.55	8.70
Tin, cents per lb	56.00	58.00
Aluminum, 98 to 99 per cent, cents per lb	32.00 to 33.00	32.50

OLD METAL PRICES—NEW YORK

	Sept. 16, 1919	Feb. 4, 1920
Heavy copper, cents per lb	19.00 to 19.50	17.75 to 18.00
Light copper, cents per lb	15.50 to 16.00	15.50 to 16.00
Heavy brass, cents per lb	10.00 to 10.50	10.00 to 10.50
Zinc, cents per lb	4.75 to 5.00	5.00 to 5.25
Yellow brass, cents per lb	8.50 to 9.00	8.50 to 9.00
Lead, heavy, cents per lb	5.00 to 5.10	6.75 to 7.00
Steel car axles, Chicago, per net ton	$26.00 to $27.00	$33.00 to $35.00
Old carwheels, Chicago, per gross ton	$25.50 to $27.00	$35.00 to $36.00
Steel rails (scrap), Chicago, per gross ton	$22.75 to $23.75	$29.00 to $30.00
Steel rails (relaying), Chicago, gross ton	$26.50 to $27.50	$34.00 to $35.00
Machine shop turnings, Chicago, net ton	$9.25 to $9.75	$14.50 to $15.00

ELECTRIC RAILWAY MATERIAL PRICES

	Sept. 16, 1919	Feb. 4, 1920
Rubber-covered wire base, New York, cents per lb	30	30
Waterproofed wire (100 lb. lots), cents per lb., New York	34	27.50
Weatherproof wire (100 lb. lots), cents per lb., Chicago	33	27.00
T rails (A.S. C. E. standard), per gross ton	$49.00 to $51.00	$55.00 to $57.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	$47.00 to $49.00	$51.00 to $53.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$45.00 to $47.00	$45.00 to $47.00
T rail, high (Shanghai), cents per lb	3	3
Rails, girder (grooved), cents per lb	3	3
Wire nails, Pittsburgh, cents per lb	3.25 to 3.50	4.50
Railroad spikes, drive, Pittsburgh base, cents per lb	3.50	3.35 to 3.85
Railroad spikes, screw, Pittsburgh base, cents per lb	7.50 to 9.00	7.50 to 9.00
Tie plates (flat type), cents per lb	2.75	3.00
Tie plates (brace type), cents per lb	2.75	3.00

ELECTRIC RAILWAY MATERIAL PRICES

	Sept. 16, 1919	Feb. 4, 1920
Tie rods, Pittsburgh base, cents per lb	7.00	7.00
Fish plates, cents per lb	3.00	3.00
Angle plates, cents per lb	3.90	3.90
Angle bars, cents per lb	3.90	3.90
Rail bolts and nuts, Pittsburgh base, cents per lb	4.50	4.50 to 6.50
Steel bars, Pittsburgh, cents per lb	2.35	
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.20	4.35 to 4.60
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.25	5.75 to 5.95
Galvanized barbed wire, Pittsburgh, cents per lb	4.10 to 4.20	4.10 to 4.45
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.70 to 3.80	3.70 to 3.95
Car window glass (single strength), first three brackets, A quality, New York, discount†	77%	77%
Car window glass (single strength), first three brackets, B quality, New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York, discount	79%	79%
Waste, wool (according to grade), cents per lb	16 to 19	20 to 23
Waste, cotton (100 lb. bale), cents per lb	10 to 14½	19 to 22
Asphalt, hot (150 tons minimum), per ton delivered	....	....
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton	....	$25.00
Asphalt filler, per ton	$30.00	$30.00
Cement (carload lots), New York, per bbl	$2.90	$2.90
Cement (carload lots), Chicago, per bbl.	$3.05	$2.00
Cement (carload lots), Seattle, per bbl.	$3.13	$2.68
Linseed oil (raw, 5 bbl. lots), New York, per gal	$2.15	$1.93
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$2.17	$1.95
White lead (100 lb. keg), New York, cents per lb	13	14½
Turpentine (bbl. lots), New York, cents per gal	$1.63	$1.97

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† These prices are f.o.b. works, with boxing charges extra.

Spokane & Eastern Railway & Power Company, Spokane, Wash.—The Spokane & Eastern Railway & Power Company and the Inland Empire Railroad have been incorporated as the successors to the Spokane & Inland Empire Railroad. The Spokane & Eastern Railway & Power Company is capitalized at $3,000,000 and the Inland Empire Railroad at $1,000,000.

Track and Roadway

Vallejo, Cal.—An allotment of $47,500 has been received by the Public Works Department on Mare Island for the electrification of the causeway and the construction of a number of electrified spurs to be used in handling the transcontinental freight shortly to be brought to the navy yard by car barges from the lower bay.

Cumberland & Westernport Electric Railway, Frostburg, Md.—The Cumberland & Westernport Electric Railway has completed extensive improvements on its lines in Frostburg, Pekin and Westernport, Md. At Frostburg the tracks have been extended to the corner of Main and Water Sts., where the company's office is now located.

Worcester (Mass.) Consolidated Street Railway.—The State Department of Public Utilities has issued an order approving the granting of track locations in Belmont and Shrewsbury Sts., Worcester, to the Worcester Consolidated Street Railway.

Interborough Rapid Transit Company, New York, N. Y.—The Interborough Rapid Transit Company contemplates the construction of a new substation for its Westchester branch on Westchester Ave. near St. Peters Avenue, to cost about $50,000. This is substation No. 48 under the municipal contract.

Power Houses, Shops and Buildings

Ohio Valley Electric Railway, Huntington, W. Va.—This company is planning to purchase additional power house equipment during the coming year.

Trade Notes

Robert T. Lozier, New York, has resumed his practice as consultant in industrial and public utility lines and has opened an office in the Woolworth Building.

Johnson Coin Counting Machine Company announces that after Feb. 2, 1920, it will occupy the building which it has recently purchased at 10 Anable St., Long Island City, N. Y.

Charles Cory & Son, Inc., New York, N. Y., manufacturer of electrical signaling apparatus, etc., is rushing work on the construction of its new plant at 183-187 Varick St., which should be in operation by May 1.

Chicago Pneumatic Tool Company, Chicago, Ill., announces that C. E. Laverenz, formerly an inspector in the Ordnance Department, has been made special railroad representative of the company with headquarters at Chicago.

Electric Railway Material Needed in Scandinavia.—Material and equipment are needed for a railway to be built in one of the Scandinavian countries (No. 30,918). Locomotive power may be steam or electrical traction (probably the latter). Information, descriptions, illustrations, estimates, etc., are desired.

Doehler Die-Casting Company, Brooklyn, N. Y., at its Jan. 5 directors' meeting, re-elected the following officers: H. H. Doehler, president; H. B. Griffin, vice-president; O. A. Schroeder, treasurer; O. A. Lewis, assistant secretary. The company also added to its list of officers J. Kralund, second vice-president, in charge of production, and Charles Pack, secretary and chief chemist.

The Bussmann Manufacturing Company, St. Louis, Mo., has completed the purchase of a modern factory in East St. Louis totaling 22,000 sq.ft. of floor space. The new factory will be operated as plant No. 2 and will double the capacity of the Bussmann company, which manufactures electrical fuses of all types. Its sales in 1919 amounted to 16,000,000 fuses, and the 1920 production is based on an estimated output of 40,000,000.

Blaw-Knox Company, Pittsburgh, Pa., announces that A. W. Ransome, manager of the New England territory of the company, has been transferred to San Francisco, Cal., as manager of the Pacific Coast territory, with offices in the Monadnock Bldg., San Francisco. O. A. Olstead, formerly of the New York office of the company, succeeds Mr. Ransome at Boston.

Buda Company, Harvey, Ill, announces the appointment of R. B. Fisher as general sales manager, who will direct all domestic and foreign sales and the advertising department. William P. Hunt, Jr., will continue as sales manager of the railway department; Mark J. Ross, sales manager of the headlight department, H. L. Miller, sales manager of the frog and switch department, J. L. Artmaier as sales manager of the export department, and S. G. Hyde as advertising manager.

Material Handling Machinery Manufacturers' Association, 35 West Thirty-ninth St., New York, N. Y., has changed the date of its meeting from Jan. 29-30 to Feb. 26-27. The sessions will be held at the Waldorf-Astoria Hotel, and the association invites to them all manufacturers of cranes of various types, hoists, winches, conveyors, industrial trucks, tractors and trailers, bulk-handling machinery, elevators and all forms of equipment and supplies used in construction and operation of mechanical handling machinery. Zenas W. Carter, 35 West Thirty-ninth St., is secretary.

Locke Insulator Manufacturing Company, Victor, N. Y., announces that, as of Jan. 1, Kent A. Hawley will have charge of the company's New York City office, at 233 Broadway. Mr. Hawley is a graduate of the University of California and has been connected since 1907 with the following firms and projects: Simmen Automatic Railway Signal Company, of Los Angeles; Charles C. Moore & Co., on the test of the Redondo power plant of the Pacific Light & Power Company; Great Western Power Company, on the construction of the Great Bend power plant with Vielè, Blackwell & Buck, engineers; design and construction of the Oakland substation and auxiliary power plant, and the construction of the generating and substations of the Appalachian Power Company. He was with the construction department of the General Electric Company at the McCall's Ferry power plant of the Pennsylvania Water & Power Company, and with Gibbs & Hill of New York on the electrification of the Norfolk & Western Elkhorn grade, the Pennsylvania Railroad at Philadelphia, the New York Connecting Railroad on Long Island, and recently on the electrified zone of the New York, New Haven & Hartford Railroad.

New Advertising Literature

Perry Manufacturing Company, New York, N. Y.: An illustrated pamphlet dealing with the question as to why prepayment terminals are operated by electric railways.

Hickey & Schneider, Elizabeth, N. J.: Bulletin No. 15 on its different types of disconnecting switches.

Templeton, Kenly & Company, Chicago, Ill.: A circular announcing a new model automatic raising and lowering pole pulling and pole straightening jack.

Pyrolectric Instrument Company, Trenton, N. J.: A forty-page booklet covering pyrovolter type instruments and thermocouples.

Ohio Brass Company, Mansfield, Ohio.: Price list No. 206, effective Dec. 15, 1919, applying to catalogs 201, 202, 202-A, 203, and 205 on Crouse-Hinds Imperial headlights of the arc and incandescent types.

Economy Electric Devices Company, Chicago, Ill.: A mailing card with the title "Meter the Energy—'That's What You Want to Save'," showing how the economy meter is used, first, as a power-saving device, second, for equipment inspection, and third, as an engineering device.

Northern Equipment Company, Erie, Pa.: A twenty-four-page booklet on "Saving Fuel Automatically and Scientifically in the Boiler Room," the subject matter of which was based upon information prepared for the United States Fuel Administration during the war. Hand and mechanical regulations are compared as performed by Copes regulators.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 55 New York, Saturday, February 14, 1920 Number 7

Electric Cars Clear the Streets for Other Vehicles

THIS is the time of the year when schedules are slow because the track is the only part of the street which is kept clear from snow, and the vehicles on the track block the progress of the cars. We are not referring to the conditions caused in the eastern part of the country during the past week by the blizzard of Feb. 5. That simply accentuated a condition which exists in practically every city, and every time that there is much snow on the streets. The electric railway company clears the way for its cars, and other vehicles use that part of the street because it is the only one free from snow.

We are referring to this fact not because it is new, but because we believe that a company can well emphasize in some of its publicity matter at this time for the year that it is the only user of the highways which makes any contribution toward the cleaning of the streets. Few people realize what this means to the rest of the community. They would, however, if they lived in New York, where in Manhattan Borough the streets remained impassable for a number of days after the big storm, coincidently with the stoppage of the underground conduit lines, while in Brooklyn, where the overhead trolley is used, the cars kept in operation and kept open their part of the streets. This service is often entirely forgotten in summer, but in winter it is a very real contribution to the good of the community.

Why the Self-Propelled Vehicle Stays

SOME three or four years ago we were discussing with a railway manager the inroads of the gasoline vehicle in all its forms from Ford to motor truck. The contention of our friend was that once the public realized what a great portion of their taxes were going into the rebuilding of ruined roads, they would tax gasoline vehicles to a point that would greatly impair their growth. Had he realized the variety of powerful interests behind the good-roads movement even then, he would not have been so sanguine. Back of this movement are not merely the makers of automobiles, motor trucks and their accessories, but also the millions of people who own and ride in automobiles or who operate commercial vehicles. All of these interests are willing to see almost any amount spent for the improvement of highways, although they are not equally willing to pay for them directly out of their own pockets in the form of gasoline, mileage, tonnage taxes, etc.

Indeed, it is fatuous business to sit around and hope for such things as an uprising against the cost of concrete roadways, the exhaustion of the gasoline supply or other acts of Providence. The investment behind the self-propelled vehicle will find the power and the brains to keep on growing. That does not preclude the electric railway from growing, too, if it will search its own bosom and make a friend and partner of the gas vehicle where it can be used to advantage. instead of seeing it only as an interloper. The fact that motor buses and motor trucks usually come to the electric railway man's attention through unfair competitors does not mean that there is no place for the bus in city transportation service. There is no danger that it will supplant the trolley under similar conditions of fare, length of haul and operating requirements, but for feeders to existing lines, at additional and perhaps higher fare, there is often a field. Certainly, the interests of the public will be better served if any bus lines in a city are operated by the existing railway company rather than by an independent corporation, because the railway company has the organization and the necessary knowledge of local traffic conditions.

Take a Chance a La Terre Haute!

OASES in the electric railway desert are so few and far between that we may be pardoned for lingering at the pleasant caravansary of Terre Haute, Ind. To change the figure of speech, Terre Haute was revealed at the 1919 Atlantic City convention as one of the brightest stars in the safety car constellation. Its record answers so cheerfully some of the most difficult questions relating to the electric railway's future that we cannot help setting forth some of the facts again for the well-being of the many who are still trudging across the desert of high operating expenses and declining patronage.

First, the management was bold enough to believe that the automobile simply has created the taste for better street railway service and not produced an aversion for street railways as such. Therefore, it managed to secure up-to-date cars which are operated at up-to-date speeds and at up-to-date headways. Answer from the public: A 43 per cent increase in travel. This means that more people are being carried in Terre Haute on street cars than before the automobile became a factor.

Second, the improvement in service, speed and safety was so obvious to the city administration that it promulgated an ordinance in which the type of car used is distinctly specified as the only type that will be satisfactory to the municipality hereafter. Selfish agitation is thus cut off a-bornin'.

Third, and most important, is the fact that the Terre Haute, Indianapolis & Eastern Traction Company did not have to go beyond its own home district to get the money to make it the first city of its size to have 100 per cent safety car service. Bankers have a painfully suspicious way of scanning electric railway securities these days, being rather inclined to consider them "insecurities." Yet, the most cautious banker must be convinced by a saving of some 8 cents per car-mile;

especially when the cars themselves are running past his door every day bearing load after load of clearly contented riders.

Thus has Terre Haute answered for us the two biggest questions: Can the electric railway survive competition and can it get the money for modernization?

Electric Freight Haulage Will Reduce the H. C. of L.

WE HEARTILY indorse the plea of Mr. Bibbins in this issue for greater development of electric freight traffic. It is of benefit not only to the electric lines but to the public. The steam railroads of the country confessedly cannot handle all of the business offered to them because the demands for freight haulage have grown so much more rapidly during the past five years than the railroad facilities. On the other hand, the electric roads, although they also have not expanded, have considerable unused capacity for handling freight at times when it would not interfere with their passenger business, and they are particularly well equipped for caring for short hauls and city distribution of freight.

America has a reputation for wastefulness of its resources, and conservation is being urged as a national duty. An opportunity for national economy exists in the use of electric railway tracks for transporting freight to the extent of their useful capacity. The investment in these tracks is estimated by Mr. Bibbins at some $3,000,000,000, yet they are almost idle as regards this necessary service, while more expensive methods are being used. The plan suggested by Mr. Bibbins should appeal particularly to local organizations interested in the development of individual communities, such as merchants' associations and boards of trade, because the benefits thereby obtained should be directly reflected in lessened expenses of manufacturing and reduced costs of living in those communities introducing this reform.

Engineering Association Plans Comprehensively for 1920 Program

THERE are many signs to indicate that the American Electric Railway Engineering Association is aware of the unusual needs of its members for information and inspiration this year. Elsewhere in this issue is a list of committee assignments in additon to that issued at the beginning of the association year. This later list can be considered as an outline of what the engineers believe to be the high spots in the several fields of engineering endeavor, and the complete list may well furnish a basis for the thought and study of progressive engineers this year.

By a coincidence we print this week also a digest of the 1919 convention discussion on track spirals. The report of the sub-committee on standard track spirals of the committee on way matters was presented informally at the convention, and the printers' strike in New York prevented the inclusion of more than a mere outline of the discussion in our regular report issue. With the co-operation of E. M. T. Ryder, chairman of the sub-committee, and J. W. Welsh, special engineer of the association, we are now able to give a comprehensive digest. From this it will be noted that substantial progress has been made in the direction of getting out some standards that will be used, as these appear to commend themselves to users and manufacturers. There is no reason for further delay in putting these spirals into use, and the sooner this is done the sooner will the effect be appreciable in track special-work cost reduction. This subject is referred to in more detail in the following editorial.

Another evidence of activity was the meeting of the committee on standards held in New York last Monday. This might be termed the "balance-wheel" committee of the association, as its function is to insure steady progress for the technical work. As will be noted in the report printed on the "Association News" page this week the committee set its seal of approval upon a revised report of the committee on power distribution with reference to a specification for overhead crossings of electric circuits with steam and electric railways. It also made a number of constructive suggestions regarding the coming few months' work. In many ways the committee on standards has the most responsible work of the entire group of engineering committees, for it both reviews much of the work of the others and also initiates important work on its own account. The committee is sometimes criticized as ultra-conservative, but the critics should take into account the "balance-wheel" function mentioned before. There certainly is no committee more conscientious in the performance of its duties or more solicitious for the good name and efficiency of the association.

Standardization of Track Spirals Now Open for Discussion

THE preliminary report of the committee on way matters of the American Electric Railway Engineering Association, which was distributed prior to the 1919 convention at Atlantic City, did not include the report of the sub-committee on uniform spirals. The report was presented orally, as a statement of progress, at the convention. At the same time, data were quoted and diagrams were shown covering a proposed uniform system of spirals which had been prepared by the sub-committee. In its report the sub-committee indicated that it had dropped the tentative spiral at first proposed for discussion.

In its place a new system was proposed which, for novelty, simplicity and convenience in use, seems to meet practically every objection which so far has been raised against the idea of uniform spirals. Even the difficulty of substituting the new spiral in replacements when several existing spirals abound seems to have been overcome to such an extent that the instances where the new spiral cannot be used should prove to be a negligible number.

From the discussion at the convention it appears that the way out of what seemed to be an insurmountable difficulty has been found. If this proves to be true, we have made a very important advance in the science of special track work design.

The report of the 1920 committee on way matters will be awaited with a great deal of interest in view of this advance, and in the meantime it is desirable that the subject be given the fullest possible consideration by all engineers who have had practical experience in using or producing special track work.

To start the ball rolling we have prepared the abstract of the Atlantic City discussion. In a short time the proceedings of the Engineering Association will be in the hands of the members. This week's abstract will serve to stimulate thought on the subject, and we shall be glad to open the columns of the paper to the fullest extent for the purpose of printing contributions to the discussion. The ELECTRIC RAILWAY JOURNAL has on several occasions expressed its belief that the standardization of spirals is not only desirable but is also practicable, and this belief seems now about to be substantiated.

Valuation By Headlines

IN ITS FAMOUS case of *Smyth vs. Ames*, now quoted as a precedent in most valuation cases, the Supreme Court names as items which must be considered and given weight "original cost * * * amount expended in * * * improvements, the amount and market value of bonds and stock, the present * * * cost of construction, the probable earning capacity * * * and the sum to meet operating expenses." The court says further "We do not say that there may not be other matters to be regarded in estimating the value of the property." But we doubt if the Supreme Court ever anticipated, in this latter statement, a new method of valuation such as appears operative just now in New York newspapers, namely, what might be called valuation by headlines and their consequent molding of public opinion. By its statement, the court does not, of course, exclude such an idea, but it is certainly not included. It is a new sort of valuation method. It is not treated in the standard books on public utility finance, but it is being developed so intensely in the Interborough hearings now being held that it may become historic.

The case in question is a hearing to inquire into the financial status of the Interborough Rapid Transit Company, conducted by the Board of Estimate of New York, to consider the justice of its claim to a higher fare. The mayor, a member of the board, has an apparent taste for getting his ideas into print but has heretofore used the letter form. He has, in the present case, developed a new means—that of epigrammatic comment or question—and he has secured thereby headline space in many newspapers. What matters it as to the actual facts? The average reader enjoys these little bits of repartee which he sees so prominently displayed but shuns the mental effort of interpreting whatever real details and figures may be under discussion. He may thus be led to get a distorted conception of the real situation. This, of course, will make it all the more difficult for the board to announce any finding which may differ from the public opinion thus formed.

We do not mean here to enter into discussion of the controversial questions, to defend or condemn the acts and expenditures of the Interborough which have been brought into the limelight in this hearing. Most of this information was previously brought out by the legislative committee of which Senator Thompson was chairman or is of public record. If the board really wants to review the case on its merits, there is, of course, good reason for it to review the facts with the Interborough officials who are most familiar with them, but a more dignified hearing would engender increased confidence in the final decision of the board. It is to be hoped that, when the board considers all the testimony, it will make a decision which is worthy of a representative body of the nation's metropolis. The future stability of New York's local transportation system and, consequently, the prosperity of the city itself, quite possibly depends on this decision. Both the public and the company are entitled to a solution which will result in uninterrupted service on a basis fair to all concerned.

Traffic Studies Pay in Kansas City

"THE average speed of cars was increased from 5.52 miles per hour to 8.33 miles per hour. Sixty-one cars were put through the section (2.36 miles) instead of the former thirty-eight." This means that some good engineering was done in traffic studies. It happened in Kansas City on a busy line through a congested section in the rush hour. Moreover, this record was made on the first day that the new regulations on Eighth Street were in force and probably does not represent the ultimate gain which will be realized from the modified operating methods. The traffic study paid well in this case.

Kansas City, like many other cities, found some bothersome sore spots in the transportation system. Particular trouble was felt in the two east and west, heavily loaded lines through the congested retail district. These arteries were being pinched more and more and the traffic streams were growing more and more sluggish. Drastic treatment seemed necessary, and a doctor was called. Apparently Dr. Beeler's medicine is reviving the patient.

Intensive traffic studies, directed toward speeding up service in congested districts, have of course been made in many cases, and each one emphasizes the benefit of the practice and adds some new point or points to assist in the general problem. The present instance is an excellent example of painstaking investigation leading to clear, simple remedies which involve no radical departures from tested practice. On another page in this issue we are printing abstracts of the first two sections of Mr. Beeler's report to the Kansas City Railways Company in the hope that the troubles found and remedies suggested may assist other companies in analyzing similar difficulties.

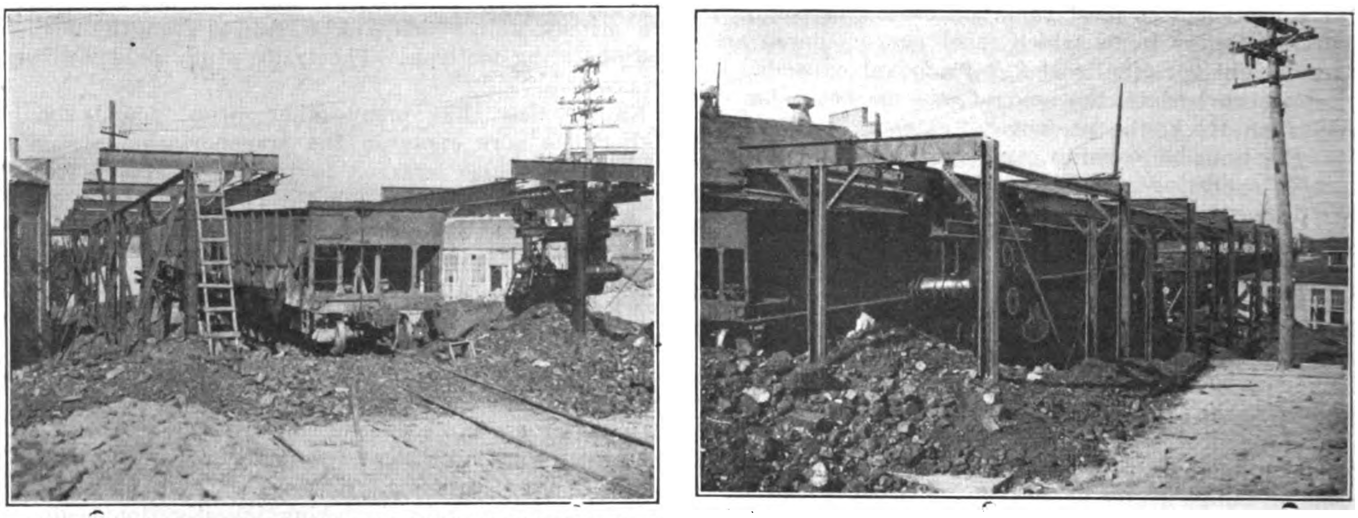
We would call particular attention to one point in these reports—and that is that a large number of the remedies suggested call for action and co-operation by the city authorities. Keeping auto traffic off the tracks, giving street cars precedence and other factors to increase efficiency of crossings, double berthing and other features cannot be put into effect by the company alone, but only with the consent of, or even by the sole action of the authorities. This emphasizes the community interest of the transportation problem and the benefits to be gained through co-operation.

So, is there not a double benefit to be derived from an organized, determined effort to solve such problems? The company, of course, benefits from increased earnings per car hour. The passenger is, in general, in a better frame of mind if he can get through the congested district with reasonable speed. But, in addition, the attitude of the general public is, it appears to us, very likely to be changed from criticism to sympathy and understanding at least, if it is allowed to see the careful analysis that is undertaken, and is made to feel that there is nothing more that can feasibly be done than is being done to provide the best possible service. We believe this to be the case in Kansas City, judging from local newspaper reports. The same remedies that solve the problem, if put in one at a time, do not attract attention, do not accentuate their effect. Publicity causes co-operation of the public and public officials, so necessary to successful traffic regulation.

We bespeak serious attention to problems of this sort and intensive effort toward the application of such clean analysis as has proven worth while in Kansas City.

Handling 50 Per Cent Greater Power Station Load With Nine Men Less

Simple Addition of Facilities at Wilmington, N. C., Which Greatly Enhance Efficiency of Plant Operation—This Installation Is Typical of Labor-Saving Practices Now Becoming General

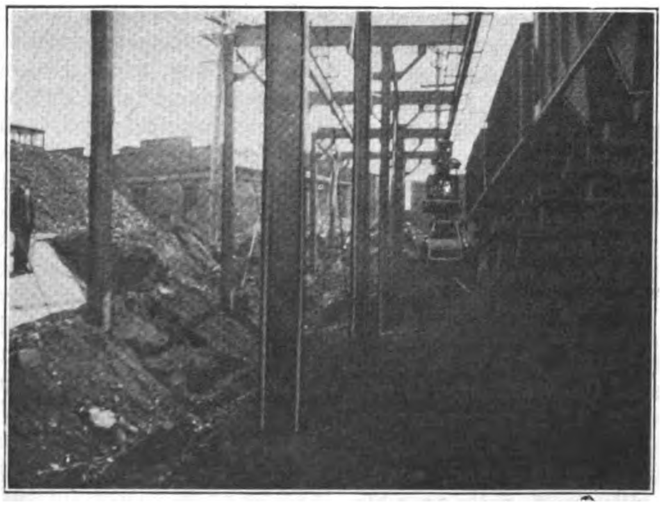


THE MONORAIL HOIST COAL-HANDLING SYSTEM AS SEEN FROM OPPOSITE SIDES OF THE UNLOADING TRESTLE

WHEN the small power plant becomes loaded to the point that its material expansion is imperative, the transition from the older hand-fired type to the first step in what will ultimately be a modern plant with stokers and coal and ash-handling and storage facilities usually begins. This characterizes the recent improvements made in the generating station of the Tidewater Power Company which supplies energy and street car service to Wilmington, N. C. Like most of the seaport cities, and particularly the Southern ones, Wilmington has grown abnormally during the war and since. The electric light and street railway service grew correspondingly so that the load on the local steam generating plant was greatly magnified.

There was space in the turbine room to install a new Westinghouse-Parsons 2,500-kw. turbo-generator unit in addition to the one 2,000-kw. and one 1,000-kw. turbine units and two old 400-kw. machines already there. But the boiler room, equipped with six 254-hp. and one 520-hp. Babcock & Wilcox boilers, was completely occupied so that an extension of 23 ft. on the end was necessary to house two new 600-hp. boilers of the same type. The old boilers were built for hand firing, and the company burned a great deal of sawdust and wood from local mills taken in exchange for power supplied to them, as well as dirty coke and breese from a gas plant, and slack coal. The use of wood was gradually being discontinued in favor of coal, as the contracts with the mills expired, because the wood was becoming too expensive. The coal that was used was handled into the plant in wheelbarrows and the ashes were removed in the same manner. This work and the actual firing and tending of the boilers required the services of eight men in three shifts respectively of four, two and two men.

The two new boilers were equipped with Westinghouse stokers and made to do the twenty-four-hour service, thus carrying the principal portion of the load. This large addition of capacity to the boiler plant meant a big increase in the amount of coal to be handled. To take care of that under the old methods meant more labor, but with labor costs continually mounting, the desire was to decrease rather than increase the amount of labor needed. So a coal and ash-handling plant was installed as described below, which, together with the stokers on the big boilers, made it possible to release nine men from the force required in the boiler room and to handle coal and ashes—six from the coal and ash-handling and three from the boiler room. The interesting part of this is that this reduction in labor was done despite a more than 50 per cent increase in load on the plant.

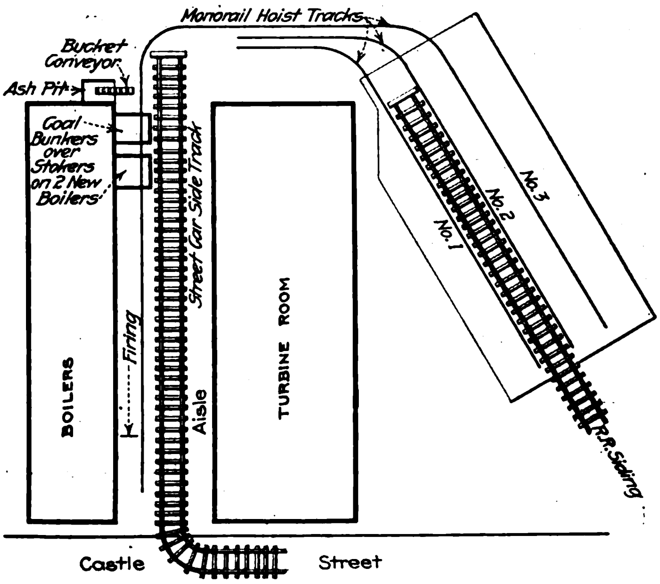


LOOKING TOWARD THE STREET FROM THE REAR END OF THE COAL STORAGE AREA

Before the expansion of the plant, there was provision for only a small reserve supply of coal. This of course had to be remedied for the larger plant, and it was done in conjunction with the arrangement for receiving coal and handling it into the plant. A small area of ground along one side of the power station was available for this purpose. To utilize it, the area was excavated down to the ground level at the rear of the station, which is about 15 ft. below that of the street in front of the area. A wood trestle was then built for the railroad side track, extending through the center of the area and long enough to receive simultaneously three cars of coal. Coal is received in side or bottom-dump cars and unloaded down through and on either side of the trestle. The excavated area provides a storage capacity of 2,500 tons, which gives a fairly good insurance of service continuity considering that the average daily consumption of the plant is 60 tons.

To get the coal into the plant from the storage pile, a Shepard Electric Crane & Hoist Company monorail hoist system was installed at a cost of approximately $18,000. The layout of this monorail system comprises a single track extending through the boiler room, passing over the bunkers directly above the stokers of the new boilers and out the rear end of the boiler room, thence curving around and branching into three tracks which extend across the length of the storage area. There is one of these tracks on either side of the unloading trestle and an extra track on one side of the trestle which is used for putting coal into and taking it from a reserve pile.

The hoist car may be operated over any of the three tracks by the operator simply throwing the switch, which is plainly seen in an accompanying illustration. Automatic stops are provided so that the car cannot run off the open end of the monorail if the switch is not properly set. The general layout is shown in the rough sketch reproduced herewith.

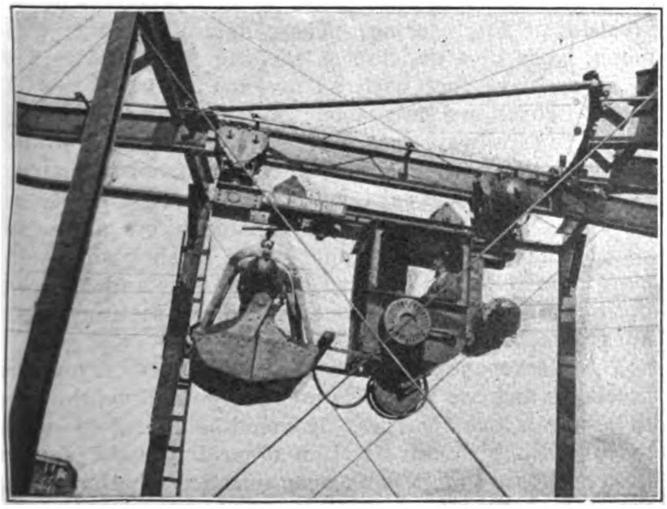


ROUGH SKETCH SHOWING THE LAYOUT OF FACILITIES AT THE WILMINGTON POWER PLANT

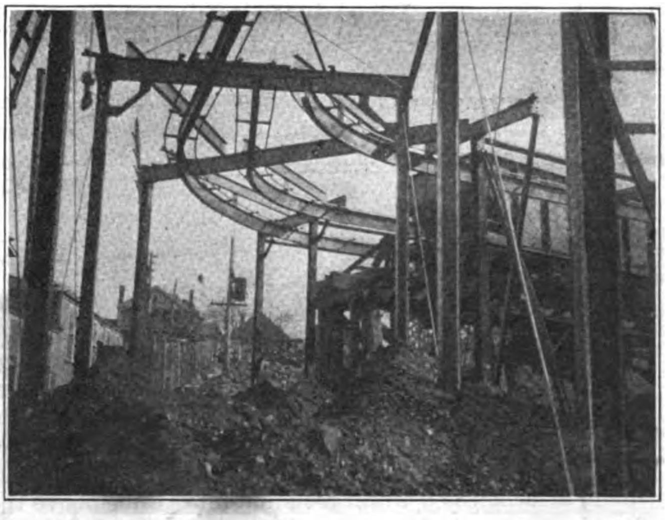
The hoist is equipped with a ¾-yd. clamshell bucket and three driving motors which operate on the 600-volt railway current supplied by means of two trolleys, one either side of the monorail. One motor drives the car along the system, another raises and lowers the hoist, and the third opens and closes the bucket. This equipment renders practically unnecessary the manual handling of coal. Some coal must be shoveled from underneath the trestle to make room for new shipments, particularly when it has been received much faster than used. But this condition is minimized by taking coal from underneath monorail tracks 1 and 2, with the hoist, and dumping it under track 3, provided there is storage space for it.

Since the monorail was extended all the way through the firing aisle in the boiler room, it is now used for bringing coal to the hand-fired boilers as well as to the new stoker-fired boilers, by simply lowering the bucket and dumping the coal on the floor in front of each boiler. As the hoist car enters the boiler room, it runs upon a Fairbanks scale balanced against the weight of the empty hoist and operator. The operator stops the hoist here and balances the scale against the loaded hoist. He inserts a card in a slot in the scale and squeezes two levers, and the weight of the coal is impressed or cut into the card. Totaling the readings on these cards at the end of the day gives the amount of coal burned in the plant. The amount burned in any one boiler can, of course, be kept separate for test purposes if desired.

The ashes from the hand-fired boilers are raked out onto the floor in the firing aisle from whence they are



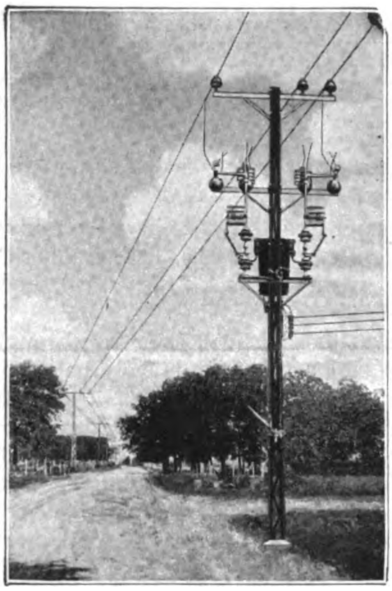
THE HOIST CAR PROCEEDING TO THE BOILER ROOM WITH ITS BUCKET OF COAL—THE THREE OPERATING MOTORS ARE CLEARLY SHOWN



THE MONORAIL SWITCH AT THE REAR OF THE POWER PLANT WHERE THE SINGLE RAIL BRANCHES INTO THREE DISTRIBUTING RAILS picked up with the monorail hoist and dumped in a car on the street car side track which extends through the boiler room firing aisle. The ashes from the stoker-fired boilers drop into ash cars in a tunnel beneath the furnaces, from whence they are removed to a pit just outside the building and from thence elevated by a bucket conveyor and dumped into a car standing on the track just mentioned, for hauling out on the roadbed for filling purposes somewhere on the railway system.

Farm Service From Interurban Lines Should Be Profitable

ELECTRIC interurban lines having an alternating-current transmission system can develop considerable farm business throughout the territory they serve in the same manner followed by transmission companies. At each farmhouse is installed a transformer with a complete switching, choke coil and lightning arrester equipment, as illustrated. The switch is preferably of an interlocked type, operated from ground level, the fuses being so located that they can be replaced by the farmer. In this manner the growing demand for electric service on farms can be used as an additional source of revenue to the railway companies. There has been a steady development during the past few years in apparatus for taking care of small consumers in this field, and this apparatus is reliable in every way.



POLE EQUIPMENT FOR PRIVATE POWER SUPPLY

Having Infrequently-Used Snow Scraper Always Ready

The Newport News & Hampton Railway, Gas & Electric Co., Hampton, Va., has little use for a snow scraper. But on the rare occasions when a snow storm causes trouble, a three or four-hour delay in installing a large scraper on a car is serious. Consequently, E. C. Kelly, overhaul shop foreman, endeavored to make a permanent installation of the scraper on a car which would involve an investment small enough to warrant tying it up continuously. The idea was of course advanced for the sake of having the scraper all ready on these rare occasions when needed.

A Root spring scraper was installed at a 45-deg. angle across the track on the bottom of a small four-wheel flat car, and the car was loaded with eight old car wheels to weight it down. The scraper is connected to a raising and lowering mechanism consisting of a chain, attached to a wheel mounted in a frame above the flat-car floor, which is turned upon its axis by means of a 3½-ft. lever.

Airplane Gives New Data on Air Resistance

Experience and Tests Show Only About One-third the Air Friction Assumed to Be Met by Electric Cars

AIR friction and the part it plays in increasing the duty required of a railway motor has always been an interesting subject to those engaged in railway motor application work. But while air friction does resist car motion it is only one of several forces that do this. It is therefore a matter of fundamental importance in the aeronautical field where it constitutes the sole resisting force to the forward motion of aircraft. During the war thousands of trained scientific workers all over the world studied the problems of aerodynamics and many millions of dollars were spent in airplane experimentation and development. It would seem, therefore, that some of the fund of information thus accumulated relative to air friction might be of value to the electric railway industry.

That air friction is an important component of train resistance particularly at high speeds has long been known. A very considerable amount of experimental work has been done in an effort to determine its exact amount for cars of different designs and a number of formulas for calculating it have been proposed. Possibly the most noteworthy work done along this line in the United States was that by the Electric Railway Test Commission at the St. Louis Exposition in 1904. The Berlin-Zossen tests made in Germany at about the same time also yielded valuable results. But in none of the work done on railway cars has there been available the test facilities, the money or the personnel available in the airplane experimental work.

Air friction, in the usual train resistance formula, is accounted for by a term involving the product of a constant based on test results and the square of the car speed. A comparison of six well known train resistance formulas shows that for a 40-ton car with a front end area of 100 sq.ft. running at the speed of 50 m.p.h. the air resistance terms in the formulas give results varying from 4.6 to 12.0 lb. per square foot. The average value for the six formulas was 7.36 lb. per square foot.

Data covering the air resistances of a large number of different types of fuselages, or the bodies of airplanes were published in a recent issue of *Mechanical Engineering*. These data reduced to a 50 m.p.h. basis give resistances ranging from 0.95 to 3.93 lb. per square foot with an average value of 2.24 lb. These figures are only about one-third of those given above for railway cars. As might be expected the shape of the fuselage, the projections from it and the openings into it have a marked effect on the air resistance. For instance the resistance on a certain stream line body with a pilot's seat is about one-third more than the same body without the seat and its opening into the body. Fuselages with round section stream lines give the lowest resistance.

The discrepancy between the resistances of airplane fuselages and car bodies is quite large and would seem to be worth investigating. It would be absurd of course to subordinate to air friction other important factors in car design, but it is an open question whether all of the attention has been given this factor that it deserves, particularly in cars which have been designed for high-speed service.

Neglected Opportunities In Electric Railway Transportation

Lower Cost of Passenger Fares and Distribution of Necessities Possible Through Electric Package Freight Transport, City Merchant Delivery and Line and Terminal Interchange with Steam Roads

Wanted—a New Outlook and a New Deal

By J. R. BIBBINS
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PERHAPS the most pressing question before the electric railway industry today is to devise ways and means for increasing its revenue producing business by all justifiable means and this promptly. If the widely heralded present day policy of "co-ordination," as applied to transportation, has definite meaning, it will not overlook the great possibilities of the established electric lines as a factor in the movement of fast and perishable freight, express and other commodities in which rapid dispatch is urgent, and in a more intensive use of electric railway mileage, particularly in terminal districts and through interchange with steam roads.

> THE electric railway industry, only about twenty-five years old, comprises throughout the United States a trackage of nearly 50,000 miles and a capital investment estimated in excess of $4,000,000,000. This mileage is nearly equal to the entire steam railroad mileage of the southern district of the United States and not far from that at the densely settled eastern district. Its revenue passenger traffic is over ten times that of all railroads of the United States today. In passenger miles (passengers carried one mile), its traffic is equal to that of the entire United States railroad traffic of ten years ago and is 80 per cent of the railroad traffic today based on an average journey of 2.5 miles for electric and 33 miles for steam passengers. It is variously estimated that a total of $200,000,000 to $600,000,000 new capital is required per year for normal progress of the industry. While the electric rate is probably 2 cents or under per mile, the steam rate is 2 to 3 cents per mile. On the steam roads the freight earnings are nearly three times passenger earnings; on the electric railways, but a small fraction or negligible. But the cost per mile of electric line exceeds that of steam on account of expensive city construction. In 1916 the property account of the United States railroads averaged about $2.80 per $1 of annual gross revenue; the electric railways require about $3 from passenger business alone, although capable of adaptation to freight transport also.
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> J. R. BIBBINS.

Up to the present time, the electric roads have been largely neglected in the public mind as other than passenger carriers. Probably the majority have been located and built primarily for such passenger travel. However, there exists in this country a large mileage of interurban electric roads constituting a valuable carrier network which could be utilized far more than at present, as secondary carriers supplementing rather than competing with the steam roads. A few have developed freight handling business extensively, notably the Pacific Electric System.

The logical use of the electric roads to their fullest extent involves the following:

1. A public policy which recognizes the duty of all railway operators to utilize the investment to the best advantage, thus ultimately reducing the unit cost of all service.

2. A railroad policy which recognizes that electric lines have a very large service capacity for supplementing steam road service, with investment already made and at a cost of service probably far below that which would be necessary for the steam roads to secure equivalent facilities.

3. The organizations of electric railway systems within large cities for the purpose of conducting during light hours of traffic a transfer or local package business, especially between the downtown wholesale and retail districts and outlying residential points of distribution.

4. The organization of the city terminal systems, including interurban terminals for the purpose of developing a less concentrated terminal distribution therein than is possible with steam terminals without prohibitive development expense.

5. Interchange with steam roads at strategic points where the electric lines can become feeders to or connecting carriers for the steam lines and can thus secure for local merchandise a more convenient and efficient city entrance already possessed by the electric lines.

6. Incorporation of electric lines into a universal Terminal Belt Line service, together with strategic parts of steam lines, in order to promote the most efficient means of internal city development, freight interchange and dispatch and possibly the ultimate electrical operation of all such service within the city.

7. Electric roadbeds and equipment suitable for this class of service, so as to avoid the objection of being a highway nuisance.

8. A sufficient quota of electric equipment to enable electric lines to take their proper place in this carrier equipment pool, or else an equivalent contribution to such quota on a proper rental basis.

9. Express stations so located within the various city and district centers as to be accessible and operated on the "union freight station" plan, thus simplifying the responsibilities and operations of the shipper, and encouraging his trade.

10. Schedules so arranged as to concentrate the electric delivery and express business during the light hours of city passenger travel, thus avoiding the prin-

cipal source of opposition of public authorities in the use of thoroughfares where this is necessary.

FIRST—RECOGNITION OF THE NECESSITY

Perhaps the most essential need in this program is the encouragement of the proper frame of mind and the necessary co-operation of city authorities and steam railroad executives and with the electric railways as the intermediate link. It is a matter of common knowledge that the general attitude of hostility of city governments and well-meaning but often misguided citizens toward the electric railways has taken the definite form of open opposition to any plan enabling electric railways to depart in the least from the specific purpose expressed in the original ordinances. This has practically restricted the railways to a passenger carrying business. In most cases, however, when these franchises were assumed, the usefulness of the electric lines as agencies for rapid transport of packages, freight and perishables was not generally understood by either party to the bargain.

In the interim, the cost and difficulty of internal city transport by trucks and motors has increased tremendously. Also, with the growing traffic upon the steam railroads, and the checking of growth in facilities due to impaired financial credit, the problem of l. c. l. or package freight transport adequate for the needs of the rapidly growing cities, has been increasingly difficult of solution. In a number of cities, carload "clearing systems" have been organized (notably the Belt Railway Clearing Yard in Chicago, with capacity of 10,000 cars per diem), but the problem of clearing l. c. l. business, and especially of handling perishable food produce, rapidly and conveniently, as needed by our large cities, has grown without commensurate improvements taking place in more rapid methods of distribution within the cities, both with respect to tracks and numerous distributing substations.

It is pertinent for every student of economics to ask the question—how long can this expensive and burdensome system of intra-city transport and distribution of dispatch freight continue under the present plan? This is one phase of the problem to which this inquiry is directed.

Obviously, an "entente cordiale" must be established among the three parties—city, electric railways and steam railroads—with a full understanding of the basic necessities and possibilities before any decisive improvement can take place. Given such an understanding and a consequent desire to utilize to the fullest extent all transport agencies, in the effort to simplify and put to the best use all existing investment in standard gage tracks and facilities throughout the terminal districts, whether steam or electric, then we may form some comprehension of the future.

Electric Railway Mileage: Chicago has over 1,250 miles of standard gage electric tracks (nearly 200 miles of which are elevated), extending radially and laterally throughout the entire area of some 200 square miles; Brooklyn and Boston have each about 600 miles, surface, elevated and subway; Pittsburgh has 600 miles, and San Francisco about 350 miles. The rapid transit mileage is especially important, being upon private right-of-way and strategically located.

In general, the city tracks extend from the retail, wholesale and railroad freight house districts into all parts of the city, with a radius of haul of from 10 to 15 miles. In many of these cities also, interurban lines radiate in all directions into and through the producing suburbs and countryside upon which the city should be dependent for its main consumption of farm products. This extremely effective system of local transport is superimposed upon a large system of railroad terminal lines, freight stations, substations and belt railways, the latter having developed along exclusive lines of frequent and convenient interchange, but between steam roads only.

On the other hand, the electric railway system is practically isolated as regards its utility in this general scheme of city freight transport, which applies not only to the city railways, but also to the interurbans. In fact, both the cities and the steam railroads have heretofore generally pursued a policy of deliberate and rigid exclusion of the electric railways from fast freight carriage, the former by restricting the city lines exclusively to passenger service, the latter by refusing to interchange freight with the electric interurbans except in isolated cases and where both steam and electric lines were jointly owned or controlled.

Interurban Development: Only the long distance interurbans have measurably succeeded in utilizing their investment to some extent for freight carriage when their contracts with the cities have been broad enough to permit it. In the Middle West, particularly, this was foreseen and, as a result, some of the large interurban systems, such as those radiating from Detroit, Cleveland, Columbus, Minneapolis, etc., actually have developed a considerable fast freight business within and between cities served by their lines. Detroit and Indianapolis are conspicuous examples of the possibilities in this section, and express business is now being conducted over these lines from large well equipped city freight stations, with regular schedules, in suitable enclosed equipment, operated during non-rush hours in and out of the city. This fast freight service extends in many cases within a radius of 100 to 300 miles, under operating agreements with connecting electric lines.

As a specific example, in one of the cities above named, the electric interurban lines actually developed this fast freight service to such an extent as to handle over 80 per cent of the milk business in a large section of the city, with a large saving in time of transit and expense in local distribution by the merchandizing companies, not to mention the saving to the city in the wear and tear on pavements by long trucking hauls from downtown railroad freight stations and the important saving in this particular product through more rapid transit and delivery.

In striking contrast, the Northwest Chicago suburbs, containing vast truck gardens, daily send their hundreds of tons of food produce by vehicle 15 miles to the congested downtown wholesale market, from which it is again hauled out by the retailers located from 10 to 15 miles distant, throughout the city.

SECOND—POSSIBILITIES OF CO-OPERATION

If the electric railways of the country, with their capital investment of over $4,000,000,000, of which possibly three-fourths represent investment in tracks and facilities practically unused during non-business hours, could be utilized as a supplemental distributing agency in the general transportation plan, it is difficult to form a modest conception of the benefits to be derived jointly by the public, the cities and by the carriers themselves, both steam and electric, in resulting economies over the present wasteful and complicated system of city distribution. For the electric lines, there would result new revenue, utterly unattainable under the present operating system of passenger transport, at no additional cost to the city or to the public, and little to the carriers. The economy would be clean-cut. For the city there would result a very large decrease in wear and tear on city streets by vehicles and in the inevitable congestion which results from concentrating within very limited hours the enormous vehicle traffic in the streets of the busy districts. For it is a fact that trucking traffic actually superimposes upon the rush hour peaks of passenger travel, resulting in the appalling conditions which are daily encountered in the outskirts of the business district of Chicago and elsewhere.

This situation, as time goes on, must become worse rather than improve, as no effective methods have yet been discovered or put into effect either by cities or the carriers, to radically improve the situation. In fact, the consistent opposition of the teaming and trucking interests themselves to any such improvements, is an important factor.

Merchant Delivery: One great advantage in using electric lines for internal city transport may be mentioned in the case of such hilly cities as Pittsburgh, where practically all of the wholesale and retail business as well, is conducted in a small congested triangle in the bottom lands at the intersection of the Alleghany and Monongahela rivers. From this triangle, all of this merchandise is daily trucked uphill to the residential districts, which are located principally upon the highlands (300 to 500 ft. elevation and with hauls of 5 or 10 miles). Even in large flat cities like Chicago, the same conditions exist, except that in place of the steep grades, the hauls are longer—running as high as 15 to 25 miles.

In Pittsburgh, several logical sub-centers or delivery points are already established in the form of little cities within the big city, such as "East Liberty," which fact increases the opportuneness of the proposed plan. But in all of these cities, delivery substations could readily be established at the outlying carhouses or along the electric lines from which local deliveries could be made quickly and at much lower expense than with the present haul from "downtown."

This initial cost of transportation under the existing plan of course is borne by the ultimate consumer, which is the public, and finds its ultimate expression in the so-called "high cost of living." It should be re-labeled "high cost of doing business."

Industrial Service: In the industrial field, another great opportunity for increased usefulness exists for the electric lines by delivering during non-rush hours express consignments to various industries throughout the city, perhaps isolated from railroad service, such for example as spare parts for automobiles. In fact, a large business of this nature is now being done by some systems in and between towns and cities reached by interurban lines. But this business could be greatly expanded by the further co-operation of the interurban and urban railway systems, which of course would only be permissible through assent of the city authorities to this general plan.

As an example of extraordinary co-operation between steam and electric lines in electric freight service, the city of Syracuse may be mentioned, in which the West Shore steam main line is practically given over to the third-rail electric, which operates regular passenger and freight schedules to the east, including three classes of service at different rates, viz: (1) terminus to terminus, consignee doing his own trucking; (2) station receipt and trucking delivery; (3) receipt and delivery by truck at both termini.

THIRD—PUBLIC POLICY

In order to bring this system of electric distribution about on an efficient operating plan, the city authorities should recognize the values in this idle investment in tracks, power stations, and other facilities, which could be used to produce additional railway revenue and thereby relieve the passenger transportation of a very considerable part of the investment burden. It is evident that in no simpler way would it be possible for the railways to keep down to a moderate price level the passenger fare which is now so perplexing a problem.

The public should be informed concerning the basic costs of transportation not only for its daily street car rides, but also for its household commodities, and that such a plan is not designed to guarantee a longer lease of franchise life (to a supposedly selfish monopoly), or undue return on its investment, without compensating return to the public.

To the steam railroads it should be demonstrated that a system of local express distribution is already available for reasonable use, far more extensive in character than they could develop as along present independent lines.

And the electric railways should co-operate in a campaign of education in a broad-minded public spirited way, endeavoring so to arrange schedules as to interfere as little as possible with normal passenger transportation and without such use of the city streets as to incur the opposition of the public.

It will be necessary to design a complete system of routes and delivery points with suitable substations and to serve them on schedules reasonably suited to the needs of the public, not only for food produce but for retail merchandise. It will be necessary to provide equipment suitable for this freight carriage, which will not be unsightly or noisy, and to maintain the roadbed in an efficient way. It may also be necessary as traffic intensifies, to provide independent rights-of-way for delivery trunk lines. This could well be worked out in connection with existing elevated and subway lines or possibly with steam railroad trunks in some instances, assuming that a spirit of co-operation exists.

The electric railways cannot, of course, expect to utilize the city streets for freight transport, except under reasonable restrictions and schedules. But in the great majority of cases, the existing investment can be so used without serious disadvantage to the public or the city, supplemented, as business grows, by more independent trunk routes. It is believed that with reasonable co-operation and publicity, the permission of the city authorities can be secured as a part of the general problem of modern city planning or zoning, which is now under active discussion in many cities.

FOURTH—STEAM ,ROAD INTERCHANGE

Possibly half of the electric railway interchange of the United States is interurban. A study of the district maps indicates a very extensive network of these interurbans connecting the various centers of population, especially in the Middle West. This network represents investment originally made largely for passenger service. But it is a fact that the use of automobiles in the countryside has so reduced the revenues of the interurbans as to render it difficult if not impossible for them to live except for the through business from city to city. Many of the interurbans were built to develop the countryside, with perhaps only one large terminus. As a result of this automobile invasion, the principal support anticipated from the countryside has gradually waned and net revenues have diminished to the vanishing point. This has made necessary a reduction of service schedules, which unfortunately but necessarily has further encouraged the use of automobiles. Looking into the future, the "good roads" program of the various states spells further diminution of revenue and increase of private automobile transportation in the countryside. There is now one automobile to every five families and to every nineteen persons in the United States—a total of 5,300,000 motors.

It is therefore obvious that this interurban investment, if it is to be conserved, must look to other lines of business. The interurban network intersects the steam railroad network at numberless points and the interurbans have in the majority of cases been projected into territory which the railroads have not and could not economically develop. But, assuming a more friendly policy between steam and electric lines, should it not be possible for these interurbans to be used as supplemental traffic lines or branch line connections to the steam roads? This will require a new "open door" policy of freight interchange between steam and electric lines at convenient designated points, possibly with a reciprocal "right-of-user," according to location, on a reasonable mileage or traffic basis.

And it would seem an eminently proper policy for the United States Railroad Administration, in the interests of conservation, to authorize a survey, at least of this interurban network in the effort to solidify the general transportation system, promote short-routing and reduce the delays in both main lines and terminals with which the steam roads are now grappling. If the roads are, in fact, to be organized into regional groups, there is no reason why interurbans should not receive the same consideration instead of being permitted to decline into a state of disuse or complete abandonment.

Railroad Policy: It has been the obvious policy of most steam railroads to ignore the electric interurbans entirely as an element in transportation. They have uniformly refused interchange connections except where the electric line had the courage and persistence to take their cases to the courts for redress. However, even with these interchange connections established by judicial decrees, there has not existed that cordial business relationship necessary for the full usefulness of the facility.

The principal argument advanced by the steam railroads is that the electric lines do not provide roadbed or equipment suitable for such reasonable interchange traffic and that the railroads are obliged to carry the entire investment in rolling stock which the interurbans would thereby be enabled to use without compensation, in other words, that the electric lines are a "parasite" of the railroad business. Consequently, the steam railroads have proceeded with their independent development, the acquisition of enormously expensive terminals and have in many cases, loaded themselves down with branch lines which never have paid and cannot pay a reasonable return on the investment.

Railroad Branch Lines: In fact, many railroads are now confronted with the "branch line problem," and owing to the necessary standardization of equipment, they cannot operate their expensive trains by a sufficiently frequent schedule to realize on their investment. In numerous cases, the steam railroads have developed branch lines into territories which have so changed in character that the original traffic has disappeared, for example, lumber, oil and mining districts, which are now completely exhausted, leaving only a small local freight business for which, alone, the lines would never have been built.

Thus both steam roads and electric roads are confronted with a situation of non-paying lines, particularly branch lines, which operate as a serious drain upon the revenues of the established main lines, and which cannot be abandoned because of the injustice to the people of the regions affected. The electric roads cannot finance their pro rata share of rolling stock because of the arbitrary attitude of the steam roads, and the whole situation is involved in the existing system of car rentals, which is of course based upon the theory that each road contributes a reasonable pro rata share to the rolling stock pool of the country according to its mileage and traffic.

Fair Basis of Usage: However, it would seem that an impartial analysis of cost-of-service in regard to rolling stock and terminal switching would reveal some reasonable basis of rental whereby the existing differences as between the electric and steam roads could be adjusted, at least temporarily, and until the electric roads could develop their traffic and terminal facilities and, with their added revenue credit, finance their necessities in new rolling stock. In fact, some of the stronger interurbans stand ready to take this step. The principal difficulty lies in adjusting and harmonizing the points of view and in correcting the arbitrary attitude of railroad and rate policy.

A Concrete Case: The possibilities of joint action are well illustrated in the extraordinary development of an automobile manufacturing city of the Middle West, which, within the present century has grown from a small country town to a city of 100,000 inhabitants and has doubled its commercial activities within about eight years, i. e., at the same rate as Cleveland, Ohio. The city authorities are bending every effort toward the establishment of an industrial belt line around the city, which will not only serve to by-pass through freights but also to develop a new industrial city of a capacity equal to the existing one.

This city is served today by two steam lines and two fast electric interurban lines. The steam road situation has reached a point of complexity and shortage of service at critical times which requires that the roads must now depart from the previous "way station" plan of operation to a co-operative terminal system with adequate clearing and interchange facilities. The electric roads handle some intra-city fast express, but both interurbans could enter such an enlarged terminal system to great advantage and also could operate as connecting links to other existing railroads which now have no terminal facilities in the city.

The steam railroads naturally desire to retain their strategic advantage as regards freight transportation, but the city authorities cannot afford to promote further development on this "way station" plan, which would unquestionably mean a restricted development. But, by using the electric lines as a connecting link, the city could secure a large increase in its pro-rata share of special automobile cars from one of the largest trans-continental railroad systems, with which the electric lines would interchange. This special automobile equipment is essential to the industry. However, under the existing plan of railroad operation the city is practically restricted to being only an "industry" on the lines of the two existing roads now serving the city, and the industries are restricted to the pro rata equipment of these two roads.

Here is a typical development situation and a contrast of conflicting interests which is probably duplicated in most cities. For the electric roads to take their specific grievances to the courts and commissions will not solve the problem in time. In fact, in this case the electric lines have already won a decision establishing a steam road interchange, but without results.

WANTED—A NEW DEAL IN CONSERVATION

It therefore appears to the unbiased observer that a new policy is urgently needed in American railway development. In no phase of our national activity is there greater need for "conservation" than in conserving jointly the existing investments in railroads and railways. At recent national conferences in Washington for the consideration of the welfare of both the steam railroads and the electric railways, no definite proposals have appeared urging co-operative effort and development as proposed in this argument. Each group of interests has seemingly neglected this proper source of economy and additional revenue with existing investment, which seems to offer such great possibilities. In the meantime, both interests are seriously handicapped in their necessary growth, and terminal operation in the large cities yearly increases in difficulty and complexity. Even under the co-ordinating influence of the United States Railroad Administration, only minor improvements and perhaps a beginning along major lines have been possible within the short period of its control.

For the Associations: It would therefore seem an eminently wise and prudent policy for the principal railroad and railway associations to join hands in the further study of this problem of co-operation, and, through joint sub-committees, to conduct a searching investigation of the essential factors involved in carrying out such a program as herein discussed, possibly along the following lines:

A SUGGESTIVE PROGRAM

1. The physical plan of railroad and railway network and the possibilities of more intimate co-operation through interchange, short routing, etc.
2. The physical plan of the respective terminal systems and the possibilities of co-operative use to expedite terminal movements by interchange, belt lines, transfers, etc.
3. The physical plan of the electric urban distributing lines and the possibilities of developing them for expediting internal transport during proper hours of the day.
4. The franchise relations with the cities and the legal and practical modifications in utility and public policy required to bring about the more intensive use of the urban lines for city transport under proper public regulation.
5. An educational policy designed to apprise the public of the opportunities for further service and development of the railways based upon a proper allocation of the costs of this additional service and the possibilities of continuing by this means, a moderate level of passenger fares so as to avoid the distressing necessity of establishing a fare so high as to discourage travel, interfere with proper city development, destroy outlying property values in the large cities through zone fares and encourage automobile competition with the serious problem of downtown traffic congestion.
6. And finally, the basis of a reasonable co-operative agreement between steam and electric roads for a less restricted interchange and usage of existing strategic investment in line and terminal facilities, fair to both parties, so as to prevent the unnecessary wastage of existing investment, uneconomic extensions along competitive lines and the needless restriction of general growth.

While this program may appear to some too broad in scope and too radical in character to draw serious attention, it is nevertheless patent that half-way measures in the past have failed of achievement. With a new deal, broad enough in vision to challenge and hold public attention, with a possibility of definite relief by lower fares and lower transport costs of city necessities, the foundation will have been laid.

In the panel is a definite legislative recommendation somewhat along the lines of policy advocated.

Recommendation of Street Railway Investigation Commission of Massachusetts, 1918

3. *Trolley Freight:*

This Commission recommends that the authority to grant permits to street railways to become common carriers of newspapers, baggage, express matter and freight, now vested in the local authorities, shall be transferred to the Public Service Commission. Proposed legislation will be found in Appendix A, 3.

Be It Enacted as Follows:

Section 1. A street railway company upon the petition of any interested party may be authorized to become a common carrier of newspapers, baggage, express matter and freight in such cases, upon such parts of its railways, and to such extent as the public service commission after public notice and a hearing shall determine that the public interests and convenience require. Any street railway acting under authority so granted shall be subject to such regulations and restrictions as said commission from time to time may make, and shall be subject to the provisions of all laws now or hereafter in force relating to common carriers in so far as they shall be consistent herewith. The authority conferred upon any street railway company by virtue of the provisions of this act may be modified or revoked at any time by said commission if it shall determine upon investigation and after public hearing that the public interests so require.

Section 2. This act shall take effect upon its passage.

Spacing of Car Stops

Reasonable Average Spacing of Traffic Stops and Fare Stages Is Not Precluded in Attracting Short Rider at Short Fare

THE matter of stop spacing and location necessarily is extremely important in a system of graduated fares which is based upon securing a large proportion of riders who have less than 1 to 1½ miles to go. We cannot reasonably expect a person to ride if one-fourth of his total journey along the route of the railway must be traversed on foot. How then has this problem been solved on British short-ride tramways where the cars seat up to seventy-eight passengers?

The gratifying answer is that in respect to stop spacing, the British tramway is frequently better off than the American street railway. Compulsory stops for safety purposes are comparatively rare, while the now-absurd firehouse stop is apparently unknown. Usually, the compulsory stops have been fixed by the Board of Trade or the railway itself and not by local bodies. Traffic stops are generally of two sorts: Stops at fare stages which are made regularly because they are natural traffic-gathering points, and stops between stages, which are optional or permissive. There will also be found, of course, certain points, as at large stores, where stops are made regularly during business hours.

WAITING ROOM AT CATHART AND BATTLEFIELD ROADS, GLASGOW TRAMWAYS

An examination of the average spacing between the points at which cars will stop for passengers proves that the British combination of short-ride fare and large car has not had any worse results than in the United States and Canada. In truth, the following table shows that the spacing in the larger cities like London, Glasgow and Leeds is just what we would like to have to meet the suggestions of the recent Fuel Administrator:

SPACING BETWEEN STOPPING PLACES IN BRITISH CITIES

Aberdeen	390 to 633 ft. Average, 471 ft.
Glasgow	Under 600 ft. to 900 ft. with average of 600 ft.
Belfast	Average spacing, 600 ft.
Dublin	Average spacing, 600 ft.
London	Average spacing, 660 ft.
Leeds	Pre-war, 540 to 750 ft.; war, 660 to 900 ft.
Reading	450 ft. to 600 ft.

In the case of the London district, we must not forget that a third cause making for the establishment of more stopping places is the competition of the motor bus.

The reason why British tramways are no worse off, when not better off, than ourselves in the spacing of stops does not lie wholly in their greater freedom from obsolete regulations. It lies largely in the fact that they have always had to examine the matter of stop location from the vital standpoint of effect on the attraction or repulsion of the short rider. Thus arose the basic policy of locating fare stages at traffic-gathering points rather than adhering to mathematical equality. In one city, for example, a very short but effective fare stage was made between the base and a point just beyond the crown of a hill! To a lesser degree the same policy of traffic building is followed in setting the permissive stops.

SHORT-RIDE FARES REDUCE RIDING HABIT

Where short-ride fares are in vogue, as in the United Kingdom, it is known that people will walk a certain distance to save part of the fare. Hence a considerably longer stop spacing is allowable just preceding and just following the fare stage inasmuch as most prospects would ignore these in any event. On the other hand, this spreading can be wisely offset by closer stops in the business district where every merchant is jealous of his vested (?) rights in car stops. The length of walk which people will take to avoid paying higher fare will depend upon the distance between the fare stages which range from ⅜ to ¾ mile, upon the increments (½d. or 1 d.) to the base fare, upon topography, upon weather, upon the prominence of car-stop signs and, not the least, upon the psychological impulse to ride, *ride*, RIDE created by the passage of cars at frequent intervals. From American experience, we know that in order to save a second 5-cent fare many people will walk distances of more than a mile.

The provision of a waiting room at fare stages or even at some prominent intervening stop is often good policy. People like to sit down in an attractive place for a minute or two. Even if they stop only for a newspaper, tobacco or candy, they are better prospects for riding. Glasgow, despite its marvelously frequent service and extremely low fares, has not disdained the installation of a couple of waiting rooms. One of these is illustrated. In Continental cities glazed waiting rooms are quite an attractive feature of this form of traffic creation.

One may say with confidence that skip-stop operation would have remained a permanent feature in more American cities on its sheer benefit to the rider had the spacing of stops been tempered by the need for attracting the short rider. As it proved, the skip stop has had the greatest success and permanence in those cities where the stops were located only after a study of on-and-off traffic instead of the use of a slide rule in an office. An average spacing of 600 to 660 ft. between stops does not preclude variations from 300 to 900 ft., provided it is clear that such variations will mean the greatest good to the greatest number.

Trolley Car Accidents in New Jersey

The trend of the times in accidents is shown by the following table prepared by the Public Service Railway:

	Autos	Wagons	Pedestrians
1917	4,815	2,341	769
1918	6,048	1,985	780
1919	7,297	1,438	645

Kansas City Studies Congested Lines

Analysis and Report Is Made by John A. Beeler—Remedies Suggested Are Directed Toward Speeding Up Traffic on Heavily Loaded Lines

KANSAS CITY has a serious problem in its surface transportation in the retail district. In the first place, the retail business and office buildings are concentrated within a comparatively small area, bounded approximately by Seventh and Thirteenth, Wyandotte and McGee Streets. The situation is further aggravated by the rugged topography of this very district. Heavy traffic must be carried through this district, and, while there are several available north and south lines, there are only two east and west lines, Twelfth Street and Eighth Street. Both of these, moreover, penetrate to the large wholesale district on the west side, the Eighth Street line going to Kansas City, Kan., and they carry much through traffic from the large residential districts in east and southeast Kansas City, Mo. All of the streets are narrow, except Grand Avenue, a north and south street, and traffic in the whole district has been growing sluggish. An extended analysis to search for remedies was decided upon, and the Kansas City Railways called in John A. Beeler, a consulting engineer of New York, to solve the problem. He divided the work into parts and has recently made the first two sections of his report, those dealing with the most serious problems of (1) Twelfth Street and (2) Eighth Street. That which follows is largely an abstract of these reports.

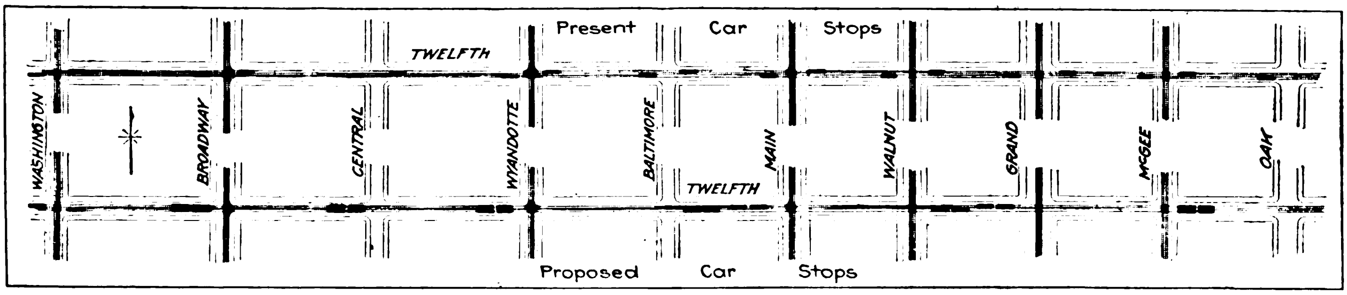


DIAGRAM SHOWING OLD AND NEW PASSENGER STOPS ON TWELFTH STREET

CAUSES OF CONGESTION

A cause which contributes much to the congestion is the slow movement of all traffic due to the large number of vehicles, both parked and moving, and the slow loading of street cars and jitneys. There is also considerable delay in getting the cars and jitneys moving when they should proceed, caused by one or more passengers attempting to squeeze into an already overcrowded conveyance and preventing the doors from closing. Meanwhile traffic is blocked.

The practice of running vehicles on the car tracks and stopping them immediately behind cars at loading zones is another factor of importance in slowing down the movements. This prevents the car following from coming up close behind the leader, and absolutely prohibits it from loading or unloading behind the first.

From tests made of street car speeds in the business district the slowest movement is found to be on Twelfth Street between McGee and Wyandotte. It varies from a maximum of 4.08 m.p.h westbound, down to as low as 1.58 m.p.h. eastbound in the same period, between 5:00 and 5:15 p.m. The slowest speed was recorded when the smallest number of cars passed eastbound, while some of the highest speeds are obtained with the largest number of cars passing, showing that the congestion cannot be due to the large number of cars put through. The difficulty is, however, caused by slow loading, and unloading of passengers, vehicular interference and excessive car stops. On Twelfth Street between Washington and Oak there are now ten passenger stops and one safety stop eastbound, and ten passenger stops westbound. This is an average of 15.8 stops per mile, which is twice the number desirable for a street of this character.

Counts of passengers boarding Twelfth Street cars in the downtown district show that the average number boarding eastbound cars at each stop runs as high as eighteen passengers per car in the evening rush. The total for the four principal stops shows that the average eastbound car in the evening takes on over 48 passengers in this district.

The heavy loading is accompanied with excessive delay and is to a considerable extent responsible for the slow speed mentioned above. One difficulty is fare collection. The present 7-cent fare is slower to collect than a 5-cent fare, and steps to rectify this should be taken. The movement of passengers in boarding the cars is slow because but a single stream is loaded at each end. Then the numbers getting on at the two ends are seldom equal, so that one door is generally open long after the other is closed. Usually the crowd at the rear door is the larger, as this is the entrance habitually used throughout the day. There is no collector at this end, and the conductor is inside the car several feet from the door where his view is obstructed when the platform is crowded, so that he is not always certain when the step is clear. Therefore he does not close the door and give the signal to proceed promptly.

Another difficulty is from patrons who are admitted after the door has been closed. Observations show the rear door has been opened as many as four times to admit passengers at one stop. Due to this uncertainty the traffic officer cannot know when the car is ready to proceed. It ends in his giving the right-of-way to the opposing direction, frequently holding the car long after it is ready to go.

To ascertain how much of the time in the rush hour the intersections are actually in use, a count was made at Twelfth and Main in the afternoon rush. Cars running east and west used the intersection but 15 per cent of the time, and the north-and-south cars used it but 20 per cent of the time. The total time during which cars were in the intersection was 35 per cent of the hour. A striking feature of this exhibit is that there were only eight times that east-and-west cars passed in the intersection, and only six times did north-and-south cars pass. Out of a total of 120 cars passing in the hour observed only four times did cars follow each other without the officer signalling traffic from the opposing direction.

These figures indicate that without any change in the methods and with no attempt to pass two cars at once, over twice as many cars could be moved across the intersection, leaving ample leeway for the inevitable loss of time when directions are changed. If cars move in both directions at the same time this figure could again be doubled. With cars passing in pairs as recommended below there would be a further gain, so that from four to five times as many cars can be put through this intersection as actually passed.

MEASURES FOR RELIEF

To relieve the serious congestion on Twelfth Street, the first thing to do is to get the cars moving faster through the business district. This can be accomplished by the adoption of a number of measures of relief, as follows:

1. Stopping places in the congested zone must be relocated and combined.
2. Double-berthing must be resorted to at all stops on this street in the business district.
3. Vehicles must keep off the car tracks and must move in the path between the right side of the car and the curb.
4. Street cars must be given precedence by traffic officers. They must be passed across the intersections in pairs and simultaneously in both directions whenever possible.
5. Automobile parking must be limited during the day and prohibited in the rush hours.
6. Additional street collectors must be employed so as to load a double stream of passengers at the rear ends of cars.
7. Street collectors must see that car doors are closed promptly when proper loads are on the cars.
8. Cars must stop but once at each passenger stopping place, and after the doors are once closed and the car ready to proceed the doors must not be opened again.
9. Car riders must assist by using street car tickets or having exact change ready, and by presenting transfers right side up and unfolded.
10. So far as possible cars should be operated on regular headway. Railroad crossing delays must be avoided or their effects minimized as far as possible.
11. The front doors of the street cars must be remodeled so as to permit two streams of passengers entering or leaving simultaneously.

RELOCATION OF PASSENGER STOPS

The present and proposed passenger stops at each intersecting street are illustrated in the diagram. In this way the stopping places will be combined for greatest efficiency. It will be necessary for some patrons to walk a few feet farther, others will walk a shorter distance, but all will be benefitted by the increased speed of the cars. Patrons will be concentrated at a smaller number of points, and while each stop made may take slightly longer there will be a material reduction in the total length of time required to ride through the business district.

Reference to the diagram shows that the stop locations recommended have been chosen in general so that the cars will stop before reaching street intersections. No passengers should be taken on except at the prescribed stops. Then when a car approaches the intersection the traffic officer, knowing it is ready to proceed immediately, can stop the opposing traffic, thereby permitting the car to cross the intersection without delay. This will obviate the necessity of bringing the car to a full stop as at present. Double berthing has been provided for all stops within the congested section.

The exact points at which the cars will stop should be indicated by distinctive signs placed along the curbs or overhead. These should be placed so that the car riders will know exactly where to stand while waiting, so that the minimum time will be taken in getting on the cars when they arrive.

REGULATION OF VEHICLE TRAFFIC

The practice of allowing vehicles to run on the car tracks is a cause of much of the congestion now existing. This prevents cars from double-berthing and in consequence makes the additional wasteful stops and slower movements of all traffic. It has already been pointed out that this practice rarely helps the vehicle driver himself, as he is likely to be stopped behind a car when he might have proceeded along side. Strict adherence to this rule will be of distinct benefit to everyone.

The street cars, owing to the necessity for loading, are likely to be hampered in getting away quickly from the intersections, unless some means is adopted of having the car always ready to move. The locations of car stops recommended provides for this by making the loading at such a point that when the car approaches the traffic officer he knows that it can move across the intersection immediately on his signal. To get the greatest traffic through the intersection he should, therefore, be prepared to give precedence to the street cars, allowing parallel vehicle traffic along with them but holding the cross traffic until cars are clear of the interesction.

By thus co-ordinating the movements of the vehicles with those of the street cars the maximum use of the intersection will be made.

It has already been indicated that so far as possible cars should be passed across the intersection in pairs in both directions, so that four cars can be passed at one signal of the officer. When cars or vehicles are passed singly much time is lost while the stream from one direction is ceasing and that coming from the other direction is starting.

While the use of Twelfth Street for parking purposes has not reached the point it has on some of the other streets, due to the narrowness of the roadway, this very condition makes it essential that the use of the street be retained for moving vehicles instead of standing ones. No parking would be allowed on this street in the rush hours, and in the non-rush the standing time allowable should be only sufficient to load and unload passengers and freight. Leaving unattended vehicles standing along the curb should be prohibited at all times. Vehicles should not be allowed to stop at the loading places.

The present street collectors who receive fares from patrons as they may board at the front end are a great help in expediting the movement of the cars. But the car loading can be done even more quickly if additional collectors receive fares at the rear ends of the cars. Practically all of the cars now running in the congested district have double doors at the rear and single doors at the front. The practice generally is for passengers to enter at the rear in single file so that they may pay their fares to the conductor. In some instances the conductor allows a second stream of passengers to enter, but as they must pass behind him it is difficult to insure collection and inspection of all the fares.

Additional collectors on the street to take fares at the rear end would permit a second stream of passengers to enter through the little-used exit door, making three streams of passengers entering at the same time. Since there are comparatively few passengers leaving the cars where the street collectors are used, and those who do leave go out the front door, the time of loading can be reduced materially by the use of these additional collectors.

An additional advantage will be that these street collectors can close the doors, enabling the car to proceed without unnecessary delay. This will save time for all the car riders. When the doors are closed they should not be opened again, as the traffic officer must know that the approaching car is ready to proceed immediately on getting his signal.

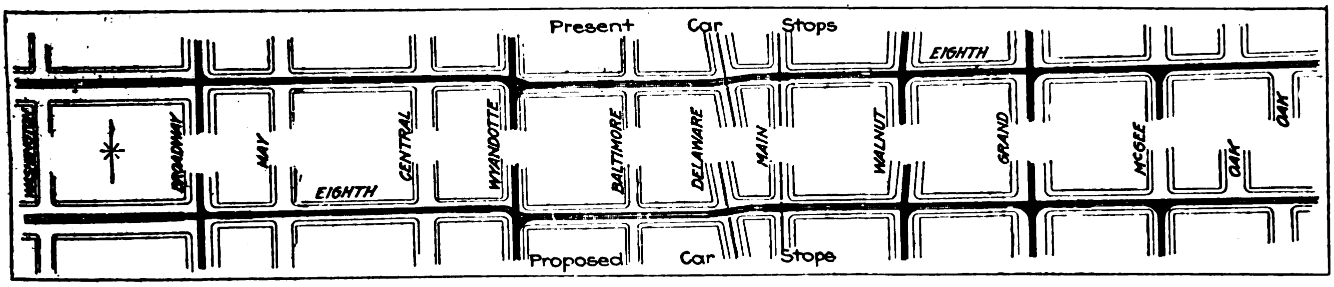


DIAGRAM SHOWING OLD AND NEW PASSENGER STOPS ON EIGHTH STREET

REGULARITY OF HEADWAY ESSENTIAL

The street railway should also use every means possible to keep the cars on schedule time. When cars are delayed, they should make every effort to get back on schedule. Certain cars should be turned back when late. When a late car is followed closely by a second car the first should proceed as rapidly as possible, and should not accept passengers until it has at least partially equalized the spacing.

The platforms have sufficient width to provide for two doors, but with the type of sliding door in use one-half the platform space is always closed by the door. Double folding doors would make it practicable to load or unload two streams of passengers at one time from the front end of the car. An air-operated door control, or a hand control that is easy to operate, would speed up closing.

HOW THE PUBLIC CAN HELP

The use of car tickets or exact change will do much to speed the car loading. If a passenger tenders a dime for fare the conductor now must count out a nickel and five pennies. The passenger will then count his change from which he will select the exact fare, and place it in the fare box. This takes from one to five seconds additional for each passenger. All this can be obviated by the purchase of tickets, and much of this can be overcome by the use of the exact change, although this latter method has the objection that it is more difficult for the conductor to inspect the coins in the box than the tickets. If a passenger has to have 50 cents or $1 broken to get change, he should step aside until the conductor has collected from the others.

Transfers should never be presented folded but should be handed to the conductor face up. Passengers on entering should pass into the car away from the door. When desiring to alight they should go to the door before the car stops, and as far as possible enter by the rear and leave by the front door.

The company should provide much more convenient packages of tickets and better channels of distribution than are now in use.

THE EIGHTH-STREET REPORT

The second section of the report deals with Eighth Street where many difficulties similar to those on Twelfth Street were found and similar remedies suggested. The conditions on Eighth Street differ from those on Twelfth Street in two particulars: first, at Baltimore Avenue, in order partially to overcome the severe grade, the tracks have been elevated on a viaduct passing completely over Delaware and Main, reaching the surface again at Walnut; second, in addition to the through service, Eighth Street is used by a number of other important lines turning around in the business district which turn on and off at Eighth Street in the congested intersections at Walnut, Grand and McGee Streets.

PEAK-LOAD CONDITIONS AT BUSY INTERSECTIONS

The number of through cars is not abnormally large. There are 31 cars scheduled eastbound and 29 westbound in the maximum hour; including the others however, the total between Walnut and Grand shows 56 scheduled eastbound and 73 westbound in the same period.

In order to afford some idea of the relative number of street cars scheduled to go through the busy intersection during the maximum rush, the following comparison between Twelfth and Eighth Streets is shown:

	Maximum Rate Cars Per Hour	
Intersection	Twelfth St.	Eighth St.
Wyandotte	104	121
Main	183	0*
Walnut	203	240
Grand	196	241
McGee	123	131
Total	809	733

*Eighth Street crosses Main on an overhead viaduct.

At all of the corresponding Twelfth Street intersections, except Wyandotte, only straight crossings are made, while on Eighth Street many left-hand turns are required at Walnut and McGee, and right-hand turns at McGee and Grand. These turns present a problem not encountered on Twelfth Street. The right-hand and left-hand turns prevent many cars from passing which otherwise would be able to do so. Especially is this true of the left-hand turns, as it not only prevents cars from passing in the opposite direction but ties up everything. With the number of cars turning reduced the capacity of the intersection would be greatly increased. The foregoing in combination with the numerous stops and poor loading facilities afforded is responsible for cars scheduled not arriving on time.

The viaduct from Baltimore Avenue to Walnut Street, carrying the Eighth Street lines, eliminates grade crossings at Main and Delaware, thus not only assisting traffic movements on Eighth but also on Main and Delaware. It is apparent that the viaduct is of great importance to Eighth Street, and were it not for this structure the street car traffic probably would be slower here than it is on Twelfth.

During the evening rush hour the east-bound cars are averaging but 2.02 m.p.h. between Walnut and McGee Streets. The westbound cars average still less, as they are moving at the rate of only 1.32 m.p.h. These two blocks represent the point of maximum congestion on Eighth Street, and speeds as low as 0.8 m.p.h. for a full fifteen minute period have been observed. From 5 to 6 p.m. between Walnut and Wyandotte, even with the assistance of the viaduct, the average car speed is 6.52 m.p.h. westbound and only 2.26 m.p.h. eastbound. Between Wyandotte and Broadway on the street surface it is 4.72 m.p.h. westbound and 2.47 eastbound.

MEASURES FOR RELIEF

In addition to employing all the measures recommended in the Twelfth Street report, such as restricting the number of stops, giving precedence to street cars, double-berthing, limited parking, and keeping vehicles off the car tracks, the following must be done:

1. Use the prepayment method of fare collection at the Main Street elevated station during periods of heavy loading.
2. Lengthen the elevated platform at Main Street, to enable four cars, two in each direction, to load simultaneously when necessary.
3. Reroute the cars to reduce the number turning into and out of Eighth Street.

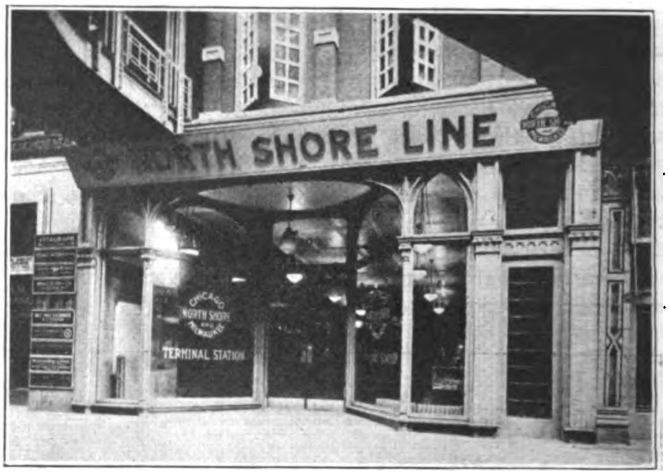
A survey of the passenger counts and the local conditions indicates that the passenger stopping places on Eighth Street should be rearranged as shown in the diagram on page 333, which shows also the present stops.

The recommended locations will place the stops where there will be a minimum of interference, and therefore, the best conditions. The present stop on the east side of Walnut caused a great deal of congestion on Eighth Street, and the use of this location is alone responsible for much delay. This is especially true in connection with those cars that turn from Walnut to Eighth. First they stop on Walnut, and, while waiting for a chance to proceed and turn the corner onto Eighth, block other northbound cars. Then when the opportunity is presented they turn the corner and stop on Eighth Street. Here they are likely to be delayed by cars going up the hill which are not able to clear the corner at Grand. This condition is serious in the rush hours and can be remedied only by omitting the stops on Eighth Street at this point.

Positive stops should be eliminated as far as possible. The present stop westbound at Grand Avenue should be discontinued. There are very few cars turning at this point and the Eighth Street cars should be given the right of way. The positive stop at Walnut Street should be done away with and a slow sign substituted.

North Shore Loop Station

AN ARTICLE appeared on page 234 of the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 31 describing the new station recently opened in the Chicago business district by the Chicago North Shore & Milwaukee Railroad. At that time a picture of the exterior of this station was not available. One has since been obtained, however, and the station is so attractive that the accompanying illustration appears as a supplement to the previous article.



EXTERIOR VIEW OF THE CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD STATION IN CHICAGO

Quick Restoration of Telephone Service After a Fire

ON A RECENT date at about 2 o'clock in the afternoon a fire started in the Chamber of Commerce Building, New Haven, Conn. This building houses the general offices of the Connecticut Company and a private branch telephone exchange carrying all dispatching lines of that company. The fire in the basement immediately severed the telephone cable which carried all lines into the building, and left the railway company without communication. The Southern New England Telephone Company, impressed with the seriousness of the situation, cut in the principal dispatching lines to its own testboard at the main exchange, and at 2.30 placed the Connecticut Company's dispatcher at the testboard operating these lines.

By 4 o'clock a sixty-line private branch exchange board which the telephone company had in stock had been moved to the terminal room and temporary connections had been made, so that the Connecticut Company's own operator was operating the board with practically all of the dispatch lines connected. By evening, in addition to the dispatch lines, all commercial lines connected with the Connecticut Company's telephone system were restored to normal operating condition. Meanwhile, as soon as telephone workmen could get into the smoke-filled building, the night and day forces were put on, and by the next morning complete telephone service was restored to the company's offices.

Present Status of Standard Track Spirals

Report of Sub-Committee and Discussion at Atlantic City Emphasize Value of Standards and Indicate That Partial Renewal With Standards Is Feasible

AT THE Atlantic City convention of the American Electric Railway Engineering Association in October, 1919, an informal report was presented by the sub-committee on standard spirals of the committee on way matters. On account of conditions in the printing industry that time it was impracticable to abstract this report in the report issue of the ELECTRIC RAILWAY JOURNAL. However, as the work of the committee on way matters for the current year is now being started, it is desirable to have before way engineers a summary of the remarks made by E. M. T. Ryder, engineer maintenance of way, Third Avenue Railway System, New York City, and others who participated in the discussion.

In introducing the subject Mr. Ryder said that at present there are many different spirals used by manufacturers, and quite a number of railroads have their own spirals. In comparing the various spirals one finds that they are quite similar. Nearly all of the existing systems are based on the Searles spiral, in which the rate of curvature is uniform. While the calculations may be made in different ways, all of the spirals are based on the same fundamental principle. A comparison of different typical spirals is given in an accompanying figure.

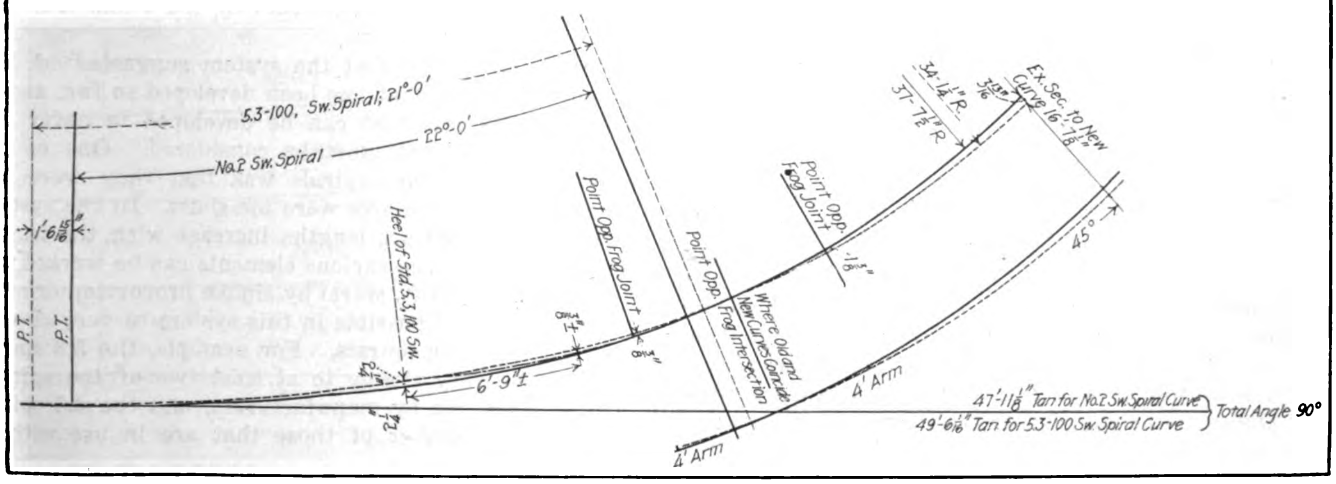

5.3-100, Sw. Spiral; 21°-0'
22°-0'
No. 2 Sw. Spiral
1'-6 15/16"
P.T.
P.T.
Heel of Std. 5.3, 100 Sw.
Point Opp. Frog Joint
Point Opp. Frog Intersection
Where Old and New Curves Coincide
Point Opp. Frog Joint
34'-1 1/4" R.
37'-7 1/2" R.
3 13/16"
Ex. Sec. to New Curve 16'-7 1/8"
45°
6'-9"±
4' Arm
4' Arm
47'-11 1/8" Tan for No. 2 Sw. Spiral Curve
49'-6 1/16" Tan for 5.3-100 Sw. Spiral Curve
Total Angle 90°

FIG. 1—ILLUSTRATING PARTIAL RENEWALS OF OLD LAYOUT USING STANDARD SWITCH PIECES AND PROPOSED UNIFORM SPIRALS

The fundamental principle referred to is that all of the angular functions are constant, and only the lineal functions, such as arc and radii, vary. Thus any one spiral can be obtained from any other, practically by simple multiplication, and the spirals are convenient to calculate and use.

The sub-committee has prepared a number of recommended spirals, as shown herewith. The most important one, No. 5.3, was picked out as the shortest Searles spiral into which could be inserted the association's standard 100-ft. radius switch. It practically conforms to the Lorain 2-A spiral, and is the one that will probably be used in 90 per cent of all cases. Similarly the No. 8.5 spiral is the shortest one in this series which will permit the insertion of the association's 200-ft. radius switch. Spiral No. 4.0 will take care of the 75-ft. radius switch to be used in places where it is impossible to use the 100-ft. radius switch. The No. 4.5 spiral very closely approximates all the manufacturers' spirals that were in common use with the 12-ft. long 100-ft. radius switch. That switch is no longer the association's standard, and while it seems desirable to figure out a spiral that will take care of it, there is some question as to whether the association should adopt it as one of its standards. The purpose in adopting it, if this seems desirable, is to provide for renewals which must be made for many years to come.

The other spirals shown on the drawing are somewhat larger ones which can be used when it is necessary to obtain clearness from obstruction on the street or on account of unusual conditions. These give more flexibility to the standards but probably would not be used except in a few cases.

In answer to a question as to the significance of the numbers on the uniform-spiral drawing (p. 337), e.g., 4, 4.5, 5.3, etc., Mr. Ryder explained that these indicate the length of arcs, of which the spiral is made up. In all cases the angular rate of change per arc is 1 deg. Mr. Ryder also said in this connection that in the opinion of manufacturers it would simplify their work if the arc length were as great as possible. Where the radii are comparatively long, it is permissible to use a long arc. With the proposed system, in the base spiral from which the lengths are figured the arcs are all 10 ft. long, while in the shorter spirals they are of varying lengths. Thus where the curvature is sharpest, the arcs are shortest.

R. B. Fisher, the Buda Company, said that his company would be pleased to use any spiral that is adopted by the association. The expense of doing this would not be great, as it would simply be a matter of carrying a different set of spiral boards until the old ones were used up. Sooner or later the company would be able to discontinue the use of the old templates.

Charles A. Alden, Bethlehem Steel Company, said that the purpose of a spiral curve is to reduce the shock of a change in direction from tangent to circular arc. The proper form of such a curve is one in which the radius of curvature is inversely proportional to the distance from the beginning of the curve. Any curve of the Searles type meets this requirement, provided the arcs are of reasonably short lengths.

To meet the varying conditions, it is necessary to have spirals of different lengths. These can be secured either by using constant angles and varying the lengths of arcs and radii, or by using constant arcs and varying angles and radii, or by using constant radii and varying arcs and angles. The spirals formed in any one of these three ways would be of practically equal value, provided the angles of the spirals and their lengths on the center line were the same.

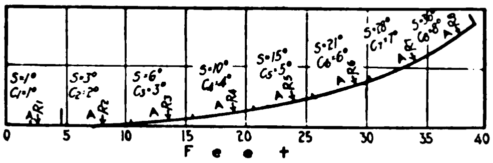


FIG. 2—PRINCIPLES OF DESIGN OF PROPOSED UNIFORM SPIRALS

NOTE—All spirals are similar to Searles spirals and consist of compound curves composed of a series of circular arcs of equal length. Rate of change of central angles of arcs is uniformly one degree.

Corresponding angles and angular functions of all spirals are the same.

Corresponding lineal dimensions of all spirals are proportional to their respective arc length. For convenience the base spiral has arc lengths of 100 ft.

The number of any spiral is the length in feet and tenths of its individual circular arcs, measured on the center line of standard gage track.

S = Total central angle of spiral.
C = Central angle for any arc.
A = Arc lengths.

R = Radius for any arc. $R = \frac{360A}{2\pi C} = 57.2958\frac{A}{C}$.

C & S are the same for corresponding arcs of all spirals.
A is constant for each spiral, and its center line length in feet and tenths is the same as the spiral number. The proposed standard spirals are: Nos. 4.0—4.5—5.3—6.5—8.5—10.0.

PROPOSED SPIRALS USE CONSTANT ANGLES WITH VARYING LENGTHS OF ARCS AND RADII

The committee has decided that the first method is the most convenient in practical use, and their report covers a series formed in this manner. The base of this series is the spiral of 10 ft. arc with successive central angles of 1, 2, 3, 4, 5, 6, 7, and 8 deg. From this base the two chord lengths of 5.3 and 8.5 ft. are deduced in order to provide spirals suitable for "cutting in" the association's 100-ft. radius and 200-ft. radius switches respectively. The 6.5 spiral is provided as an intermediate length. The 4.5 and 4.0 spirals are provided as the commercial equivalents of the usual practice for curves of radii to which such a spiral is suitable.

The spirals are extended to 12.4, 15.0 and 20.0 ft. arcs to cover radii intermediate between those covered by the above series and those for which steam railroad practice and field books are available.

Mr. Alden thought that the work of the committee should be extended to cover a specification defining the conditions under which each spiral should be used. Any one of the last mentioned three spirals could be used with a 40-ft. radius center curve. It would be possible, for instance, supposing the proposed standards were adopted and no such specification was in force for the buyer to specify that he was to get a 40-ft. radius spiral curve, and under that specification he could be furnished a curve of 80, 90 or 100 ft. long at a corresponding cost.

The discussion was continued by Victor Angerer, William Wharton, Jr., & Company, who said that it is no doubt feasible and not only advisable, but desirable for the manufacturers to have a uniform system of spirals. It is awkward for the manufacturers to have to work with different spirals. While the Wharton Company has its own special set of spirals, its customers may require it to use the Lorain or Pennsylvania Steel spirals, or in some case the special system of the railway company. As a result templates and tabulations for all sets of spirals must be kept up. It is too much to expect that the matter can be reduced to one system, although this would be a great advantage, but if at least the spirals of the several manufacturers can be eliminated the recommended spiral could be used for those customers who did not specify their own.

There is one point, however, that must not be overlooked, and that is whether a new set of spirals could be worked into partial renewals of layouts made according to the present system. In most cases this can be done with some little "fudging." Then when the remainder of a layout thus treated is renewed, the whole will conform to the new system.

Mr. Angerer felt that the system suggested by Mr. Ryder is the best that has been developed so far, and is probably the best that can be developed to cover the various phases that must be considered. One of his objections to former spirals was that they were too complicated and the arcs were too short. In the system now proposed the arc lengths increase with the length of the spiral and the various elements can be worked out from the basic 10-ft. spiral by simple proportion or multiplication. It is possible in this system to very closely approach existing spirals. For example, the 5.3 spiral corresponds very closely to at least two of the spirals now in large use by manufacturers, and the 4.5 spiral will cover a number of those that are in use with a 12-ft. switch.

Mr. Angerer said that there are some points which might still be worth studying. Without changing the general idea of the system it might be applied to the inside rail. This question has been raised by men who have discussed this subject, and also in articles appearing in the ELECTRIC RAILWAY JOURNAL. The selection of the arc lengths as they appear in this set of six spirals seems to be a happy one, even if it does not appear scientific to have odd arc lengths like 5.3 ft. There is a good reason for this, as has been explained. This system of spirals does not involve more material or greater length than most existing spirals, therefore the spirals will not cost any more than the old ones, and it is to be hoped that later on as the new spirals come into more general use economy in manufacture will work to the advantage of both manufacturer and user.

C. H. Clark pointed out an advantage to the purchaser in being able to specify a standard spiral in that if the cost of a 6.5 spiral were desired all bidders would be quoting on exactly the same length of rail. On the other hand, without the standards, if the cost of a spiral to meet certain conditions were desired, one manufacturer might bid on a 5.3 and another on a 6.5.

NO QUESTION ABOUT DESIRABILITY OF STANDARD IF ADOPTED

Charles Rufus Harte emphasized the fact that there can be no question about the desirability of having all manufacturers make only one type of spiral. That feature hinges on the possibility of inducing a general adoption of the standard. If this can be accomplished, the manufacturers using other types of spirals can, in a comparatively short time, afford to scrap the old templates. A question raised by Mr. Harte concerned the practical application of the spirals to special conditions. It not infrequently happens that special work has to be carried on special supports, and it becomes desirable to fix the exact position of the rails. In case it becomes necessary to calculate some of the points, will the recommended spiral lend itself to such purpose or does it require higher mathematics to obtain sub-chord points?

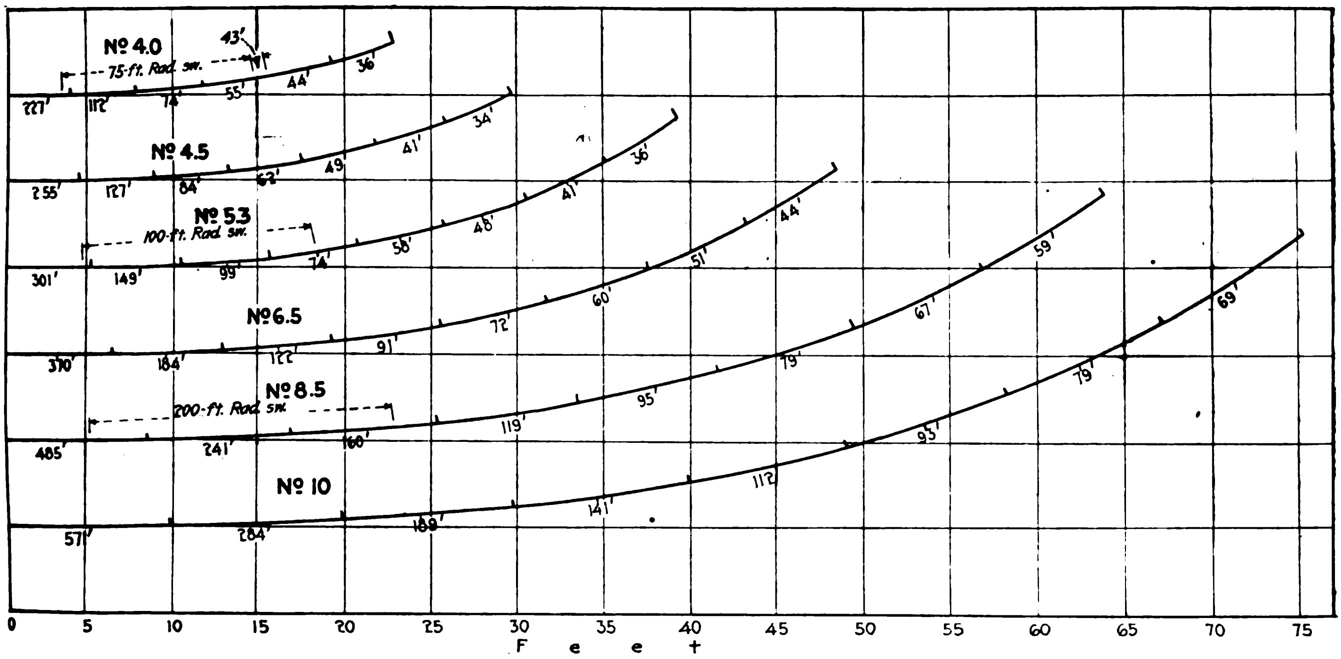


FIG. 3—COMPARISON OF PROPOSED UNIFORM SPIRALS

NOTE—Spiral number equals length of arcs of that spiral in feet and tenths. Figures below arcs give to nearest foot radii of inner gage lines.

Likewise in subway and in extensive surface changes in larger cities, it is often essential to know clearance points at odd intervals to determine on the one hand whether existing posts, manholes or similar objects will have to be shifted, or on the other hand to fix locations of such objects. Under these conditions, will the proposed standard be a help or a hindrance?

The proper step is to choose that spiral which will work best considered from all angles. As it will be necessary for the manufacturers to make a change at the time of the adoption of any standard spiral, they are the least concerned with the mathematical end of it, as the calculations for them when once made are complete. The man who works in the field and finds himself confronted with the necessity of determining intermediate points is the one who is going to be most affected. The question is, whether with remarkable ease the field man can calculate the elements he wants, or whether it will prove to be a problem calling for a branch of higher mathematics which may have been studied in college but long since forgotten.

Mr. Harte was assured by Mr. Clark that there will be no greater trouble in laying out this system of spirals from the manufacturer's drawings than has been the case with any other system. L. C. Datz explained that most of the field work is done by getting the point of intersection of the two tangents, bisecting it and getting the middle of the curve. The steel companies can easily figure out two or three more points to assist in the field work of laying out the curve. To these explanations, Mr. Harte replied that with this information the field man is all right, but in many instances the information is not at hand when wanted. With every one of these spirals it is a more or less complicated proposition to determine points not given by the standard chord but some require much more complicated calculations than others. This point should be carefully considered before a decision is reached.

In reference to the question of Mr. Harte, C. S. Kimball said that the proposed spirals are simple compared with the spirals now in use, and he does not think that any engineer will have any trouble in using them. As to the location of obstructions before the drawings are made, any manufacturer will send representatives without cost to the purchaser and design the curves, taking into account any manholes or obstructions which may be there.

Roy C. Cram expressed the thought that the convention might be overlooking the fact that the tables show quite clearly that the proposed spirals are based on a simple law. The base is No. 10.0 followed by 8.5, 6.5, 4.5, and 4, which figures are very easily remembered, and then there is the odd one, 5.3. These figures can be easily retained in the mind, and when once an engineer has become used to working with them, and has tabulated values of x and y, that is all that is needed.

W. R. Dunham, Jr., raised the question as to how the new spiral if adopted would fit into the old work when making temporary renewals; in other words, if there is a switch which has gone bad, or a frog that must be renewed, will it not be necessary for the manufacturer to renew with the original spiral, at least until all the special work is renewed?

To this question, Mr. Ryder replied that there is always considerable difficulty in changing from any set of standards to any other. It is possible to make the renewal of a switch and mate together very readily, and the amount of "fudging" would be very small. Take, for instance, the old No. 2 standard Lorain spiral in comparison with the proposed uniform spiral No. 5.3. A standard 13-ft. 6-in. switch goes in a little further back, but if the excavation is carried 4 to 5 ft. further from the heel of the switch, it leaves only about ⅜ in. to fudge. It would be impossible to renew a switch without renewing the mate.

The changes at the frog in some cases also are small. It would be necessary to go far enough in excavating the pavement to be able to spring the rails sufficiently to make a separate renewal of the frog. The change at the center of the curve is not great, so that if at a certain layout it was desirable to renew the curve without renewing the frog, it would mean practically no difference in the amount of clearance and the amount of pavement to be removed. If it is borne in mind that both the switch and the mate must be removed at the same time, it is possible to make partial renewals with the new system. In answer to a question that if Lorain Steel Company spiral is now in the track, would one of the new spirals be used and leave the frog point in the same location, Mr. Ryder said that this was the case, but that it would be necessary slightly to change the center radius of the curve. There is a change in the length of the lead rail as the heel of the switch comes in a different position. Most of the cutting is due to the new A. E. R. A. switch being 13 ft. 6 in. long, instead of 12 ft. long, as it was in the old standard.

In closing the discussion on the proposed standard spirals, President Phillips said that the point seems to be approaching where the much mooted question of standard spirals will be settled, and settled very likely to the complete satisfaction of the railway men as well as to the manufacturers. He suggested also that the association should express its gratitude for the excellent way in which the subject had been handled. A vote of thanks was extended to Mr. Ryder and the other members of the committee and to the manufacturers for the work which had been done in bringing the information on the subject up to the present state. The subject was continued with the way committee for 1920.

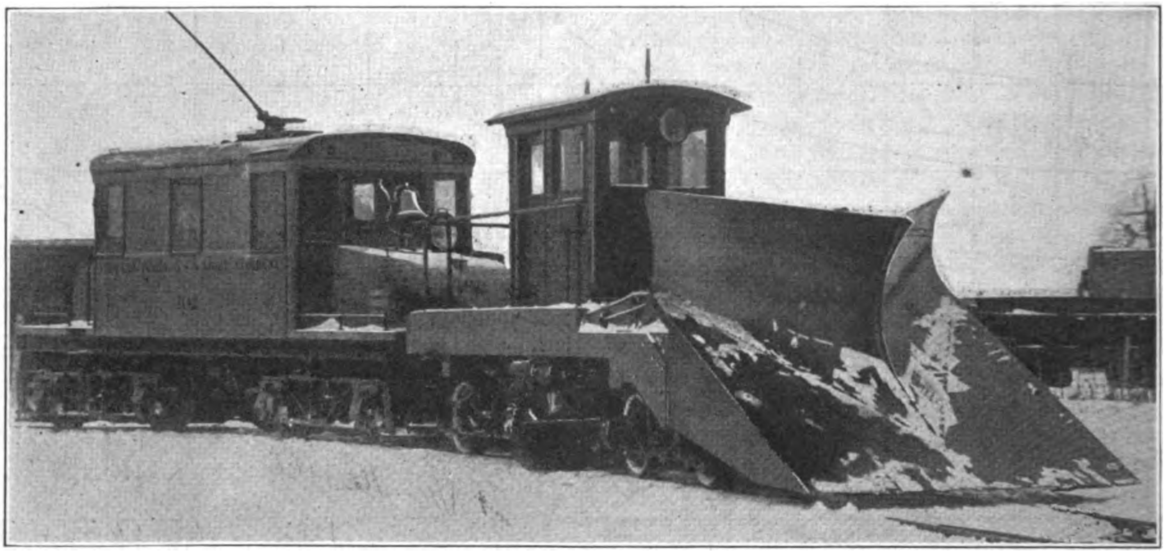
A Heavy-Duty Interurban Snow Plow

A Nose Plow Built by Indiana Line, Equipped with Air and Designed for Operation with Locomotive

By M. S. Ferguson

Master Mechanic Indiana Railways & Light Company, Kokomo

As it is essential that the lines be kept open at all times in order properly to handle the comparatively heavy passenger traffic and the constantly increasing freight business, the operating directors of the Indiana Railways & Light Company recently decided to add a new snow plow to the snow-fighting equipment of the road.



NEW HEAVY DUTY SNOW PLOW, DESIGNED AND BUILT BY INDIANA INTERURBAN LINE

The lines of the company are all on private right-of-way except through a few small towns. In these the tracks are paved with brick and there is, therefore, no objection to the use of a plow of the nose or double-shear type. The writer, in making a survey of the line, found that it would be necessary to design a plow that could be raised in order to clear some bridges and station platforms, and at the same time be rugged enough to withstand the severe strains encountered in bucking heavy drifts. The plow was designed and built in the company's shops at Kokomo, Ind., under the supervision of the writer.

The body of the plow is 20 ft. long, built on a set of freight-car trucks. As there is no electrical equipment necessary except for lights and heaters, current for these is furnished by a jumper cable from the locomotive which is used as a pusher. This locomotive, which also was built in the company's shops, will be described in an early issue of the ELECTRIC RAILWAY JOURNAL. The snow plow is equipped with automatic air brakes and there is an emergency valve in the plow cab within easy reach of either the pilot or the operator. On the exhaust of the emergency valve there is a very shrill whistle which acts both as a signal to the motorman and as a warning to pedestrians or vehicles who might be on the track.

The nose of the plow is raised by air from the locomotive furnished through standard air hose and couplings and through an engineer's valve located at the pilot's position. In addition to the whistle there is on the cab a standard chime whistle supplied with air from the main reservoir.

The flangers are hung between the trucks and are raised by a large lever in the center of the cab. They are built of a 1-in. x 20-in. plate, bent into the form of an "A," and extend 14 in. outside the rails. These flangers are balanced on three ⅝-in. chains passing up through the floor and connected to a 1-in. x 6-in. iron bar. In the center of this bar is a 1¼-in. rod which couples onto the raising lever. The flangers are held in place by three 8-in. x 8-in. oak timbers bolted to the cross sills of the car and braced back to the rear bolster with one 6-in. x 6-in. oak timber and six 3-in. x 3-in. x ⅜-in. angles. Two of the ⅝-in. chains are attached to eyebolts through the center post and then into eyebolts through the plate. These act as a guide to keep the flangers at all times in the proper position. The flangers have an effective rise of 6 in.

The body bolsters of the car are 12-in. x 12-in. x 8-ft. x 10-in. oak timbers, and the side, intermediate and end sills are 8-in. x 8-in. oak, bolted through the bolsters with 1¼-in. bolts. Between the bolsters are two 4-in. x 12-in. x 14-ft. oak planks bound in place by two 1½-in. truss rods. The ends of these truss planks are supported on 6-in. x 6-in. x ½-in. angle brackets bolted through the bolster. Extending from the front bolster to the rear end of the body is an extra set of side sills of 8-in. x 8-in. oak bolted through the lower sills. These act as a stiffener for the car and also as a retainer for the reinforced concrete ballast. Two 2-in. x 2-in. x ¼-in. angle irons are bolted to the lower inside of the sills to support the ends of the false floor, which is of 2-in. oak plank. The center of the false floor is lagged to the two oak timbers that are between the bolsters. For ballast there is a solid block of concrete reinforced with ⅝-in. rods and scrap brake shoes. This block measures 16 in. x 8 ft. x 18 ft.

The cab of the car is 4 ft. 6 in. x 5 ft. 8 in. built of wood and provided with eight windows. The sills of the cab are bolted to the intermediate sills and there is a filling consisting of 8 in. of concrete both inside and outside. A wooden floor is laid on 2-in. oak strips placed on top of the concrete. This gives a 2-in. air space under the floor. Three Consolidated electric heaters are placed under a seat which extends the full length of the cab. A standard Crouse-Hinds headlight is used with the resistor placed inside the cab. The car is equipped at each end with a standard M. C. B. coupler.

On the front ends of the side and intermediate sills are four heavy castings with a 2½-in. hole through the nose. These act as the stationary part of the plow hinge and are bolted through the sills with 1¼-in. bolts. Four 8-in. x 8-in. x 28-in. oak stopper blocks are bolted in an upright position under the ends of the sills and are braced with a ⅞-in. x 18-in. plate. The sloping legs of the plow are 6-in. x 6-in. x ½-in. x 10-in. angles through the top end of which is a 2½-in. hole accommodating a $2\frac{7}{16}$-in. shaft which passes through the hinge castings. The two bottom center braces are made of 3-in. x 6-in. x ½-in. angles while the two bottom outside braces are 3-in. x 3-in. x ⅜-in. angles. The plow frame is covered with ¼-in. plate riveted with ½-in. rivets on 5-in. centers and driven hot. The plow is 9 ft. 6 in. wide, 10 ft. long and 8 ft. 3 in. high. It sets 4¼ in. above the rail and has an effective rise of 18 in. at the nose.

For raising the plow a 12-in. x 12-in. oak timber is used. It is butted against the front bolster and extends 4 ft. ahead of the end sill. It is attached to the bolster by means of 6-in. x 6-in. x ½-in. angle brackets and is hung under the end sills with three 1¼-in. bolts, using a 1-in. x 10-in. x 16-in. plate for a washer. On the front end of the timber two 10-in. sheaves are fitted. A 10-in. x 12-in. air cylinder is set between the two center hinge castings with a 1-in. x 5-in. x 12-in. spreader-bar attached to the plunger. Two ⅝-in. twisted chains extend from the spreader-bar over the sheaves and are attached to the center bottom braces. The lateral bracing is of 3-in. x 3-in. x ⅜-in. angles.

In making a test of the lifting power of the snow plow air hoist ten men were placed on the nose of the plow and it rose with seemingly no effort on the part of the apparatus.

Western Society of Engineers Holds Annual Meeting

General Wood Was the Principal Speaker at Banquet Marking End of Fifty Years of Society Activity

THE Western Society of Engineers held its annual banquet on Jan. 29 at the Morrison Hotel, Chicago. Frederick P. Vose acted as toastmaster and Major-General Leonard A. Wood was the principal speaker. General Wood extolled the work of engineers in connection with great public accomplishments and cited some of his experiences in connection with the development of Cuba and the work on the Panama Canal. He also stressed the importance of keeping alive the Engineer Reserve Corps.

The retiring president of the society, A. Stuart Baldwin, chief engineer Illinois Central Railroad, then made a very brilliant address of which the principal theme was that good will was the great need of the present day in the relations between labor and capital and all peoples. He summed up his thoughts in the statement that the progress or retrogression from our present state of civilization will be in direct proportion to the extent to which the golden rule is practiced.

Mr. Baldwin also announced the names of the new officers of the association as follows:

President, F. K. Copeland, president Sullivan Machinery Company, Chicago; first vice-president, C. F. W. Felt; second vice-president, J. L. Hecht; third vice-president, Linn White; treasurer, F. F. Fowle.

In his inaugural address, President Copeland indicated certain lines along which the society might direct its efforts to secure a substantial and consistent growth during the coming year. He pointed out the great advantages of the society to the younger engineers, but stated that the society held forth no promises of influencing any increase in salaries, but rather that it would benefit the members through the opportunity which it afforded for expansion, through the educational value of the meetings and the contact with older engineers and the wider acquaintance made possible.

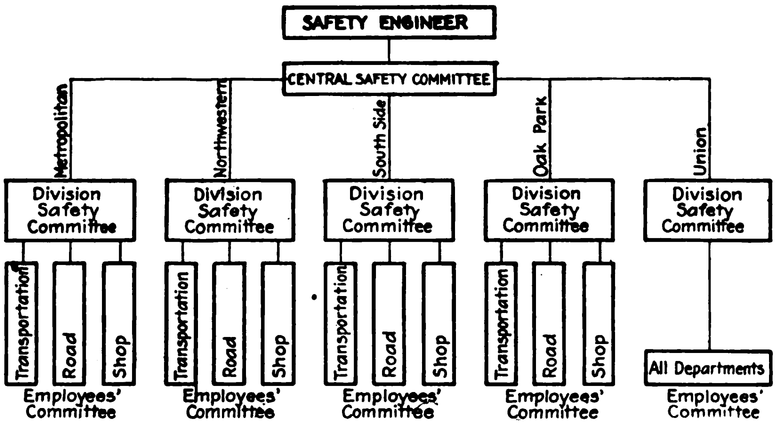
Chicago Elevated Railways Organize for Safety

New Organization Headed by Safety Engineer Has Been Perfected on the Chicago Elevated Railways—Employees and Division Safety Committees Meet Bi-Weekly, Central Safety Committee Monthly

A NEW safety organization has recently been perfected on the Chicago Elevated Railways with Melvin W. Bridges as safety engineer. During the period of the war, when many of the regular employees were in army service, their places were filled with inexperienced men, and the safety work was permitted to lag. The result was an increase in the number of accidents. President Britton I. Budd of the Elevated Lines is determined to place that property at the top of the column of electric railways in the matter of safety both to employees and to the public, and for that reason has appointed Mr. Bridges to give his entire time to this work.

At a meeting of the supervisory force held on Dec. 30, Mr. Budd outlined briefly what he expected under the new plan. During his remarks he said:

> Safety work is the most important thing in connection with our job. It is more important than keeping trains running on time. We must bring the organization up to the highest point of efficiency in the matter of safety of the employees and the public. Recently the enthusiasm has died down a little, and I wish to see it restored. You have all been trained to cultivate the faculty of observation, but while that is very necessary it is not enough by itself. There are many who observe a condition which might be the cause of an accident, but it fails to register in their minds. An accident has to happen before we act.
>
> Every man must be on the alert. When he sees a dangerous condition it must so impress itself upon his mind that he feels impelled to call attention to it at once and have it remedied. He must not wait for the accident to occur. That is what I mean when I say a dangerous condition must register itself on the mind the moment it is observed.
>
> A case in point occurred recently up on the North Shore Line where some street improvements were being put in contiguous to both the steam and electric railroad tracks. The street was closed to traffic and the ordinary barrier put up, but a vehicle had to cross the railroad tracks before coming to the barrier. Now I suppose during the day or two that the barrier stood at that particular point, there probably were hundreds of persons passed, yet no one observed that the condition was dangerous. It would not have required five minutes time to carry that street barrier across to the other side of the railroad tracks, so that a person driving an automobile would know that the street on the other side was closed. The inevitable happened. An automobile drove across the tracks and was stopped by the street barrier. In trying to shift gears and turn around in the small space, the automobile backed in front of a train on the steam railroad. Then the danger of the situation was made apparent to all. Why didn't some one see it before the accident occurred? It was because the faculty of observation was not developed to the point where it registers such a situation on the brain.
>
> As we go about our daily work we all see somewhat similar situations. We must try to train ourselves to act immediately in such cases and not wait until some one is killed. There is something more in life than merely making money and achieving success in a business way. In safety work you are doing for your fellowmen something that is worth while in life and it is in that spirit that I bid you put your hearts into it and make "safety first" more than a mere phrase.



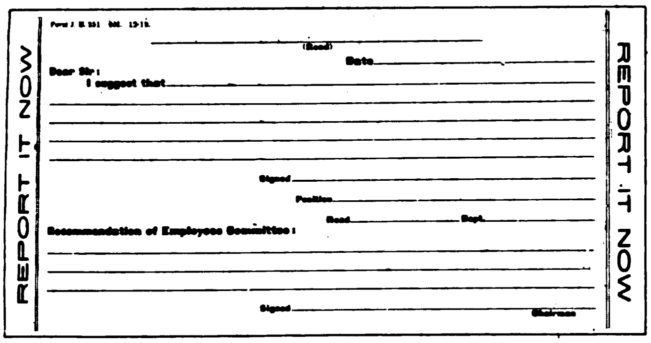
ORGANIZATION CHART, CHICAGO ELEVATED RAILWAYS SAFETY DEPARTMENTS

The Chicago Elevated Railways is a consolidation of four systems, the Metropolitan West Side Elevated Railway, the Northwestern Elevated Railroad, the South Side Elevated Railroad and the Chicago & Oak Park Elevated Railroad. All of these four systems pass through and around the loop in the business district of Chicago, and this section of the combined systems forms a fifth unit known as the Union Elevated Railroad.

The new safety organization is composed, first, of employees' committees, each of the four elevated systems furnishing three employees, committees respectively from the transportation, road and shop departments. The transportation department employees' committee includes one man in each of the following positions: Motorman, conductor, guard, switchman, tower man, gateman and agent. Each road department committee includes one trackman, one interlocking man, one carpenter, one tieman, one painter and one electrician. The shop department committee includes a machinist, a truckman, a car inspector, a carpenter, an electrician, a car cleaner and a painter. The loop, or union system furnishes one employees' committee which includes representation from all departments, namely, a towerman, a platform man, an electrician and an agent.

All employees' committees are composed of employees below the grade of foreman, who are selected to serve for four months. Meetings are held every two weeks on company time, and at regular rates. They even are paid for time consumed in the performance of committee duties. The safety engineer sets dates for the meetings of the employees' committees, and each superintendent and foreman arranges to have the members of the committees released from duty to attend the meetings and provides a room where the meetings may be held.

Members of the employees' committees are selected by the superintndents and general foremen. All suggestions coming to the attention of any employees'



REPORT IT NOW

(Road)

Date

Dear Sir:

I suggest that

Signed

Position

Road Dept.

Recommendation of Employees Committee:

Signed

Chairman

REPORT IT NOW

CARD USED IN MAKING SAFETY SUGGESTIONS

committees for consideration are acted upon and turned over to the general foreman or superintendent of their respective departments who is a member of the division safety committee.

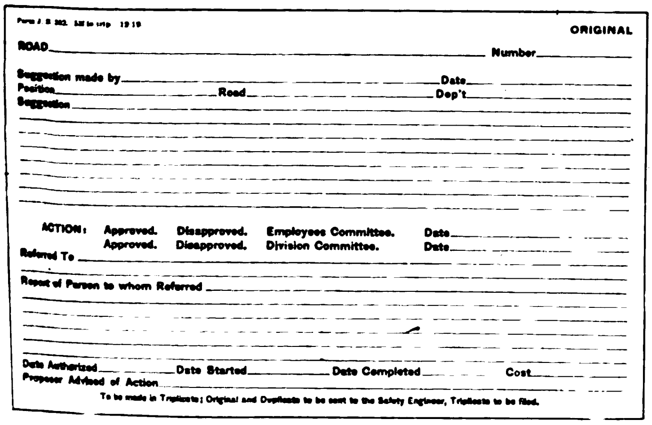
Each employees' committee records the minutes of its meetings and forwards them to the chairmen of the respective division committees. A copy is also forwarded to the safety engineer. The minutes comprise the names of the members present and absent, and a record of suggestions received, and acted upon favorably or unfavorably.

Division Committee Passes on Suggestions of Employees' Committee

As already stated, all suggestions acted upon by the employees' committees are turned over to the respective division committees. Each of the five systems has a division committee which is made up of the division superintendent of transportation, general shop foreman, general track foreman, general foreman of electrical department, supervisor of service and claim department investigator. On the loop system committee, the place of the shop representative is taken by the foreman of the telephone department. This committee has no representative of the service department.

The division safety committees hold their meetings every two weeks. All recommendations referred to the division committees by the employees' committees are taken up and disposed of at each meeting. The minutes of each meeting are recorded and a copy is sent to the safety engineer.

Forms such as the accompanying "Report It Now" illustration are used by employees in making safety suggestions. When these pass through the employees' committees and are turned over to the division committees for action they are each given a number and copied in triplicate on another form also reproduced in an accompanying illustration. The original and duplicate are forwarded to the safety engineer together with the minutes of the meeting. The third copy is filed with the original suggestion card and kept as a record in the office of the chairman of the division committee.



ORIGINAL

ROAD Number

Suggestion made by Date

Position Road Dep't

Suggestion

ACTION: Approved. Disapproved. Employees Committee. Date

Approved. Disapproved. Division Committee. Date

Referred To

Report of Person to whom Referred

Date Authorized Date Started Date Completed Cost

Proposer Advised of Action

To be made in Triplicate; Original and Duplicate to be sent to the Safety Engineer, Triplicate to be filed.

CARD UPON WHICH ORIGINAL SUGGESTION IS COPIED IN TRIPLICATE

Safety Engineer With Central Committee Takes Final Action

All suggestions which pass through the hands of the division committees, together with the minutes of that committee, are referred to a central safety committee. This committee is composed of the safety engineer and four other members. These four members are the assistant superintendents, respectively of transportation, shop and roadway, together with the organization engineer of the consolidated system.

The central safety committee holds monthly meetings. Special meetings are called by the chairman when matters of importance are presented which should receive immediate attention. At the meetings of the central committee all recommendations sent in by the division committees are reviewed, and those suggestions which have been disapproved either by the employees or division committees are taken up for final action.

The safety engineer has direct supervision of all safety matters. He maintains a record in his office of all suggestions made, and all suggestions that have been approved are followed up by him until such time as the work is completed. It is his duty to advise any employee who has made a suggestion what action was taken on same. He attends all employees' committee meetings, and as many division-committee meetings as is convenient. He also endeavors in every way to stimulate the spirit of safety among employees and officers of the company.

As this new organization has been so recently perfected, there has as yet been little time for results. Even in this short period, however, many safety suggestions have been placed before the various committees.

New Paving at San Diego

A NEW type of permanent paving, differing in character from the usual asphalt surface paving, is to be tried out between the tracks of the San Diego Electric Railway. The paving will consist of crushed rock, coarse at the base and fine at the surface, rolled and watered into a solid mass.

The city has authorized the laying of a few blocks of this type of paving on trial because the officials of the company have stated that the company cannot continue to operate if compelled to place asphalt paving between all of its tracks on paved streets. The new type of paving proposed will be almost as expensive in first cost as asphalt paving, but it is said that it will be practically everlasting, subject to quick and inexpensive repairs. For this reason the company will be relieved of a great burden in paving maintenance.

If upon trial the new paving proves successful and is satisfactory to the city authorities, it will be used by the company in its reconstruction work in the outlying districts. It will be divided from the solid surface paving by concrete curbing, which will be deep enough to protect the solid surface paving from water seepage from below, and will conform in all respects with the general outline of the streets.

Card Record for Employees

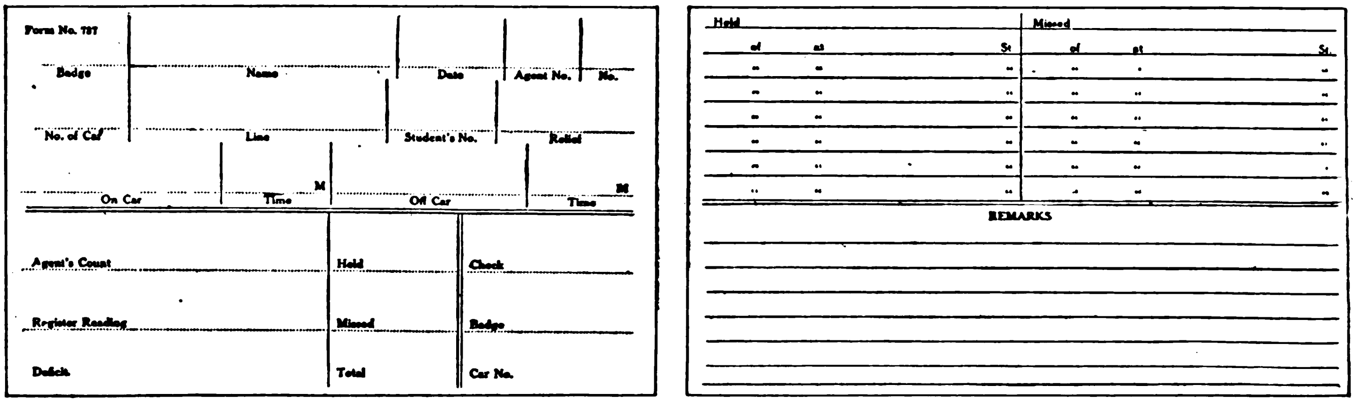
Principal Data of Performance of Transportation Men Can Be Obtained From This File

THE International Railway, Buffalo, has had in use for several years a system of card records for transportation employees to supplement the usual folder or envelope plan for keeping the records. The envelope system is retained in Buffalo, that is to say, there is for each employee a large manila envelope, about 9 in. x 12 in., into which is placed his application blank and the originals of any reports of accidents or other statements relating to his work. These envelopes are arranged numerically by the badge number of the employees and are kept in a vertical file in a steel cabinet adjoining the office of the superintendent of transportation.

It was felt, however, that the work of getting at an employee's record, as given in the original papers, could be reduced if there should be a summary of the contents of these papers easily available. In consequence a series of index slips, on thin paper, 3 in. x 5 in., was arranged to give an abstract of the data contained in the larger envelopes, these slips also being classified under the badge number of the employee.

There are five of these printed index slips, as shown in the accompanying reproductions. They are of different colors, so that a glance at the file of each man will show approximately the number of each color of slip contained in the file.

The pink slip, of which both sides are shown, is a digest of any checker's report of held or missed fares. The company also keeps a record of all checker's "O.K." reports, but these are not kept in the file mentioned because there would be too many of them, but a notation is made of each report so received.


Form No. [illegible]

Badge | Name | Date | Agent No. | No.

No. of Car | Line | Student's No. | Relief

On Car | Time M | Off Car | Time M

Agent's Count | Held | Check

Register Reading | Missed | Badge

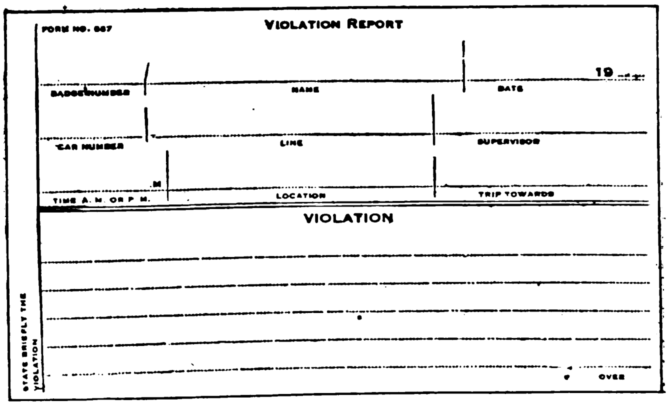
Deficit | Total | Car No.

Held | Missed

of | at | St | of | at | St.

REMARKS

FRONT AND BACK OF PINK SLIP


FORM NO. [illegible]

VIOLATION REPORT

BADGE NUMBER | NAME | DATE 19

CAR NUMBER | LINE | SUPERVISOR

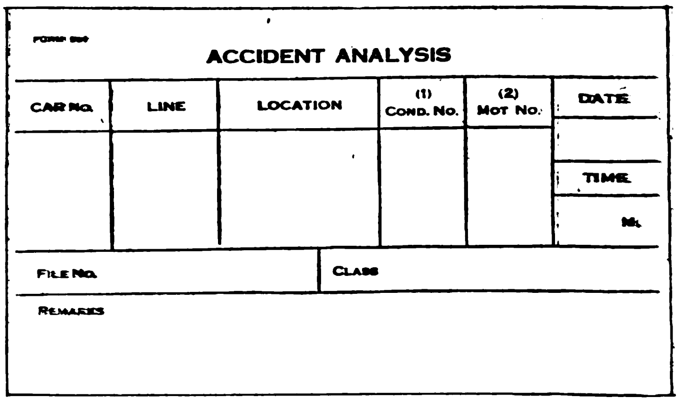
TIME A. M. OR P. M. M | LOCATION | TRIP TOWARDS

VIOLATION

STATE BRIEFLY THE VIOLATION

OVER

FRONT OF LIGHT YELLOW SLIP


FORM [illegible]

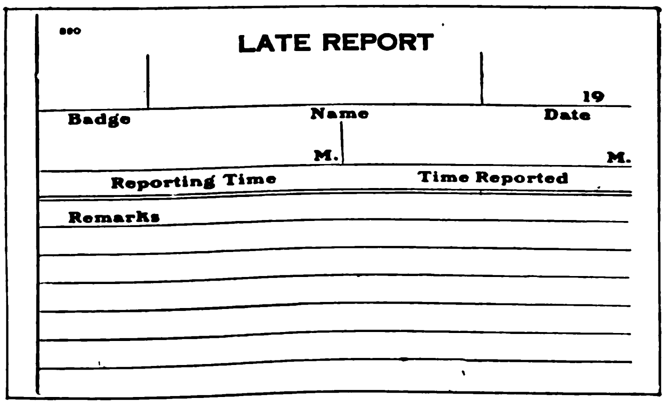
ACCIDENT ANALYSIS

CAR No.	LINE	LOCATION	(1) COND. No.	(2) MOT No.	DATE
					TIME
					M.

FILE No. | CLASS

REMARKS

FRONT OF DARK YELLOW SLIP


890

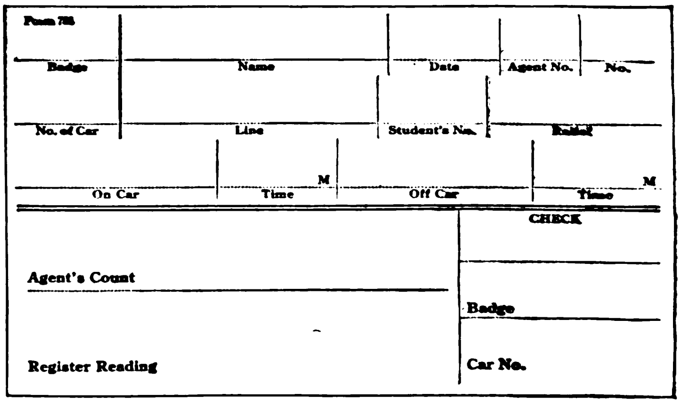
LATE REPORT

Badge | Name | Date 19

Reporting Time M. | Time Reported M.

Remarks

FRONT OF BLUE SLIP


Form [illegible]

Badge | Name | Date | Agent No. | No.

No. of Car | Line | Student's No. | Relief

On Car | Time M | Off Car | Time M

CHECK

Agent's Count | Badge

Register Reading | Car No.

FRONT OF WHITE SLIP

The light yellow card, the next in the series, is to cover reports of violations of rules. Only the front of this card is reproduced; the back contains space for remarks. The dark yellow card contains spaces for a brief record of accidents. Finally, there is a blue slip used when the man reports late.

The file is kept adjoining the large file of original papers and has been found very convenient. The principal labor in connection with it was to start it and bring it up to date. This was done by filling out the slips for current events as they occurred and filling out the past records of the older employees when the time of the clerk permitted. The file was begun in 1914, and from that time records were available immediately, but it was some two years before all of the back records had been entered.

Powdered Coal Plant for P. R. T. Power House

AN EQUIPMENT for burning powdered coal will shortly be installed in the Mount Vernon St. power plant of the Philadelphia Rapid Transit Company by the Quigley Furnace Specialties Company. The Mount Vernon St. plant is in the downtown section of the city, at 13th St., and is a direct-current plant which has been in operation for many years.

The plant at present is producing about 7,500 kw., employing twenty 375-hp. Babcock & Wilcox water-tube boilers. It is estimated that with powdered coal firing the needed output will be secured by using only ten boilers, even though the fuel to be employed is low in volatile matter and high in ash content.

The equipment will be installed according to what is known as the Quigley system. By means of compressed air, pulverized coal will be transported through small wrought pipe from an adjacent milling plant to the present coal bunker which will be partitioned into ten sections, each section supplying coal individually to its corresponding boiler. In this system the fuel is not mixed with air in transport but travels through the pipe in compact masses. The equipment from milling plant to burners is entirely inclosed and dust tight.

A blowing-tank unit of 5 tons capacity equipped with a quick-reading scale located in the milling plant, will insure accurate fuel records for each boiler. Pushing valves, located along the fuel distribution lines will divert the coal to each section of the bunker. The capacity of feeding and burning equipment for each boiler is to be 3,000 lb. of coal per hour. The regulation of the fuel fed to each boiler will be controlled by simply turning a hand wheel.

The change from hand power to powdered coal will be made without interruption of service, and it is expected that the new installation will be completed during the coming summer.

It is understood that when supplied with the powdered-coal equipment, the station will be used primarily for peak-load power supply, for which it will be admirably adapted. It is planned to use "river coal" or "wash coal" taken from deposits in the beds of streams in the anthracite mining regions, which exist in "buckwheat" sizes. A recent newspaper statement contains the information that the Shamokin Valley Company has assured the Philadelphia Rapid Transit Company that at least 2,000,000 tons of river coal can be obtained. O. M. Rau, of the railway company, stated, however, that no definite amount of the fuel had been contracted for.

Simply Constructed Truck Turntables Facilitate Repair Work at Hampton

TWO truck turntables of simple home-made construction were recently installed in the shops of the Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., as an effective means of expediting the work of truck overhauling. These were placed in two adjacent tracks in the shops, the forward half of which are equipped with pits and the rear half with concrete floors on which the truck dismantling and assembling work is done. Through the installation of a turntable in each of these tracks, just to the rear of the pits, the flexibility of the limited facilities and the convenience of shifting trucks from one track to another are greatly improved.

While the use of such turntables is a common practice in many shops, the construction features of those in the Hampton shops are interesting. Two circular concrete pits 16 in. deep and 8 ft. in diameter were first made, and the perimeter of the pits was faced with a circular steel plate held in place by bolting to brackets on the ends of the main running rails and the short run rail pieces between the two turntables. An ordinary Brill friction center-bearing plate for the center bearing of the turntable was placed in the bottom of the pit and held in place by two anchor bolts set in the concrete. Twelve supporting brackets for the 4-in. wide x ¾-in. thick circular plate tracks were also set in the concrete in the bottom of the pits.

For the framework of the turntables, two pieces of old girder rails, turned bottom side up, were used to form the main cross members. These were cross tied and braced with angle irons and bound into a solid structure by an iron plate forming the circumference of the table and bolted to brackets on the end of the girders and to the stiffener pieces. Then 3-in. I-beams placed on top of the underframing were used to support the board deck for flooring. Brackets for the four rollers supporting the perimeter of the table were bolted to the ends of the two sections of girder rails.

Some Points About the Ford Engine for Street Cars

THE new Ford internal-combustion engine designed for use in street cars has the cylinders mounted horizontally in two units so as to comprise two 80-hp., 4-cylinder double-opposed motors, operating on a planetary transmission drive to both the forward and the rear trucks. The construction is such that the over-all height is but 24 in. and the entire driving apparatus will be installed underneath the floor of the car so as to permit the utilization for passenger service of practically the entire floor space.

The operation of the engine is similar to that of the Ford automobile. Throttle, switches, gears and brakes are all operated like those of the Ford car. The engine is a self-contained unit with air pump and generator. The generator supplies current to a storage battery for lighting the car as well as for self-starting purposes. The air from the radiator is circulated through the car for heating. The trucks are fully spring mounted with no frame for separation.

It is the intention to operate the engine with gasoline on its trial trip, but it is adapted to operate with kerosene, alcohol or benzol.

Association News

Additional Assignments to Engineering Association Committees

ON RECOMMENDATION of President E. R. Hill, the executive committee of the Engineering Association has assigned to the respective committees a number of subjects in addition to those listed in the issue of this paper for Jan. 3: To committee on power distribution—Compilation of data on safe limit of wear on trolley wires, on frogs, on life of insulators and on cable insulation. To committee on way matters—Compilation of data on safe limit of wear on rails and special work and on life of track construction of various types. To committee on equipment—Compilation of data on wear and life of parts of rolling stock and equipment, such as wheels, journals, axles, brake shoes, trolley wheels, motor bearings, brushes and commutators, on life of motor windings, on dipping and baking, on reinsulation, etc. To committee on buildings and structures—Compilation of data and information on methods and standards of maintenance. To committee on heavy electric traction—Recent development and progress in design of motors and motor drives for heavy traction, both direct current and alternating current, with comparison of weight, space efficiency, etc. Description and illustrations of recent types of electric locomotives (supplementing report of 1916). The electric switching engine in freight yards; comparison with steam.

Standards Committee Holds Winter Meeting

A MEETING of the Engineering Association Committee on Standards was held in New York City on Feb. 9 to consider several matters assigned to it at the convention, as well as the normal business of the committee accruing about mid-year. In the absence of the chairman, H. H. Adams, the vice-chairman, Martin Schreiber, presided. In attendance also were H. L. Andrews, General Electric Company, Schenectady, N. Y.; C. C. Beck, Ohio Brass Company, Mansfield (representing W. C. Starkey); E. J. Blair, Elevated Railways of Chicago; C. H. Clark, Cleveland Railway; H. H. Norris, ELECTRIC RAILWAY JOURNAL; F. R. Phillips, Pittsburgh Railways; K. A. Simmon, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. (representing N. W. Storer); N. B. Trist, Carnegie Steel Company, Pittsburgh Pa., and J. W. Welsh of the association.

The routine business transacted comprised the referring of the 1919 report of the Committee on Equipment back to the committee for further revision with a view to harmonizing the proposed standards on wheel and flange contour, journal bearing and wedge gages, and the adoption of the joint specifications for electric light, power supply and trolley lines crossing steam and electric railways. The crossings specifications had been approved by the American Railway Engineering Association at its last meeting.

Under "Miscellaneous Business" the committee considered the desirability of affiliation with the American Engineering Standards Committee, the organization of which was explained by Mr. Schreiber, who is a representative of the A. S. C. E. on the committee. It was voted to recommend to the executive committee that the association apply for representation in the American Committee. For a sub-committee of the Standards Committee, appointed to prepare a plan for making the Engineering Manual more convenient for reference, Mr. Schreiber reported informally. The relative merits of the loose-leaf and permanently bound forms of the Manual were discussed and, while the merits of the latter were recognized, sentiment seemed to favor the present form, in the interest of economy, with possible elimination of folding plates and miscellaneous practices reports. All agreed upon the desirability of making every effort to insure the revision of the Manuals now in the hands of the membership.

Letter to the Editors

More About Car Weight Comparisons

THE J. G. BRILL COMPANY
PHILADELPHIA, PA., Jan. 20, 1920.

To the Editor:

I have read C. W. Squier's comments in the ELECTRIC RAILWAY JOURNAL of Jan. 17 on my letter of Dec. 26 in regard to the computation of car weights for comparison on the maximum load basis, and conclude that the only fair method is to give the weight of car both per passenger seat and on the total-passenger basis.

Simply to give the weight on the per-passenger-seat basis is very unsatisfactory, as cars are constructed to carry a definite maximum passenger load of so many seated plus so many standing passengers. In some cars increased standing space is secured at the expense of seating capacity, so that the number of passenger seats will vary, depending upon the total carrying capacity.

For instance, the standard double-end Birney safety car, weighing about 15,000 lb., is constructed to carry thirty-two seated and sixty-eight standing passengers, which, taking 150 lb. as the average weight per person, gives a passenger load also weighing 15,000 lb. or a pound of car to a pound of passenger.

It is true, as Mr. Squier states, that in some few localities a maximum load of sixty passengers for the Birney safety car has been established, but as a railway is privileged to place any limit it desires, up to the maximum, on the passenger load, this limitation does not affect the maximum load which the car is constructed to carry.

However, it is an interesting comparison on the per-passenger-seat basis and, as stated above, I consider that in all fairness to the various types of cars both weights should be given, then where a car has a small seating capacity but large standing space, a comparison based on the total passengers carried may be favorable although one based on the per-seat basis may be unfavorable.

I wish to thank you for your consideration of this subject and it is hoped that other readers of the ELECTRIC RAILWAY JOURNAL will add their opinions to the discussion.

W. S. ADAMS.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

$2,500,000 for Improvement

Cleveland's Street Railway Commissioner Recommends This, His Suggestion Covering 100 New Cars

Eight resolutions, based on recommendations of Street Railway Commissioner Fielder Sanders for extending, bettering and making permanent improvements calculated to relieve congestion and to aid in bringing the railway system of Cleveland, Ohio, to the requirements of a greatly increased population, have been introduced in City Council.

COUNCIL WILL INDORSE PLAN

Councilman Alva R. Dittrick, chairman of the street railway committee, to which the resolutions were referred, predicts that they will be acted upon favorably. This means that by March 1 they will be indorsed by Council unless opposition develops.

The principal recommendations of the commissioner embodied in the resolutions are:

Fifty cars and fifty trailers immediately be acquired at a cost of $1,200,000.

Complete development plans for the west side of Public Square, which lay the basis for routing cars when the proposed subways are under construction, provide that Madison, Lorain, W. Twenty-fifth St., Clifton, Fulton and Detroit cars make only one stop in the square at a designated shelter house. To accomplish this, new switch tracks will be laid. Plans for relieving congestion in the east side of the square will be worked out soon.

Prohibition of all vehicular traffic through the square during the rush hours, and the stopping of all parking of such traffic in the square. The rush hours generally are understood to be from 8 a.m. to 6 p.m., in the opinion of Councilmen.

All Cleveland, Southwestern & Columbus and Lake Shore interurban cars shall stop only on W. Third St., between Superior Ave., N. W. and St. Clair Ave., N. W., and all Northern Ohio Traction & Light Company, Cleveland & Chagrin Falls & Eastern Ohio Traction Company cars running north of Central market house and west of E. Ninth St., shall stop only on W. Third St., between Superior Ave., N. W. and Champlain Ave., N. W. These cars have taken on and unloaded passengers in the square, causing much congestion.

That the Clark Ave. and Union Ave. lines be joined, making a cross-town line by laying a double track along Pershing Ave., S. E.

EIGHT NEW SHELTER HOUSES

When this is done it is proposed to have cars operated from E. 131st St. and Corlett Ave., S. E. to E. 116th St., on E. 116th St. to Union Ave., S. E., on Union Ave. to Broadway, S. E., on Broadway to Pershing Ave., on Pershing Ave., Clark Ave., S. E., Clark Ave. bridge, Clark Ave., S. W. to W. 73rd St., on W. 73rd St. to Denison Ave., S. W. and on Denison Ave. to Loraine Ave., with through service as a cross-town line.

Request the director of public service to give estimates on the cost of constructing eight new shelter houses in Public Square.

Give the Cleveland Railway right to construct a single track line in W. 117th St., from Lake Erie to Thrush Ave., S. W. The cost of this improvement is estimated at $300,000.

Permit the Cleveland Railway to issue $2,500,000 additional stock to cover costs of improvements.

Probably the most important step for relief of congestion lies in that part of Mr. Sanders' recommendation dealing with the west side of the square. Additional rails will be laid to make a pair of parallel tracks around both the north and south sections and cross-overs would be put in to make all sections of both tracks available if necessary for every car using the loops.

Monorail Suggested in Chicago

Mayor's Traction Commission Hears About System—$2,000,000, 8-Mile Line Proposed as Experiment

The proposal to solve Chicago's traction problems by building a monorail system has again bobbed up in Chicago. This time, F. D. Flint, president of the National Suspended Monorail Company, appeared a few days ago before Mayor Thompson's traction commission to explain the advantages of the monorail rapid transit system.

MONORAIL TALK GAINS IN FAVOR

Mr. Flint argued that the monorail system could be built for $100,000 per mile of double track as compared with $150,000 for surface lines and $500,000 for elevated. It was also claimed that the monorail could be operated at a saving of 65 per cent over the present systems and that the running time could be more than cut in half.

At the last meeting of the traction commission the talk about the monorail installation seemed to be gaining in favor. It is now proposed that a double-track line be built on Monroe St. from the loop to the Western city limits, a distance of 8 miles. The claim is that such an installation could be built for $2,000,000 and it is proposed that the City Council be asked to appropriate that sum from the $26,000,000 traction fund. In some quarters it is thought that perhaps the city administration is "all set" for the adoption of the monorail scheme to make good Mayor Thompson's promise of "the best transportation system in the world at a 5-cent fare."

COMMISSION OF ENGINEERS

It is understood that six engineers for the commission have been proposed to Mayor Thompson as candidates for the job of working out the municipal ownership scheme. The first job assigned to the engineers selected will be a thorough investigation of the monorail plan presented by Mr. Flint of the promoting company.

Against New City Loop

Detroit Administration Opposed to Further Construction by Detroit United Railway

The City Council of Detroit, Mich., on Feb. 6 decided against the proposed plan of the Detroit United Railway for relieving congestion of cars in the down town district by means of a loop that would turn Woodward cars at Grand Circus Park. Permission had been requested to construct a loop to provide a means by which a part of the Woodward cars might be turned for the northbound trip, and do away with running all these cars through the congested part of Woodward Ave., near the southern end of the line.

MATTER LAID OVER

Although this plan has been favored by several city officials and the Council has endeavored for several years to have the plan carried out, it was decided that the matter should be laid over until after the April 5 election when a vote will be taken on Mayor Couzens' plan for a $15,000,000 municipal railway system.

The reason given for denying the company's request at this time was that in the company's move to build the loop at the present time was seen an attempt to strengthen its hold on the section of Woodward Avenue line south of Milwaukee Avenue, which Mayor Couzens plans to use as one of the down town outlets for his proposed municipal system. The Mayor proposes to take over this section of the Woodward line by right of the expired franchise decision.

At the same meeting the Council approved the Detroit United Railway's plan for rerouting part of the West Sherman cars over the new Springwells line, an action which the company held was necessary because of the rapid development of the district served by the line.

DAY-TO-DAY AGREEMENT

According to the company's statement, it has undertaken the construction of all the railway extensions the city has permitted it to build. That was the fact before the Aug. 7, 1913, agreement and has been the fact ever since.

When the agreement was entered into it was with the hope that the costs then prevailing would be pretty well adhered to for some time to come. However, the agreement was made day-to-day—terminable by either the city or the company, in case events developed that made a termination seem advisable.

In spite of aldermanic slowness in adopting the proper resolutions, litigation by some citizens opposing one extension, slowing up of the extension program while an appraisal was being made by engineers and accountants hired by the city prior to the vote on the so-called "pig-in-a-poke" purchase plan of November, 1915, the abnormal conditions brought about by the European war with restrictions on material and labor, and the continued labor shortage, yet within the one-fare zone alone, since Aug. 7, 1913, the company's property has been added to in the way of cars, of tracks, of land and of power requirements to the sum of more than $8,500,000.

$15,000,000 Subway

Voters of Cleveland Will Be Asked on April 27 to Pass on New Project

An agreement has been reached between the city and the Cleveland (Ohio) Railway whereby radical changes will be made in handling traffic, especially in connection with the electric railway. With a few minor changes, this agreement will be acceptable to the railway interests. Within a few weeks the voters will pass upon a project that will eliminate traffic congestion in the downtown sections. There is every reason to believe the project will be acted upon favorably. Within a few months the project for relief is expected to be under way.

TERMINALS AND SHORT TUBES

The principal work decided upon is the construction of subways. They are advocated for two purposes:

1. To speed up service of surface cars, now much slowed down because of traffic congestion.
2. To clear the downtown streets of one of the principal forms of traffic, resulting in quicker handling of railway passengers and the quicker handling of automobile, vehicular and pedestrian traffic.

The program calls for terminals and short tubes in the congested district. These will be so constructed that each may be built by itself, and increased in size as future requirements dictate. There will be five units to a terminal and four tubes.

Practically all surface traffic will be diverted underground from the edges of the business districts to the center of the downtown section, known as the Public Square. Not all the cars will go underground in this district, but a few will be retained on the surface, merely to care for short haul business.

The entire program, in the opinion of members of the Rapid Transit Commission, is the beginning of a comprehensive system of transportation for Cleveland, the idea being to connect the system under consideration now with tubes, elevated structures or right-of-way over steam railroad lines reaching into the outlying districts.

SAVING IN TIME IMPORTANT

The significant feature of the present program is that it is estimated that from three to five minutes will be saved over each line from the present running time. This saving will be increased as the lines are extended. This will be a benefit to car riders directly. Other savings will accrue to the railway in that there will be less paving to be maintained, fewer accidents, reduced platform expense, increased speed, and ease of transferring of passengers at principal points.

The cost of the initial project will be $15,000,000, according to the plans now being completed by Parsons, Klapp, Brinckerhoff & Douglas, consulting engineers to the Street Railway Commission. The funds will be obtained by the city of Cleveland on its credit or general bonds. The city will build the subways and equip them with tracks, wires, signals, stations—everything except power and cars—and turn the lines over to the railway for operation.

The Cleveland Railway will rent the system for a period coincident with its present surface grant. The rental will be 6 per cent of the cost of equipment in the subways, but not on the cost of the subways themselves. No rental for the tubes and stations will be charged. The charge to the car rider will not be increased by this plan of rental, which will continue as long as the company operates at its present, or limited return, method.

CLEVELAND GROWING RAPIDLY

If for any reason the present franchise should be nullified, and the railway obtain a grant different from the present service-at-cost arrangement, then the company will be required to pay a rental on the cost of the entire subway system. If the present franchise is not renewed ten years from now or during the last fifteen years of the surface franchise, the company will pay the city the differences in cost in operation in subways or on the surface. The present franchise runs until May 1, 1944.

The tremendous growth of the city industrially is the prime factor that has spurred the officials of the city to act for better transportation. It is estimated roughly that all surface traffic other than street cars will be speeded up 50 per cent. The speed of car traffic will be increased from 10 per cent to 20 per cent. Based upon an average working wage of $1 an hour, it is estimated that in a year of 300 working days the saving will be $15,000,000.

The projects will be constructed with funds accrued by the issuance of bonds, authority for which is vested in the Rapid Transit Commission, which also will contract for the operation. The project will be placed before the people on April 27, the regular presidential primary day in Ohio. If the vote is favorable work will probably start late during the coming summer. It is expected that work can be completed in two years.

Preliminaries in connection with the project consist of the issuance of $30,000 in bonds in connection with engineering work and the appointment of the Rapid Transit Commission. The commission includes: Charles A. Otis, of Otis & Company; Clarence J. Neal, director of finance; M. A. Bradley, capitalist; Charles E. Adams, Cleveland Hardware Company; Fielder Sanders, Street Railway Commissioner.

The subways will extend as follows:

1. From the High Level Bridge at Superior Ave. and West Ninth St. through West Superior Ave., to Public Square for West Side cars.
2. From the Market House along Ontario St., to Public Square, for South Side cars.
3. From East Twenty-second St., along Euclid Ave., to the Public Square for East Side cars.
4. From East Twelfth St., along East Superior Ave., to the Public Square for East Side cars.

There will be terminals under the Public Square linked with five loops for the different branches of the subway lines. Under the Public Square there will be three levels—terminals, concourse and tracks.

The project has been planned by Parsons, Klapp, Brinckerhoff & Douglas. They will supervise the awarding of contracts and the construction.

Recent New York Bills

Bills have recently been introduced in the Legislature at Albany, N. Y., providing as follows:

Senate Intro. No. 129, Print No. 129. Introduced Jan. 21 by Mr. Fowler, Adding new article 9-b Conservation Law, empowering conservation commissioner to acquire, control and utilize the waters in state and boundary waters, appropriate for power purposes; develop water power and generate electric current, power and energy and transit, distribute ,sell or lease same to municipalities and inhabitants of the state. Current is to be supplied at cost. Municipalities contracting for supply of electricity are authorized to light public places, to sell power to persons or corporations and to make rules concerning price. $250,000 is appropriated.

Senate Intro. No. 151, Print No. 151. Introduced Jan. 22 by Mr. Knight. Amending § 45-a Tax Law, relative to hearing on special franchise valuation, by providing that notice for hearing must be at least 25 days in advance hereof instead of 10 days as at present. If any person, association or corporation whose franchise is assessed proposes to complain at such hearing concerning valuation or rate of equalization, a written complaint specifying objections thereto in detail must be served on authorities of city, town or village in which franchise is subject to assessment, at least 10 days before date of hearing. If the local authorities propose to complain, they shall in like manner serve written complaint on the person or corporation assessed.

Assembly Intro. No. 258, Print No. 260. Introduced Jan. 22, by C. P. Miller. Amending section 35 and subdivision 4, section 49, Public Service Commissions Law, relative to interchange of facilities by common carriers, by striking out provision that section 45 shall not be construed to require a common carrier to allow any other common carrier to use its tracks or terminal facilities.

Want Tacoma Problem Settled

City Officials Suggest Basis of Negotiations to Continue Until Railway Matter Is Settled

Efforts of City Attorney U. E. Harmon and Mayor C. M. Riddell of Tacoma, Wash., to arrive at some settlement of the differences with the Tacoma Railway & Power Company in regard to railway operations came to a head recently when Mr. Harmon and Mr. Riddell reported to the City Council on their recent Eastern trip, with recommendations for a basis of settlement. A provision of the recommendation calls for a revaluation of the railway property on a basis of what is "usable and useful," the city to pay half of the cost of the revaluation.

NEW FRANCHISES IMPERATIVE

Whether the Council will agree to pay this bill and whether the company will agree to a new valuation on the basis the city will demand, will probably form the main themes for discussion. The report shows that the franchises are expiring; that streets uncared for are going to pieces; that the public is suspicious of the company; that the city will not favor municipal ownership; that better service is demanded and required, and that revenues are not adequate to support expenditures.

The following suggestions for negotiations were made in the report: All franchises should be cancelled and new ones granted. New valuation to be made of street railway property. Only useful and usable property to be considered. City to guarantee profit on company's investment. Sliding scale of fares to be provided. Five cents suggested as basis of fares, with additional charges for transfers. City to have official to approve all expenditures by company. Arbitration of all disputes. City to have an option to buy the lines any time.

The report follows in part:

Some have advocated that the Council refuse to renew any expired franchises and stop the operation of railway traffic over that portion of the lines on which the franchises have expired and will expire. It is plain to be seen, however, that this would not contribute to the public service and would only add to the complications already existing.

The only remedy suggested by the railway companies to meet the financial condition is the raise of fares to 10 cents. The railway corporations have filed a tariff and are asking the Public Service Commission to grant this increase in fares.

COMPANY CAN'T PAY FIXED CHARGES

The application thus made is based upon the assertion that the companies cannot, under existing conditions, pay their fixed charges and operating expenses and provide for the upkeep of their property out of the present income. Protest against the proposed raise is heard on every hand and a long contest must necessarily ensue unless some permanent solution is found.

An effort, therefore, should be made to work out a plan promising more satisfactory results. Before suggesting a possible solution we desire to call attention to several fundamental things:

1. The city by authority of law controls the streets. Under the statutes as they now stand the city is the only tribunal which has the power to grant the use of streets. This is the most valuable concession which the city has the power to grant and it can grant this concession only in the interests of a public use.

2. The use or service contemplated and which is made the consideration of franchise contracts is safe, adequate and sufficient service. These two elements of the contract, namely, occupation and service, are reciprocal and dependent.

3. All investments made by the public utility in order to render such service must be limited to property useful and usable and reasonably necessary to that end, and the expense of operation must be confined within the limit of strict economy. Extravagance in investment or in the operation of the system ought not to be charged to the general public and it should not be called upon to pay therefor or to pay a return thereon, either out of fares exacted or taxes imposed. Legitimate investment, economy in the expediture of revenue, and efficiency in service is the only basis upon which the people can be expected to ratify an agreement providing for safe, adequate and sufficient service and a return to the companies.

The situation has become so much involved that it seems necessary to have a reinvestigation by competent persons of all of the elements which enter into the problem. Therefore, we recommend that the city submit to the railway companies the following plan for the determination of all matters in controversy:

1. That a reinvestigation of the value of their investment be made by disinterested engineers, the expense thereof to be borne equally by the companies and the city.

2. That traffic conditions and expenses of operation be likewise examined with the view of securing improvement in the one and greater economy in the other.

3. That a new franchise be proposed, covering the average life of existing franchises, which, when accepted by the company and ratified by the people, shall take the place of existing franchises; and that such franchise, among other things, shall provide:

(a) For the valuation so fixed as the basis for a guaranteed return, with provision made for addition to capital account as improvements are required, such additions to be governed by regulations stated in the franchise.

(b) For a fixed rate of guaranteed return with suitable provision to insure payment thereof.

(c) For the maximum fare to be charged, with a sliding scale within such maximum adaptable to conditions as they arise affecting the rate of return.

(d) For a railway commissioner, as in the city of Cleveland; such commissioner to be given a large measure of supervision over further investment, improvement of property, regulation of service and all other matters entering into the practical operation of the system, and the salary and expense of such provision to be charged to operating expense.

(e) For the arbitration of disputes, protecting both parties to the contract.

(f) For an option during the life of the franchise to the city to purchase the railway systems on such terms and such notice as may be prescribed. By such an option to purchase is not meant that the city will be compelled to buy the systems, but that it shall have the privilege of purchase if it should so elect.

There are many details which would have to be worked out in connection with such a franchise as we have suggested which cannot now be covered, but the foregoing statement embodies the more important features which seem to have solved in the most practical way the street railway problems concerning other cities.

In working out the details of any plan which may be the subject of negotiations between the city and the railway companies, we suggest that a practical man be secured, having knowledge of all the questions to be dealt with, he to be the city's representative during such negotiations. In making this suggestion we are following the best advice we have been able to obtain.

We recommend that the street railway companies be asked to meet with the Council for the purpose of trying to arrive at a basis for a permanent settlement, and that the matters to be determined be given continuous attention until finally disposed of.

Service-at-Cost Plan Almost Ready

It Was Expected Mr. Doherty Would Have Toledo Proposal This Week—Will Enter Any Objections in Writing

The proposed franchise for a service-at-cost plan for the Toledo Railways & Light Company, Toledo, Ohio, has been practically completed by the commissioners appointed by the federal court at Toledo. It will be printed and submitted to Henry L. Doherty, operating head of the railway company.

The new ordinance provides a maximum rate of fare of 7 cents with a 1-cent charge for transfer. The minimum rate provided is 3 cents on a ticket basis or a 5-cent cash fare. The initial fare will be 6 cents with a 1-cent transfer charge. The present fare is 6 cents with a 2-cent transfer charge.

The municipal ownership commission has placed its only hope for an ordinance incorporating its plan for a settlement in a favorable decision of the Ohio Supreme Court on a test case which will be argued on Feb. 10, to determine whether under existing laws a municipality has the right to issue general credit bonds to purchase a transportation system.

Mayor Schreiber and Law Director Martin will represent the city and Former Attorney General U. G. Denman will present the brief for the publicity and efficiency commission which became a party to the suit when it refused to publish the ordinance passed by Council authorizing the issuance of $1,000 of bonds to acquire a transportation system.

The Brach bill, granting the specific right which the city will attempt to obtain in the case before the Supreme Court, after being passed by a vote of sixty-seven to six, when reconsidered by the House of Representatives at Columbus was definitely lost when it was called out for a vote in the upper house of the General Assembly.

When service-at-cost commissioners and Mr. Doherty became deadlocked on several financial provisions to be inserted into the ordinance now being written, a committee of local bankers and bond men was called in to arbitrate differences. The following recommendations of the financiers will be incorporated in the ordinance:

Issuance of 7 per cent stock and 6 per cent bonds.

Creation of a sinking fund by setting aside annually an amount equal to 1½ per cent of the existing capital value, until it reaches a maximum of 20 per cent of the capital value.

Such a fund would be used for the purchase of the bonds of the company, to be held by the sinking fund trustees of the city of Toledo and to be recognized as junior securities; coupons of the bonds to be forwarded to the trustees of the mortgage to be used for the purchase of additional bonds of the company which would also be held by the local sinking fund trustees.

A call premium of 4 per cent on bonds and 8 per cent on stock.

Henry L. Doherty told the commissioners that there was nothing in those recommendations he could not accept.

In addition to the sinking fund, a depreciation fund with an annual minimum of ½ per cent and a maximum of 1½ per cent of the capital value will be provided, according to present intentions of commissioners.

Nothing has been said concerning the valuation and rate of return which will be incorporated in the new franchise. It is expected that there will be considerable bargaining on these two points on account of the wide difference in the city and company valuation figures submitted two weeks ago.

The question of a maximum fare and amount allowed for call premium on the stock and bonds will undoubtedly result in negotiations between Mr. Doherty and the commissioners.

It is expected that Mr. Doherty will have a completed copy of the franchise on Feb. 11. He will make all objections in writing. The differences will be ironed out before the document is submitted to the voters for ratification.

Many Lines Snowbound

Storm Ties Up Traffic in Atlantic Coast Section—New York City Chief Sufferer

City and interurban lines in the section along the Atlantic Coast from the New England States to Pennsylvania, are slowly resuming normal operation, interrupted by the storm of snow and sleet which swept over the section on Feb. 4 and 5. The storm, the most severe of its kind in years, demoralized traffic for almost a week. Many lines were closed for several days. A number, including most of the Manhattan surface lines, have not yet been reopened, and it will be a week more before service is restored.

Boston and New York have been the chief sufferers from the storm. The Boston Elevated Railway kept most of its lines open, although hampered by lack of men to clear the tracks. This scarcity of men has hampered the work of snow removal in many other cities, notably in New York City.

It seems incredible that ten inches of snow could paralyze all forms of street transportation—street cars, buses and automobiles—in the Borough of Manhattan. Nevertheless, it was a fact. On Feb. 13, a week after the storm, the main arteries were far from being open for traffic and not more than four or five miles of trolley routes were in operation.

In Brooklyn, due to the efforts of the two traction companies, the streets on which tracks were laid were at all times in passable condition, and in less than twenty-four hours after the storm the trolley car companies were operating the regular quota of cars on all routes with the exception of a few outlying shuttle lines. The situation in Manhattan Borough was far more complicated. Traffic on the lines of the New York Railways and the other trolley companies was absolutely at a standstill for several days, and the subway and elevated stations were swamped by the inrush of thousands of persons who ordinarily use the street cars.

This tieup resulted from the method of propulsion of the Manhattan lines. In Manhattan the lines are forced to use the underground conduit system, whereas Brooklyn lines are permitted to operate with the overhead trolley. Under storm conditions existent last week the "sugar snow," so called because it does not pack down or "stay put," so filled the conduit slots and manholes on the Manhattan lines that when the storm was at its height the life blood of the car was cut off, with the result that the sweepers and cars literally dropped dead in their tracks—to remain thus until the ice-covered rails and conduits had been cleared with pick ax, shovel and hoe. To clear 250 miles of track by hand is no small task and one that is likely to take days to accomplish.

The real cause of the traffic tie-up in which Manhattan finds itself can be attributed to the fact that in the past the city has been more or less dependent upon the surface transportation companies to keep open the streets on which they have tracks. With the transportation companies unable to use their snow removal equipment and the borough without the necessary reserve snow fighters, the whole work fell upon the street cleaning department, and was more than it could handle. The result was that instead of having soft snow to handle, six to nine inches of solid ice confronted the snow shovelers.

Chilean Representatives Study Electrification

Ricardo Solar and Rafael Edwards of the State Railway Commission of Chile have arrived in the United States to study heavy electric traction installations in the interest of the plan to electrify the old steam railroad from Valparaiso to Santiago. This road traverses mountainous country for almost its entire length of 116 miles. The Chilean government has appropriated $5,000,000 to start the work.

Messrs. Solar and Edwards have been in Seattle recently. They are interested particularly in the Chicago, Milwaukee & St. Paul installation. This, they say, very nearly approximates the conditions with which they will have to contend. The grades and other physical conditions encountered on this line are very similar to those of the line in Chile.

The railroad problem in Chile is complicated by the very high price charged for coal. Water powers are available, but coal in Chile at present costs more than $15 a ton. Most of the coal used there now is imported from Australia, with a small amount coming from the United States. It has been estimated roughly that the saving in freight rates on this line resultant from electrification will be about 40 per cent.

The engineers expect that the full equipment for the line, including the generating apparatus, cars, car equipment, etc., will be purchased in the United States.

Threshing Over Old Straw

The editors of New York's dailies are becoming wearied at the traction investigation in that city. The more conservative papers some time ago expressed their disapproval of the conduct of the inquiry and of the futility of it to correct a condition which demands some kind of immediate emergency action.

This spirit of fair play is now beginning to manifest itself in the papers which while pronouncing judgment slowly on matters affecting corporation management stand squarely for the right as they see it. One of these papers is the New York *World*, the editorials of which are noted for their vigor. That paper now demands a constructive municipal traction policy. It says:

> Only to readers very young or most forgetful can the so-called revelations of the Board of Estimate transit inquiry seem new. Practically all the facts thus far elicited were made public by the Thompson committee, along with many others not yet recalled by the Board of Estimate.
>
> If no new data are to be unearthed, why not act now? If action must, after all, be based upon familiar facts, why not use the Thompson committee records instead of threshing old straw? Scandalous waste or worse in the past must be considered in planning the future, but it is present conditions that must be faced.
>
> What New York wants and must have is a constructive policy. To date, Commissioner Nixon is the only man concerned in the problem who has had the courage to propose one. The Mayor has no policy except drift. He seems not even able to realize that he needs a policy.
>
> Traction companies should have income to pay expenses and a fair return on capital actually expended; to pay fair wages; to keep up equipment; to pay proper damage awards. Experience in other cities and shifting prices suggest the need of sliding scales of fares based on costs. Mr. Nixon is right in holding that local transit should be treated as one problem—with one administering body if union can be arranged without too great condonation of past wrongs.
>
> Is the Hylan Administration capable of evolving an intelligent traction policy? There is no evidence of it as yet.

Service-at-Cost Suggested at Buffalo

Revival of the service-at-cost plan as a permanent solution of the railway problem in Buffalo, N. Y., is proposed by Mayor George S. Buck in a letter to Elliott C. McDougal, chairman of the protective committee of the bondholders of the International Railway which is now in possession of the property. As a means of putting the plan into operation the Mayor proposes the following plan:

> Acceptance of the $18,000,000 valuation of the property in Buffalo as fixed by the Public Service Commission in its 7-cent fare decision.
>
> Ratification at a referendum election of an agreement between the city and company, designed to make the plan effective.
>
> A complete reorganization of the controlling interests of the International, eliminating a management which the Mayor characterizes as "so regardless of the welfare of the public, so indifferent to the public goodwill and so defiant in its attitude generally that every scheme proposed by it has immediately met with suspicion, irrespective of its merits."

The Mayor believes that the proposed referendum for ratifying the agreement between the city and company will overcome the objection to the service-at-cost plan which led to its veto by Governor Smith after it had been passed by the last Legislature.

Under the service-at-cost plan, the Mayor believes that the company's daily loss through fares not turned in by conductors will drop to a minimum. He says the present daily loss is close to $2,000 as compared with less than $300 daily in Cleveland where the service-at-cost plan is in operation. He believes the public would take a greater interest in the successful operation of the railway properties if the plan is accepted by the company and put into operation.

Mr. Morse Makes Final Address

In addressing the City Council of Pittsburgh, Pa., for the last time befor he left office, E. K. Morse, transit commissioner of Pittsburgh, declared this is not a propitious moment for constructing either of the subway systems which have been at issue in Pittsburgh. Mr. Morse was dismissed by Mayor E. V. Babcock, because of his opposition to the downtown subway loop fostered by the Mayor and authorized by the people of the city in a bond issue election. Mr. Morse, in his final presentation to Council, explained the subway system he has in mind for Pittsburgh, to consist of two intersecting subways crossing the downtown section at right angles.

Objecting to the subway loop, Mr. Morse insisted it could only be used by the Pittsburgh Railways and could not conceivably result in any more revenue to that company. "The railways company," he said, "ought not to be allowed to spend a cent for any so-called improvement which will not be a revenue-earner." The subway loop, he said, "could not accommodate one-half of the surface cars now operated by the traction company, and would not be, in any sense, a step toward the solution of transit problems." The two subways he proposed for the Council's consideration were the ones he outlined in his annual report for 1917.

Washington Men Ask Wage Increase

The trainmen of the Washington Railway & Electric Company and the Capital Traction Company, Washington, D. C., are agitating for more pay. Already the Brotherhood of Electric Railway Employees of the Washington Railway & Electric Company not in the Amalgamated Association have presented a demand for 60 cents an hour. They say:

> We, the Brotherhood of Electric Railway Workers, solemnly declare that the brotherhood is and has a right to be free and independent of all other labor organizations. We wish to state that on this day we are progressing in our efforts to incorporate under the laws of the District of Columbia, as a free labor organization and the charter is being drawn under our constitution and by-laws as follows:
>
> The motto of this organization shall be "Peace."
>
> The purpose is to promote the social welfare of its members and to assure its members all the rights and privileges guaranteed under the Constitution of the United States.
>
> This organization shall at no time affiliate itself with any other organization whatsoever.
>
> The name, Brotherhood of Electric Railway Employees, shall be always retained, and, with the further support of its members, this declaration, made with a firm reliance on the protection of the Divine Providence, we mutually pledge our loyalty to each other on our sacred honor.

J. H. Cookman, representing the Amalgamated Association, said the amount of the increase to be asked for has not been decided on. While the men appreciate the increase of 3 cents an hour granted by both companies a few months ago, they still find it impossible properly to support their families on the present wage scale. They contend that their wages have not kept pace with the cost of living. The present scale is 46 cents an hour for the first three months, 49 cents for the next nine months and 51 cents thereafter.

News Notes

Strike in Columbia.—Employees of the Columbia Railway, Gas & Electric Company, Columbia, S. C., went on strike on Jan. 28. Negotiations between the men and the company for a new wage scale contract ended in a deadlock.

Steam Displaces Electricity. — The United States Railroad Administration has begun the operation of steam cars over the lines of the Rock Island Southern Railway between Rock Island and Aledo. All of the electric cars are eliminated. The new train being operated by steam is a mixed train for passengers and freight service.

Legislature Wants Transit Evidence.—Minority Leader James J. Walker introduced in the New York Senate on Feb. 4 a concurrent resolution asking that the New York City Board of Estimate & Apportionment be requested to transmit to the Legislature evidence and information it may receive through its inquiry on the transit situation.

Office of Safety League Removed.—The offices of the Ontario Safety League have been moved to 189 Church St., Toronto. The honorary president of this league Hon. L. H. Clarke, lieutenant-governor of Ontario; the president is Hon. T. L. Church, Mayor of Toronto; the organizer and engineer is J. F. H. Wyse, and the general manager is R. B. Morley.

Bridgeport Franchise Renewed.—The controversy between the Wheeling (W. Va.) Traction Company and the Council over the company's franchise at Bridgeport, Ohio, was settled when it was agreed that the company's franchise was to be renewed for twenty-five years. Bridgeport is to have a 5-cent fare for five years. The company also agreed to continue to maintain the streets over which its tracks pass, as heretofore.

Bus Concession in Buenos Aires.—The Commission of Public Works of Buenos Aires, Argentina, has granted a concession to a private concern to operate lines of autobuses for a period of fifty years, after which the concession will revert to the city. To begin with, there will be four lines operating from the center of the city to the suburbs, with twenty-five busses to each line. The fare will be 10 centavos, the same as charged by the tram lines and the subway.

Illinois Leagues Combine for Home Rule.—A consolidation of the Illinois Municipal League and the Home Rule Municipal League was effected at a joint meeting in Springfield on Jan. 29 and 30. The new league will make a determined effort on behalf of the municipalities to secure unlimited power in the revised constitution to acquire, construct and operate their own public utilities and to regulate those privately owned. Mayor Harry P. Pearsons, Evanston, is the president and Prof. John A. Fairlie, University of Illinois, is the seceretary-treasurer of the consolidated league. The new body will now operate under the name of the Illinois Municipal League & Home Rule Municipal League, Consolidated.

Court Overrides Commission on Bus Line.—A certificate of convenience and necessity was denied by the Public Utilities Commission of Illinois to the Bartonville Bus Line which petitioned for the right to operate motor vhicles over public highways of the State outside the corporate limits of cities and villages. The State Supreme Court has handed down a decision in connection with this ruling of the commission in which it is stated that "there is nothing in the act which authorizes the commission arbitrarily to deny the certificate because a portion of the route over which the utility proposes to operate is a highway outside the corporate limits of a city or village." The court holds that the commisson's decision is unreasonable and therefore unlawful.

Programs of Meetings

New England Street Railway Club

The annual meeting and dinner of the New England Street Railway Club will be held at the Copley-Plaza Hotel in Boston on March 25. The speakers include Matthew C. Brush, Governor Sproul of Pennsylvania, Governor Coolidge of Massachusetts and Mayor Peters of Boston.

National Railway Appliance Association

The National Railway Appliance Association will hold its annual exhibition at the Coliseum and Annex, Chicago, March 15 to 18, inclusive. The exhibit will be open from 8 a.m. to 6:30 p.m. each day, except Tuesday, March 16, when it will not close until 11 p.m. Practically the full amount of space has been contracted for, assuring a good exhibition of railway materials, supplies and equipment.

Financial and Corporate

Good Showing in South

Operating Statistics Indicate Favorable Conditions Throughout the United States, but Influenza Epidemic Makes Conclusions Difficult

The influence of the influenza epidemic which had about reached its peak in October, 1918, is sharply reflected in the comparison of the returns of electric railways for October, 1919, and 1918, as shown in Tables I to IV of the returns as made public by the information bureau of the American Electric Railway Association as contained on page 351. For this reason it is impossible to draw any accurate conclusions based on statistics as to the development in the electric railway operating situation of the railways during that month.

INFLUENZA AFFECTS RETURNS

The effect of the influenza plague upon operations of electric railways is too well known to require any comment or exposition at this time. Probably the most interesting feature of the tables is the extraordinarily good showing of the South as brought out in Table II. It is known, of course, that the South suffered more severely from the influenza epidemic than any other section of this country, and this would naturally produce a correspondingly good showing for the 1919 month as compared with the same month in 1918 when the epidemic was at its height, but it does not explain the net income, after all deductions, of 4.18 cents per car mile which the South earned in 1919, while the East was earning only 1.79 cents per car mile and the West was showing a deficit of 0.64 cents per car mile.

MANY ONE-MAN CARS

Since October, 1918, a good portion of the mileage of the Southern companies represented in the tables introduced one-man cars on their lines and it is quite probable that this fact contributed in some measure to the good showing made by the South. To what extent this is true, however, it is impossible at this time to determine because the results of one-man car operation as reflected in the operating statistics cannot be distinguished from the effects of the epidemic, which also operate to make a favorable showing in 1919. Only a comparison of returns of a month in which normal operating conditions prevailed in both years under consideration will shed any real light on this question.

In the West operating conditions were very nearly normal. It will be remembered that the influenza did not begin to make any headway in that section until after it had been gotten under control in the East and South. For this reason the statistics of October, 1919, and 1918, for the West can be fairly compared.

The most favorable thing that can be said about these returns from the West is that the deficit for the month was slightly reduced—from 0.76 cents per car mile to 0.64 cents per car mile. And as the number of car miles operated was practically the same both years, this reflects a reduction in the actual cash amount of the deficit.

As in the past the returns from both city and interurban companies have been classified according to the following geographic grouping: Eastern district—east of the Mississippi River and north of the Ohio River; southern district—south of the Ohio River and east of the Mississippi River; western district—west of the Mississippi River.

Maine Road Organizes Permanently

The Androscoggin & Kennebec Railway, Augusta, Me., the successor to the Lewiston, Augusta & Waterville Street Railway, has organized permanently. The new officers are William B. Skelton, president; William H. Newell, vice-president and counsel; Miss Grace E. Fitz, treasurer; Alfred Sweeney, clerk and general manager. The directors are Mr. Skelton and Mr. Newell, Frank Silliman, Jr., and C. S. Newhall, Philadelphia; Henry W. Cushman and John Wilson, Bangor; Frank D. True, Portland, and Rupert H. Baxter, Bath.

The company has in contemplation an extensive plan for improving the line. About $500,000 will be expended upon the roadbed and transmission system. It is also proposed to order thirty-six new cars.

It is pointed out that under the foreclosure and reorganization, to which reference was made in the ELECTRIC RAILWAY JOURNAL for Jan. 10, control of the electric railway system is now vested principally in the hands of Maine interests.

Whereas formerly fixed charges had to be met on about $4,000,000, the company is now required to meet such charges on only $1,345,000.

In the article in the issue of this paper for Jan. 10, referred to previously, details were given of the new capitalization, the mileage and the discontinuance of the so-called Turner line. The new company is operating 157.165 miles as compared with 165.909 miles formerly.

$144,055,177 New York Value

These Are Experts' Figures on War-Time Basis for New York Railways, Before Disintegration

The report of Stone & Webster showing the appraised values of the lines in the New York (N. Y.) Railways system was made public on Feb. 5 by Federal Judge Mayer. The total value of the property, including all of the leased lines before the disintegration began, is fixed at $88,998,970 before the war and at $144,055,177 in June of last year.

In figuring these values the report accepts the arbitrary 10 per cent allowance for depreciation set by the Public Service Commission. Deducting these allowances the two totals are $71,516,188 and $112,526,657. Outstanding against the June estimate of $112,526,657 are underlying securities of $18,000,000 of 4 per cent bonds and $30,000,000 of 5 per cent income adjustment bonds.

The lines owned by the company, with the 10 per cent allowance for depreciation, are appraised at $34,926,660 before the war and $55,153,210 in June last; the leased lines are appraised at $34,304,903 and $54,691,361, and the values of the property not used in railroad operation for the two periods are fixed at $2,285,525 and $2,682,086.

The value of the three leased lines separated from the railways system for the pre-war and after the war periods, less depreciation, are: Eighth Avenue Railroad, $5,480,360 and $8,885,975; Ninth Avenue Railroad, $3,586,341 and $6,206,838; Fourth & Madison Avenue Railroad, $5,761,722 and $9,878,675, making totals of $14,828,423 and $24,971,488 which must be deducted from the totals of the values given above to show the appraised value of the railways company's property as it exists at present, as well as totals of $1,513,769 and $1,667,743, showing the value before the war and after it of the property owned by the Eighth and the Ninth Avenue Companies not used in operating the lines.

Predicts Deficit for Six Months

Frank Hedley, president of the Interborough Rapid Transit Company, New York, N. Y., sees a deficit for that company of $3,210,400 for the six months which will end on June 30, 1920. In a statement which he made on Feb. 2, Mr. Hedley declares that in consequence of the present increase in travel, officers of the company expect a total estimated revenue from Jan. 1 to June 30 of $26,800,000. Total operating expenses are estimated at $23,859,900, leaving a balance of $2,940,100. He says disbursements for interest and rentals during the time will amount to $6,150,500, and will leave the company $3,210,400 short. The statement continues:

> On June 30 the company is also obligated to pay the principal and interest of the $2.900,000 note issue made on Dec. 31 last, which represents the amount of money borrowed to weather the crisis of Jan. 1, 1920. It is expected that the auction sale of real estate will take care of a substantial proportion of this particular debt.

TABLE I—INCOME STATEMENT OF TWENTY-SIX ELECTRIC RAILWAYS FOR OCTOBER, 1919, COMPARED WITH OCTOBER, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Railway operating revenues	$7,472,644	$5,585,555	$2,902,384	$2,135,197	$800,031	$499,115	$3,770,229	$2,951,243
Railway operating expenses	5,919,067	4,613,438	2,303,524	1,918,347	521,019	411,211	3,094,524	2,283,880
Net operating revenue	1,553,577	972,117	598,860	216,850	279,012	87,904	675,705	667,363
Net revenue: Auxiliary operations	361,450	302,347	192,107	158,565	159,558	119,350	9,785	24,432
Taxes	496,020	436,838	187,465	200,261	83,418	67,714	225,137	168,863
Operating income	1,419,007	837,626	603,502	175,154	355,152	139,540	460,353	522,932
Non-operating income	221,071	36,133	57,025	23,866	176	211	163,870	12,056
Gross income	1,640,078	873,759	660,527	199,020	355,328	139,751	624,223	534,988
Deductions from gross income	1,463,769	1,261,811	565,237	447,009	208,867	201,142	689,665	613,660
Net income	176,309	388,052	95,290	247,989	146,461	61,391	65,442	78,672
Operating ratio (per cent)	79.21	82.60	79.35	89.85	65.12	82.37	82.06	77.40
Car miles operated	19,019,147	17,794,936	5,346,523	5,153,921	3,505,812	2,458,040	10,184,812	10,182,975

TABLE II—INCOME STATEMENT IN CENTS PER CAR-MILE OF TWENTY-SIX COMPANIES APPEARING IN TABLE I FOR OCTOBER, 1919, COMPARED WITH OCTOBER, 1918

	United States			East			South			West		
	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase
Railway operating revenue	39.29	31.39	25.16	54.29	41.42	31.07	22.82	20.31	12.25	37.02	28.98	27.74
Railway operating expenses	31.12	25.93	20.00	43.08	37.22	15.74	14.86	16.73	11.18	30.38	22.43	35.44
Net operating revenue	8.17	5.46	50.00	11.21	4.20	166.90	7.96	3.58	122.34	6.64	6.55	1.37
Net revenue: Auxiliary operations	1.90	1.69	12.42	3.59	3.08	16.55	4.55	4.86	6.38	0.09	0.25	64.00
Taxes	2.61	2.45	6.53	3.51	3.88	9.54	2.38	2.76	13.77	2.21	1.66	33.13
Operating income	7.46	4.71	58.38	11.29	3.40	232.05	10.13	5.68	78.34	4.52	5.14	12.07
Non-operating income	1.16	0.20	480.00	1.07	0.46	132.60	0.01	0.01	......	1.61	0.12	1,241.66
Gross income	8.62	4.91	75.56	12.36	3.86	220.21	10.14	5.69	78.20	6.13	5.26	16.53
Deductions from gross income	7.70	7.09	8.60	10.57	8.67	21.91	5.96	8.18	27.14	6.77	6.02	12.46
Net income	0.92	2.18	......	1.79	4.81	......	4.18	2.49	......	0.64	0.76	......
Operating ratio (per cent)	79.21	82.60	4.11	79.35	89.85	11.69	65.12	82.37	20.95	82.06	77.40	6.02
Car miles operated	19,019,147	17,794,936	6.88	5,346,523	5,153,921	3.73	3,505,812	2,458,040	42.63	10,184,812	10,182,975	0.08

TABLE III—OPERATING EXPENSES OF FORTY-TWO *ELECTRIC RAILWAYS FOR OCTOBER, 1919, COMPARED WITH OCTOBER, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Operating expenses	[1]$6,065,043	[2]$4,628,988	$1,852,898	$1,540,572	$787,312	$559,718	$3,424,833	[4]$2,528,698
Way and structures	687,776	453,336	272,677	179,378	76,123	80,092	338,976	193,866
Equipment	689,403	581,464	228,247	206,354	105,340	67,831	355,816	307,279
Power	793,155	729,672	294,697	322,755	48,386	10,922	450,072	395,995
Conducting transportation	2,909,543	2,054,768	836,582	633,610	438,803	304,181	1,634,158	1,116,977
Traffic	26,077	22,873	15,461	7,547	2,352	2,788	8,264	12,538
General and miscellaneous	803,598	654,407	205,236	190,928	116,308	93,904	482,054	369,575
Transportation for Investment—Cr	6,285	5,702	....	....	....	....	6,285	5,702
Car-miles operated	19,744,285	18,663,969	5,673,030	5,607,269	3,505,812	2,458,040	10,565,443	10,598,660

* NOTE.—This table includes the expenses of the companies shown in Tables I and II, and in addition other companies which are not included in Tables I and II because of the fact they do a power and light business and do not separate their railway taxes and fixed charges from the taxes and fixed charges of their other business.

[1] Includes $161,780 for undistributed depreciation.

[2] Includes $138,170 for undistributed depreciation.

[3] Includes $161,780 for undistributed depreciation.

[4] Includes $138,170 for undistributed depreciation.

TABLE IV—OPERATING EXPENSES IN CENTS PER CAR-MILE OF FORTY-TWO COMPANIES APPEARING IN TABLE III, FOR OCTOBER, 1919, COMPARED WITH OCTOBER, 1918

	United States			East			South			West		
	1919 (Cents per car mile)	1918 (Cents per car mile)	Per Cent Increase	1919 (Cents per car mile)	1918 (Cents per car mile)	Per Cent Increase	1919 (Cents per (car mile)	1918 (Cents per car mile)	Per Cent Increase	1919 (Cents per car mile)	1918 (Cents per car mile)	Per Cent Increase
Operating expenses	[1]30.72	[2]24.80	23.87	32.66	27.47	14.34	22.46	22.77	1.37	[3]32.42	[4]23.86	35.88
Way and structures	3.48	2.42	43.80	4.81	3.19	50.71	2.17	3.26	33.44	3.21	1.83	75.40
Equipment	3.49	3.12	11.85	4.02	3.68	9.23	3.00	2.76	8.70	3.38	2.90	16.55
Power	4.02	3.91	2.81	5.19	5.76	9.90	1.38	0.44	213.63	4.26	3.72	14.52
Conducting transportation	14.75	11.01	33.97	14.75	11.31	30.32	12.52	12.38	1.13	15.47	10.54	46.77
Traffic	0.13	0.12	8.33	0.27	0.13	107.60	0.07	0.11	36.37	0.08	0.12	33.33
General and miscellaneous	4.07	3.51	15.90	3.62	3.40	6.47	3.32	3.82	13.09	4.56	3.49	30.66
Transportation for investment—Cr	0.03	0.03	.....	....	....	......	....	....	......	0.07	0.06	.....
Car-miles operated	19,744,285	18,663,969	5.78	5,673,030	5,607,269	1.17	3,505,812	2,458,040	42.63	10,565,443	10,598,660	0.32

[1] Includes 0.81 cents per car-mile for undistributed depreciation.

[2] Includes 0.74 cents per car-mile for undistributed depreciation.

[3] Includes 1.53 cents per car-mile for undistributed depreciation.

[4] Includes 1.31 cents per car-mile for undistributed depreciation.

TABLE V—INCOME STATEMENT OF EIGHTY-ONE *RAILWAYS FOR OCTOBER, 1919

	United States	East	South	West
Railway operating revenue	$14,468,435	$7,118,194	$1,526,963	$5,823,278
Railway operating expenses	11,098,344	5,532,000	1,006,254	4,560,090
Net operating revenue	3,370,091	1,586,194	520,709	1,263,188
New revenue: Auxiliary operations	844,165	455,426	334,223	54,516
Taxes	906,741	432,137	143,438	331,166
Operating income	3,307,515	1,609,483	711,494	986,538
Non-operating income	349,612	130,572	9,042	209,998
Gross income	3,657,127	1,740,055	720,536	1,196,536
Deductions from gross income	3,003,262	1,496,290	410,233	1,096,739
Net income	653,865	243,765	310,303	99,797
Car-miles operated	35,374,196	18,283,852	4,323,169	12,767,175

* Includes the companies shown in Tables I to IV and others for which the 1918 figures are not available.

TABLE VII—DETAILED STATEMENT OF OPERATING EXPENSES OF NINETY-SEVEN *ELECTRIC RAILWAYS FOR OCTOBER, 1919

	United States	East	South	West
Operating expenses	[1]$11,362,345	[2]$5,681,555	$1,282,594	[3]$4,398,196
Way and structures	1,394,928	797,807	145,800	451,321
Equipment	1,398,792	700,127	206,219	492,446
Power	1,477,307	830,710	78,898	567,699
Conducting transportation	5,335,383	2,584,451	689,605	2,061,327
Traffic	57,612	39,444	2,750	15,418
General and miscellaneous	1,536,816	723,317	159,322	654,177
Transportation for investment—Cr	5,972	....	....	5,972
Car-miles operated	38,348,518	19,022,136	5,553,257	13,773,125

* This table includes the expenses of the companies shown in Tables V and VI, and in addition, other companies which are not included in Tables V and VI because of the fact they do a power and light business and do not separate their railway taxes and fixed charges from the taxes and fixed charges of their other business.

[1] Includes $167,479 undistributed depreciation.

[2] Includes $5,699 undistributed depreciation.

[3] Includes $161,780 undistributed depreciation.

TABLE VI—INCOME STATEMENT OF TABLE V IN CENTS PER CAR-MILE

	United States	East	South	West
Railway operating revenue	40.90	38.93	35.32	45.61
Railway operating expenses	31.37	30.26	23.28	35.72
Net operating revenue	9.53	8.67	12.04	9.89
Net revenue: Auxiliary operations	2.39	2.49	7.73	0.43
Taxes	2.56	2.36	3.32	2.59
Operating income	9.36	8.80	16.45	7.73
Non-operating income	0.99	0.71	0.21	1.64
Gross income	10.35	9.51	16.66	9.37
Deductions from gross income	8.49	8.18	9.49	8.59
Net income	1.86	1.33	7.17	0.78
Operating ratio per cent	76.70	77.73	65.91	78.32
Car-miles operated	35,374,196	18,283,852	4,323,169	12,767,175

TABLE VIII—DETAILED STATEMENT OF OPERATING EXPENSES OF THE NINETY-SEVEN COMPANIES APPEARING IN TABLE VII, IN CENTS PER CAR-MILE

	United States	East	South	West
Operating expenses	[1]29.63	[2]29.87	23.10	[3]31.93
Way and structures	3.64	4.19	2.63	3.28
Equipment	3.65	3.68	3.71	3.58
Power	3.85	4.37	1.42	4.12
Conducting transportation	13.91	13.59	12.42	14.97
Traffic	0.15	0.21	0.05	0.11
General and miscellaneous	4.01	3.80	2.87	4.75
Transportation for investment—Cr	0.01	....	....	0.04
Car-miles operated	38,348,518	19,022,136	5,553,257	13,773,125

[1] Includes 0.43 cents per car-mile for undistributed depreciation.

[2] Includes 0.03 cents per car-mile for undistributed depreciation.

[3] Includes 1.17 cents per car-mile for undistributed depreciation.

Financial Outlook Better

Signs Point to Possible Reconciliation of Differences Among Rhode Island Security Holders

The traction interests may agree upon a plan for the reorganization of The Rhode Island Company, Providence, R. I., in time to be presented to the State Legislature at its present session which will end late in April, according to one of the spokesmen representing the security holders. One of the investors said:

> Legislation will be requested to make jitneys and buses common carriers, subject to regulation by the Public Utilities Commission.
>
> The law will be so framed that it will be impossible for automobiles to compete with the existing services of the Rhode Island Company. Such legislation is the very first essential to a successful reorganization of the traction properties.
>
> The men who have invested money in these properties are not going to be content to let that money go much longer without earning any return. They will junk the road first. And the elimination of the present unfair and ruinous jitney competition is absolutely necessary if the business is to be put upon its feet again.

Another man, intimately identified with reorganization activities in Rhode Island, said:

> We have not as yet agreed upon a plan, but we are getting together slowly and ironing out the difficulties.

The two stumbling blocks which have kept apart the security holders since negotiations were begun last July still prevent complete agreement upon a reorganization plan.

There has not been a settlement of the question of how the bondholders of the Rhode Island Suburban Railway are to fare in a rehabilitation of the properties. These bondholders own securities valued at $5,000,000 at par and bearing 4 per cent interest. They have a first lien upon the physical assets of the Suburban Company, including the power house, the Elmwood Avenue carhouse, the repair shops and a number of trolley lines.

The Suburban bondholders have, from the first, aligned themselves with the traction stockholders as against the traction bondholders. At a meeting of all interests on Dec. 31, the traction bondholders submitted a reorganization plan under which the Suburban bondholders would exchange their $5,000,000 of 4 per cent bonds, based on a first mortgage on the physical assets of the Suburban Company, for $2,400,000 of 5 per cent bonds issued against a general mortgage on the assets of the proposed new company.

The Suburban bondholders flatly refused to listen to such a plan or to compromise from any such basis. At a succeeding meeting they offered to enter a reorganization under which their holdings would not be shrunk in value, would continue to bear 4 per cent interest, and would still have as security the property now held by the Suburban Company.

This issue is still unsettled, but it is believed that the Suburban bondholders are to insist that their $5,000,000 bonds be not shrunk to less than the taxable valuation of the properties of the Suburban Company upon which they are based. This taxable valuation is $4,114,912.

A stockholders' plan submitted as a basis for a settlement proposes that the new working capital be raised with a first mortgage on the property as security and that a sinking fund be created which would retire the new securities within a short term of years, thus leaving to the present bondholders a first lien upon the underlying assets.

Men competent to pass judgment say that a compromise is in sight on the basis of a reorganization capitalized at about $25,000,000, of which $2,000,000 would be in working capital to be paid in by the stockholders. This would accommodate the holders of $9,000,000 traction bonds, $5,000,000 Suburban bonds and $8,000,000 traction stock and leave $1,000,000 in stock to be set aside for the purchase of the New Haven's present holdings.

Before such a plan could be acted upon by the General Assembly, it would have to be ratified by the Federal District Court for the Southern District of New York, from which the Federal trustees of the New Haven's stock derive their authority, by the governments of Providence and the various surrounding cities and towns.

Confer on Foreclosure Sale

Attorney John J. Coniff of Wheeling, W. Va., counsel for the West Virginia Traction & Electric Company, and J. D. Whittemore, receiver of the company, conferred in Pittsburgh recently with counsel from New York for the entering of a degree of foreclosure in the State of Pennsylvania.

This procedure is necessary as a portion of the company's property near Morgantown touches Pennsylvania territory. Following the decree in Pittsburgh the property will be advertised for auction in Morgantown, W. Va., and a date will be set for the sale.

The properties involved include real estate, rights, leases, franchises and other assets of the company and its subsidiaries. This embraces the traction lines, City & Suburban Gas Company's property, real estate along the pike in Wheeling and Wheeling Park and other property.

Net Off 22 Per Cent

Toronto Unable to Pay Dividends Due To Abnormal Wages Although Gross Increased

That the financial condition in which the Toronto Railway Company finds itself at the end of the calendar and also its fiscal year for 1919 are not much different than those confronting many other electric railway companies, is reflected in its 28th annual report just issued. No dividends were declared during the year due entirely to the abnormal increase in wages during the past few years, combined with the rapidly increasing cost of materials.

COMPARATIVE STATEMENT OF TORONTO RAILWAY

	1919	1918	Per Cent + Inc. — Dec.
Passenger revenue	$7,114,036	$6,289,611	+ 13.10
Gross earnings	7,234,895	6,526,302	+ 10.82
Operating expenses	5,655,658	4,509,651	+ 25.40
Net operating revenue	1,579,237	2,016,651	— 21.78
Deductions:			
Bond interest, etc.	128,433	138,660	— 7.42
War and provincial government taxes	39,059	75,155	— 48.10
Payments to city:			
Percentage on earnings	1,152,515	1,046,495	+ 10.13
Pavement charges	98,794	98,817	— 0.02
General taxes	147,161	155,955	— 5.64
Dividends	none	480,000	—100.00
Profit and loss account	13,275	21,569	— 38.60
Traffic:			
Revenue passengers	182,377,494	166,510,326	+ 9.54
Transfer passengers	70,446,128	63,176,397	+ 11.51
Total passengers	252,823,602	229,686,723	+ 10.08
Operating ratio	78.00	68.30	+ 13.60

Wages of trainmen in 1916 reached a maximum of 27½ cents per hour. In 1917 this was increased to 37 cents per hour by an arbitration board. Before this agreement had expired the trainmen sought a conciliation board and secured a war bonus of 2 cents per hour, bringing the maximum rate up to 39 cents. In 1919, under the action of the Conciliation Board and the Ontario Railway & Municipal Board the maximum rate was fixed at 55 cents per hour, with an 8-hour working day and 30-min. break; after which overtime rates were to be paid. Special rates, which are higher, are paid for work on Sundays and holidays. The actual cost to the company was estimated to be approximately $1,500,000 per year. With the scale paid but half a year the company without the payment of dividends had only a balance of $13,275.

In consequence, the money that would otherwise have gone toward improvements in the property and dividends has been utilized solely to pay the increases in wages and the increased cost of materials.

These expenditures have been faced with the revenues from rates fixed 28 years ago. The axerage fare during 1919 was but 8.9 cents per revenue passenger.

The city has persistently refused to allow an increase in fare to care for the increased costs thrust upon the company. The Ontario government has likewise refused relief. The company even offered to sell out to the city upon the terms set forth in the franchise agreement for sale on Sept. 1, 1921, but the Council would not favorably consider the offer.

$418,665 Added to Surplus

At the annual meeting of the Detroit (Mich.) United Railway, held on Feb. 3, the annual report of the company was presented by President F. W. Brooks. A summary of the business of the Detroit United Railway, the Rapid Railway System, the Sandwich, Windsor & Amherstburg Railway, the Detroit, Monroe & Toledo Short Line Railway and the Detroit, Jackson & Chicago Railway, for the years 1918 and 1919 follows:

COMPARATIVE STATEMENT OF DETROIT UNITED RAILWAY

Year Ended Dec. 31	1919	1918
Gross earnings from operation:		
Passenger	$23,108,561	$17,696,781
Express	1,514,238	1,265,311
Mail	12,926	12,433
Special car	47,311	39,492
Total gross earnings from operation	$24,683,037	$19,014,018
Deduct—Operating expenses	19,792,528	14,758,339
Net earnings from operation	$4,890,509	$4,255,678
Add—Other income	546,406	449,736
Gross Income less operating expenses	$5,436,915	$4,705,415
Deduct—Interest on funded and floating debts and taxes	2,868,250	2,610,831
Net income for the year before providing for depreciation or contingencies	$2,568,665	$2,094,584
Deduct—		
Amount credited to depreciation reserve	$600,000	$600,000
Amount credited to contingent liability reserve	150,000	....
Amount provided for Federal taxes	200,000	150,000
Dividends paid	1,200,000	1,200,000
Together	$2,150,000	$1,950,000
Balance from all lines, including city of Detroit, transferred to surplus acct	$418,665	$144,584

During the year the track mileage of the company increased from 915.46 miles to 928.39 miles.

Additions to the properties during the year reached the sum of $1,799,301.

As required the accounts of the company are kept according to the plans and under the supervision of the interstate commerce commission.

Time for Deposit Extended

In addition to the statement of facts recently sent to the holders of undeposited general mortgage 5 per cent bonds of the Columbus, Newark & Zanesville Electric Ry., Newark, Ohio, due in 1926, the protective committee of that issue calls attention to the fact that ever since the property of the Columbus, Newark & Zanesville Electric Ry. was leased to the Indiana, Columbus & Eastern Traction Co., the earnings of the former company have been sufficient to cover the interest on all of its bonded debt, and 6 per cent dividends on its preferred stock and in addition a surplus for the common stock, (all of which is owned by the Indiana, Columbus & Eastern Traction Co.) aggregating for the period of the lease, in excess of $1,100,000.

The committee further says that even during the twelve months ended Dec. 31, 1918, a most unfavorable year, the Columbus, Newark & Zanesville Electric Ry. showed net earnings in excess of all interest and preferred dividend requirements. Furthermore the committee is advised that for the ten months ended Oct. 31, 1919, the net earnings exceeded those for the corresponding period in 1918, by more than $20,000. In spite of these adequate earnings, says the committee, the interest has not been paid.

The period of grace stipulated in the deed of trust securing the mortgage under which the bonds mentioned were issued will expire on Feb. 1, and the committee, therefore has notified non-depositing holders that the Land Title & Trust Co., Philadelphia, depositary, will accept, without penalty, bonds received by it on or before Jan. 24. After that date bonds may be deposited only upon such terms as the committee may then impose.

19.3 Per Cent Increase in Gross

Gross earnings of the Eastern Massachusetts Street Railway, Boston, Mass., under the management of the board of public trustees headed by Chairman Loring, increased 19.3 per cent during the seven months to Dec. 31 last as compared with the corresponding period of 1918. October and December each showed gains of more than 30 per cent.

Aggregate receipts for the seven months' period were $7,892,626, compared with $6,610,783 for the same seven months in 1918.

The gross earnings by months for the period in question as compared by the *Boston News Bureau* follows:

	1919	1918	Inc.	Per Cent Inc.
June	$988,319	$909,360	$78,958	8.7
July	1,169,775	1,029,111	140,664	13.7
August	1,286,010	1,114,068	171,942	15.4
September	1,104,618	969,768	134,850	13.9
October	1,073,463	795,616	277,847	34.9
November	1,055,809	879,325	176,484	20.
December	1,214,632	913,535	301,097	32.9
Total	7,892,626	6,610,783	1,281,783	19.3

It is understood that the trustees charged with the operation of the road plan to make public monthly financial statements beginning with January. This will permit the patrons of the road to know the exact gross and net earnings of the lines which are operated by the company in their particular district.

It is probable that the statement for January and eight months of the entire system will just about show the bond interest was covered.

City Blamed in Receivership Case

Failure of agents of the City of New York to serve a Supreme Court order on the proper officials of the Midland Railway, Staten Island, N. Y., ordering them to show why they should discontinue operation of cars on Staten Island released the company from any responsibility for disobedience of the order, Supreme Court Justice Cropsey of Brooklyn said in handing down his decision on the case.

Although the Supreme Court order was obtained by Corporation Counsel for the city on Saturday three weeks ago it was not served upon Henry J. Blackman, superintendent of the road, until the following night, only a few hours before the cars were scheduled to cease operation. Mr. Blackman, in his position as head of the physical operation of the trains, Justice Cropsey decides, did not have the power to order the service to continue in accordance with the court order.

Several directors of the road, upon whom the order should have been served, the court said, were in New York City all of Saturday and Sunday, and could have been found by the city's agents had they shown the proper perspicacity and zeal.

The Midland road went out of business following a warning to the Board of Estimate that it could not continue unless allowed to charge a 7-cent fare. When the board refused to grant this privilege the road continued a short time, and then after another preliminary warning sent to the city it shut down.

The City of New York then started suit to compel the road to continue the service it had been rendering, the first move being to obtain the order from the court, which was improperly served. The next move was to sue the road for failure to obey the court's order. This action has been nullified by the decision which has just been rendered in the Supreme Court by Judge Cropsey.

Testifies on Merger Bill

W. F. Ham, president of the Washington Railway & Electric Company, testifying before the House committee on the District of Columbia, which is considering a bill to merge that company and the Capital Traction Company, operating within the District, declared on Jan. 29 that Congress has stood in the way of a merger of the systems.

Unless something is done immediately to alleviate the financial condition of the company, Mr. Ham said, it would be forced to cut off some of the suburban service in order to reduce operating costs.

Mr. Ham asked that street railways be relieved of the cost of maintaining traffic policemen. He argued that the cost of new pavement between the tracks and for 2 ft. on either side should be laid upon the community rather than on the companies. He said that every one of the suburban lines which he characterized as "city builders and tax producers," had been operated by the company at a loss.

Sold for Junk

Kroger Line of 53 Miles, Long Since a Liability, Will Profit Railway Materials Dealers

Despite the efforts of a firm of Dayton engineers and various citizens' committees, boards of trade and municipal authorities, to work out a refinancing and reorganization plan for the Cincinnati & Columbus Traction Company, as related in the ELECTRIC RAILWAY JOURNAL for Jan. 17, the road has finally had to be sold for junk. The Union Savings Bank & Trust Company, Cincinnati, which has been the receiver of the company since 1913, would have sold the road for $300,000 if the proposal recently made by the Dayton engineers had been carried out.

The Hyman-Michaels Company, Chicago, and the Joseph Joseph Brothers Company, Cincinnati, have now jointly purchased the entire 53 miles of line and all equipment for the purpose of dismantling and selling. There were outstanding capital stock of $1,853,500 and funded debt of $809,200.

The road runs between Norwood, Ohio, a suburb of Cincinnati, through Milford, Fayetteville and Hillsboro. The fact that it was a standard gage road precluded the possibility of its entrance into the city over the wide-gage track of the Cincinnati Traction Company.

The road was equipped with eight motor passenger cars and twenty-one freight cars. A small power house, the substations, shop and all equipment, are included in the purchase. The dismantling operations will begin at once. The power house will be continued in operation until April 1, which is the date of termination of a contract with a local distribution company for the lighting of the village of Madeira.

Toronto Railway Offered to City

The Toronto Railway Company on Feb. 6, through D. L. McCarthy, K.C., offered to sell the railway system to the city, without waiting for the expiration of the franchise. The offer was made at a conference in the Attorney-General's office called to consider the city's demand that 200 additional cars be ordered at once, and placed in operation at the earliest possible moment to relieve congestion during the rush hours. Mr. McCarthy said that it was impossible for the Toronto Railway to raise another dollar to buy new cars, but suggested that the city go into the market and buy some and turn them over to be operated, under any condition imposed by the railway board.

After hearing all the arguments the Attorney-General said the case would have to go before the railway board. Meantime he asked the Mayor to present a memorandum to the Government setting forth the city's side.

The franchise of the company expires in September, 1921.

Financial News Notes

Refunding Operation Approved—The Georgia Railway & Power Company, Atlanta, Ga., was granted permission by the State Railroad Commission at a recent meeting to issue $2,500,000 of collateral notes for the purpose of refunding notes of that amount which matured on Feb. 1.

Purchase Negotiations Reported.—Reports are being circulated at Niagara Falls, N. Y., that the Niagara Falls Power Company is negotiating with the Niagara Gorge Railroad for the purchase of its double track line through the lower gorge of the Niagara River between Niagara Falls and Lewiston, N. Y., a distance of 7 miles.

Municipal Line Run at Loss.—A deficit of $84,603 was shown in the operation of the municipal street railway at Tacoma, Wash., for the year 1919, according to a report made public on Jan. 22 by City Comptroller John M. Roberts. The line is a comparatively short one, running from the center of the city to the Todd shipyards across the tide flats.

New Directors for Grand Rapids Railway.—L. J. DeLamarter was elected vice-president and general manager of the Grand Rapids (Mich.) Railway at the annual meeting and also a director of the company. He succeeds Benjamin S. Hanchett as general manager, Mr. Hanchett being re-elected president. New directors, besides Mr. DeLamarter, are Clay H. Hollister, Claude T. Hamilton, Dudley E. Waters, E. W. Clark, III, Philadelphia, and T. J. O'Brien.

Towns Urge Restoration of Service.—At a meeting in Newburyport, Mass., on Feb. 2, a committee was appointed to investigate and estimate the expense of having the five communities affected by the suspension of service by the Georgetown, Rowley & Ipswich Street Railway restore the service. The committee is expected to report in time to permit voting upon the question at the town meetings in March.

Want Service Restored.—Residents of Westfield, N. Y., have signed a petition asking for the return of service on the lines of the Chautauqua Traction Company, Jamestown, N. Y., between Westfield and Barcelona, which was discontinued some time ago because the line did not pay expenses. The petition has been sent to the Public Service Commission for the Second District.

$8,468,278 in Salt Lake Value.—The Public Utilities Commission of Utah in passing on the value of the property of the Utah Light & Traction Company, Salt Lake City, Utah, said: "We find that your property is worth $8,468,278. And that is all that interests us. We don't care whether you are capitalized for $8,000,000 or whether you are capitalized for $80,000,000. We shall fix for you a rate of fare that will permit you to earn a fair return on $8,468,278 and not on a dollar more."

Liquidating War Finance Debt.—J. D. O'Keefe, federal receiver of the New Orleans Railway & Light Company, New Orleans, La., has been authorized by Judge Rufus E. Foster, in the Federal District Court, to pay the sum of $25,000 monthly to the War Finance Corporation, so that the debt owed by the company to the corporation amounting to $660,000 could be wiped out quickly. Judge Foster also approved the payment of $125,000 on Oct. 31 and Jan. 24, to the War Finance Corporation, as well as $37,275 in interest which was paid to the same body on Dec. 31, 1919.

Ottawa Company Prosperous.—The established record of the Ottawa (Ont.) Electric Railway has been fully maintained, as shown by the annual report for 1919 of the Ottawa Traction Company, Ltd., and receipts have shown a steady increase, even though service was suspended for eighteen days in July due to a strike of the trainmen. The operating company paid dividends of $278,958 on its capital stock held by the Traction Company amounting to $1,860,100. This is equivalent to 15 per cent return. The holding company, however, paid only four quarterly dividends of 1 per cent and in the last quarter also a bonus equivalent to the dividend rate.

Inventory Nearing Completion.—John C. Brackenridge, New York, N. Y., who has been making a survey of the city property of the International Railway, Buffalo, N. Y., for the municipal authorities, will make a spot-check of the inventory of the company's property. The inventory is rapidly nearing completion under the direction of Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, who is a factor in the operation of the International Railway on behalf of the bondholders' committee, of which he is a member. The city authorities have refused to aid in making the inventory, but Mr. Brackenridge will make the spot-check to determine the accuracy of the report. The city believes the inventory will be used by the International Railway in a new rate case before the Public Service Commission.

Traffic and Transportation

$7,000,000 Loop Plan

Unprecedented Traffic Demands Make Relief Necessary in New York's Terminal and Theatrical District

At the recent hearing before Transit Construction Commissioner John H. Delaney on proposals now pending for bringing about the betterment of rapid transit facilities in the vicinity of New York, representatives of both the Interborough Rapid Transit Company and the Brooklyn Rapid Transit system gave the views of the engineering and operating experts of the two systems as to the most satisfactory way of meeting the increasing traffic at the Times Square, Grand Central, and Pennsylvania Terminal Stations.

TWO-TRACK LINK PLANNED

In addition to the plan to extend the Steinway tunnel route to Seventh Ave., the petition to provide a subway loop between Forty-second and Thirtieth Sts., Seventh and Fourth Aves., and the construction of a moving platform under Forty-second St., the possibility of constructing a new link under Fortieth St., between the east side and the west side trunk lines, was considered.

This idea was originally pressed by B. L. M. Bates. It has been revised as to many details, but it is still proposed to construct either a two-track or a four-track link that will make it possible to restore the through traffic between the east side south of Forty-second St., and the west side north of Forty-second St., by again utilizing the tracks under the thoroughfare for through traffic and utilizing tracks to be built under Fortieth St., for making possible through service between the lower west side and the upper east side.

This project contemplates a switching of a percentage of through trains at a point immediately north of the Pennsylvania Terminal Station on the Seventh Ave. Subway to tracks to be built either outside or inside of the existing tracks. The new tracks are to gradually descend to a deep level under Fortieth St., and to continue at a deep level under the existing express station at the Grand Central Terminal and north of that point to ascend gradually until they reach the level of the existing subway tracks in Lexington Ave., just south of the Fifty-first St. local station.

CONGESTION AT GRAND CENTRAL

It is stated that this new link can be constructed from a subway reservoir north of the Pennsylvania Terminal at Seventh Ave., to a similar reservoir at Fiftieth St. and Lexington Ave., for approximately $7,000,000, and that the switching from the existing trunk line tracks to the new connecting link can be made without grade crossings and without encroachment upon private property, so that there will be no expenditure needed for the purchase of real estate or for easement purchases.

Ticket sales during the year ended June 30, 1919, at the Forty-second St. stations of local rapid transit lines, including the Manhattan "L," the Interborough Subway, the New York Municipal Subway, and the Steinway Tunnel, amounted to 69,259,117, a daily average for the year of 203,672 tickets. In addition there were 14,492,285 tickets, a daily average of 39,731, sold during the year at the Grand Central Terminal for passage over the New York Central and the New York, New Haven & Hartford lines. This brought the total sales at passenger traffic stations located at Forty-second Street up to 83,751,402 for the year, a daily average of 243,403 fares paid by passengers at that point. This does not take into consideration surface railroad traffic originating there.

In the territory immediately below Forty-second St., ticket sales at the subway and "L" stations are also unusually heavy. During the year ended June 30, 1919, for instance, ticket sales at the express station of the Seventh Avenue Subway Line at Thirty-third St., (Pennsylvania Station) were 11,812,877, a daily average of 34,774, and at the Thirty-third St., Station of the Fourth Avenue-Lexington Avenue Subway, 5,639,367, a daily average of 16,586. At the Herald Square station of the New York Municipal Subway line the ticket sales for the year were 7,698,891, a daily average of 22,644.

Flat Seven-Cent Fare in San Antonio

A flat 7-cent fare with free transfers became effective on the lines of the San Antonio (Tex.) Public Service Company on Feb. 2. Children's fares are now 3.5 cents each. The new schedule replaces the zone system which the company installed on Nov. 30, and which provided a maximum fare of 10 cents for a ride across the city. The zone system was later modified by the addition of a second 3-cent zone, making the fare from the center of San Antonio to the city limits 8 cents.

The company's revenue was increased only 2 per cent under this plan, owing to the fact that many persons preferred to walk to the beginning of the second zone rather than pay the extra fare. The company formerly charged a straight 5-cent fare. Judge Duval West several months ago issued an injunction restraining the city authorities from collecting fares in excess of this amount.

Columbus Ordinance Passed

Provides for Six-Cent Cash Fare With Five Tickets for a Quarter—Arbitrators Announce Decision

The City Council of Columbus, Ohio, on Feb. 9 passed an ordinance by the terms of which the Columbus Railway, Power & Light Company will be permitted to charge a 6-cent cash fare for a period of six years. The ordinance will become effective at the end of thirty days. The present fare in Columbus is 5 cents, with eight tickets for 25 cents.

The ordinance as passed by the Council is substantially similar to that drafted by the company some time ago at the instance of the board of arbitration appointed to pass on the demands of the company's employees for an increase in wages. It provides for the sale of five tickets for 25 cents, as suggested by the company, but limits the life of this ticket rate to a period of two years. For the remaining four years a ticket rate of six tickets for 25 cents is provided. The company is also required to expend certain sums for improvements and extensions during the six-year period.

COMPANY WILL ACCEPT

Owing to the latter provision it was at first reported that the company would refuse to accept the terms of the ordinance. It is now understood that the ordinance will be accepted, although the company has not yet acted officially. The Mayor refused to sign the bill because of objection to details regarding extensions to the company's lines, and it will become effective without his signature.

The carmen in the company's employ are to receive a wage increase of 12 per cent. This increase has been awarded them by the board of arbitration, of which S. D. Hutchins of the Westinghouse Traction Brake Company is chairman, and which withheld its decision pending action by the City Council on the question of granting the company a higher fare. Mr. Hutchins declared before the Council on Dec. 4 that the company could not increase wages unless fares were also raised. He urged the city authorities to take action, so that the board could announce its award.

NEW WAGE SCALE

The new wage scale fixes the maximum pay for platform men at 50 cents an hour. The pay of linemen is raised from 20 to 30 per cent. The new scale is satisfactory to the men, who have expressed their intention of abiding by the board's award.

There has been some effort to submit the ordinance to a referendum vote as allowed by law. Petitions calling for a referendum are being circulated, but are receiving little endorsement. The labor unions oppose the submission of the question to popular vote, owing to the fact that the increase in wages depends upon the advance in fare.

Still Delving Into New York Details

The hearing of the city of New York into the need of the Interborough Rapid Transit Company for an increase in fare will be continued on Feb. 18.

The principal witness at the session on Feb. 11 was Dr. John Bauer, special technical adviser to the Corporation Counsel on franchise questions. Dr. Bauer went into detail on some of the charges of the company. It was his opinion that the railroad had improperly claimed as subway investments under contracts one and two items totaling $40,217,700. In summing up Dr. Bauer said that the Interborough should have paid off at least $40,000,000 during its profitable days, with the result that instead of having that amount or more in book figures the railroad would have that sum in actual cash or equipment property.

James L. Quackenbush, general counsel for the company, declared that if the system were broken up, following a default in the next payment of interest on the outstanding bonds, there was no legal way of preventing the Manhattan (Elevated) Railway from charging a 15-cent fare from the Battery to Harlem River.

Tacoma Wants Ten Cents

A hearing has been started on the legal fight between the city and the Tacoma Railway & Power Company, Tacoma, Wash., over a 10-cent fare the company is asking. The company management, in a statement, asked that an agreement be reached in time for submission to the voters at the April city election.

The matter of fares is one of the subjects referred to by the mayor and the city counsel in their report to the Council, referred to elsewhere in this issue. These officials quote chapter 33, page 61, of the laws of 1919, amending the Public Service Commission law as providing as follows:

> No street railroad company shall charge, demand or collect more than 5 cents for one continuous ride within the corporate limits of any city or town; Provided, That such rate may be exceeded or lowered as to any municipally owned street railroad when the corporate authorities of the municipality owning such railroad shall, by an ordinance duly passed, authorize the collection of a higher or lower rate of fare, to be specified in such ordinance, and as to any other street railroad company, such rate may be exceeded or lowered with the permission or upon the order of the Public Service Commission after the filing of a tariff or a complaint by such street railroad company and a hearing thereon as provided in this act.

Will Restore Buffalo Owl Service

R. Harland Horton, traffic engineer for the Philadelphia (Pa.) Rapid Transit Company, who has been making a survey of traffic conditions on the lines of the International Railway, Buffalo, N. Y., especially with the view of determining whether or not owl car service shall be restored on all lines, has submitted his report to Herbert G. Tulley, acting president of the company. He recommends that no owl car service be given on five lines and that service be restored on three additional lines, making twelve lines upon which the company has restored all-night car service. Lines upon which the company will not restore all-night service parallel within a quarter of a mile lines upon which owl service has been restored, according to Mr. Horton. Hourly service will be maintained upon lines where service has been restored.

At a recent hearing before Chairman Charles B. Hill of the Public Service Commission, Second District, on the petition of the city for the restoration of half-hour owl service on all lines, Commissioner Frank C. Perkins of the municipal public utilities bureau urged the purchase of one-man safety cars for operation on all lines throughout the night. He believed that the use of one-man cars on owl lines would effect a big saving in operating costs and make the all-night service a paying proposition.

Service-at-Cost Bill for New York

The hearing on the public service bills introduced into the Legislature of New York at Albany has been postponed until Feb. 17. The hearing was originally set for Feb. 11.

Meanwhile there is much talk of action being contemplated looking toward the enactment of legislation at the present legislative session authorizing higher fares on the traction lines in New York City.

A measure already drafted embodying a service-at-cost plan will be introduced by J. Henry Walters, president pro tem, of the Senate. It is said that this measure will have the support of Speaker Sweet and his Republican followers in the Assembly.

Corporation Counsel Burr, apparently speaking for the New York City administration, said on Feb. 12 that the proposed Walters bill would undoubtedly solve a very perplexing problem providing its provisions met with the approval of the city administration.

Committee Favors Rochester Increase

A citizens' committee, whose members are representative of the commercial organizations, clubs and other societies of Rochester, N. Y., has been organized to co-operate with the municipal authorities and the officials of the Rochester lines of the New York State Railways to secure improved transportation facilities for the city. The committee has suggested that the City Council enact a resolution allowing the company to charge more than a 5-cent fare for a period of six months.

The suggestions for a higher fare during the probationary period call for the sale of five tickets for 25 cents for use only in the rush-hour periods, with a charge of 6 or 7 cents during other periods of the day. If fares of 6 cents in non-rush hour and 5 cents in rush-hour periods do not produce sufficient revenue, the committee suggests that 6 cents be charged in non-rush hours and 5 cents in rush hours with an additional 1-cent charge for transfers.

It is also suggested that an informal referendum be held on the proposal to grant the fare increase, so that an evidence of popular feeling can be secured before final action is taken by the City Council. Legislation which would empower the municipality to take over the property of the company for municipal operation is also proposed by the committee.

Transportation News Notes

Six-Cent Fare Continues.—The Illinois Public Utilities Commission has issued an order continuing in effect until March 31 next, the 6-cent fare now charged by the Evanston Railway.

Ten Cents on Vermont Line.—The Public Service Commission of Vermont has authorized the Military Post Street Railroad, Burlington, to raise the fare on its line between Winooski and Essex Junction from 5 cents to 10 cents. The line is five miles in length.

Seven Cents in Douglas.—The Douglas Traction & Light Company, Douglas, Ariz., has installed a 7-cent cash fare on its lines. The ticket rate is 6 cents. The increase was made on authority of the State Corporation Commission. The company had applied for an 8-cent cash fare with a ticket rate of 7 cents.

Asks Seven Cents in Aberdeen.—The Gray's Harbor Railway & Light Company, Aberdeen, Wash., has filed with the State Public Service Commission a new tariff, fixing fares in Aberdeen, Hoquiam and Cosmopolis at 7 cents. The Aberdeen-Hoquiam interurban rate remains at 10 cents.

One-Man Cars Sanctioned in Muscatine.—The City Council of Muscatine, Iowa., on Jan. 16 repealed the ordinance barring one-man cars within the city limits. The Clinton, Davenport & Muscatine Railway will install one-man cars on its lines in Muscatine in the near future.

Increase on Ohio Interurban.—The Northwestern Ohio Railway & Power Company, Toledo, Ohio, on Feb. 1 placed in effect a new tariff involving an increase of 5 cents between several points on its lines. The fare between Genoa and Toledo was reduced from 45 cents to 40 cents.

Seven-Cent Fares Approved in Glen Cove.—An increase in the fare of the Glen Cove (N. Y.) Railroad from 5 cents to 7 cents has been approved by the Board of Supervisors. Children's fares are raised from 2.5 cents to 3.5

cents. The higher rates are provided for in a modification of the company's franchise which has already been approved by the Glen Cove City Council.

Interurban Fare Reduced.—The Saginaw-Bay City Railway, Bay City, Mich., has reduced the fare between Bay City and Carrollton from 27 cents to 25 cents. The reduction was made following a hearing before the State Public Utilities Commission at which it was charged that the rate was 2 cents higher than that fixed by franchise.

Richmond Five-Cent Fare Extended.—The City Council of Richmond, Va., has passed an ordinance authorizing the Virginia Railway & Power Company to continue to charge a straight 5-cent fare for a period of six months. Labor tickets will be sold as formerly at the rate of six for 25 cents. The company's petition for a 6-cent fare is under investigation.

Seven Cents in Chattanooga.—The Railroad & Public Utilities Commission of Tennessee on Feb. 4 issued an order authorizing the Chattanooga Railway & Light Company to raise its fare from 5 cents to 7 cents, effective Feb. 10. Free transfers are continued. The rate for school tickets is unchanged. The order stipulates improvements in physical property and operation as a condition under which the increase is granted.

Fare Bill Passed by Assembly.—The Assembly of Ohio has passed the Pearson bill giving the Public Utilities Commission power to fix rates of fare for steam and interurban railroads at a rate not exceeding 3 cents a mile. Not a vote was cast against the bill. Steam roads are now charging 3 cents a mile under wartime orders. The Senate is expected to pass the Pearson bill. A 2-cent passenger fare law was passed in Ohio in 1906.

Asks City-Owned Bus Line. — The Central Labor Council of Los Angeles, Cal., has asked the City Council to appropriate $25,000 for the establishment of an experimental line of buses. Forty thousand trade unionists are represented by the request. The establishment of a bus line for experimental purposes was recommended recently in the report of a committee of which Van Griffith, commissioner of motor bus transportation, was a member.

Wants Increase on Interurbans in City.—The Gary & Southern Traction Company and the Gary & Hobart Traction Company, Gary, Ind., are seeking to increase the fare from 5 cents to 6 cents on interurban cars within the city limits of Gary. The company has had in effect a 6-cent fare for some time on city cars, but the fare on interurbans has not been increased. As a result congestion of intra-city traffic on interurban cars leaving and entering the city has become a burden.

Eight Cents in Youngstown. — The Youngstown (Ohio) Municipal Railway has raised its cash fare from 7 cents to 8 cents in accordance with the terms of the cost-of-service franchise under which the company operates. The 1-cent transfer charge is retained. The Mahoning & Shenango Railway & Light Company has increased the fare between Girard and Youngstown from 8 cents to 9 cents. The fare between the two cities automatically changes with the rate in Youngstown, being 1 cent greater than the latter.

One-Way Traffic Proposed for Portland.—The one-way traffic plan proposed by Mayor Baker and members of the City Council of Portland, Ore., is still under discussion. The plan to date has not met with opposition on the part of the Portland Railway, Light & Power Company. However, the proposal to include Washington and Morrison Sts. in the plan has met with objection from the company, on the ground that such a change would necessitate the handling of four-track traffic on two tracks.

Asks Seven Cents in Mobile.—The Mobile Light & Railroad Company, Mobile, Ala., has filed a petition with the Mobile City Commission for permission to charge a 7-cent fare for a period of two years. The wages of the company's employees were advanced on Jan. 1, and the latter have been promised a second increase if the fares are raised. Representatives of the carmen's union and other unions in the city sent representatives to the city hall to indorse the petition. Last May the company applied for 6-cent fares, but later withdrew its petition.

Wants Seven Cents in Salt Lake.—The Utah Light & Traction Company, Salt Lake City, Utah, has applied to the State Public Utilities Commission for permission to raise the fare in Salt Lake City from 6 cents to 7 cents. The company also asks the privilege of charging 1 cent for each transfer. Without waiving the right to protest the valuation fixed by the utilities commission on the property of the company, the latter in its petition accepts that estimate, $8,468,278, for the purpose of establishing a basis on which to found its request for an increase in fares.

Milwaukee Injunction Effective.—The city of Milwaukee, Wis., on Feb. 2, entered judgment in the Circuit Court of Milwaukee County, thus making effective the injunction of Judge Fairchild, restraining the Milwaukee Electric Railway & Light Company from operating interurban cars within the city limits. In issuing the injunction Judge Fairchild held that, to continue operating such cars on the city lines, the company must obtain an interurban franchise from the city. Officials of the company announced that, as soon as car schedules could be re-arranged, interurban and city service would be segregated.

Parking Barred in Los Angeles. — Parking of vehicles within the business district of Los Angeles, Cal., will be prohibited after April 10. The City Council has unanimously passed an ordinance to this effect. The ordinance establishes a zone in which no parking will be allowed between 11 a.m. and 6:15 p.m., but gives two minutes for the loading and unloading of passengers at any point in that section. Within this district commercial vehicles have a maximum of fifteen minutes for loading or unloading between 11 a.m. and 4 p.m. Between 4 and 6:15 p.m. no commercial vehicles will be permitted to load or unload within the congested district.

One-Man Cars a Success in Saginaw.—The Saginaw-Bay City Railway, Saginaw, Mich., some time ago began to operate all but two of its double-truck and single-truck two-man cars with a single operator. While some difficulty was experienced during the holiday rush the company is apparently getting along with the one-man operation, though some of the men have objected. All operators are paid the 5-cent bonus which has been in force for operators of the company's fourteen safety cars. The service has naturally been slowed up somewhat, but it is contended that the schedule is faster than it used to be with the pay-within operation and all entrance and exit of passengers at the rear of the car.

Bus-System for Louisville. — Forty buses will begin operating in Louisville, Ky., on March 1. Articles of incorporation of the Kentucky Automobile Transportation Service Company, which will provide the bus system, were filed on Feb. 2. The company is capitalized at $150,000. Five-cent fares will be charged, transfers will be given and only white persons will be transported. E. C. Marsh is president of the corporation, J. L. Bierach is vice-president and treasurer, and A. T. King, is a director. It is planned to have 100 of the buses operating on a number of lines by Fall. The company plans to operate as a private corporation without a city franchise. For protection it will carry liability insurance.

One-Way Rules for Fifth Avenue.—Fifth Avenue, most famous of New York City's throughfares, is to be made a one-way street. The great increase in traffic in recent months has resulted in growing congestion of the avenue. To relieve the situation the Police Department on Feb. 16 will put into effect regulations under which all traffic will move south in Fifth Avenue and North in Park Avenue, two blocks to the east. The rules will be in effect from 10 a.m. to 5 p.m., and at other hours two-way traffic will be permitted. Traffic policemen will be stationed 12 feet above the pavement in towers which will be contructed at the principal intersections of the avenues with cross-streets. A system of flash-light signals will be installed to control the movement of vehicles in the avenues and cross streets. The Fifth Avenue Coach Company, which operates the buses in Fifth Avenue, is faced with the problem of rearranging routes to conform to the new regulations. It may be necessary for the company to obtain a franchise to permit it to operate in Park Avenue.

Personal Mention

L. J. DeLamarter, treasurer of the Grand Rapids (Mich.) Railway, has been elected vice-president and general manager of the company.

Frederick J. Macleod, formerly chairman of the Massachusetts Public Service Commission, has resumed the general practice of law in Boston.

W. M. Bowen, of the Western Maryland Railway, has been appointed general track supervisor of the Monongahela Valley Traction Company, Fairmount, W. Va.

Benjamin S. Hanchett, president of the Grand Rapids (Mich.) Railway, has relinquished the position of general manager of the company. Mr. Hanchett will continue to serve as president.

Thomas R. McAuley, manager of construction and operation of the Calgary (Alta.) Municipal Railway, has accepted the position of general manager of the New Brunswick Power Company, St. Johns, N. B.

W. E. Livingston, purchasing agent of the Grand Rapids (Mich.) Railway, has succeeded L. J. DeLamarter as treasurer of the company, the latter having been elected vice-president and general manager.

W. G. Yates, for several years assistant superintendent of the Wheeling (W. Va.) Traction Company, has been promoted to superintendent of the company, succeeding William A Underwood, who recently resigned. Mr. Yates has been in the employ of the company for twelve years.

F. H. Knox, vice-president and general manager of the South Carolina Light, Power & Railways Company, Spartanburg, S. C., has been elected president of the Columbia Railway, Gas & Electric Company and the Parr Shoals Power Company, Columbia, S. C., to succeed Edwin W. Robertson, resigned.

Edwin W. Robertson, president of the Columbia Railway, Gas & Electric Company, Columbia, S. C., has resigned. Mr. Robertson's resignation resulted from his wish to obtain relief from the innumerable details of the office of president, to the end that he might devote his attention to the carrying out of plans for the betterment of the working and social conditions of the company's employees.

George Van Namee, secretary to Governor Smith of New York, has been named by the Governor to be Public Service Commissioner, Second District, for a term of five years to succeed Thomas F. Fennell, whose term expired on Feb. 1. Mr. Van Namee has been secretary to the Governor since the latter's inauguration a year ago. He was assistant clerk and clerk of the State Assembly in 1911 and clerk in 1913 and was later a member of the Legislative Bill Drafting Commission.

Mr. Coleman at Scranton

Former District Engineer for Emergency Fleet Corporation Becomes Railway Executive Again

Jilson J. Coleman, well known in electric railway circles and lately with the Emergency Fleet Corporation, has been made manager of the Scranton (Pa.) Railway, succeeding W. E. Boileau, who has gone to Dayton as manager of the People's Railway. Mr. Coleman is one of the pioneers of the industry. He helped to father the infant through some of its growing pains. After it had become a lusty child Mr. Coleman went into other work, but the call was too strong to resist and he returned to railway management.

JILSON J. COLEMAN

Mr. Coleman started railway work in Louisville, Ky., in 1882 as a clerk with the Central Passenger Railway. His pay was 75 cents a day. This was during the old horse and mule car days. Mr. Coleman worked his way up to chief clerk and then managed the lines in New Albany, Ind., where he was married. Later Mr. Coleman moved to Cleveland and associated himself with Tom L. Johnson and assisted in electrifying the horse-car lines there.

After that work had been finished Mr. Coleman and Albert L. Johnson, a brother of Tom L. and also a cousin of Mr. Coleman, built the lines from Allentown to South Bethlehem and from Allentown to Catasaqua, now included in the system of the Lehigh Valley Transit Company. The company at Allentown, which was financed by R. T. Wilson & Company, purchased the lines from Allentown to Bethlehem and consolidated the two companies. They next rehabilitated the Yonkers system, and in 1895 started the Nassau Electric Railroad, Brooklyn, N. Y., now included in the Brooklyn Rapid Transit System.

Mr. Coleman then managed the consolidation of the St. Louis and the Washington systems for Brown Brothers, bankers, New York. He next built the line of the New Jersey & Pennsylvania Traction Company between Trenton and Princeton, left unfinished by the death of Albert L. Johnson. Mr. Coleman also examined for bankers the railway properties in Pittsburgh, St. Louis, Washington, San Francisco, Indianapolis and Baltimore.

For the last two years he has been district engineer of the passenger transportation division of the United States Shipping Board, Emergency Fleet Corporation, under A. Merritt Taylor, former transit commissioner of Philadelphia. In this position he was charged with the responsibility of seeing that adequate transportation was provided for the ship workers in the territory extending from Boston, Mass., to Houston, Tex.

O. J. Shaw, secretary of the Lincoln (Neb.) Traction Company, has been appointed general manager of the company. Mr. Shaw will continue to perform the duties of secretary in addition to his new ones. For two years after his graduation from the University of Nebraska he had charge of light and power properties at Aurora, Neb. He joined the Lincoln Traction Company nine years ago, his first position being in the contract department. Shortly thereafter he was made assistant secretary, and in 1913 he became secretary. For several years he has been in charge of all of the company's overhead lines, the steam heating plant, the commercial department and the accounting department. As general manager he succeeds John M. Bramlette, who resigned several months ago.

W. E. Boileau, general manager of the Scranton (Pa.) Railway, has resigned to accept the position of general manager of the People's Railway, Dayton, Ohio. Mr. Boileau entered railway work in the early 80's with a large steam railroad system. In 1888 he undertook electric railway work and spent a number of years constructing and operating properties in the South. In 1904 he went to Dubuque, Iowa, where he was in charge of the construction of a power station, carhouse and shops and the rebuilding of tracks for the Union Electric Company. In 1905 Mr. Boileau became connected with the New York, Westchester & Boston Railway, New York, and remained with the company until the property passed into the control of the New York, New Haven & Hartford Railroad. He was at one time general manager of the Chattanooga Railway & Light Company, the Lookout Mountain Railway and the Lookout Incline Railway, Chattanooga, Tenn.

Mr. Blair in Control on a Platform of Service

Assumes Important Task of Operating Largest City System in World—Other Changes in Officials

The election of Henry A. Blair to the three principal positions of the Chicago (Ill.) Surface Lines, chronicled in ELECTRIC RAILWAY JOURNAL last week, marks the assumption on the part of this able financier and railway man of the gigantic task not only of operating the largest electric railway system in the world in a manner to win public approval, but also of solving the uncertain financial future of the properties. What Mr. Blair will do or can do to re-establish the soundness of the financial structure supporting the enormous investment of capital in the Chicago street railways is only a matter of conjecture. What he will do toward winning the support and allaying the antagonism of the public and public officials is perhaps intimated in the following statement which he issued upon his election:

MR. BLAIR'S STATEMENT

The change that has become effective in the management of the Surface Lines properties is merely a reorganization which places the administration of these properties in the hands of the majority interest—a right which the majority interest possesses and deems it advisable to exercise at this time.

The conditions that have obtained in the electric railway business throughout the United States during the last three or four years are not the fault of the management of the companies. They have been the direct result of the world war in which this nation participated. The national war program involved the electric railways and other public utilities to a very great extent. In many respects the control of the properties was taken over by the national government, which greatly increased the costs and the difficulties of operation and supplying service to the public.

This management believes, and proposes to work on the theory, that what the people of this city want is service, and it hopes that, by working in conjunction with the city authorities and with the State Utilities Commission, it will be able to provide the additional facilities required to enable it to so adjust the operation of the street railway cars to the requirements of traffic that Chicago will have better transportation service than any other city in the world. It has faith that the people of Chicago will co-operate with it and lend their full support in the effort of the management to fulfill the program it has in mind.

Mr. Blair's new responsibilities come as the culmination of fifteen years' active connection with the Chicago Railways and Chicago Surface Lines. He began his railway career in 1904 when he was appointed receiver of the North Chicago Street Railroad and of the West Chicago Street Railroad. He carried these companies through the receivership and through the 1907 ordinance settlement, and later became chairman of the board of the Chicago Railways at the reorganization of the subsidiaries which took place on Feb. 1, 1908. He has also served continuously since that time as chairman of the finance committee. At the time of the operating unification of the Chicago Railways with the Chicago City Railway, in the early part of 1914, he became president of the Chicago Railways and chairman of the board of operation and a member of the executive committee of the Chicago Surface Lines. In addition to accomplishing the unified operation of the surface lines, Mr. Blair brought about on July 1, 1911, the merger of the Chicago & Northwestern Elevated Railroad, the South Side Elevated Railroad, and the Metropolitan West Side Elevated Railway, serving until 1916 as chairman of the governing board, a member of the executive committees and a trustee of the Chicago Elevated Railways, though not officially connected with the elevated system at present.

Mr. Blair was born in July, 1852, at Michigan City, Ind. He was educated at Williston Seminary, Easthampton, Mass. His business career began in the Merchants National Bank, Chicago, which was founded by his father. Subsequently he was elected vice-president of the bank, continuing in that capacity until 1902, when it was consolidated with the Corn Exchange National Bank. Mr. Blair is now a vice-president of the Illinois Trust & Savings Bank and a director of the Commonwealth Edison Company, Public Service Company of Northern Illinois, Chicago & Interurban Traction Company, and the Elgin National Watch Company.

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HENRY A. BLAIR

OTHER CHANGES IN CHICAGO

F. P. Edinger has been appointed acting superintendent of transportation, Chicago Surface Lines, succeeding W. M. Weatherwax. Mr. Edinger was formerly division superintendent of the Sixth division, which comprised the Lawndale and Blue Island stations. He has been with the Chicago Railways or its subsidiaries since 1893, beginning his career as a conductor and working up through the transportation department to become superintendent of one of the north side districts. In 1914, at the time of the unification of the surface lines, he was transferred to the West Side and placed in charge of the Sixth division.

Edward L. Maguire, formerly assistant superintendent of the Sixth division, has been made acting division superintendent. His connection with the Chicago Railways began in 1880 as a conductor at the Blue Island station.

William Hall, formerly a supervisor in the Sixth division, has been made acting assistant division superintendent to succeed Mr. Maguire.

H. H. Hansen, General Manager

Harry H. Hansen, superintendent of the Middlesex & Boston Street Railway, has been appointed general manager of the company. Mr. Hansen succeeds George M. Cox. He will perform the duties of general superintendent in addition to that of general manager, the former office having been abolished. He will make his headquarters in Newtonville, Mass.

Mr. Hansen entered street railway work in 1889 as a conductor for the Boston Elevated Railway. He worked up through the various grades in the operating department, becoming in 1901 district supervisor for the company at the Dudley Street terminal, Roxbury district. In 1913 he was appointed superintendent of district No. 2 and served in this capacity until he was transferred to more important work. He served as superintendent of division No. 7 for two years, with headquarters at Cambridge. In April, 1919, Mr. Hansen became general superintendent of the Middlesex & Boston Street Railway, continuing to act in that capacity until his promotion to the general managership.

Edeard C. Gramling, dispatcher of the Georgia Railway & Power Company, Atlanta, Ga., has been promoted to the position of assistant superintendent of transportation of the company. He has been at Atlanta since 1901.

Obituary

Alvin S. King, eastern manager of the Sterling Varnish Company, Pittsburgh, Pa., died on Feb. 3 in New York City from pneumonia.

J. A. Wheelwright, a director of the Monongahela Valley Traction Company, Fairmont, W. Va., is dead. Mr. Wheelwright was president of the Consolidated Coal Company, Fairmont.

Daniel D. Martling, at one time superintendent of the old Atlantic Avenue Railroad, Brooklyn, N. Y., died in Brooklyn on Feb. 6 at the age of eighty-seven years. Mr. Martling aided in the construction of the old Culver Street Railroad, of which he was superintendent until its merger with the Brooklyn Rapid Transit System.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Sheet-Steel Gear Cases Up 10 to 15 Per Cent

Deliveries on Quantities of Fifty or Less Can be Made in Two to Three Weeks

Effective the second week in Feb., reinforced spot-welded, sheet steel gear cases are advanced 10 to 15 per cent owing to the increase in price of steel sheets which are becoming more and more difficult to obtain. Production is satisfactory and is improving gradually. Railways usually break most gear cases when the frost comes out of the ground, the roadbed then becoming more uneven and harder on the rolling stock and equipment than at other times. The need for gear cases at this time is largely accountable to the weather which causes frequent breakdowns and renewal of parts.

Good deliveries are being maintained but there is no telling how long they will last. For the present, good quantities can be made up in three weeks.

In the malleable gear cases, an advance will be announced soon. This is because of a recent heavy advance in the cost of malleable iron from which they are made. There are now on hand, a considerable number of malleable gear cases, made up for stock that may be had for immediate delivery. These, however, it is expected will not last long as the railways are coming into the market actively for maintenance needs for the coming spring.

Car Shortage Affecting Coal and Steel Markets

Lack of Raw Materials Will Seriously Cut Down Production if Car Shortage Grows Worse

During the week ended Jan. 31, the car supply in the coal and coke regions was but 50 to 70 per cent of normal. Although figures are not yet available, the bad weather accompanied by heavy slides on several coal-carrying roads no doubt has resulted in a largely decreased tonnage reaching tide water. According to the Geological Survey figures, production for the week ended Jan. 28 declined 737,000 tons due to car shortage and bad weather. The fuel shortage which prevails throughout the country became critical during the past week in the east where both rail and water transportation were paralyzed by the heaviest blizzard and storm that has been experienced since 1888.

Some blast furnaces in the Pittsburgh and other districts are being banked for lack of coke. Fabricated steel is piling up in the yards of steel manufacturers who estimate that not over 20 to 30 per cent of their output is being shipped.

One large eastern manufacturer of wire products requested 100 cars and after some delay received seventeen, most of which had leaky roofs and could not be used for the shipment of insulated wires and cables which had been planned.

Wood Hulse Yates Co., Inc.

B. F. Wood Engineers, Inc., New York, announce a change of name to Wood Hulse Yates Company, Inc., to act as engineers and contractors. Active members of the firm are Benjamin F. Wood, William S. Hulse, and Eugene A. Yates.

Mr. Wood, who is a graduate electrical engineer, was for sixteen years with the Pennsylvania Railroad. During this time he had charge of the electrical work east of Pittsburgh, Pa., including the design and construction of power houses and of principal terminals, such as the Pittsburgh Station and Union Station in Washington, D. C. He was also a member of the electrical and mechanical advisory committee which had general supervision of the mechanical features of the tunnels, the new Pennsylvania Station in New York City and the Long Island City Power Station and the motive-power facilities of Sunnyside yards. In 1913, he became vice-president and chief engineer of the United Gas & Electric Engineering Corporation.

W. S. Hulse joined the Fort Wayne Electric Company in 1894. Two years later he went to Europe and as engineer for one of the largest foreign electrical concerns, designed and built for a French syndicate, the first complete lighting and power system in Buenos Aires, Argentine, costing $1,500,000. He has directed the design and construction of large plants in many foreign countries and more recently has spent considerable time in England for the General Electric Company and later as managing director of a Belgium Holding Company.

E. A. Yates from 1902 until 1912 was associated with MacArthur Brothers Company and other contractors as superintendent on railroad and hydroelectric work. He spent four years as assistant engineer on the construction of the Pennsylvania tunnels in New York. From 1912 to 1914 he acted as chief engineer for the Alabama Power Company. In 1914, he became chief engineer and later vice-president of the T. A. Gillespie Company engineers and contractors.

Shellac Advances 45 Cents Per Gallon

Trouble Reported In India from Which Most of Supply Is Imported—Production Greatly Reduced

The amount of shellac being brought down the river to Calcutta, India, is much reduced owing to troubles with the natives in the interior. On Jan. 1 the quotation in Calcutta was $1.80 a pound, while on Jan. 19, prices ranged from $2 to $2.05 per pound.

Prices in New York as of Feb. 7 are as follows: Orange, $1.70 per pound; T.-N., $1.60 per pound; bleached, ground, $1.50 per pound, and bone dry, $1.80 per pound. White shellac cut 4 lb. to the gallon is $5.50 per gallon in barrel lots, while orange shellac is quoted at $5.25 per gallon in barrel lots. Prices of small lots in the jobbing trade have been advanced 45 cents per gallon.

Malleable Deliveries May Be Worse

Production About 80 Per Cent of Normal—Plants Badly Handicapped By Lack of Capacity

Foundries throughout the country are unable to turn out malleables sufficient to keep up with the demands. Capacity is lacking everywhere with the result that malleable deliveries are from six to ten weeks on light castings in medium quantities and from three to six months on heavy castings in large quantities. Regardless of the amount of business offered, malleable plants so far have been forced to refuse orders unless purchasers are willing to wait a long time. Railways will do well to place orders now for their requirements even if they are in a position to wait for deliveries.

Many automotive industries are now in the market for enormous quantities of malleables and if successful in gaining the amount of space to fill their requirements, the railroads, railways and other malleable users will no doubt suffer greatly.

Manufacturers of malleables who formerly accepted business on a contract basis over a number of months have suffered through increased prices of pig iron and of labor. Some have adopted the plan of making adjustments quarterly on a sliding scale basis, so that an increase in the cost of pig iron or labor will be adjusted in a more equitable manner.

The American Malleable Casting Association, which held its annual meeting in Cleveland, January 14, have elected officers for the coming year as follows: President, John A. Penton, Cleveland; vice-president, Western Section, E. E. Walker, Erie Malleable Iron Works, Erie, Pa.; vice-president Eastern Section, F. J. Eppele, president Trenton Malleable Iron Company, Trenton, N. J.; secretary and treasurer, Robert E. Belt who was re-elected to office. E. M. Griswold, Frazer & Jones, Syracuse, N. Y., and John E. Walker, Wilmington Malleable Iron Works, Wilmington, Del. were elected to the executive committee of which John C. Haswell, president of Dayton Malleable Iron Company, Dayton, Ohio, is chairman.

Materials and Supplies Cost Figures Brought Up-to-Date

Below is a revised tabulation of the costs of various railway materials and equipment taken from the *Kansas City Railwayan*, showing a comparison with the prices four years ago. The last item of advertising is significant in view of the vociferous attacks of the *Kansas City Star* against any increases in street car fare.

Item	Unit	1915	1919
Coal	ton	$1.95	$3.46
Fuel oil	Bbl.	.78	.... 1.40
Copper—base	lb.	.13	.24
Tin	lb.	.32	.72
Lead	lb.	4.67	5.00
Steel bars—base	cwt.	1.21	2.35
Yellow pine	M ft.	25.00	47.50
Oak	M ft.	70.00	150.00
Linseed oil	gal.	.58	2.38
Cement	bbl.	.99	2.26
Paving brick	M	13.50	24.50
Fire brick	M	31.00	46.65
Sand	yd.	.65	1.30
Malleable castings	lb.	.04	.10½
Grey iron castings	lb.	.02	.10
Brass castings	lb.	.18	.36
White lead in oil	lb.	.06	.13½
Rotary converter (3,000 kw.)		19,450.00	27,300.00
Transformer for 3,000 kw		10,500.00	16,600.00
Motor and electrical equipment for car		3,200.00	5,300.00
Car wheel	each	9.50	16.63
Car axle	cwt.	$3.25	6.50
Roof paint	gal.	1.40	2.20
Brake shoes	net ton	36.33	64.00
Gears	each	26.65	53.14
Steel sheets	cwt.	2.60	5.09
Glass—30x34½	each	.98	1.85
Rails	gr. ton	40.95	69.50
Ties—6x8x8 white oak	each	.62½	1.40
Street poles—30 ft. 900 lb	cwt.	2.68	6.31
boiler tube	ft.	.25½	.71
Frog	each	85.00	200.00
Switch	each	150.00	350.00
Mate	each	110.00	300.00
Crossing—2—track	each	1,100.00	2,200.00
Advertising	per line	.22½	.40

Promotion of Westinghouse Electric Officials

The Westinghouse Electric & Manufacturing Company has announced a number of promotions among its officials at East Pittsburgh. Among the more important of these are the following:

Alexander Taylor, for many years Manager of Works, has been made Assistant to Vice-President in general charge in all plants of production, stocks and stores. R. L. Wilson has been promoted from the position of general superintendent to works manager at East Pittsburgh. E. R. Norris has been appointed director of works equipment. C. B. Auel is made manager of the Employees' Service Department.

Other appointments announced were: G. M. Eaton as chief mechanical engineer of the company, C. W. Johnson and H. W. Cope as assistant directors of engineering, C. H. Champlain and E. S. McClelland as assistant works managers, John E. Bonham as assistant to works manager, and F. E. Wynne as manager of the railway equipment engineering department.

100 Cars for Cleveland

The purchase of fifty motor cars and fifty trailers by the Cleveland (Ohio) Railway is recommended to the Council of that city by Street Railway Commissioner Sanders as part of a program of improvements for the company calling for the expenditure of $2,500,000 in all. The matter has been referred to the street railway committee, but it is regarded as quite certain the program will be approved. The Cleveland Railway would of course be permitted by the city to capitalize the new work by selling additional stock.

Rolling Stock

Concord (N. H.) Electric Railway expects to purchase four safety cars.

Grand River (Col.) Railway Company, is in the market for one safety car.

Cairo & St. Louis Railroad Company, Cairo, Ill., is in the market for a few new cars.

Baton Rouge Electric Company, Baton Rouge, La., has purchased eight Birney safety cars.

Beaver Valley Traction Company, New Brighton, Pa., are asking for prices on three safety cars.

Lincoln Traction Company, Lincoln, Neb., will place an order for fifteen safety cars within a short time.

Escanaba Traction Company, Escanaba, Mich., will be in the market for motors, supplies and for one snow plow.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., has purchased new trucks and control equipment for six cars.

Granite City Railway Company, St. Cloud, Minn., will purchase trucks for two single-truck cars and install air-brakes on six additional cars.

Cincinnati & Dayton Traction Company, Dayton, Ohio, purchased one single-truck snow sweeper from the McGuire Commings Manufacturing Company.

Chicago, South Bend & Northern Indiana Railroad, South Bend, Ind., have purchased ten new safety cars from the National Safety Car & Equipment Company.

Levis County Traction Company, Levis, P. Q., is in the market for three cars which are needed immediately. Offers from any source will be considered.

Franchises

Detroit, (Mich.) United Railway.—The voters of Pontiac, Mich., have approved a franchise for the Detroit United Railway under which the company will make extensions in that city at a cost of $500,000.

Track and Roadway

San Francisco, Napa & Calistoga Railway, Napa, Cal.—The San Francisco, Napa & Calistoga Railway has concluded arrangements with the United States Railroad Administration and the Navy Department for the construction of a line connecting its tracks with those of the new Government causeway in the vicinity of Vallejo, Cal. It is also constructing a 75-car interchange yard at Napa Junction. When these lines are completed, all freight for the United States Navy Yard at Mare Island will be moved over this route between Napa Junction and Mare Island.

Connecticut Company, New Haven, Conn.—Judge John H. Webb of the superior court has dismissed the appeal of the Connecticut Company in the case of the city of Stamford vs. the Connecticut Company from a decision of the Public Utilities commission confirming an order of the town for the relocation of the tracks on the Springdale line.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—The Chicago, South Bend & Northern Indiana Railway will lay 1,500 feet of double track in Michigan St., and will install two additional turn-outs.

Benton Harbor, St. Joe Railway & Light Company, Benton Harbor, Mich.—This company has ordered from the Lorain Steel Company 125 tons of high T-rail for repairs.

Seattle (Wash.) Municipal Street Railway.—Superintendent of Public Utilities Thomas F. Murphine, has announced that the 6th Ave. Northwest line of the Seattle Municipal Street Railway will be extended to the city limits and double-tracked within two months.

Power Houses, Shops and Buildings

Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala.—This company expects to build this spring a car-house 40 ft. by 80 ft.

Cairo & St. Louis Railway, Cairo, Ill.—The Cairo & St. Louis Railway expects to purchase a new 2,000-k.w., turbine, with condenser, auxiliary apparatus and boilers.

Chicago, Ottawa & Peoria Railway, Ottawa, Ill.—The Chicago, Ottawa & Peoria Railway will install at least one automatic substation during 1920.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.—This company has placed orders for equipment to install one automatic substation at Muskegon Heights, Mich.

Empire State Railroad, Oswego, N. Y.—Fire on Feb. 2 destroyed the carhouse and a large amount of equipment of the Oswego city division of the Empire State Railroad. A number of cars were destroyed, and will be replaced with one-man cars. The loss is estimated at $150,000.

Philadelphia (Pa.) Rapid Transit Company.—The Philadelphia Rapid Transit Company will equip its Mount Vernon St. power station with the Quigley powdered coal system for firing boilers.

Virginia Railway & Power Company, Richmond, Va.—The Virginia Railway & Power Company has authorized the expenditure of $45,000 to reinforce its underground cables in the business district of Richmond.

Wheeling (W. Va.) Traction Company.—The carhouse of Wheeling Traction Company at West Wheeling, with all its contents, was destroyed by fire on Jan. 24. The loss is estimated at more than $20,000. The building will be replaced at once.

Trade Notes

Portable Machinery Company, Passaic, N. J.: A pamphlet of Type B portable belt conveyors which have a maximum conveying capacity of 1 ton per minute.

Johnson Coin Counting Machine Company announces that after Feb. 2, 1920, it will occupy the building which it has recently purchased at 10 Anable St., Long Island City, N. Y.

John K. Martin has retired from the sales organization of the Gleason-Tiebout Glass Company after being connected with the glass industry for fifty years of practically continuous service.

Johns-Pratt Company, Hartford, Conn., has received the Underwriters' Laboratories "listing as standard" of its Noark renewable fuses in all sizes from 3 amp. to 600 amp. on 250 volts and 600 volts.

Standard Undergound Cable Company's St. Louis Office, E. J. Pietzcher, manager, on Feb. 1 was moved from the Security Building, where it has been established since 1897, to the Arcade Building.

Chicago Pneumatic Tool Company, Chicago, Ill., announces that C. E. Laverenz, formerly an inspector in the Ordnance Department, has been made special railroad representative of the company with headquarters at Chicago.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that seventy-five of its engineers and the machine works engineering department were recently transferred to Lester, Pa., near the South Philadelphia works of the company.

Independent Pneumatic Tool Company, Cleveland, Ohio, announces that William R. Gummere, who for a number of years represented the company in Cleveland, Ohio, will be connected with the Pittsburgh branch, which is under the management of Harry F. Finney.

Combustion Engineering Corporation, New York, N. Y., announces that W. C. Stripe, formerly of the Pittsburgh office has been made manager of the Philadelphia District. C. L. Bachman, formerly manager of the Chicago office and E. F. Kuehnle of the New York office will be associated with Mr. Stripe.

Gannett, Seelye & Fleming, Inc., engineers, Harrisburg, Pa., have opened a branch office in Memphis, Tenn., at No. 262 Randolph Building. This engineering company is engaged in all classes of work including electrical developments, appraisals and operation of public utilities. It expects to make the new office in Memphis the center for all work in the Southwest.

Arthur H. Abbott, for the last eight years district transformer specialist of the General Electric Company, New England territory, has resigned to become sales engineer of the Blake Electric Manufacturing Company, with headquarters at I Rowe's Wharf, Boston. Mr. Abbott will pay particular attention to the sale of General Electric transformers, motors, outdoor substation and other equipment.

Chicago Fuse Manufacturing Company, Chicago, Ill., through its president, Arthur D. Dana, has purchased from the Ohio Elevator Company a two-story factory building with a four-story office section at Fifteenth and Laflin Streets. With the additions contemplated the buildings, which are now 140 x 360 ft., and the equipment will represent an investment of $500,000.

Chicago Pneumatic Tool Company, Chicago, Ill., on Jan. 21 and 22 held a conference of executives, plant and branch managers and salesmen at its Detroit plant, Second Avenue and Amsterdam St., at which time a large five-story addition was formally opened. At this conference the program of the company for 1920 was outlined, calling for largely increased production not only at Detroit but at the five other American plants of the Company. It was reported that much of the proposed increase in production was already absorbed by orders for future deliveries.

Electrical Engineers' Equipment Company suffered a loss by fire at its general offices, 710 to 714 West Madison St., Chicago, on the night of Jan. 13. This did not affect the company's manufacturing, stock and shipping departments at 711 to 715 Meridian St. The factory is running at full capacity, so there should be no delay in the shipment of orders now in production. Regular deliveries can be promised on new orders. All mail should be addressed to 711-15 Meridian St., Chicago, until further notice.

M. R. Evans and J. B. Harris, Jr., have resigned from the Pittsburgh Transformer Company, Pittsburgh, Pa., the former as sales manager and the latter as Pittsburgh district manager of the company, to become associated under the name of Harris & Evans, district managers, Real Estate Trust Building, Philadelphia. They will operate a joint district office of the Moloney Electric Company of St. Louis, the Delta-Star Electric Company of Chicago and the Simplex Wire & Cable Company of Boston, and will handle the business of these companies in the Philadelphia district, which includes the eastern part of Pennsylvania and the States of New Jersey, Delaware and Maryland.

Lieut.-Col. L. M. Clark, who was mentioned in the issue of Jan. 31 as having become associated with the Railway Improvement Company, New York, and whose title was erroneously given as "Lieut.", has been recently re-commissioned a lieutenant-colonel in the Ordnance Section of the Reserve Corps. During the early period of the war, Colonel Clark was assigned to the manufacture of recoil mechanisms for the 240-mm. French howitzers. Later he was made district inspection manager at Chicago, having in charge the inspection of all ordnance material in eight adjoining states. After the signing of the armistice, he was appointed a member of the Chicago District Claims Board, serving in this capacity until his discharge from the service last November.

Canadian Engineering Agency, Inc., 115 Broadway, New York City, announces that the above named company has been appointed and the Pearson Engineering Corporation has ceased to act as purchasing agent for the following companies: Ebro Irrigation & Power Company, Ltd., Cataluna Railways, Ltd., and allied companies, Mexico Tramways Company, Mexican Light & Power Company, Ltd., and allied companies, Rio de Janerio Tramway, Light & Power Company, Ltd., Rio de Janeiro and Sao Paulo Telephone Company, société Anonyme du Gaz Rio de Janeiro and allied companies, Sao Paulo Tramway, Light & Power Company, Ltd., and Sao Paulo Electric Company, Ltd., and allied companies. Louis J. Hirt is the consulting engineer for and Walter J. Plummer is in charge of the purchasing department of the Canadian Engineering Agency, Inc.

New Advertising Literature

Thompson Electric Company, Cleveland, Ohio, has moved into more commodious quarters at 226 St. Clair Ave., N. E.

B. F. Goodrich Rubber Company, Akron, Ohio: A series of twelve booklets by James A. McQueen, manager of mail sales, covering the following subjects: Form letters that sell, the right sales letters for selling the dealer, faulty expressions in dictation, building goodwill through courtesy, good paragraphing, cleaness, conciseness, handling the angry customer, the mechanical make-up of a letter, the beginning and the ending of a business letter.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 55 New York, Saturday, February 21, 1920 *Number* 8

Railways Clear Streets for City Competition

WE TOOK occasion last week to direct attention to a great community benefit performed by electric railways in winter. This is the clearing of the parts of the streets occupied by the car tracks for the movement of cars. No other user of the highway is called upon to do this, but all benefit from what the electric cars do in clearing off the snow.

A striking example of the value of this service to other vehicles has been given during the past two weeks in Brooklyn. It will be remembered that last year a number of bus lines were started in that borough under the authority of the city to give what was said at the time to be needed additional service. After the recent storm these lines would have had great difficulty in operating if it had not been that the B. R. T. and other electric railway companies in Brooklyn had cleared off the snow from the streets having trolley tracks. In consequence the municipal buses changed their routes in several cases so as to coincide with streets having tracks. Our worthy mayor thunders against the electric lines, but even he will have to admit that without the cars the buses in Brooklyn would have had a hard time this past week.

The Surface Railway Is an Engineering Machine for Snow Removal

THE more we study this service of the railways, the broader and more comprehensive the whole situation appears. A big fact is overlooked or not appreciated. In addition to its function of transporting passengers, the surface railway, as a whole, is a huge machine, upon which the large urban center (where heavy snowfall occurs) depends to keep its commerce moving and, more important, to preserve its health. In our larger cities, we live by mechanical methods; the very functioning of the city as a whole is like a big engineering machine. We have outgrown the day when individual or even collective human labor alone can overcome a real snow storm and we must depend upon engineering and mechanical methods. It is only when an unprecedented storm such as has recently overcome the northeastern part of the country actually conquers the machine, that we realize the machine, namely, the street railway, exists. In the most accentuated case—New York—in normal storms, the surface lines, which attack the problem at the first flake of snow, can keep the arteries open so that, say, 75 per cent of the city's normal food, coal, garbage and commercial hauling can go ahead. At this point, the city departments start to work and gradually clear away the rest of the snow. But, without the machine, no human force could keep paths open. As a community interest, therefore, and irrespective of ownership, management, rates or cost of any kind, this machine should be kept equipped and ready to do its work.

As indicated by figures on another page, the records of the Weather Bureau show no storm in the New York district so great in precipitation as that of last week. The machine, in this case, was choked, and slowly, one by one, its parts—cars, plows and sweepers—succumbed. The underground trolley proved a weak point. Specific equipment for this unpredicted situation did not exist. The people have therefore an interest in seeing that the railways are in a position to develop and maintain for service adequate snow-fighting equipment to fit their particular installations.

We believe that the electric railway engineers, who can appreciate this engineering viewpoint of the whole situation, should, by proper publicity with the assistance of other and disinterested engineers, establish this conception of the service of the railways in the collective mind of the community.

The Era of Steam Railroad Electrification Is Due to Open Soon

STEAM and electric railway men who appreciate the enormous economies which are to be accomplished through the electrification of our steam railroads are apt to be impatient at the slowness of the transition from steam to electric motive power. They remember how the horse and cable street railways were electrified almost overnight, and, while they know that nothing of this kind can occur in the heavy traction field, they would like to see a little more speed in the substitution of the electric locomotive for its steam predecessor.

There is very little parallel, however, between these two electrifications. As soon as the electric street railway car had been made an operating success, the question of electrification became merely one of the rate at which equipment could be manufactured and installed. In the heavy traction field, the electric locomotive is confronted by a formidable rival, to which the finest designing skill is being constantly applied. This rival can only be displaced as the "powers that be" become convinced of the ability of the electric locomotive to get more tonnage over the track in a given time and at a lower unit cost.

To the nation as a whole the most cogent argument in favor of electrification is the conservation of our store of coal. In time public sentiment will compel widespread electrification of steam railroads for this reason. To the railroads themselves, however, the matter must be one of dollars and cents, because when they return to their owners they will have greater difficulty than ever in meeting operating expenses and paying a reasonable return upon the money invested in them. They will not be able to attract the capital necessary for new equipment unless they are allowed rates which will insure a fair margin of profit. We believe, however, that in due course the railroads will be in a sufficiently stable financial condition to permit the carrying out of a reasonably rapid electrification program. Good electrical apparatus can be furnished as rapidly as demanded, and amply full data as to the reliability of electric operation are now available to the open-minded, wide-awake railroad manager.

At the meeting of the Schenectady section of the A. I. E. E. held last evening, A. H. Armstrong, chairman of the electrification committee of the General Electric Company, read a comprehensive paper on the present heavy electric traction situation. This will be found abstracted at considerable length elsewhere. The particular point in this paper to which we wish to direct attention is his contention that a new standpoint from which to view transportation as a whole is necessary. The advent of the successful locomotive puts a new transportation tool into the hands of railway managers. They cannot get the best results with this unless they gradually change their whole plan of operation to utilize its characteristics. To do this will require great foresight and vision on the part of these managers. Up to the present time the railroads have not shown much initiative in the line of studying the electric locomotive and adapting their plans to it. The initiative so far has had to be taken by manufacturers of electric equipment and independent electrical engineers. They have had to overcome a lot of inertia and even opposition. The big day will be ushered in when the railroads begin seriously to plan to make the most of the electric locomotive.

We Progress Through Practical Investigations

THOSE connected with the operation of electric railways find that the investigation of causes for troubles and failures and the devising of a means for overcoming them and preventing their repetition form a large part of their work. Such investigations frequently include a large amount of research work, and the knowledge gained often is of far-reaching effect on future designs of equipment. Tests undertaken with a definite object in view sometimes result in uncovering effects of a totally different nature. These may be caused by extreme conditions which seldom occur, but the effects become of prime importance when serious detentions to service result and the equipment is damaged or destroyed.

Some rather astonishing results for abnormal current peaks are given in the article in this issue on "Transformer Action of Tapped-Field Railway Motors." In ordinary operation the maximum current reached with this equipment did not exceed 350 amp. per motor, but when contact was broken or established with the third rail while the train was passing through gaps a maximum of 1,280 amp. per motor was reached. Control equipments were severely overloaded as a result, and much damage was done before the real cause was determined and a remedy applied.

In previous analysis of the operation to be expected from the control equipment it was assumed that when a gap in the third rail was passed the circuit would be opened immediately by the line relay dropping out and causing the control equipment to return to its "off" position. In actual operation it was found that the voltage did not drop to zero immediately, so that the line relay stayed in and held the control circuits closed. At the same time, due to a momentary decrease in current through the current limit relay, the control equipment actually notched up while the train was passing through the gap. Due to this unexpected operation of the control equipment, abnormal conditions which otherwise would have happened but very seldom became frequent. The tests described led to a speedy solution of the difficulties so that for this particular equipment they are a thing of the past, but the principles illustrated are constantly cropping up. The consideration of such occurrences as this should be of considerable help to those who may at some future time have similar problems to deal with.

Intelligent Selection of Materials a Factor in Economy

IN PREPARING specifications for rolling stock, as well as other features of the physical plant of the electric railway, superintendents of equipment and engineers have need of a comprehensive knowledge regarding the materials which are to be used therein. It sometimes happens that materials are specified which, while desirable in many ways, are really not the best for the intended purpose, and occasionally the specifications call for material that is very difficult to get and not really necessary. In view of this general situation, the editors of the ELECTRIC RAILWAY JOURNAL reached the conclusion that the readers of the paper would like to have in comprehensive form some practical articles on the subject of the materials that go into the makeup of an electric railway car. They asked Norman Litchfield to prepare these articles because he had had practical experience in car construction from both sides, and because he looks at the matter from the engineering point of view.

The first article in the series, on lumber, is printed this week, and others on steel, electrical insulation, bearing metals, paints and varnishes respectively will follow in reasonably rapid succession. We believe that one result of careful reading of this series will be a better mutual understanding between railways and manufacturers as to what kind of stuff should go into a car. The articles might well be made the basis for discussion, as obviously there must be some difference of opinion in a field so vital as this one. One valuable effect of the articles will be that they will direct attention to the standard specifications of materials which most nearly represent the consensus of opinion of the experts in the several lines of production.

The Price of Newspapers Is Raised When Necessary

THE Foxy Grandpa of American journalism, William Randolph Hearst, who is always doing things for the dear "peepul," has raised the price of his Sunday edition from 6 cents to 10 cents. He is averse to living on last year's beefsteak. Did he conduct a campaign of education before raising the price? He did not. Mr. Hearst knows the value of publicity. He also knows its drawbacks. He tells the Interborough it cannot charge more for fare, but he does not tell himself that he can't charge more for his own product. He just says: "Willie, you ought to have more money for your product." And Willie, the great traction baiter, sets about to get it by raising the price of his paper 67 per cent. In the light of present events it may seem that the Interborough Rapid Transit Company was somewhat lavish in the payment of dividends. But it didn't know. It couldn't know. It is a corporation subject to all the limitations which beset human judgment, but subversive to an omnipotent Mayor. It did at least explain that you can't use again the water that has gone over the dam.

Not so Mr. Hearst. That some of his readers will find their champion has feet of clay is more than certain now. There is a type of human whose intelligence you can insult with impunity. Mr. Hearst has certainly capitalized this knowledge. Whether this same type of human will stand an insult to and an assault on his pocketbook remains to be seen. The answer will be read not in the stars, but in the circulation figures. Liars may figure, but these figures do not lie. One million copies of the Sunday New York *American*, which is Mr. Hearst's boasted circulation, for fifty-two Sundays at four cents over the present price is $2,080,000. For our own part, and to paraphrase Brann, it appears to us that if all the milk of human charity in Mr. Hearst were churned the product would be limburger cheese.

They'll Hang Themselves at This Rate

IN THE NEWS columns of this issue we reproduce a piece of sales copy which is being spread broadcast by an Ohio motor truck company through its distributors. It is pathetic. The copy comprises a series of statements so extravagant in their claims for the advantages of motor bus transportation that we cannot understand why the truck company is wasting its time trying to sell trucks. Why doesn't it use its energies in establishing one of these wonderful bus line systems in every city which now has a street railway. We thought that character of salesmanship and advertising was a thing of the past, but it need not worry us. Motor buses sold on the basis of such claims will only bring discredit to bus ventures and perhaps afford the quickest way for such bus manufacturers to hang themselves.

There is not much object in our reiterating here the answers to the various statements which motor truck companies may circulate. Most railway men know the answers. But is there not a lesson to be drawn from such publicity? Does it not emphasize the desirability of the street railway companies getting out at every favorable opportunity some true publicity matter regarding the comparative costs of gasoline motor bus and electric street car operation, more particularly the latter? This would not disillusion such persons as the publicity man in point, for a truly scientific study would not register in his mind, but it would go a long way toward preventing such unworthy motor truck publicity from gaining any substantial hold on the populace.

In all of this we do not hesitate to recognize that there are places in which the motor bus can be used to advantage. This has been pointed out in various issues of this paper. From this we know that even when installed in places where they fit, buses cannot make any profit on a 5-cent fare, except for a very short haul. Even at a 10-cent fare the margin of profit is not what would induce a stampede of would-be investors. Nor do any of these estimates of cost take into account that in some future day the municipalities are going to get tired of paving streets for the benefit of a private bus corporation. That requirement will surely come, for as soon as bus companies show signs of making money (if they can), some ever-present champion of the "pee-pul" will create an agitation about spending public funds to provide a right-of-way for the private bus company.

Make the Railway a Home Institution

IN these days of high interest rates and large bankers' commissions, there is every reason for an electric railway to secure money for necessary improvements from local investors, when such a course is possible. The local lender has many reasons for favoring the trolley system in his city. He can watch his investment, and if he is interested in other business enterprises in the city he usually has a direct interest in seeing that the local company has sufficient capital to provide good service and extend its lines. Finally, where such securities can be sold directly by the company to the ultimate holder the commissions which otherwise would have to be paid to the bankers can be saved and divided between company and purchaser.

We have observed with pleasure, therefore, increasing examples of direct sales of railway securities to local interests. Two recent examples have been the sale last fall by the Milwaukee Electric Railway & Light Company of $3,600,000 five-year notes and the financing with local capital of its latest purchases of safety cars in Terre Haute by the Terre Haute, Indianapolis & Eastern Traction Company. This week, news of another probable case of the same kind comes from Springfield, Mass. There the Chamber of Commerce is seriously considering the appointment of a special committee of merchants, manufacturers and employees to assist in the sale by the Springfield Street Railway at popular subscription of an issue of $300,000 6 per cent bonds. This is the sum which President Clark V. Wood of that company estimates to be necessary to build certain extensions and carry out improvements which the recent growth of the city has shown to be desirable.

For many years the more seasoned electric railway bonds were considered by investors to be among the choicest securities. They represented ownership of a community necessity, the corporations were not so large but their operations could be easily watched, their accounts were a matter of public record, so could be studied without difficulty and their earnings were less affected by bad times than those of many other industries. Within the last two or three years, because of the depreciation of the nickel, electric railway securities have fallen into disfavor with investors, but with the growing recognition of the necessity for higher fares and their grant by the authorities there is no reason why these securities should not recover their original high standing. The advantages mentioned still hold. In addition, three other important principles have become established. One is that the authorities realize that higher fares must be charged when the expenses of providing the service increase; the second is the general recognition now of current depreciation as a proper operating charge, and the third is that both company and commission appreciate that electric railway lines cannot be continually extended without an increased fare for at least the long distance riders. Railway securities, therefore, are really in a much stronger position now than ever before.

THE LUMBER CAMP IS AN IMPORTANT AUXILIARY TO THE ELECTRIC RAILWAY

Railway Car Materials—Wood

Some Practical Suggestions for Those Who Are Responsible for the Purchase and Upkeep of Electric Rolling Stock

By NORMAN LITCHFIELD

The Characteristics of Wood

IN CONSIDERING wood as a structural material it must be remembered that, unlike stone, iron and steel, which are lifeless mineral substances, wood is a living, organic material. As such its desirability is determined not only by its inherent characteristic make-up, but also by its manner of growth, its freedom from defects acquired during growth, its freedom from moisture and its resistance to decay. A further influence is the size to which the tree grows and the extent to which the trees are found in our forests.

Foreword to the Series

The materials of construction have received consideration at length in many text-books, but these of necessity cover a wide range and are apt to include a mass of detail from which it is sometimes difficult to select the facts which are fundamental, and in which the user of car material is particularly interested. In these books the more practical features from a railway and shop standpoint are not always brought out as forcibly as they might be. It appeared, therefore, that a series of practical notes on the principal materials used in railway cars might be of interest and value.

The subject is especially timely now on account of the difficulty of obtaining materials of any grade, which makes it doubly necessary that the user should have as clear an idea as possible of the essentials which constitute good material and further that he should carefully steer clear of demanding excessively particular requirements which may increase the price of the material or make it more difficult to obtain.

With these ends in view a series of articles covering several aspects of the subject has been prepared which it is hoped will be of interest to the readers of the ELECTRIC RAILWAY JOURNAL.

Much interesting detail is found on the structure of woods in the bulletins of United States Forestry Division, one of which states: "The structure of wood affords the only reliable means of distinguishing the various kinds. In the growth of the tree, each year a new layer of wood is added which covers the old wood in all parts of the stem and limbs. Thus the trunk grows in thickness throughout the life of the tree by additions (annual rings) which are accurate records of the tree.

"Thus a cross-section of a yellow-pine log shows a center of whitish pith, and a great number of concentric rings. A zone of wood next to the bark, one to three inches or more wide, and containing thirty to fifty or more annual rings, is of lighter color; this is the 'sap wood,' the inner and darker part of the log being the 'heart wood.' These concentric rings are cross-sections of so many thin layers of wood. Each such layer forms an envelope around its inner neighbor, and is in turn covered by the adjoining layer without, so that the whole stem is built up of a series of thin hollow cylinders or, rather, cones. Examining the rings more closely, it is noticed that each is made up of an inner, softer light-colored, and an outer or peripheral, firmer and darker colored portion. Being formed in the fore part of the season, the inner light-colored part is termed the 'spring wood,' and the outer, darker portion 'summer wood,' of the ring. Since the latter is very heavy and firm, it determines to a large extent the weight and strength of the wood.

"When the log is sawed into boards, the yearly rings are represented on the faces of the middle board by narrow, parallel strips. On the faces of the boards nearest the slabs (tangential boards) the several years' growth should also appear as parallel, but much broader strips."

To sum up, therefore, the main points in regard to the inherent structure of the tree, we may say that the greater the amount of "summer wood" the stronger the wood, and that the greater the amount of "heart wood" in the stick or plank, the greater the strength.

MOISTURE MAKES WOOD WEAK

The amount of moisture in wood materially affects the strength thereof, the strength being about twice as great when it is dry as when it is green or wet. It apparently makes little or no difference whether this moisture exists naturally in the living cells of the wood or whether it is soaked up from external sources by capillary attraction in the cavities in the cellular structure.

To reduce the moisture to an amount to render the wood fit for use, it must be dried, either by seasoning under cover out of doors, or by heating in a kiln. The outdoor process requires months, or even years, before the wood is at its best. Kiln-drying has to some extent had a bad name in the past, but this has been due to the unsatisfactory results occasioned by poor equipment or poor handling in the kiln, for if there is proper equipment and if the work of drying is done as it should be, the results are just as good as those secured from air drying. The equipment, however, is expensive, the modern kiln being an elaborate affair, fitted with means of varying the temperature and humidity of the air, and for recording them. Careful manipulation is required to prevent checking, warping and shrinkage. This will be more readily understood by the following explanation of the causes of checking, etc., given in the forestry bulletin already referred to:

"When a short piece of wood fiber is dried it shrinks, its walls grow thinner, its width, the thickness of the fiber, becomes smaller and the cavity or opening larger, but the height or length remains the same.

"In a similar piece of fiber with a thinner wall, the effect is the same, but if the wall is only half as thick the total change is only about half as great. If a piece of wood is made up of fibers some of which have thin, and others thick walls, then the row of thick-walled cells shrink much more than the row of thin-walled cells, the piece becomes unevenly shrunk or warped, and the force which led to this warping continues to strain the interior parts of the piece in different directions.

"In a timber the width may have shortened at the end while a short distance from the end the original width is still preserved. This tends to produce a bending of the parts toward the center of the piece, but the rigidity of the several parts of the timber prevents such bending, and the consequent strain leads to their separation, the end surfaces of the timber being 'checked.' The faster the rate of drying at the surface, the greater is the difference in the moisture of the different parts, and hence the greater the strains, and consequently the amount of checking. Hence the necessity for an adequate equipment to regulate the drying conditions, and care in handling."

The foregoing shows the importance of knowing the amount of moisture the lumber contains, and it becomes necessary to determine what may be considered a reasonable minimum content to expect. "Absolutely dry wood can not be obtained inasmuch as chemical destruction sets in before all the water is driven off. It may be considered that air-dry wood contains 8 to 10 per cent of moisture." Some specifications call for as low as five per cent moisture, but this is a far lower figure than is at all necessary for general practice, and it may be said that a reasonable grade is covered by from twelve to fifteen per cent moisture content.

The defects common to lumber are well covered in the A. S. T. M. standard definitions of terms relating to structural timber. These cover knots of various kinds, the general nature of which is known to all and needs no further comment; pitch pockets, which are "openings between the grain of the wood containing more or less pitch or bark; pitch streaks, a well-defined accumulation of pitch at one point in the piece; wane, bark or the lack of wood from any cause on edges of timbers; shakes, splits or checks in timbers which usually cause a separation of the wood between annual rings; rot, dote and red heart, any form of decay which may be evident either as a dark red discoloration not found in the sound wood, or the presence of white or red rotten spots."

KINDS OF WOOD USED IN CAR CONSTRUCTION

The chief two classes of trees contributing car timber are the needle-leaved conifers, such as pine and fir, and the broad-leaved trees such as maple, oak, cherry, mahogany, ash, etc.

Of these, yellow pine and Douglas fir are used chiefly for long structural timbers, flooring and sheathing boards, and until recently, oak and ash for the shorter members, and mahogany, cherry, etc., for trim.

Yellow pine is the most widely used structural timber. The term covers a wide variety of trees. The chief authorities to which the reader may look for more detailed information on this subject are the "Standard Lumber Specifications" of the M. C. B. Association, those of the American Society for Testing Materials and those of the Southern Pine Association, covering Southern yellow pine lumber, yellow pine car material and yellow pine timber.

The last-named specifications form a comprehensive guide to the selection of grades and are given in great detail. They call attention to the fact that "recognized defects in yellow pine are knots, knot-holes, splits (either from seasoning, ring hearts or rough handling), shake, wane, red heart, pitch pockets, torn grain, loosened grain, seasoning checks, sap stains, crooks and defects caused by manufacturing."

Until comparatively recent years it was customary to classify yellow pine as "long-leaf," "short-leaf" or "loblolly" pine, etc. But this was a confusing method, as was pointed out by Prof. J. B. Johnson in his book on the materials of construction thus: "The characteristic indications of these two species of pine (long leaf and short-leaf) become so merged that it is impossible to distinguish them when mixed in a consignment. If the 'short-leaf' comes up to the 'long-leaf' in specific gravity it would not be necessary to distinguish them, as they would then be of equal strength and value. The average weight per cubic foot of dry long-leaf pine is 38 lb., while that of short-leaf pine is only 32 lb. But as the lighter specimens of 'long-leaf' may be no heavier than the heavier specimens of 'short-leaf,' this is not an absolute guide." He then goes on to say that "the most nearly absolute criterion is the place of growth. The long-leaf and short-leaf pines do not grow together to any great extent."

But this was not altogether a practical means of grading timber, and has given way to a system based on the density of the wood, which originated with the United States Bureau of Forestry and was later adopted by the American Society for Testing Materials and the Southern Pine Association. It is now in general use.

This system does away with the terms "long-leaf," "short-leaf" and "loblolly." A pamphlet issued by the Southern Pine Association states: "The new rule provides two classes: Dense Southern yellow pine and sound Southern yellow pine. Dense Southern yellow pine includes the best pieces of what has hitherto been known as long-leaf pine, and excludes the occasional pieces of inferior quality for structural purposes. It also includes those pieces of short-leaf pine, Cuban pine and loblolly pines which, because of their density and high percentage of summer wood, are equal in strength to long-leaf pine, as shown from numerous tests by the United States Forestry Service, and many other well-known authorities."

According to the rule as given in the A. S. T. M. specifications, "Dense Southern yellow pine shall show on either end an average of at least six annual rings per inch and at least one-third summer wood, or else the greater number of the rings shall show at least one-third summer wood, all as measured over the third, fourth and fifth inches of a radial line from the pith. Wide-ringed material excluded by this rule will be acceptable, provided that the amount of summer wood as above measured shall be at least one-half. The contrast in color between summer wood and spring wood shall be sharp and the summer wood shall be dark in color, except in pieces having considerably above the minimum of requirements for summer wood. . . . Sound Southern yellow pine shall include pieces of Southern pine without any ring or wood requirements."

It will be seen that this rule gives a definite and practical means of determining whether a stick of timber is suitable for any given purpose.

Under these two general classes, four grades have been established: (a) No. 1 common, (b) square-edge and sound, (c) merchantable, (d) select structural. Of these four grades, the first three may be either dense or sound pine, while in the select-structural grade only dense pine is permitted.

The various grades are further distinguished by their relative freedom from defects and by the percentage of heart which they contain, as shown briefly in Table I, shows only the main differences. For details the specification should be consulted.

It should be noted that the word "timber," as herein used, refers to the larger sticks suitable for use as beams, columns, etc. The word "lumber" applies to the smaller pieces cut from the large timbers and designed for use in boards of one variety or another, or small-dimension pieces such as ordinary floor beams, joists, scantlings, etc.

TABLE I—GRADES OF YELLOW PINE TIMBER

	Dense or Sound	Sap Wood	Wane	Knots	Shakes, Etc.	Heart
No. 1 common timbers	D or S	Any amount	1½ in. one corner, ¼ length, etc.	Sound and pith of various sizes	Shakes ½ length of piece, etc.	....
Square edge and sound	D or S	Any amount	Free	Free from injurious shakes and knots		
Merchantable	D or S	....	Not to exceed ¼ of face and ¼ length on one corner	Free from injurious shakes and knots	Under 9 in., ⅓ or more	
Select structural	D	See specifications				85 per cent heart, girth measurement

For ordinary building lumber there are various grades, based on their use, such as those for finishing, siding, flooring, ceiling, facing, dimension and heavy joists, etc., each of which is as a general thing divided into subgrades.

For freight cars, the building of which is a large industry in itself, material is thoroughly covered by the specifications of the M. C. B. Association, which were adopted also in 1915 by the Southern Pine Association. The chief divisions and sub-division are as below:

(a) "B and better"	Siding Lining Roofing	(b) Select	Siding Lining Roofing
(c) No. 1 common	Siding Lining Roofing	(d) All heart	Decking Flooring
(e) Heart face	Decking Flooring	(f) No. 1 common	Decking Flooring
(g) No. 1 common heart	Sills Framing	(h) No. 1 common	Sills Framing

"B and better" is a grade which admits certain slight defects which are noted in detail in the specification.

"Select" comprises the culls from "B and better," which do not have defects beyond certain ones as specified.

"No. 1 common," siding, etc., is a still lower grade, which is intended to be worked from fencing stock.

"All heart" admits certain small defects, and is required to be all heart on both sides and both edges.

"Heart face" admits the same defects as "all heart," but only requires that the face side of the piece shall be all heart.

"No. 1 common," decking and flooring, is a lower grade without heart requirements.

"No. 1 common heart," sills and framing, is "square-edge and sound" pine, admitting certain small defects, but requiring that "measurement of the girth at any point throughout the length of the piece must show at least 75 per cent heart wood."

"No. 1 common," sills and framing, is a lower grade without heart requirements.

The foregoing list of grades has been given in order to indicate how thoroughly the matter is covered by existing standard specifications, so that any desired quality may be obtained by ordering by name. This is preferable to attempting to formulate a list of qualities which possibly would not clearly define that grade and might force the mill to supply a grade better than necessary for the matter in hand, and the excess cost of which the user would, of course, pay.

Some idea of the importance of these points may be obtained from the statement that "No. 1 common" costs only about 70 per cent as much as "B and better."

The division of the lumber into various grades as above noted is determined "by the number, character, position and location of the defects visible in any piece." It is to be noted, however, that the admissible defects are not intended to represent the average lot, but simply "the coarsest pieces such grades may contain." The application of any specification should be tempered with judgment and common sense, and the grading rules very rightly contain this word of caution: "No arbitrary rules for the inspection of lumber can be maintained with satisfaction. The variations from any given rule are numerous and suggested by practical common sense, so that nothing more definite than the general features of different grades should be attempted by rules of inspection."

In order to avoid waste, the designer should select as nearly as possible those dimensions which can be obtained from stock sizes, and he should therefore familiarize himself with these dimensions, including thickness, width and length.

THE STRENGTH OF YELLOW PINE TIMBER

United States Forestry Division tests in cross-bending of dense yellow pine weighing 38 lb. per cubic foot, show the following results:

Characteristic	Lb. per Sq.In.
Ultimate strength	12,600
Yield point	10,000
Crushing end wise	8,000
Crushing across the grain at 3 per cent deformation	1,260
Shearing along the grain	835

The safe unit stresses at 18 per cent moisture, as recommended in Bulletin No. 12 of the Forestry Division, are as follows: Modulus of strength at rupture, 1,550 lb. per square inch; crushing strength end-wise, 1,000 lb.; crushing strength across grain, 215 lb. It is to be noted that no mention is made of the tensile strength, as the timber will always fail in some other way, usually by shearing. The crushing strength across the grain is based upon a crushing of three per cent of the cross-sectional height of the piece.

Distribution of Lumber in Freight Car.—For the average car, a fair distribution for Southern pine would be as follows: Sills, dense Southern pine; plates and stringers, square-edge and sound grade; framing, square-edge and sound or No. 1 common; siding, B and better; lining, No. 1 common; roofing, No. 1 common, and flooring, No. 1 common.

NOTES REGARDING OTHER WOODS

Douglas Fir.—The increasing scarcity of high-grade yellow pine has brought more into general use what is commonly called "fir." This is in reality the Douglas spruce which grows in Oregon and other western states. It is about the weight of short-leaf yellow pine and has a strength between that of the latter and long-leaf yellow pine. Different varieties are red, yellow and silver fir. Existing standard specifications are those of the West Coast Lumber Manufacturers' Association. The divisions of car material are as follows:

(a) No. 2 clear and better "V. G." (vertical grain)
(b) No. 2 clear and better "F. G." (flat grain)
(c) No. 2 clear and better mill run as to grain
Car siding, lining, etc.
(d) No. 3 clear—box car lining, etc.
(e) No. 2 clear and better "V. G."—car decking, etc.
(f) No. 2 clear and better "F. G."—car decking, etc.
(g) Select common decking, a lower grade with no grain requirements.
(h) No. 1 common decking, a lower grade with no grain requirements.
(i) Select common—car sills, framing, etc.
(j) No. 1 common—car sills, framing, etc. (lower grade).

Oak.—In passenger-car construction, until recently, the end sills, buffer timbers and main cross bearers were usually of oak, as for these members it is desirable to have a material which is strong and stiff, and furthermore one of a hard and tough nature which will form a secure foundation for parts which are bolted thereto, such as draft-rigging, etc. This is necessary to prevent the occurrence of elongated holes which may be caused in members having bolted to them parts which are subject to heavy strains and shocks. As the pieces are short, as a general rule, and of not excessive section, oak lent itself very favorably for such purposes. At the present time, however, it is practically impossible to obtain oak for these purposes, and for this reason, where metal draft sills, etc., are not used, recourse is had to yellow pine or fir.

The chief varieties are "white" and "red," the white being the better, as it is stronger, tougher and less porus than the red.

Safe unit stresses for white oak with 18 per cent moisture, as given by the Forestry Division, are: Modulus of strength at rupture, 12,000 lb. per square inch; crushing strength end-wise, based on crushing of 3 per cent of height, 800 lb.; crushing strength across grain, 400 lb.

Ash.—For window posts, carlines and other minor framing parts of small cross-section, and to a certain extent for finish, ash was commonly used. It is tough grain, but this also is practically out of the market.

White wood.—For panels and the like, white wood, so called, is commonly used. It is also known as yellow poplar, although its correct name is tulip wood.

Maple.—Where an exceedingly hard, close-grained, long-wearing surface is desired, such as in passenger car floors, or the so-called "mat strips" used on top of floors, maple is the most satisfactory material.

DURABILITY OF WOODS

The durability of woods depends largely on climatic conditions, and the protection of the piece from the weather. Good long-leaf yellow pine, in passenger-car sills, where protected by sheathing, has been known to last for thirty years or more without any apparent impairment of strength. Some attempt has been made to give car timbers a preservative treatment of creosote, but for ordinary purposes this does not seem to be necessary, and entails considerable hardship in the handling of the material in the mill.

CONCLUSION

In conclusion the writer would emphasize the facts that existing standard specifications cover the field of structural lumber materials very well, and that any desired quality can be obtained by selection of the proper standard grade. Furthermore, by exercise of judgment a grade may be picked out that will be entirely satisfactory and reasonably priced, whereas an attempt to specify this and that quality may prove a hardship to the manufacturer and expensive to the purchaser.

Welfare Work of Engineering Council

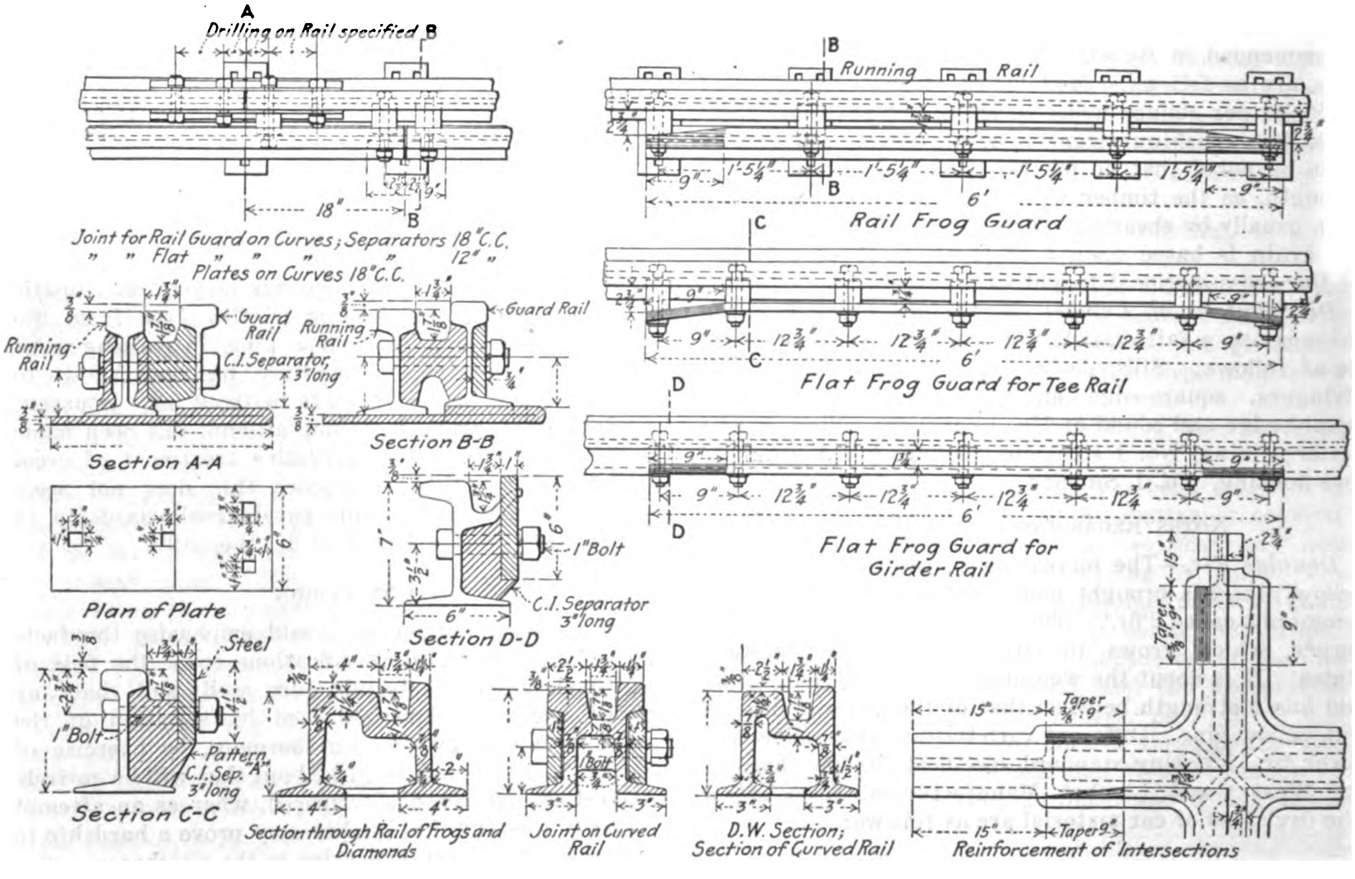
A conference of the Engineering Council with the governing bodies of its member societies was held in New York on Jan. 23. At this meeting it was resolved that the amount contributed for Engineering Council by each founder society is to be $5,000 for 1920 in place of $3,000 now provided, and that the A. S. T. M. will contribute $1,000 instead of $600. It was also resolved that, subject to the discretion of the governing boards of the societies represented, they should issue appeals to their members for contributions of $2 each in all grades except juniors and student members for the support of Engineering Council so as to enable it to continue its public welfare work for engineers. The next conference will be held in Chicago on April 20.

Renewing Railway Crossings and Special Work

The Experience of the Pacific Electric Railway, Los Angeles, Cal., in Maintaining Many Railway Crossings, Crossovers and Special Work Layouts on Its Lines Is Described

BY CLIFFORD A. ELLIOTT
Cost Engineer Pacific Electric Railway, Los Angeles, Cal.

SINCE the year 1908 the practice of the Pacific Electric Railway has been to use 6-in. 72-lb. T-rail, Lorain Steel Company's section No. 331, for all special work required with similar section T-rails in paved streets, and to use a 7-in. 91-lb. T-rail, Pennsylvania Steel Company's section No. 382, for special work where 7-in. 127-lb. grooved girder rail, Pennsylvania Steel Company's section No. 404, is used. The connections at the ends are made with taper rails, or cast-steel compromise joints.


Drilling on Rail specified
A
B
18"
Joint for Rail Guard on Curves; Separators 18" C.C.
" " Flat " " " 12" "
Plates on Curves 18" C.C.
Running Rail
Guard Rail
C.I. Separator, 3" long
Section A-A
Section B-B
Plan of Plate
Section D-D
1" Bolt
C.I. Separator 3" long
Steel
Pattern "A" C.I. Sep. 3" long
Section C-C
Section through Rail of Frogs and Diamonds
Joint on Curved Rail
D.W. Section; Section of Curved Rail
Running Rail
Rail Frog Guard
Flat Frog Guard for Tee Rail
Flat Frog Guard for Girder Rail
Taper
Reinforcement of Intersections

MANGANESE STEEL SPECIAL WORK CONSTRUCTION

The 6-in. 72-lb. T-rail and 7-in. 91-lb. T-rail for special work in paved streets are used only where traffic does not justify the expense of solid manganese construction. Where manganese construction is used, all ends are shaped to conform to the abutting rail ends and connections are made with continuous joints.

Since 1913 the company has had some 7-in. 91-lb. T-rail solid manganese curves in service for certain curved connections on its Los Angeles city lines. This type of construction is giving excellent results. These curves are very sharp, located where traffic is congested, and, due to the short radius, are provided with guards. On this same line there are several curves constructed of 7-in. 127-lb. grooved girder rails, not of the manganese type. There have also been in service since the year 1911 several large solid manganese special-work layouts on another line where traffic is very heavy. As many as 1,200 trains per day have passed over this special work, the cars being principally of a large heavy interurban type. These curves are constructed of 7-in. and 7½-in. solid manganese rail, and the leads on the straightaway portion are of rolled manganese rail. These layouts, after eight years' service, are still in good condition. A large number of the company's crossings in Los Angeles are of combination gage type to provide for both the Pacific Electric Company's cars having standard gage and those of the Los Angeles Railway with 3 ft. 6 in. gage.

In providing guard rail for curves of 150 ft. radius or less, all work is performed at the time of fabrication in the company's shop. On curves of larger radius the curving and fitting is done in the field. Where light equipment only is operated, 1-in. x 4½-in. flat steel guard rail is used, with cast-iron separators spaced

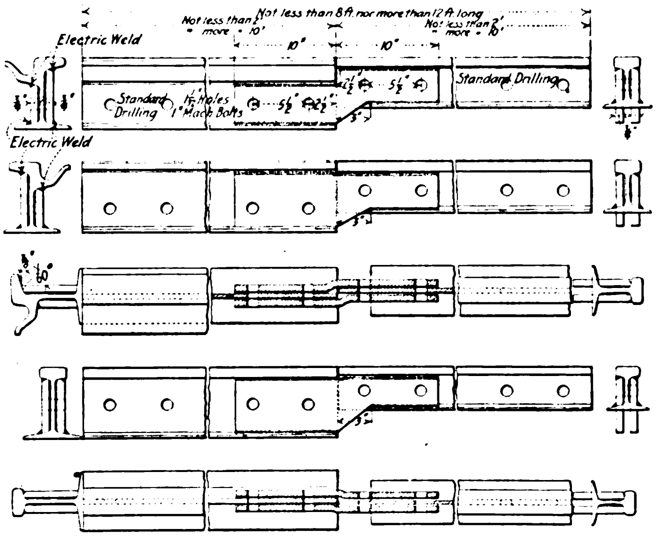
12 in. center to center and with ⅞-in. x 6-in. or 1-in. x 6-in. machine bolts. Where heavy equipment is operated rail guards of the same section as the running rail are used, and separators are spaced 18 in. center to center.

The use of grooved girder rails for track special work is not favored here, as it is not considered economical. It is possible, however, to use a grooved girder guard rail to advantage for single rail crossings, but a crossing of this type is too light for the heavy class of equipment operated by this company. Therefore, to obtain satisfactory results the company is obliged to use double- or three-rail construction. This consists of T-rails for the riser, running and guard rails with heavy steel base plates. Heat-treated machine bolts of 1¼-in. diameter are used.

The steel base plates are ordered either from the mills or are made up in the company's shop after the crossing arrives. Two convenient sizes used are ½ in. x 10 in. x 24 in. and ¾ in. x 18 in. x 18 in. Plates of the former size weigh 34 lb., and those of the latter size 69 lb. These steel plates are inserted under all four corners of each unit of the crossing.

Where the company's own design of taper rail is used, it is built up in the field by the use of a portable arc-welding machine. Extra metal for reinforcement is added at the point where the heavier section of rails join the lighter section. The freight equipment of the Pacific Electric Railway is all M. C. B. standard and its interurban passenger and express cars weigh from 60,000 to 107,000 lb. without load. The electric locomotives of the company weigh from 60,000 to 132,000 lb., and freight trains having from five to forty loaded cars of 100,000 lb. capacity are operated with these locomotives. Steam roads on the Pacific Coast lines are operating some of their heaviest engines and equipment over these lines. It has therefore been the policy of the Pacific Electric Railway to give extensive study to the type of special work in its tracks. The tendency in recent years is toward the use of a heavier type of crossing and special work than was previously used. The depth of crossings and special work layouts is 7 in. and compromise joints are carried well out into the straight track so as to be clear of crossings and special work and to permit of convenient maintenance.

All bolts, after thoroughly tightening, are welded at the point of the toe of the bolt and the nut. This practice insures a rigid construction and lessens track-bolt-tightening maintenance at least 50 per cent. Rock ballast thoroughly tamped is placed 8 in. to 12 in. beneath the base of timbers of crossings and in and about the timbers flush with their top. The use of concrete foundation beneath railway crossing timbers in city paved streets to guard against water pockets is not practiced, due to the great expense involved and the lack of desired resilience for the special work.



STANDARD TYPE OF TAPER-RAILS

Redwood or treated pine timber 8 in. by 10 in. is used for light traffic crossings, and 10 in. by 12 in. redwood timber for heavy traffic crossings. During the period from 1908 to 1919 approximately 131 important crossings were renewed on this system. Fifty-four of these crossings are on street railway lines, while seventy-seven are crossings of interurban lines with steam road lines.

The figures for average life given in the accom-

RENEWALS AND LIFE OF SEVERAL TYPES OF CROSSING

Types of Crossing	— Number of Renewals — Street Railway Line with Street Railway Line	Interurban Line with Steam Road	Life Based on Actual Service
Manganese steel center	4	1	Four street railway crossings had average life of 4½ years. One interurban with steam road crossing had life of eight years.
Rolled manganese running rail in steam road portion only	8	..	Five crossings—average life five years. Three crossings still in service after seven years' use.
Cast manganese running rail	..	1	
Shop built ordinary steel rail	7	38	Twenty-eight interurban with steam road, average life four years. Some interuban with branch steam road with but two trains per day have life of seven years. Crossings on main steam road lines have but one year average life. Four street railway crossings have average life of 6½ years. One street railway crossing has average life of nine years. One street railway crossing has average life of one year.
Shop built titanium treated rail	..	2	
Hard center built up	15	2	Fifteen street railway crossings—average 5.4 years. One crossing maximum life ten years. One crossing minimum life two years. Two interurban with steam road—average life 7½ years.
Solid manganese	18	29	Nine interurban with steam line—average life four years. One crossing with maximum life of eight years. One crossing with minimum life of one year. Thirteen street railways with interurban—average life seven years. One crossing with maximum life of eight years. One crossing with minimum life of six years. Five street railways with interurban—average life eight years.
Anvil face—manganese corners	..	1	
Manganese double-web type	1	..	
Bound Balkwill patent type	..	3	
Cobb shockless patent type	1	..	

panying table apply only generally, but for the same type of crossing and equal traffic conditions the average life of a shop-built crossing for a street railway line is four years, while that of the solid manganese type is eight years. Due to the distance of Eastern manufacturers from the Pacific Coast and the high freight rates prevalent, the material cost of solid manganese crossings is double that of a crossing fabricated in the company's own shop. The company's engineering department has a most efficient organization with ample equipment to repair most of its special work by electric arc welding. But if we consider that from six to nine months are required to secure the solid manganese crossing for replacement, our experience shows that considerable expense and difficulty result from trying to keep the old shop-built crossing in service before the improved type of crossing arrives from the East and is in place. In the majority of instances, when a crossing fails it is generally as a whole, and while the failure of one arm of the crossing may permit its individual replacement with an emergency repair part that can be provided by the company's shop within a week's time, yet this renewal can only be considered temporary until permanent relief is obtained by complete renewal.

With a solid manganese crossing, failure occurs only when the metal chips off in certain portions, when the arms show evidence of being battered down or when fissures occur in the corner. These minor failures are easily built up by arc welding at minimum expense. The life of the crossing is thus prolonged for a year to eighteen months, which allows ample time for securing a new crossing of the same type for replacing.

Our experience indicates that the use of solid manganese material is economy. This conclusion is based on first cost and maintenance of main line crossings located in paved streets or where the track is curved and the uncovering and replacing of the surface for repairs and renewals is an important factor. The yearly saving, with allowance made for interest on additional investment, maintenance and depreciation, amounts to from 25 to 50 per cent. In open track, where traffic is heavy, the average yearly cost of manganese material compares favorably with other types, and its use involves less frequent interruptions to the service for the making of renewals and repairs.

Manganese inserts for special work have not proved entirely satisfactory to the Pacific Electric Railway. Most of the company's manganese layouts are of solid construction with double-web design. The company has also obtained good results from a type of manganese construction known as "rail-bound manganese," where manganese is placed only at the wearing part, resting on $\frac{3}{4}$-in. steel bases and securely bolted to the rail.

The New York local council of the National Safety Council will organize and conduct schools for safety supervisors and foremen, workmen's mass meetings and conferences for industrial executives. The promotion of public safety, school safety and educational safety will be a distinct service of the Safety Institute in that city and will be carried on in the Metropolitan District under the direction of the Institute, the National Safety Council co-operating. The Safety Institute will soon be moved to the arsenal building in Central Park, which is being remodeled to provide accommodations for the various schools of the Council.

The Burning of Pulverized Fuel

JOLTS may not be pleasant to take, but their after effects sometimes have value. The war and its aftermath of labor and other troubles have given us quite a few hearty knocks which among other things have had a tendency to set us thinking along new lines. For example, before the recent fuel shortage, a great many power plant men had about arrived at the conclusion that the ultimate solution of the problem of extracting B.t.u. from coal and putting them into steam had been found in the modern stoker-fired boiler furnace. Since the fuel shortage of a couple of years ago, however, much thought has been expended on the possibilities afforded by other fuels and on the burning of the fuels now in use more effectively. In this connection some attention has been given to the use of pulverized coal, and an article in a recent issue of the official organ of the American Society of Mechanical Engineers, sums up in an interesting way the possibilities of this fuel. The committee on power generation of the American Electric Railway Engineering Association is very properly going into the subject in some detail this year.

Researches made by the United States Bureau of Mines some years ago showed that coal dust mixed with air in proper proportions is highly explosive. The burning of pulverized coal, therefore, is very much like the burning of gas or oil. The coal, reduced to a fine powder, so fine in fact that 85 per cent of it will pass through a 200-mesh screen, is blown by air pressure into the furnace where combustion takes place very much the same as in a gas jet.

The advantages claimed for the burning of coal in this manner are several. In the first place all of the combustible portion of the fuel is said to be burned. Secondly, it appears that all grades of coal, including peat and lignite, can be burned with approximately the same efficiency. As a matter of fact the low-grade fuels are in some respects superior to the higher grade ones since the effect of impurities to lower the furnace temperatures which with good fuel are high. Again, a pulverized coal fire like one fed from gas or oil admits of ready control. This feature is a matter of major importance in electric power station service where the demand on the boiler is likely to be subject to severe fluctuations.

As a combustion of pulverized bituminous coal may give furnace temperatures in excess of 4,000 deg. F. it is not hard to imagine that furnace operating and design problems abound. Other limitations of this method of burning coal are found in the operation and maintenance of the pulverizer and other accessory equipment in the fact that the ash resulting from combustion is sometimes difficult to collect.

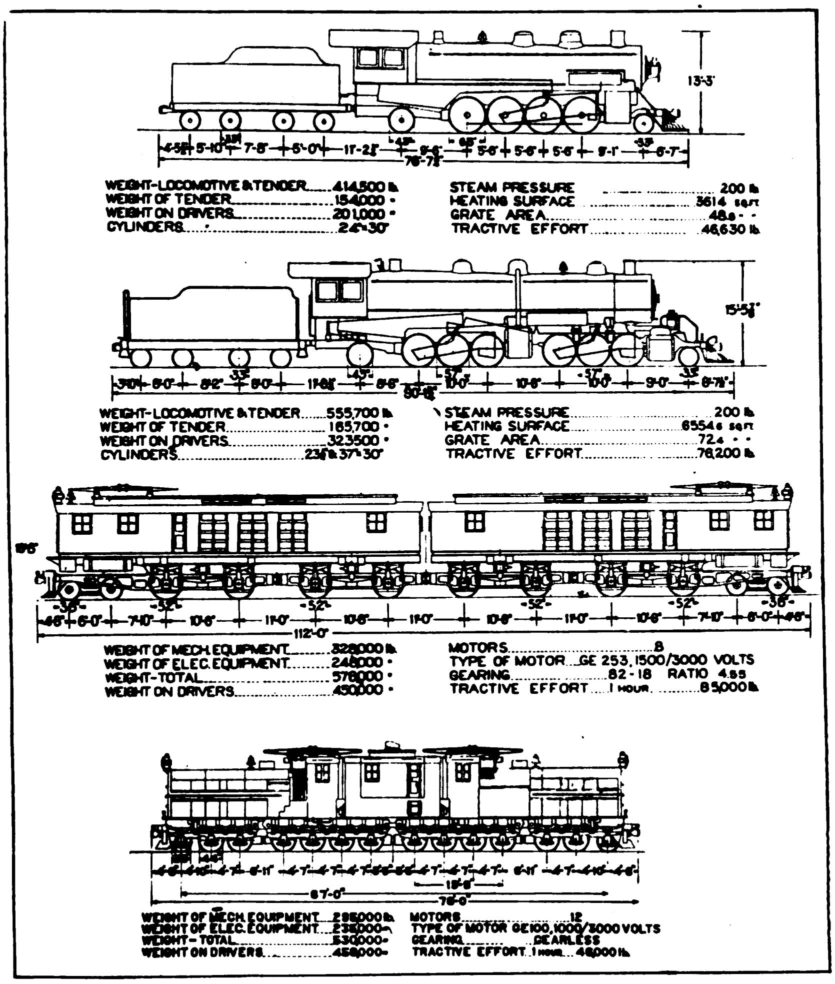
In the matter of over-all efficiency, test records show that for a wide range of boiler types and sizes the efficiencies range from 75 to 80 per cent. In other words, while the efficiency of a small pulverized-coal-fired boiler is likely to be on a par with that of a large well-designed stoker-fired unit, the efficiency of large units is not greatly superior to that of stoker-fired units. Pulverized-coal-fired boilers will find a place in the electric power station due to their superior flexibility of control and their ability to use poor fuel rather than because of their higher efficiencies. While the development of this type of boiler furnace is in its infancy the results so far secured are so promising that power station men should keep in close touch its future

Why Electrification Is an Economic Necessity*

High Load Factor, Fuel Economy and Service Capacity of Electric Locomotive Equipment Are Salient Factors in Making Reasonably Rapid Replacement of Steam Locomotives an Economic Necessity

BY A. H. ARMSTRONG
Chairman electrification committee, General Electric Company, Schenectady, N. Y.

AMONG the many lessons brought home to us during the war period, not the least was that there is something inherently wrong with our steam railroads. During the three generations of the development of the steam engine we have become accustomed to look upon it as properly belonging to the railway picture, and but little thought has been given to its wastefulness and limitations, around which railway practice of today has gradually crystallized. During the winter of 1917 and 1918, our railways fell down badly when the need was the greatest in our history. It is true that the cold-weather conditions were unprecedented and the volume of traffic abnormal, but the weaknesses of steam engine haulage were disclosed in a most startling and disastrous manner. In marked contrast to the adjoining steam engine division, the 440-mile electrified section of the Chicago, Milwaukee & St. Paul Railway continued to do business as usual all through that trying winter. The electric locomotives brought both freight and passenger trains over the electrified tracks in schedule time or better; in fact, it was quite customary to make up on the 440-mile electric run fully two hours of the time lost by passenger trains on adjoining steam-engine divisions. Other electrified roads contributed similarly attractive records.


13'-3"
78'-7 1/8"
WEIGHT-LOCOMOTIVE & TENDER.......414,500 lb
WEIGHT OF TENDER.......154,000 "
WEIGHT ON DRIVERS.......201,000 "
CYLINDERS.......24"x30"
STEAM PRESSURE.......200 lb
HEATING SURFACE.......3614 sq ft
GRATE AREA.......48.8 " "
TRACTIVE EFFORT.......46,630 lb
15'-5 7/8"
WEIGHT-LOCOMOTIVE & TENDER.......555,700 lb
WEIGHT OF TENDER.......165,700 "
WEIGHT ON DRIVERS.......323500 "
CYLINDERS.......23 1/2" & 37" x 30"
STEAM PRESSURE.......200 lb
HEATING SURFACE.......6554.6 sq ft
GRATE AREA.......72.4 " "
TRACTIVE EFFORT.......76,200 lb
112'-0"
WEIGHT OF MECH. EQUIPMENT.......328,000 lb
WEIGHT OF ELEC. EQUIPMENT.......248,000 "
WEIGHT-TOTAL.......576,000 "
WEIGHT ON DRIVERS.......450,000 "
MOTORS.......8
TYPE OF MOTOR...GE 253, 1500/3000 VOLTS
GEARING.......82-18 RATIO 4.55
TRACTIVE EFFORT...1 HOUR.......85,000 lb
67'-0"
76'-0"
WEIGHT OF MECH. EQUIPMENT.......295000 lb
WEIGHT OF ELEC. EQUIPMENT.......235000 "
WEIGHT-TOTAL.......530,000 "
WEIGHT ON DRIVERS.......458,000 "
MOTORS.......12
TYPE OF MOTOR GE100, 1000/3000 VOLTS
GEARING.......GEARLESS
TRACTIVE EFFORT 1 HOUR...46,000 lb

PRINCIPAL TYPES OF STEAM AND ELECTRIC LOCOMOTIVES USED ON THE CHICAGO, MILWAUKEE AND ST. PAUL RAILWAY

The reliability and permanency of the comparison between steam and electric locomotive haulages is sufficiently guaranteed, therefore, by the results of several years of operation to justify the drawing of certain conclusions regarding the merits of the two types of motive power. The following analysis of the railway situation is offered for the purpose of exposing the fact that railroading today is in reality steam engine railroading, and the general introduction of the electric locomotive will permit fundamental and far-reaching changes in the method and cost of hauling freight and passenger trains. The writer is not proposing the immediate electrification of all the railways in the United States, as many roads of lean tonnage would produce no adequate return upon the large capital investment required. The accompanying table of total operating statistics (See Table I) is offered simply as a measure of the magnitude of the problem confronting us in the future. In this country we have already installed electric power stations, during the past thirty years, equal to twice the estimated capacity required for the electrical operation of every mile of track in the country today. Referring to Table I, on page 374, it will be noted that this gives a sub-division of the tonnage passing over the tracks of our electric railways.

The first four items in Table I, representing 85.56 per cent of the total ton-miles made during the year 1918, may be regarded as fundamentally common to both steam and electric operation. The last four items, however, are seriously affected by introducing the electric locomotive to the extent of completely eliminating items

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*Abstract of paper read before the Schenectady section of the American Institute of Electrical Engineers, Feb. 20, 1920.

TABLE I—TOTAL TON-MILE MOVEMENT FOR ALL RAILWAYS IN UNITED STATES, 1918

Items		Per Cent	Ton-miles, Millions
1	Miscellaneous freight cars and contents	42.3	515,000
2	Revenue coal cars and contents	16.23	197,000
3	Locomotive revenue driver, weight only	10.90	132,300
4	Passenger cars, all classes	16.13	196,000
	Total revenue, freight and passenger	85.56	1,040,300
5	Railway coal	5.00	60,600
6	Tenders, all classes	6.50	78,800
7	Locomotive railway coal	.39	4,700
8	Locomotive non-driving weight	2.55	31,000
	Total non-revenue	14.44	175,100
	Grand total, all classes	100	1,215,400

6 and 7, reducing item 5 by possibly 80 per cent and item 8 by one half. Of the total of 14.44 per cent affected, therefore, it may be assumed for purposes of comparison that approximately 12 per cent, or 146,000,000,000 ton-miles, at present hauled by steam engines over our roads, will be totally eliminated with electric locomotive haulage. This ton-mileage eliminated is equal to over 20 per cent of items 1 and 2, representing the revenue-producing freight traffic on our railways. In other words, if all of our railways were completely electrified they could carry one fifth more revenue-producing freight tonnage with no change in present operating expenses or track congestion.

THE GRAND CENTRAL TERMINAL AREA, IN NEW YORK CITY, AS IT APPEARS TODAY

The greater part of the tonnage reduction effected by electrification is included in items 5 and 6, representing the railway coal movement in cars and engine tenders. The steam engine tender will, of course, entirely disappear, while the railway coal haulage will be largely curtailed by utilization of water as a source of power and the establishment of steam power houses as near the coal mines as an abundant supply of good condensing water and load demand will permit. While water power should be utilized to the fullest economical extent, the greater portion of the railway power must undoubtedly be supplied by coal, due to the unequal geographical distribution of water power available.

STATIONARY POWER PLANT IS MOST ECONOMICAL

Even with coal as the source of power, it may not be fully appreciated just how enormous is the saving made by burning fuel in large modern power stations under the most efficient conditions possible, instead of under the boilers of 63,000 engines, which by necessity must be designed and operated for service rather than for fuel economy. During the year 1918 the fuel used by railways is reported as in Table II.

TABLE II—RAILWAY FUEL, 1918

Total coal production, all grades, tons	678,211,000
Used by steam railways, tons	163,000,000
Percentage of total	24
Total oil marketed in United States, barrels	355,927,000
Used by steam railways, barrels	45,700,000
Percentage of total	5.8
Cost equivalent of oil at 3½ bbl. to the ton, tons	13,000,000
Total equivalent railway coal, tons	176,000,000

A quarter of all the coal mined in the United States is consumed on our railways and the following analysis will point out some features of this extreme wastefulness which are inseparable from steam engine operation.

During 1910 exhaustive tests were made upon the Rocky Mountain Division of the Chicago, Milwaukee & St. Paul Railway to determine the relation existing between horse-power-hours of work done in moving trains and coal and water consumed on the steam engines in service. Table III gives the results of these tests.

These records were obtained during the portion of the runs on which the engines were doing useful work in overcoming train and grade resistance; that is, all stand by losses were excluded. The through run, however, included such losses in the magnitudes shown in Table IV.

Adding standby losses to the average of 7.86 lb. per horsepower shown by the preceding eight tests, the total actual coal consumed under the engine boiler in twenty-four hours divided by the actual work performed by the engine was found to be 10.18 lb. per horsepower at the driver rims.

STEAM LOCOMOTIVE STANDBY LOSSES ARE HIGH

As the result of this particular series of tests it was determined that standby losses raised the coal consumption during the useful work period by 30 per cent. It

TABLE III—COAL AND WATER USED ON ROCKY MOUNTAIN DIVISION C. M. & ST. P. RY.

	Pounds of Water per Horsepower Hour	Pounds of Water per Pound of Coal	Pounds of Coal per Horsepower Hour
Three Forks-Piedmont	39.6	5.08	7.75
Piedmont-Donald	35.4	4.70	7.54
Deer Lodge-Butte	39.7	4.85	8.31
Butte-Donald	40.4	4.86	8.74
Harlowton-Jenny	38.0	4.09	8.90
Jenny-Summit	44.2	4.65	9.48
Three Forks-Piedmont	41.4	6.51	6.37
Piedmont-Donald	40.2	5.63	5.78
Average of eight tests	39.86	5.04	7.86

TABLE IV—STANDBY LOSSES IN ST. PAUL STEAM LOCOMOTIVES

	Coal per Hour, Pounds
Fire banked in roundhouse	150
Cleaning fires for starting	800
Coasting down grade	950
Standing on passing track	500

TABLE V—COAL EQUIVALENT PER KILOWATT-HOUR, STEAM OPERATION

Coal per horsepower-hour at driver rims, pounds	10.27
Coal per kilowatt-hour at driver rims, pounds	13.75
Coal per kilowatt-hour at power supply on basis 55 per cent efficiency, pounds	7.56

TABLE VI—ANALYSIS OF ROUND-UP COAL USED BY BUTTE, ANACONDA & PACIFIC RAILWAY

Fixed carbon, per cent	49.26
Volatile carbon, per cent	38.12
Ash, per cent	7.74
Moisture, per cent	4.88
B.t.u.	11,899

TABLE VIII—ESTIMATED COAL REQUIREMENT FOR ALL RAILROADS, 1918

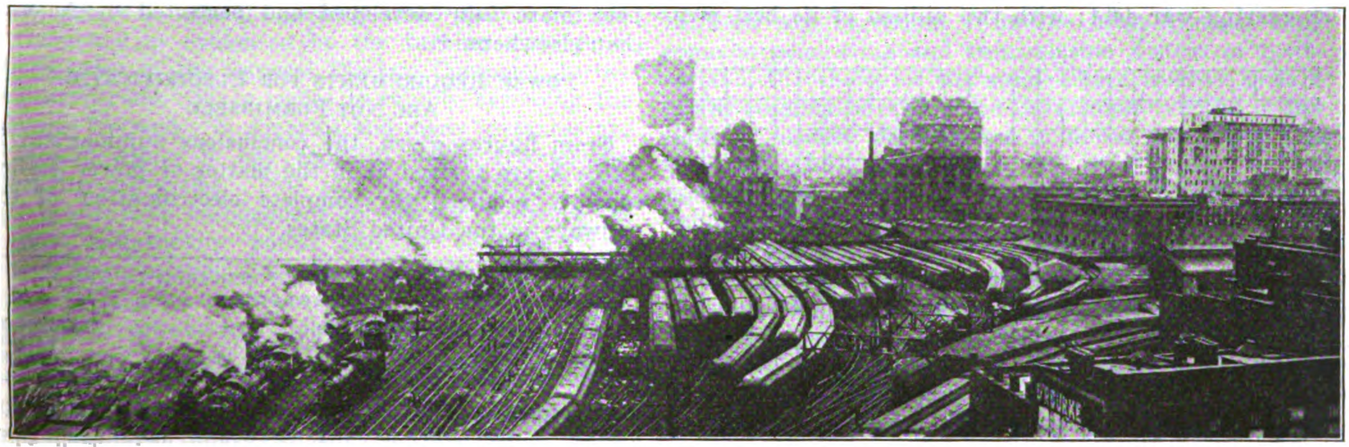
Total ton-miles	1,215,400,000,000
Watt-hours per ton-mile	40
Kilowatt-hours total movement	48,700,000,000
Coal required at 7 lb. per kilowatt-hour, tons	170,000,000

TABLE IX—COAL SAVING BY ELECTRIFICATION

Total ton-miles, steam	1,215,400,000,000
Reduction by electrification	146,000,000,000
Total ton-miles electric	1,069,400,000,000
Kilowatt-hours, electric, at 40 watts	42,776,000,000
Coal on basis 2½ lb. per kilowatt-hour, tons	53,500,000
Equivalent railway coal, 1918, tons	176,000,000
Saving by electrification, tons	122,500,000

should be appreciated in this connection, moreover, that this value was obtained on through runs with no yard switching service or adverse climatic conditions. It may be concluded therefore that under all conditions of service fully one third the coal burned on our steam engines today is absolutely wasted in standby losses of the general nature indicated above.

Supplementing these tests, a 30-day record was kept of all coal used on the entire Rocky Mountain Division, and the total engine, tender and train movement was reduced to horsepower-hours. The resulting value was 10.53 lb. of coal consumed per horsepower-hour at the driver rims. Both of the above values were based upon constants of 6 lb. per ton train resistance at all speeds and 0.7 lb. per ton per degree of curvature as determined in part by dynamometer car tests and as representative of general railway operation. Reducing the average coal values of test runs and 30-day record per horsepower-hour to electrical constants we arrive at the values in Table V.



THE TERMINAL PRESENTED A DIFFERENT APPEARANCE BEFORE ELECTRIFICATION
(View from same point as opposite picture)

It is this last figure of 7.56 lb. of coal burned on steam engines to get the equivalent tonnage movement of 1 kw-hr. delivered from an electric power station that is of special interest to this discussion. A comparison of the coal and electrical records on the Butte, Anaconda & Pacific Railway before and after electrification shows a value of 7.17 lb. of coal previously burned on the steam engines to equal the same service now performed by 1 kw.-hr. input at the substations, a figure comparing favorably with the 7.56 lb. arrived at above by an entirely different method.

Making due allowance for the fact that round-up coal is somewhat low in heat units, it is nevertheless within the limits of reasonable accuracy to assume that the steam engines operating over all of our railways are consuming coal at a rate closely approximating 12.75 lb. per kilowatt-hour of useful work done, as measured at the driver rims, or 7 lb. per kilowatt-hour as measured at a power station and including for convenience of comparison the transmission and conversion losses inherent to electrical operation.

TABLE VII—RELATION BETWEEN KILOWATT-HOURS AND TON-MILES, CHICAGO, MILWAUKEE & ST. PAUL RAILWAY, AVERY-HARLOWTON, 1918

	Passenger	Freight
Average weight of locomotive-tons	300	284
Locomotive-miles, 1918	651,000	1,431,500
Locomotive, ton-miles	195,000,000	407,000,000
Trailing ton-miles	434,406,000	2,903,099,000
Total ton-miles	629,406,000	3,310,049,000
Kilowatt-hours	24,890,000	105,287,000
Watt-hours per ton-mile	39.6	31.9
Ratio locomotive to total, per cent	31	12.3
Watt-hours per ton-mile, combined movement	33.2	....
Ratio locomotive total combined movement, per cent	15.25	....

A kilowatt-hour of energy can be produced for so much less coal expenditure than 7 lb. that we are now in position finally to forecast the approximate extent of the coal economy that would result from electrification.

All power values are given at the point of supply from the Montana Power Company at 100,000 volts and include deductions made for the return of power due to regenerative braking of the electric locomotives on down grades and amounting to approximately 14 per cent of the total. Owing to the excessive rise and fall of the profile of the electrified zone of the Chicago, Milwaukee & St. Paul Railway, its operation is materially benefited by regenerative electric braking and the value of 33.2 watt-hours per ton mile for combined freight and passenger movement should possibly be raised to the round figure of 40 to make it apply more nearly to conditions universally obtaining on more regular profiles.

Hence referring again to the ton-mile values of Table I we have the values of Table VIII.

The actual equivalent coal consumed on our steam railways for the year 1918 is given as 176,000,000 tons, closely approximating the figure of 170,000,000 tons estimated above from the operating results obtained on the Chicago, Milwaukee & St. Paul electrified zone.

These several values check so closely as to justify the completion of the fuel analysis of the railways as shown in Table IX.

The startling conclusion arrived at is that approximately 122,500,000 tons of coal, or more than two-thirds of the coal now burned on our 63,000 steam engines, would have been saved during the year 1918 had the railways of the United States been completely electrified along lines fully tried out and proved successful today. This vast amount of coal is 50 per cent greater than the pre-war exports of England and twice the total amount consumed in France for all its railways and industries. Moreover, the estimate is probably too conservative, as no allowance has been made for the extensive utilization of water power which can be developed to produce power more cheaply than coal in many favored localities.

CRITICAL FUEL SHORTAGES IN EUROPE ARE FORCING ELECTRIFICATION

In striking contrast with the picture of fuel waste on the railways in this country is the situation presented in Europe at this writing. For example, faced with a staggering war debt; with two million of its best men gone and an undetermined number incapacitated for hard labor, and with so much reconstruction work to do, France has to contend also with the destruction of half her coal producing capacity. Before the war France imported 23,000,000 tons of the 65,000,000 tons of coal consumed. It is estimated that the full restoration of the coal mines in the Lens region will take ten years to accomplish, which means materially increasing the coal imported into France if pre-war consumption is to be reached, as the relief rendered from the Saar district will not compensate for the loss in productivity of the mines destroyed by the Germans. This situation in part is promptly met by France in the appointment of a commission to study the feasibility of the general electrification of all its railways with special reference to immediate construction in districts adjacent to its three large water power groups, the Alps, the Pyrenees and the Dordoyne or central plateau region.

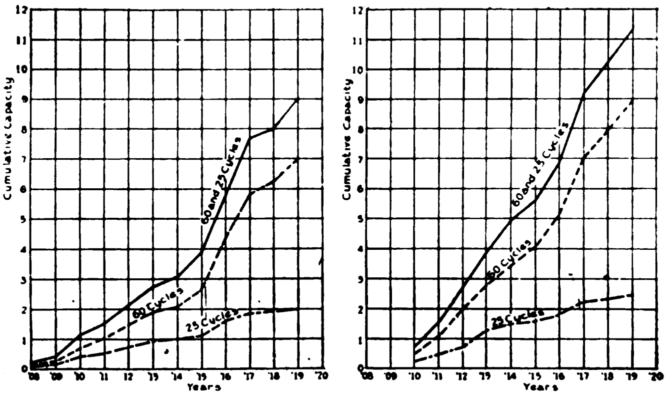


CHART SHOWING THE TENDENCY TOWARD HIGHER FREQUENCY IN POWER GENERATION

It is proposed to electrify 5,200 miles of its total of 26,000 miles of railways during a period covering twenty years. If this work is accomplished at a uniform rate of 260 miles a year, it is a modest program if consideration is had of the extreme necessity for the improvement.

In even worse plight is Italy with practically no coal of its own and compelled to import its total supply of 9,000,000 tons. The war has brought home to these countries what it means to be dependent upon imported fuel for their very existence, and both Italy and Switzerland are also going ahead with extensive plans for railway electrification. Contrary to general understanding, the mines of Belgium are not destroyed, but the need of fuel economy is very acute and this country also has broad plans for railway electrification with immediate construction in view.

Recognizing the many advantages of electric operation of its railways, Europe furthermore considers this a most opportune time to start the change, rather than to spend its limited funds in replacing worn out and obsolete steam equipment in kind. Also in marked contrast to the American attitude, is the sympathetic interest and constructive assistance rendered by the governments abroad in regard to the vital matter of rehabilitation of its railway systems. It would not be without precedent if the decade witnessed England and the Continent outstripping this country in the exploitation of another industry which has certainly been more fully developed and perfected in America than elsewhere.

POWER REQUIREMENTS FOR ELECTRIFICATION ARE NOT FORMIDABLE

From figures given, the conclusions summarized in Table X are arrived at in the matter of power station capacity required for complete electrification of the railways in the United States.

TABLE X—RAILWAY POWER REQUIRED IN THE UNITED STATES

Kilowatt-hours electric operation, 1918	42,776,000,000
Average load, 100 per cent load factor, kilowatts	4,875,000
Power station capacity at 50 per cent load factor, kilowatts	9,750,000

It appears therefore that approximately 10,000,000 kw. of power station capacity would have been sufficient to operate all of the railroads for 1918, or one half the station capacity which has been constructed during the past thirty years.

TABLE XI—ESTIMATED POWER STATION CAPACITY IN UNITED STATES, 1918

Central stations, kilowatts	9,000,000
Electric railways, kilowatts	3,000,000
Isolated plants, kilowatts	8,000,000
Total, kilowatts	20,000,000

In the order of magnitude, therefore, it is not such a formidable problem to consider the matter of power supply for our electrified railways and it becomes evident also that the railway power demand will be secondary to industrial and miscellaneous requirements.

Such being the case, the question of frequency of electric power supply becomes of great importance, if full benefit is to be obtained from extensive interconnected generating and transmission systems, covering the entire country. Indeed with the full development of interconnected power systems supplying both railway and industrial load from the same transmission wires, the above assumption of 50 per cent load factor for the railway load can be materially bettered.

IMPROVED LOAD FACTOR ON THE ST. PAUL

In this connection it is interesting to note that a method of limiting the troublesome peak load hitherto considered inherent in railway power supply has been in successful operation in the Chicago, Milwaukee & St. Paul electrified zone for the past year. With unrestrained peaks, the load factor was approximately 40 per cent, but this low value has been raised to nearly 60 per cent by the installation of the inexpensive and most satisfactory power limiting and indicating apparatus.

TABLE XII—LOAD FACTOR RECORDS, CHICAGO, MILWAUKEE & ST. PAUL RAILWAY, 1919

	Per Cent Duration of Peak	Per Cent Load Factor
April	6.4	59.3
May	4.6	56.1
June	1.6	56.5
July	0.7	55.6
August	4.1	54.7
September	9.5	58.8

The above readings cover the performance on the 220 miles of the Rocky Mountain Division supplied by seven substations controlled as a unit. A load factor of nearly 60 per cent brings the electric railway within the list of desirable customers and makes it possible for power companies to quote attractively low rates for power.

Returning again to the question of power supply, it is instructive to note the general trend toward a higher frequency as evidenced by the turbine and transformer sales of the General Electric Company during the past decade. Sixty cycles is rapidly becoming the standard frequency in America and many instances are of record where it has replaced lower frequencies, principally 25 cycles. This fact in no manner handicaps the future development of electric railways, as entirely satisfactory power can be obtained from 60-cycle transmission lines through either rotary converters or synchronous motor-generator sets, depending upon the direct-current trolley voltage desired.

FREQUENCY IS TENDING TOWARDS STANDARDIZATION

While America apparently has adopted 60 cycles as its standard frequency and can look forward to unlimited interconnection of its large power systems, European practice is evidently crystallizing on 50 cycles. The situation abroad is as yet, however, not clearly defined. In such a small, compact country as Switzerland, for instance, where so much electrical development is taking place, there is much conflict of frequencies. Apparently there is little appreciation of the advantages resulting from interconnected power stations; in fact, the Loetschberg Railway is supplied with power from 15-cycle, water-wheel-driven generators placed in the same power station with 42-cycle units supplying industrial load, while in the same immediate district there is a 50-cycle transmission line and no tie-in frequency-changer sets are as yet installed to interconnect any two frequencies. Power company, power consumer and electrical manufacturer pay heavily for the complication imposed by maintaining three frequencies where only one is needed, and growing appreciation of this fact may lead to the standardization of 50 cycles in Switzerland and thus swing that country in line with its neighbors and ultimately bring about a more economical ratio of installed generator capacity to average load demand of the country as a whole.

TABLE XIII—POWER SUPPLY FOR LOETSCHBERG RAILWAY, MARCH, 1919

Total for month, kilowatt-hours	540,180
Average of six 15-min. peaks, kilowatts	3,489
Load factor, 24-hr. basis, per cent	20.8

A good example of the necessity for improvement in power distribution conditions in Switzerland is provided in the supply of power to the Loetschberg Railway, as shown in Table XIII.

As the railway was operating for only seventeen hours per day, the load factor during actual operation is somewhat better than 20.8 per cent. On the other hand the actual momentary peak load greatly exceeded 3,489 kw., and this very fluctuating railway load furnishes a good illustration of the need of combining it with other diversified loads, in order to keep down the fixed investment of power station equipment now set aside for this isolated railway load. For example, the 60 per cent load factor of the Chicago, Milwaukee & St. Paul power demand is the ratio of average to momentary peak, while the Loetschberg Railway peak load is determined from six 15-min. peaks with momentary peaks greatly in excess of this figure.

Apparently the adoption of a standard frequency of 50 cycles would meet all general requirements in Switzerland, but would necessitate the installation of frequency-changing substations to meet the demands for 15-cycle single-phase railway power. If the electrified railways are to benefit from the establishment of a common generating and transmission system in Switzerland, the choice of the single-phase railway system might possibly be considered unfortunate viewed in the light of modern development in power economics and the successful adaptation of the less expensive and more flexible direct current motor to high trolley voltages.

From the power-station standpoint, the electrification of our railways admits but one conclusion. We have some 63,000 engines now in operation and their average combined load amounts to approximately 4,000,000 hp. at the driver rims or only an insignificant total of 65 hp. for each engine owned. It is true that owing to shopping and other causes many of these engines are not in active service at all times, still the average 24-hour output of each engine is less than 10 per cent of its rating.

ELECTRIFICATION IMPROVES THE SYSTEM LOAD FACTOR

In the case of the Chicago, Milwaukee & St. Paul electrification, the average load of each individual electric locomotive is only 15 per cent of its continuous rating, but as power is supplied to forty-five electric locomotives from one transmission system, the average combined load factor is raised to nearly 60 per cent, a figure which could even be surpassed on roads of more regular profile. Furthermore, when the railway load is merged with the lighting and industrial power of the district and the whole diversified load is supplied from the same 60-cycle transmission and generating system, it is quite evident that all conditions are favorable for the efficient production of power. In this country such an achievement will probably be governed by the laws of economic return upon the capital required, because our vast natural fuel resources are popularly regarded as inexhaustible, but in European countries there is the compelling spur of stern necessity behind the movement economically to utilize the water powers they possess in place of the coal they cannot get.

While the much discussed subject of power generation and transmission is a very vital part of the railway electrification project, chief interest centers in the electric locomotive itself. Few realize what a truly wonderful development has taken place in this connection in a comparatively few years and how peculiarly fitted this type of motive power is to meet the requirements of rail transportation. Free from the limitations of the steam boiler and possessing in the electric motor the most efficient and flexible known means of transmitting power to the driving axles, the electric locomotive gives promise of revolutionizing present steam railway practice when its capabilities become fully recognized. The only limits placed upon the speed and hauling capacity of a single locomotive are those imposed by track alignment and standard draft rigging. Only questions of cost and expediency control the size of the locomotive that can be built and operated by one man, as there are no mechanical or electrical limitations that have not been brushed aside by careful development. Just what this means in advancing the art of railroading is not more fully realized than the boldest prophet of twenty years ago could have fully pictured the change that has taken place at the Grand Central Terminal, as the result of replacing steam by electricity.

ELECTRIC LOCOMOTIVE HAS UNIQUE OPERATING QUALITIES NOT YET FULLY APPRECIATED

Progress in utilizing the capabilities of the electric locomotive has been slow. It is hard to break away from life-long railway traditions established by costly experience in many cases. In consequence the electric locomotive has thus far simply replaced the steam engine in nearly similar operation. Even under such conditions of only partial fulfillment of its possibilities, the electric locomotive has scored such a signal operating success as to justify giving it the fullest consideration in future railway improvement plans.

On the Chicago, Milwaukee & St. Paul Railway, forty-two locomotives have replaced 112 steam engines and are hauling a greater tonnage with reserve capacity for still more. On this and other roads they have set a new standard for reliability and low cost of operation. In fact, although no official figures have yet been published, it is an open secret that the reductions from previous steam operating expenses on the Chicago, Milwaukee & St. Paul Railway are sufficient to show an attractive return upon the $12,500,000 expended for the 440 miles of electrification, without deducting the value of the 112 steam engines released for service elsewhere.

Our steam engine construction is unsymmetrical in wheel arrangement and, further handicapped with the addition of a tender to haul its fuel and water supply, must run single-ended. The result has been much congestion at terminals and the necessary roundhouses, always with the inevitable turntable, ashpits and coal and water facilities, have occupied much valuable land. In addition steam operation has greatly depreciated the value of neighboring real estate. The contrast offered by the two large electric terminals in New York City is too apparent to need more than passing comment and similar results may be expected upon the fulfillment of plans for electrifying the Chicago terminals.

While it has been a simple matter to design electric locomotives to run double-ended at the moderate speeds required in freight service, the problem of higher speed attainment, exceeding 60 m.p.h., has presented greater difficulties. The electric motor is, however, so adaptable to the needs of running-gear design that electric locomotives are now in operation which can meet all the requirements of high speed passenger train running. These results also are obtained with less than 40,000 lb. total weight and 9,500 lb., non-spring-borne or "dead" weight on each driving axle. And finally, but not least, front and rear trucks ride equally well, a success never before achieved in locomotives of such large capacity.

In connection with the riding qualities of electric locomotives, it is of interest to note the following conclusions that a committee of the American Railway Engineering Association, of which Dean F. E. Turneaure was chairman, reached in its report of 1917.

> From the results of the tests on the electrified section of the Chicago, Milwaukee & St. Paul Railway, the tests made in 1916 on the Norfolk & Western, and the few tests made in 1909 at Schenectady, N. Y., it would appear to be fairly well established that the impact effect from electric locomotives is very much less than from steam locomotives of the usual type. Comparing results obtained in these tests with the results from steam locomotives, it would appear that the impact from electric locomotives on structures exceeding say, 25-ft. span length, is not more than one-third of the impact produced by steam locomotives.

ELECTRIC LOCOMOTIVE DESIGN IS FAR FROM STANDARDIZED

There is as yet no general acceptance of a standard design of electric locomotive. Geared side-rod construction for heavy freight service and twin motors geared to a quill for passenger locomotives appear to find favor with the Westinghouse-Baldwin engineers, while the General Electric Company goes in for the simple arrangement of geared axle motors for freight and gearless motors for passenger locomotives. In both Switzerland and Italy the side-rod locomotive enjoys an almost exclusive field. How much of this preference for side-rod construction is due to the restrictions imposed by the use of alternating-current motors is hard to determine, but the facts available indicate the uniformly higher cost of repairs of this more complicated form of mechanical drive both in this country and abroad.

The electric railway situation in Italy is further complicated by the employment of three-phase induction motors, with all the attendant handicaps of double overhead trolleys, low power factor, constant speeds and overheating of motors resulting from operation on ruling gradients with motors in cascade connection. In many respects the non-flexible, three-phase induction motor is poorly adapted to meet the varied requirements of universal electrification, and in consequence Italian engineers are still struggling with the vexing question of system which may, however, be in fair way of settlement through the adoption of a standard of 50 cycles as the frequency of a nation-wide interconnected power supply, thus throwing the preponderance of advantage to high voltage direct current.

The extreme simplicity of the gearless motor locomotive appeals to many, as does its enviable record of low maintenance cost, reliability and high operating efficiency, as exemplified by its unvarying performance in the electrified zone of the New York Central for the past twelve years.

TABLE XIV—MAINTENANCE COSTS—NEW YORK CENTRAL ELECTRIC LOCOMOTIVES

	1913	1914	1915	1916	1917	1918
Number of locomotives owned	48	62	63	63	73	73
Average weight, tons	118	118	118	118	118	118
Cost of repairs per locomotive-mile, cents	4.32	4.03	4.45	3.78	4.01	6.26

The high cost of living did not appear to have reached this favored locomotive until the year 1918.

The records with the Chicago, Milwaukee & St. Paul locomotive are equally remarkable when considered with due regard to their greater weight and the more severe character of the service.

TABLE XV—MAINTENANCE COSTS—CHICAGO, MILWAUKEE & ST. PAUL ELECTRIC LOCOMOTIVES

	1916	1917	1918
Number of locomotives owned	20	44	45
Average weight, tons	290	290	290
Cost of repairs per locomotive-mile, cents	8.21	9.62	10.87

In both of, these instances the cost of repairs approaches closely to 3 cents per 100 tons of locomotive weight. Giving due credit to the excellent repair shop service rendered in each case, it is instructive to note that 3 cents per 100 tons maintenance costs of these direct-current locomotives is less than half the figures given for any of the alternating current locomotives operating in the United States or in Europe.

The Electric Locomotive Can Be Depended Upon

Compared with the cost of repairs of equivalent steam engines, the above figures for electric locomotives are so very favorable as to justify the general statement that electric motive power can be maintained for approximately one-third the cost of steam engines for the same train tonnage handled. As locomotive maintenance is a measure of reliability in service and in a way expresses the number of engine failures, it is quite in keeping with the records available to state also that the electric locomotive has introduced a new standard of reliability that effects material savings in engine and train crew expense as well.

While the first cost of electrification is admittedly high, it may in certain instances be the cheapest way to increase the tonnage-carrying capacity of a single track, especially in mountain districts where construction is most expensive and steam engine operation most severely handicapped. In this connection a comparison of steam and electric operation on the Chicago, Milwaukee & St. Paul may be summarized as follows:

For the same freight tonnage handled over the Rocky Mountain Division, electric operation has effected a reduction of 22½ per cent in the number of trains and 24.5 per cent in the average time per train, and has improved the operating conditions so that nearly 30 per cent more tonnage can be handled by electric operation in about 80 per cent of the time it formerly took to handle the smaller tonnage by steam engines. This means a material increase in capacity of this single-track line, which may be conservatively estimated in the order of at least 50 per cent and probably more. In other words, on this particular road electrification has effected economies which sufficiently justify the capital expenditure incurred and furthermore has postponed for an indefinite period any necessity for constructing a second track through this difficult country.

A careful study of the seriously congested tracks of the Baltimore & Ohio Railroad between Grafton and Cumberland disclosed vitally interesting facts. Company coal movement in coal cars and engine tenders constituted over 11 per cent of the total ton-miles passing over the tracks. In other words, due to the very broken profile of this division, the equivalent of one train in every nine is required to haul the coal burned on the engines. Taking advantage of this fact and the higher speed and hauling capacity of the electric locomotive and its freedom from delays due to taking on water and fuel, it is estimated that the three tracks now badly congested with present steam-engine tonnage, could carry 80 per cent more freight with electric-locomotive operation. The coal output of the Fairmont District is largely restricted by the congestion of this Division of the Baltimore & Ohio Railroad and it is probable that equal relief with continued steam-engine operation could not be secured without the expenditure of a much larger sum for additional track facilities than would be needed to put electric locomotives upon the present tracks.

Further instances could be cited where the benefits of electrification are badly needed and many of these are coal carrying roads, among which the Virginian Railway stands out conspicuously as a good opportunity to make both a necessary improvement and a sound investment.

Reviewing the progress made in the short period of twenty years, we have seen the steam turbine and electric generator drive the reciprocating engine from the stationary power field. The same replacement is now taking place on our ships, big and small, notwithstanding the fact that the marine reciprocating engine is a very good engine indeed, and operates under the ideal conditions of a steady load and constant speed. And now the steam locomotive must in turn give way to the electric motor for the same good reasons that the reciprocating steam locomotive has become obsolete and fails to respond to our advancing needs. Electrification affords a cheaper and better means of securing increased track capacity and improved service than laying more rails and continuing the operation of still more steam engines in the same old wasteful way.

To conclude the startling picture of our present railway inefficiency, we are today wasting enough fuel on our steam engines to pay interest charges on the cost of completely electrifying all the railways in the United States—fuel that Europe stands in sad need of and which England and Germany, the pre-war coal exporting countries, cannot now supply. With operating expenses mounting to 82 per cent of revenue, inadequate equipment and congestion of tracks, what we need, in addition to constructive legislation and real co-operation on the part of the government in the matter of rates and the safeguarding of invested capital, is wise direction in the expenditure of the large sums that must speedily be found and used to bring our railways abreast of the times. Accord full honor to the reciprocating steam engine for the great part it has played in the development of our railways and industries, but complete the work by replacing it with the electric motor and enter upon a new era of real railroading, not restricted steam-engine railroading.

During February the Public Service Railway, the headquarters of which are at Newark, N. J., has under way an active safety campaign. By means of dasher signs, safety stickers pasted on the front windows of cars in front of the motorman, the distribution of "Whys and Other Whys on the Trolley Situation," edited with special reference to safety, etc., an aggressive attempt is being made to impress the idea of safety on employees and public. Some details of the campaign and of the results obtained will be given in a later issue of the ELECTRIC RAILWAY JOURNAL.

Educating Apprentice Track Foremen

The Denver Tramway Has Inaugurated a Course for Training Young Men in the Work of the Way Department

BY W. L. WHITLOCK
Superintendent of Way, the Denver Tramway Company

ONE of the problems of the electric railway way department is the obtaining of capable foremen for track construction and maintenance work to replace the "old-timers" who are constantly dropping out of service due to old age, disability or death. To the uninitiated this may seem to be a matter of small importance, but to the man responsible for this department it is quite often a serious matter. Today the efficient track foreman must be familiar with the many labor-saving devices and special track maintenance equipment found on any modern system. The big cost of labor and its scarcity, together with the reluctance of the workers to exert themselves, make the track foreman's position more responsible than ever before. The day of the "strong arm" boss is gone; its departure followed the exit of the old-time section hand whose buttonhole still held a sprig of shamrock plucked on the "Isle."

To go out into the market and hire a track foreman familiar with your trackage is impossible. The methods of work, the varieties of reports and the thousand and one peculiarities and weak points of any system impose special requirements as to training. With a view to overcoming this condition, and looking toward the future, this company has inaugurated an apprentice track foreman course. Carefully selected young men are employed and systematically trained. The desirable qualifications looked for in such men include good physical condition, an education at least fair and the "sand" to stick. An apprentice track foreman who follows through his program is bound to "make good," first to his own benefit and, second, to that of the organization. In addition he has a vocation that insures his future, and a stepping stone to further advancement. These men must be supplied with sufficient incentive to make the effort worth while. Hence, in addition to the attraction of future possibilities, a scale to start with is made that should hold them to the job.

The system followed in educating the apprentice track foreman is approximately as follows:

Three months with a general maintenance repair gang. This work gives experience in ordinary track maintenance in unpaved streets and includes repairing joints, changing minor pieces of special work, repairing broken rails, culverts and spread track, cleaning dead tracks, drainage and similar items.

Three months with a paving maintenance repair gang. This work gives experience in all phases of paving in connection with track work and includes stone block and concrete paving, grouting and protection of fresh paving, and the use of concrete mixers and pneumatic tools used in removing various types of paving.

Three months with an emergency auto truck track repair gang. This work gives experience in nearly every kind of emergency track repairs that will be encountered on any large system, teaches the value of knowing what to do and how to do it and also furnishes a means of putting "pep" into the work as it emphasizes the value of the time element on certain work.

Three months or more on construction work. This work gives experience in practical details of track construction or reconstruction, the proper methods of excavation work, ballasting, distributing material properly, joining, spiking, lining and surfacing track, back-filling and the "short cut" on track removals.

The order of work is varied with the seasons of the year so as to yield best results. At the end of a year's work, the apprentice track foreman is put in charge of a few men on minor repairs and is started on his journey.

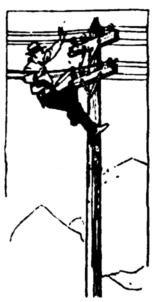
Our experience has shown that three out of five men will not finish more than the first three months, but when the two who do stick it out are graduated, a valuable addition to the organization results.

The apprentice track foreman's education is gained by practical work under experienced men, supplemented by the study of standard books on track construction and maintenance which are available in the company or public library. In addition he is given practical experience and must be proficient in the proper operation of the oxy-acetylene cutting torch, the proper use of all hand tools and the operation of an electric car, an auto-truck, electric concrete mixers, gasoline concrete mixers, gasoline speeders, pneumatic tie tampers and pneumatic concrete cutters. The value of electric welding is taught, as well as methods to be followed in placing and removing temporary crossovers under traffic, and caring for switches and special work. He is also expected to familiarize himself with city ordinances affecting track construction and maintenance, the rules and regulations of water commissioners regarding the use of fire hydrants, methods of making up estimates, reporting quantities and distributing time and materials to proper accounts, and other items.

It is reasonable to expect that an apprentice track foreman will not be 100 per cent efficient at the end of a year's work, but if he has tried at all, he will have a solid groundwork of the items listed above, and time and experience will do the rest.

It costs money to train men as outlined, but experience has convinced me that it is a paying investment notwithstanding the fact that the "quitters" are a total loss not covered by insurance.

Safety on the Pole Top

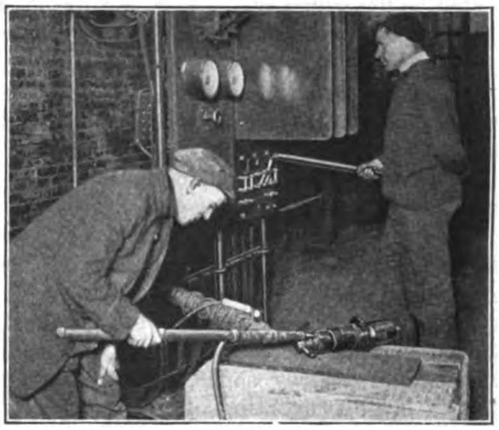


Never fasten your Safety Strap to a Cross-arm Brace.
The Pole itself will support you.
The Brace may not.

A HINT WHICH OVERHEAD ENGINEERS MIGHT PASS ON TO THEIR LINEMEN

THE accompanying poster issued by the Ontario Safety League, by courtesy of the Bureau of Safety, tells its own story. A crossarm brace is so strong in itself that a lineman might very easily overlook the fact that the lag screw which holds it to the pole may not be as secure as it appears to be.

Some Mysterious Car Ailments

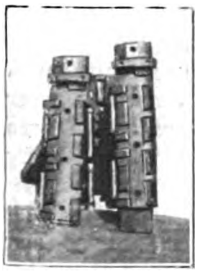


Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD

Trouble at the End of the Line

DURING the years 1913 and 1914 an eastern railway operating General Electric type M multiple-unit control had a series of detentions which all occurred at the end of the line. After changing ends the motormen of these cars frequently found that the cars would not start. An examination of the equipment showed that the reverser fingers had become welded to their contacts so that the reverser could not throw to the opposite direction. As these reports of welded fingers came into the shop it was at first assumed that the tension on the fingers was too light and that poor contact started an arc which resulted in the welding of the fingers to the contact plates. The tension on the fingers was accordingly increased, but the troubles increased instead of diminishing. A man was then sent to the terminal where the trouble was occurring in an endeavor to locate the cause of the welding of the fingers. Investigation showed that when the reverser was thrown from one position to the other the tension of the contact fingers prevented it from throwing entirely to its running position and it would stick with the fingers just at the edge of the contacts. A few fingers only would make proper contact and as soon as power was applied the remaining fingers would fuse to the segments and in some cases cause serious burning of the reverser drum. An attempt was made to use lighter tension on the contact fingers and, while this allowed the reverser to return to its proper position, the light tension was not sufficient to give proper contact so that the fingers continued to fuse to the plates and in some cases the motors flashed over.



FILLING IN BETWEEN REVERSER CONTACTS
At left, original reverser; at right, reverser as changed.

It was evident that some construction would have to be used which would allow increased tension on the fingers and at the same time do away with the necessity of the fingers lifting to ride up on the contact segments, as it was in this position that the reversers would stick with heavy tension. The accompanying illustration shows the method in which the reversers were changed to overcome the trouble. A piece of fiber was fitted in between the reverser contacts so that it came to the same height as the top of the contacts. The contact segments were $\frac{3}{16}$ in. high above the segment block, so fiber pieces $\frac{3}{16}$ in. thick by $1\frac{1}{4}$ in. wide were fitted into the space, and drilled with three holes for fastening. Flat head brass screws, $\frac{3}{16}$ in. by 1 in., were used to fasten the fiber in place. The heads of these screws were sunk into the fiber which was counterbored so that when the screws were in position the space around and over the head could be filled in with sealing wax. The under side of the drum was recessed to receive a nut and washer for fastening. Sealing wax was also filled in over the top of these. By this method of construction the trouble was entirely overcome and it also resulted in a decreased cost of maintenance for the reversers and motors as well.

Defects of 1,200-Volt Armatures Corrected With Amber Baking Varnish

A CERTAIN 1,200-volt interurban road in the East has cars equipped with four Westinghouse 317-A4 motors. These are connected two in series for permanent operation on 1,200 volts and are worked very close to their capacity. The equipments had all run about five years at an average mileage of 60,000 per equipment per year when they began to develop an epidemic of motor flashing.

To one who had only been accustomed to 600-volt operation the solution of the trouble presented some difficulty. The leakage to ground was found to be small, the brushholder tension about right and the brushholders were found to span the proper number of commutator bars. The fields and armatures were given a voltage drop test for shorts or bad connections, but this failed to reveal the trouble. Several of the offending armatures were removed and placed in the lathe to check the trueness of the armature shaft and the commutator. These being found in good shape the commutator slots were carefully cleaned and the commutators given a telephone test for shorts. Again no indication of trouble was found and the armatures were returned to service, this time in motor shells which had given no flashing trouble when used with other armatures. But the offending armatures again flashed over.

It had been noticed that a few of the leads of the armatures had worked loose in the commutator necks and that there had been a small amount of pitting between these leads and their commutator bars, but in view of earlier experience of swedged leads in 600-volt commutators it did not seem probable that these had caused the flashing. But when the armatures continued to give trouble after having been checked and tested as described in the last paragraph it was decided to resolder the commutator necks of the defective armatures with a high tin solder, and this cured the trouble.

But with the location of the trouble the road was faced with resoldering some fifty armatures, fully eighty per cent of which had never been rewound. The resoldering necessitated a partial removel of the asbestos hood over the leads on the commutator end, and as these hoods were not in good condition it was decided to replace them with new asbestos hoods. The replacement of these hoods required a rebanding of the armatures where the dried out leads were weakest, and it was feared that the drawing down of the leads by the band wire would destroy some of their insulation and produce a large proportion of grounded armatures. It is interesting to note that this is exactly what happened to several armatures which because of a temporary shortage had to be used without the treatment hereafter described.

On the other hand new coils cost about $100 per set and were difficult to obtain, as were the services of a sufficient force to carry out the rewinding program which the increasing amount of motor flashing would have demanded had it been decided to rewind all the armatures.

The problem was finally met by softening the dry coils by dipping them hot in amber baking varnish and applying the bands while the coils were still flexible from the dipping and a partial baking. The program was to strip the old bands and heads from the armatures, to blow them out with compressed air, to check and remove all short circuits by a telephone test, to resolder the leads at the commutator necks, to turn and reslot the commutators where necessary, and to hold the new asbestos headers with a temporary tape banding. The armatures were then baked for twenty-four hours in an electrically heated oven maintained at 125 degrees C., following which they were dipped for one hour in Westinghouse amber baking varnish. The armatures were dipped in a vertical position with the commutator ends down, and were immersed below the back end bells.

The armatures were then drained for one hour in a horizontal position and baked for twenty-four hours, when they were removed from the oven and placed hot in the lathe for the final banding. After the banding the armatures were given a second dipping to fill any small crevices which may have been created by a displacement of the coils while banding, and were again drained and returned to the oven, this time for from sixty-four to eighty hours' baking at 125 deg. C. At the conclusion of the baking the armatures were removed while hot and immediately given a 1,200-volt leakage test. It may be noted that the leakage never exceeded 5 volts under the 1,200 volts pressure and that it rarely exceeded 2 volts.

A point worth noting is that during each draining the varnish was removed from the wearing surface of the commutator by cleaning with gasoline, fifteen minutes spent in this manner saving an hour of sandpapering after the armature had been baked. But after the baking it was necessary to saw the baked varnish from the commutator slots with the aid of a piece of hack saw blade.

About ten per cent of the armatures removed from service were so far gone that it was considered advisable to rewind them entirely. On these the preliminary dipping and baking were omitted. Of about thirty-five armatures which were resoldered, rebanded, double dipped and baked but one came back as grounded, open or shorted during a period of seven months.

Material for the latter armatures aside from the usual banding material were 1½ gal. amber baking varnish per armature at about $2, 1 gal. gasoline per armature at 25 cents, about 200 kw-hr. of electricity for the baking oven per armature, about 18 hours of the armature winder's time, about 6 hours of the winder's helper's time, and one hour of the machinist's time, or a total of about $30 per armature, against about $160 for each armature rewound.

Testing "Turned the Trick" in This Case

THE blowing of the circuit breaker on a city car equipped with interpole motors was easily traced to a certain motor, but there the trail ended. The motor looked all right and the insulation resistance was high. A new set of main field coils was put in, however, and the motor went into service, but after a week or so of operation complaints began to come in again due to the motor flashing over. The armature was next changed but the result was no better. The carhouse force was then told to change all of the field coils, including interpole fields, which they did with one exception, a coil that they were "dead sure" of. They checked the connections carefully by the tags, but the result was no better.

As there was no field tester at the carhouse the car was finally sent to the repair shop, where careful tests of polarity showed one interpole field, the one that aroused no suspicion, to have had its terminals stamped incorrectly at the factory. This had caused a reversal of polarity in that particular field. The explanation of the ability of the motor to operate at all was that under ordinary load its commutating ability was good even with a commutating pole reversed, but when a very heavy load came on, it flashed over.

Although this is undoubtedly a very unusual incident it is cited here to point the moral: Have and use a tester where a baffling "ailment" has not occurred.

Perhaps a word should be added regarding the proper relation of interpole to main field polarity. To check this in a motor having four main and four interpole fields, connect the positive armature lead to the trolley side of the test, the negative armature lead to the positive main field lead and the negative main field lead to the ground side of the test. If the armature is not in the frame it will be necessary to short-circuit the brush holders. With connections thus made, a rule that can be readily remembered is when standing at the commutator end facing the motor, the polarity of an interpole should be the same as the main pole next adjacent to it in a counter clockwise direction.

Four pole railway motors with but two interpole coils located directly opposite each other have the polarity of both interpoles the same. In motors with three interpole coils, the interpoles diametrically opposite should have the same polarity, while the intervening pole should have opposite polarity.

When desired the interpole coils may be tested separately from the main field coils by making two separate tests. The polarity will be the same as that just described if the positive lead in each case is connected to the trolley side of the test.

Transformer Action of Tapped Field Railway Motors

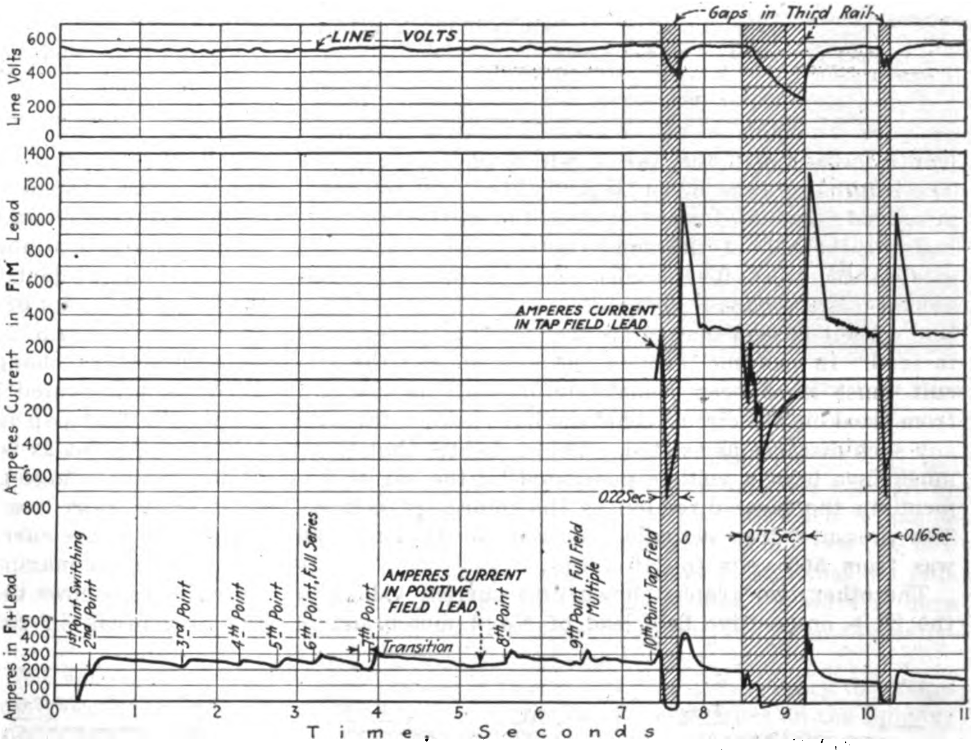
Necessary Gaps in Third-Rail Construction Cause an Opening and Closing of the Supply Circuit to Electric Cars With a Resulting Inductive Effect in the Field and Armature Windings of the Motors

BY C. W. SQUIER

DURING the last few years field control for railway motors has been developed and made practical. While the idea of securing additional efficient running speeds by varying the effective field turns is an old one, still on account of commutation difficulties it did not prove successful until the commutating-pole motor was developed. Field-control motors have their main field coils wound in two parts. During the acceleration period with resistance in circuit both sections are connected in series, thus giving a low-speed, high-tractive-effort characteristic to the motor. After the resistance is all cut out and the motors are operating on full voltage, the connections are changed so that only one section of the main field coils remains in circuit. This reduces the field ampere-turns and therefore the magnetic flux and gives the motor entirely different speed characteristics.

The accompanying circuit diagrams show the changes that take place with a two-motor equipment, including Westinghouse type-ABF control, while changing from full field to tapped field. The first diagram shows the motors in full multiple position with full field. The resistance of the full field winding of each motor is 0.06 ohm in the case under consideration. The second diagram shows the first transition that takes place, the short-circuiting of a portion of the field of No. 1 motor having a resistance of 0.025 ohm. In the next transition position the circuit is opened at the ground side of the short-circuited portion of No. 1 field, so that this motor has a field of but 0.035 ohm while No. 2 motor still retains its full field of 0.06 ohm resistance. The next step in the transition is the short-circuiting of a portion of No. 2 field with 0.025 ohm resistance, and in the final or tapped-field position both motors are operating with fields of 0.035 ohm resistance, the remaining portions of the fields being open-circuited.

By following these circuit changes it is seen that approximately 40 per cent of each field is successively first short-circuited and then open-circuited. This of course is necessary, otherwise the main motor circuit would have to be opened while the transition is taking place.



GRAPHS OF CURRENT AND VOLTAGE FOR CAR OPERATING THROUGH CROSSOVER

This arrangement of windings and connections produces what is in effect a transformer or induction coil. The two windings on one iron core constitute a pair of mutually inductive circuits with a common magnetic circuit. If then a variation in impressed voltage takes place in one of the windings there will be a corresponding electromotive-force induced in the other winding. In regular operation these conditions are fulfilled if the main circuit is broken or made while connections are established as shown in diagrams 2 and 4. If then one of the field windings of a motor is short-circuited while the car passes through a gap in the third-rail, as is necessary at crossovers, the circuit in the other winding is broken and again made. The effect produced under these conditions is the same as that in a transformer with its secondary short-circuited if the primary is opened and closed rapidly.

The graphs of current and voltage shown herewith were taken with an oscillograph on a car while operating through a crossover, with the control operated so as to reproduce the desired conditions. There were three gaps in the third-rail at the crossover where the test was made of approximately 3 ft., 10 ft. and 2 ft

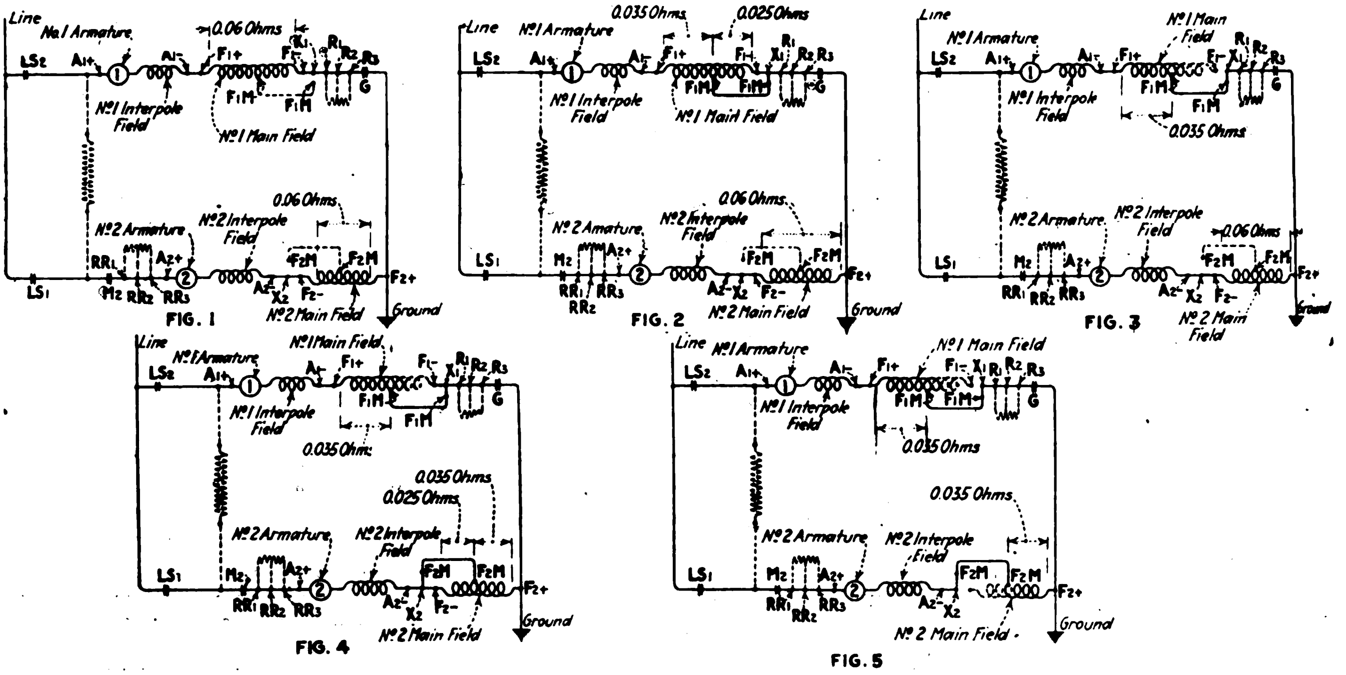


FIG. 1
FIG. 2
FIG. 3
FIG. 4
FIG. 5
Line
No. 1 Armature
No. 1 Interpole Field
No. 1 Main Field
No. 2 Armature
No. 2 Interpole Field
No. 2 Main Field
0.06 Ohms
0.035 Ohms
0.025 Ohms
LS1
LS2
A1+
A1-
A2+
A2-
F1+
F1-
F1M
F2+
F2-
F2M
X1
X2
R1
R2
R3
RR1
RR2
RR3
M2
G
Ground

CIRCUIT DIAGRAMS FOR TRANSITION FROM FULL TO TAPPED FIELD POSITIONS

1—Motors in multiple with full field.
2—A portion of No. 1 field is short-circuited.
3—No. 1 motor with short field, No. 2 motor with full field.
4—A portion of No. 2 field is short-circuited.
5—Both motors with short field.

length measured in the line in which the car traveled. The lengths of time taken to pass througn these gaps, measured from the instant that contact with the third-rail was broken at the shoes until it was again re-established, were 0.22 second, 0.77 second and 0.16 second respectively. By referring to the graph for line volts it is seen that in no case did the voltage drop to zero. In passing through the longest gap the circuit must have been completely opened, as the arc from breaking the circuit could not have held on through any such distance as existed. This indicates that there must have been a voltage generated by the car equipment, in the same direction as the impressed voltage. The pressure drop actually obtained in the long gap was from 560 volts to 210 volts.

The other two graphs shown give current values in the F1+ or positive field lead of No. 1 motor and in the F1M lead, which is the tapped-field lead of No. 1 motor. The graphs show that there was a complete reversal of current in both of these leads. Considering the graphs in conjunction with the diagrams of connections it is evident that from the 6.5-second point to the 7.4 second point of the graphs the connections are as shown in diagram 1. At the 7.4-second point the connections are changed to those shown in diagram 2. This is indicated by a rise in current in the F1M lead. The first gap in the third-rail is reached at the 7.46-second point as is indicated by the drop in voltage shown in the voltage graph.

In order more readily to follow the direction and magnitude of the current changes a series of diagrams is given for the maximum values for each change. The first of these shows the conditions as they existed when the first break in contact between the shoe and the

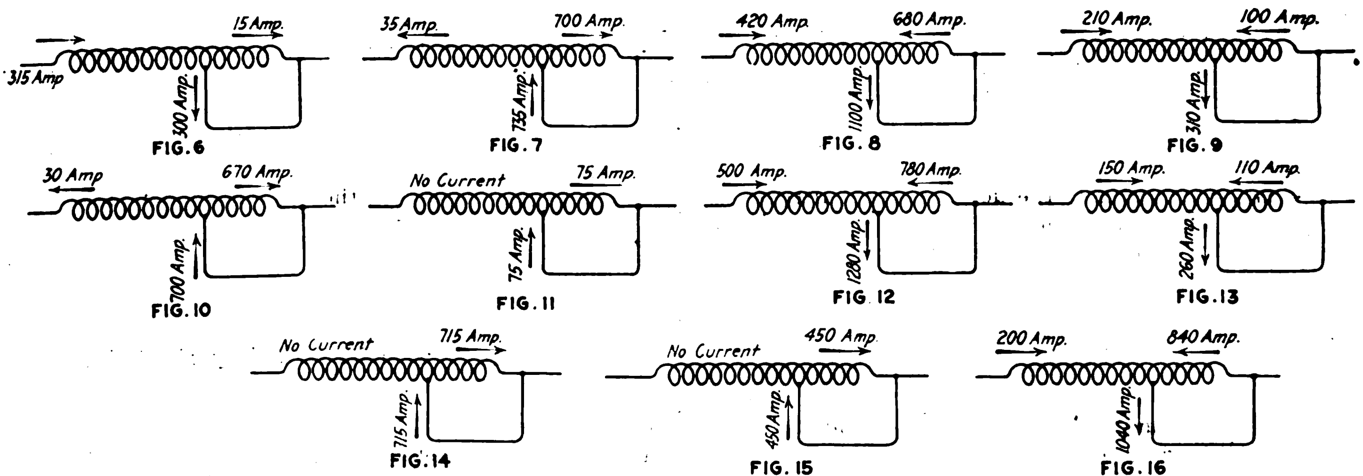


FIG. 6
315 Amp
15 Amp.
300 Amp.
FIG. 7
35 Amp.
700 Amp.
735 Amp.
FIG. 8
420 Amp.
680 Amp.
1100 Amp.
FIG. 9
210 Amp.
100 Amp.
310 Amp.
FIG. 10
30 Amp
670 Amp.
700 Amp.
FIG. 11
No Current
75 Amp.
75 Amp.
FIG. 12
500 Amp.
780 Amp.
1280 Amp.
FIG. 13
150 Amp.
110 Amp.
260 Amp.
FIG. 14
No Current
715 Amp.
715 Amp.
FIG. 15
No Current
450 Amp.
450 Amp.
FIG. 16
200 Amp.
840 Amp.
1040 Amp.

DIAGRAMS FOR MAXIMUM VALUES OF CURRENT OCCURRING WITH CAR OPERATING THROUGH CROSSOVER

6—At first break in contact.
7—0.1 second after first break.
8—0.05 second after contact is re-established.
9—At second break in contact.
10—0.24 second after second break.
11—At instant of second contact.
12—0.06 second after second contact.
13—At third break in contact.
14—0.1 second after third break.
15—At instant of third contact.
16—0.08 second after third contact.

third-rail occured. At this instant 315 amp. was flowing in the positive field lead F1+ and 300 amp. in the tapped-field lead F1M. This indicates that 15 amp. was flowing in a positive direction through the short-circuited portion of the field. The flow of current is considered positive when it is in the normal direction for regular operation.

As soon as the voltage begins to decrease, due to the breaking of contact between the contact shoe and the third-rail, there is a sudden reversal of current. A tenth of a second after contact is broken there is a current of 735 amp. in the reverse direction flowing in the F1M lead, 35 amp. in the reverse direction through the positive field lead F1+ and 700 amp. in a positive direction through the short-circuited portion of the field. After these maximum values are reached the current in the tapped-field lead F1M and the short-circuited portion of the field decreases, while that in the F1+ lead remains nearly constant until contact with the third-rail is again established. A complete reversal of current then takes place again and 0.05 second after contact is re-established, maximum values are reached of 1,100 amp. in a positive direction through the F1M lead, 420 amp. in a positive direction through the F1+ lead and 680 amp. in a reverse direction through the short-circuited portion of the field.

Similar reversals and current values occur at each break and whenever contact is again re-established. The maximum value obtained in this particular test was 1280 amp., which was reached 0.06 second after contact was re-established at the end of the second gap.

The magnitudes of the current values reached under these conditions are quite astonishing when compared with those found in normal operation on a straight track with no gaps in the third-rail. Normally the current peaks range from 280 amp. to 340 amp., and equipment designed for these values will be severely overloaded when currents of the values shown, which are 400 per cent greater than normal are encountered.

The current peaks that occur shortly after contact is re-established with the third-rail are larger than those that occur after the circuit is opened. This is due to the fact that the induced current is in the same direction as the applied current when contact is made, while it is opposed to the applied current when the circuit is opened.

The values for voltage and current shown in the accompanying graphs illustrate what occurred in one particular case. It is evident that these values will change with different conditions. Thus the length of the gap in the third rail and the speed of the car or train as it passes through the gap will have marked effects on the values obtained. Also the design of the motor, the proportion of the field short-circuited to the full field of the motor, the current value at which the transition takes place, the normal operating voltage and the effect that heavy current surges have in varying the voltage, all will cause a variation in the results.

Improvements in control apparatus and in its operation have effectively met the conditions encountered so that under normal operation the equipment is properly protected from dangerous results. The condition, however, exists and a wider knowledge of this together with a discussion of the principals and theory that underlie it will aid in explaining the action and will assist in reducing the troubles of the operating engineer.

Taking the Track Greaser Off Safety Cars

IT DOES not look good to passengers to see a track greaser in dirty overalls get on a safety car and deposit his pail of grease on the front platform while he stands and talks with the operator until reaching the next curve he is to grease. Not only is the sight offensive, but it presents a real source of complaint, for a woman boarding the car can very easily brush her dress against the pail. For the company that usually means buying a new dress or paying a cleaner's bill. Yet this practice is going on.

F. C. Folsom, roadmaster Tampa (Fla.) Electric Company has solved this problem by providing motorcycle side cars for the track greasers. On the side car is a box in which are carried the pail of grease, a broom and several wrenches and other tools. Two laborers thus equipped now cover the entire system every day, working on a regular schedule. This work formerly required four men. Colored laborers were used for the purpose and when the new plan of using motorcycles was put up to them, three of them did not want to learn to handle the machines. So one old employee and one new one now do the work of the four. Mr. Folsom says that not only is a large amount of time saved, but the work is done better because the greasers are not hurrying the job at any point in order to catch the next car.

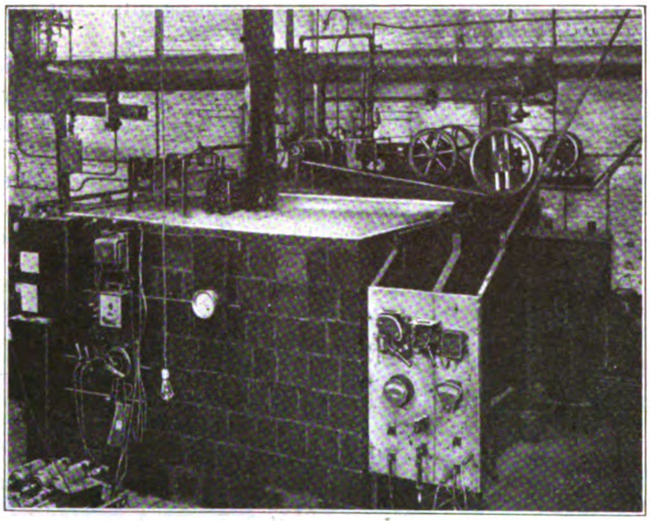
HOW THE TRACK GREASER HAS BEEN TAKEN OFF THE SAFETY CAR IN TAMPA

The regular schedule over the system every day takes the men as far out of the city as 6 miles on the Sulphur Springs line and 9 miles on the Port Tampa line. On the latter line it takes the street car one and one-half hours to go and come, including a layover of ten minutes at Port Tampa. This gave the track greasers only ten minutes to do the work at this point and catch the same car back. Consequently the job was only half done. Now the round trip is made in one and one-quarter hours on the motorcycle and the man who does the greasing has all the time necessary to do the work thoroughly.

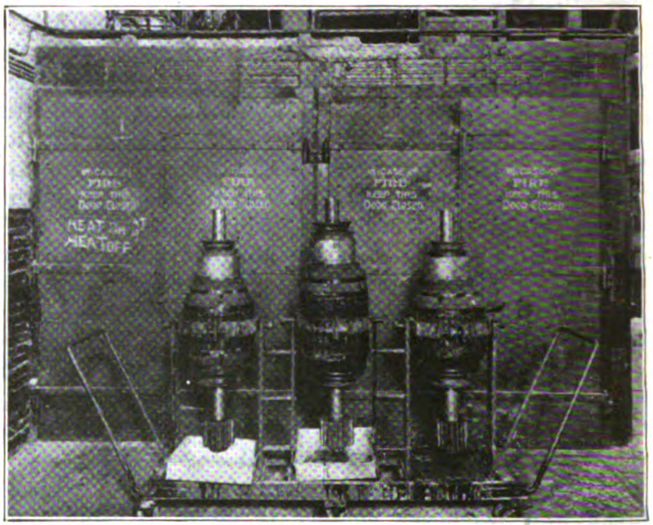
When the plan was worked up to inaugurate the use of the two motorcycles, it was thought that there would result a reduction in the cost of this work. It has been found, however, that the cost of operating and maintaining the two machines has about offset the saving made in labor. However, the company feels that the use of the motorcycles would be justified because of the other advantages, even though their use entailed a greater expense.

An Almost Laborless Dipping and Baking Plant

In Its Cold Spring Shops, the International Railway Has Installed a Compact Dipping, Impregnating and Baking Equipment Designed with Particular Reference to Economizing Man Power



GENERAL VIEW OF IMPREGNATING AND BAKING PLANT, INTERNATIONAL RAILWAY

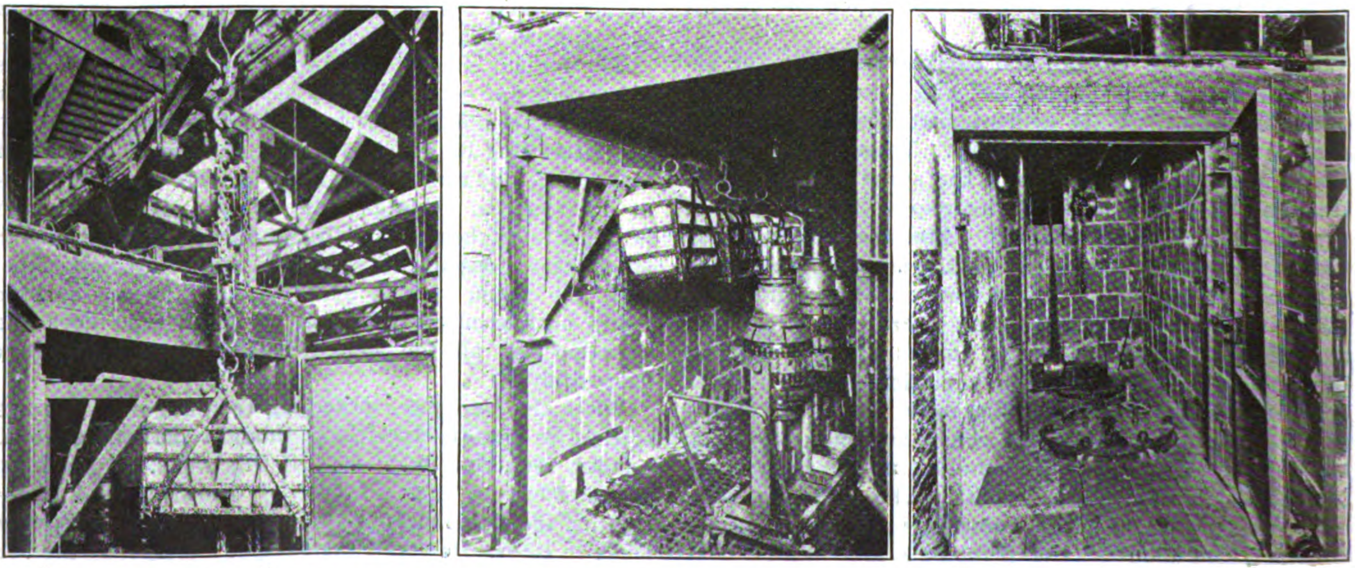


ARMATURE TRUCK WITH ARMATURES IN POSITION FOR BAKING

AS AN ADJUNCT to its armature and field-coil winding room, the equipment department of the International Railway, Buffalo, of which J. W. Hulme is superintendent, has developed a highly successful outfit for dipping, impregnating and baking. Part of this is shown in the accompanying photographs. The practice of this company is to impregnate all new field coils, after which they receive the usual outside wrapping of tape. They are then dipped in varnish and baked. This is done to insure a practically waterproof and oilproof covering. Armatures are not impregnated but practically all of them are dipped and baked for forty-eight hours.

The complete plant consists of a dipping room and a structure built up of hollow tile, with steel door frames and doors, divided into two parts, one for the impregnating plant and the other for the baking oven. The whole is covered with a concrete slab roof.

The dipping room contains two large varnish tanks with tops level with the floor and provision for handling coils and armatures by means of an overhead trolley. Particular attention will be devoted in this article to the impregnating and baking outfit. On the roof of the brick structure is the vacuum pump used for exhausting the air from the impregnating cylinder and a motor which drives the pump and also operates the



AT LEFT—BASKET OF FIELD COILS SUSPENDED FROM TROLLEY CRANE, READY FOR TRANSFERRING TO BAKING OVEN. IN CENTER—BAKING OVEN WITH ARMATURES AND FIELD COILS IN POSITION FOR BAKING. AT RIGHT—INTERIOR OF IMPREGNATING ROOM stirrer in the impregnating compound tank below. On the outside wall are the switchboard and transformer used in testing armature insulation and also a pyrometer to indicate the oven temperature. The oven is heated by electric current controlled through the switchboard shown at the right in the general illustration. The impregnating plant was built by the J. P. Devine Co., Buffalo, manufacturer of vacuum drying apparatus. It consists of two tanks which are lined with steam coils for heating the compound. One tank contains the supply of compound which is allowed to run into the second tank after a vacuum has been established. The compound is first heated to 300 deg. F. and is then blended until the proper specific gravity is obtained.

Proper ventilation of the oven is obtained by taking in the cold air from the shop through a duct which has six openings underneath the heater. This arrangement insures an even temperature, as the hot air rises into the oven and is then carried off to the outside atmosphere through a ventilating flue leading from the top of the oven.

FACILITATING THE HANDLING OF ARMATURES AND FIELD COILS

The principal feature which Mr. Hulme had in mind in designing this plant was the provision of lifting and conveying devices to permit one man to do all of the work. In the impregnating room is a trolley bar mounted centrally overhead, on which runs a trolley with a differential hoist. By means of the hoist the basket of field coils is lowered into the impregnating cylinder, and on being lifted out is transferred to the outside overhead trolley as the case may be.

The device used for handling the field coil baskets outside of the impregnating room and the oven deserves special mention. A trolley from which hangs a differential hoist travels on a long I-beam, of which one end is hinged. The free end of the I-beam is supported from a crossbar mounted above the door of the oven and dipping room, by means of a trolley provided below with a roller so that the I-beam can swing freely from side to side.

Inside the oven at one side is an overhead trolley bar with several small trolleys for carrying the baskets of field coils undergoing the baking process. For the purpose of transferring the baskets from the outside hoist to the inside trolley bar a small gib crane, supported from one of the oven door posts, is utilized. On the end of the horizontal member of this little crane is pivoted a lever with one end projecting beyond the end of the crane and having its own end turned up. This lever provides enough vertical movement for the basket to permit it to be hooked onto one of the inside trolleys when the crane is swung inward. The long end of the lever is bent downward so as to permit it to be handled readily, and also to provide stops by means of which the range of action of the lever can be limited. The pictures show the details of construction of this device, as well as its method of operation.

The armatures, after dipping, are carried on a special truck, having a capacity for three of them, the support of the armature being from clamps which span the core at the middle. The clamps are supported in trunnions, simply cap bolts, in such a way that one man can turn an armature with very little effort.

The floor of the oven is made of a grating so that drippings from the armatures and field coils fall into the tank below and are drained away.

Specifications for Bolts Used in Construction

Proper Requirements for Physical Properties, Workmanship and Finish Assist in Reducing Number of Loose Bolts

BY HOWARD H. GEORGE
Assistant Engineer Public Service Railway of New Jersey

IN A PREVIOUS article I took up the question of the general desirability of purchasing all track materials under definite specifications and covered specifically the matter of track spikes. In this article it is proposed to deal with the subject of track bolts, one which is equally as important as that of spikes. The actual specifications, used on the Public Service Railway and appended, again differ from those usually encountered in that they cover both steel and iron, and for the reasons given in the case of track spikes.

The strength of any mechanical joint depends very largely upon the strength of the bolts. This statement applies with greater force to the case of electric railways with their comparatively light loads, where failures of the joint plates themselves are comparatively rare, and where the trouble experienced is generally due to loosening of bolts from any one of several possible causes. Among the latter may be mentioned failure of nut locks or lock washers, rusting of rail and plates at points of contact, loosening of bolts due to turning of nuts, and finally the stretching of the bolt itself beyond its elastic limit in tightening of the bolts, either at the time of installation or by track walkers. While other factors may enter into the problem, it is believed that these are the principal ones, and it is felt that the last named, is one of the causes of a large percentage of loose bolts. With proper provisions in the specifications, and regulation in the maintenance of way department of the size of track wrenches used, such troubles can be very largely reduced.

The question of when a bolt is tight is entirely a matter of judgment on the part of the trackmen and the latter have often been known to slip a pipe extension on the handle of an ordinary track wrench so as to draw a bolt up tighter, under the mistaken idea that they were doing the proper thing. In this connection, it is interesting to refer to a series of tests made a few years ago by the engineer of maintenance of way of the Baltimore & Ohio Railroad and reported in Vol. 17 of the Proceedings of the American Railway Engineering Asso-

Steel and Track Bolts

1. Material:

If steel, it shall be made by the open hearth or other approved process. If necessary to secure the properties desired, the bolts may be heat treated.

If of iron, the iron shall be double refined, tough and fibrous and uniform in character and quality throughout. It shall be thoroughly welded in rolling and be free from cracks, flaws, blisters and other surface defects. If necessary the bolts may be heat treated to secure the desired physical properties.

2. Physical Properties and Tests:

The steel shall conform to the following requirements:

"A" For carbon steel:

- (*a*) Elastic limit, not less than 35,000 lb. per square inch.
- (*b*) Elongation, not less than 25 per cent in 2 in.
- (*c*) Reduction of area, not less than 50 per cent.

"B" For untreated nickel or other alloy steel:

- (*a*) Elastic limit, not less than 45,000 lb. per square inch.
- (*b*) Elongation, not less than 20 per cent in 2 in.
- (*c*) Reduction of area, not less than 40 per cent.

"C" For heat-treated nickel or other alloy steel:

- (*a*) Elastic limit, not less than 75,000 lb. per square inch.
- (*b*) Elongation, not less than 15 per cent in 2 in.
- (*c*) Reduction of area, not less than 40 per cent.

"D" The elastic limit shall in no case be less than 50 per cent of the ultimate strength.

"E" The elastic limit, elongation and reduction of area may be determined on a test piece ½ in. by 2 in. turned from a finished bolt.

"F" The ductility of the bolts shall be determined by the cold bend test, which requires that the material used in the bolts shall bend cold through 180 deg., and flatten itself without fracture on the outside of the bent portion. This bend may be made on the unthreaded portion of a finished bolt, on a blank bolt, or on a test piece of the same size and same grade of steel. In any case the specimen tested must be subjected to the same treatment as the finished bolt. It is not necessary that the bolt bend double in the threaded portion.

The iron shall conform to the following requirements:

"AA" Ultimate strength, not less than 50,000 lb. per square inch.

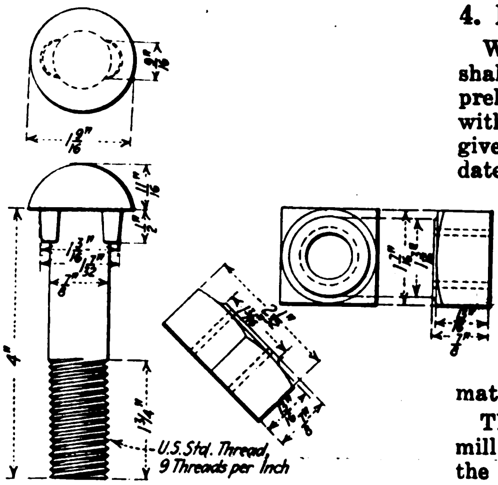
"BB" Elastic limit, not less than 50 per cent of the ultimate strength.

"CC" Elongation, not less than 18 per cent in 2 in., with the fracture wholly fibrous.

"DD" Reduction of area, not less than 25 per cent.

"EE" The elastic limit, elongation and reduction of area may be determined on a test piece ½ in. by 2 in. turned from a finished bolt.

"FF" The ductility of the bolts shall be determined by the cold bend test, which requires that the material used in the bolts shall bend cold through 180 deg. with a radius of not more than ½ in. without fracture on the outside of the bent portion. When nicked specimens are bent cold the fracture must be wholly fibrous. The bends may be made on the unthreaded portion of a finished bolt, on a blank bolt, or on a test piece of the same grade of iron. In any case the specimen tested must be subjected to the same treatment as the finished bolt. It is not necessary that the bolt bend double in the threaded portion.



STANDARD TRACK BOLT

In either case, a sufficient number of tests shall be made to satisfy the railway company's inspector that the material meets the specifications in every respect, and he shall have the privilege of selecting the specimens to be tested.

3. Workmanship and Finish:

The form and dimensions of both the steel and iron bolts shall conform to the drawings submitted by the railway company and forming a part of these specifications, subject to the following permissible variations:

- (*a*) The length shall not be more than 1/16 in. less nor more than ⅛ in. greater than that shown on the drawing.
- (*b*) The diameter of the bolt shall not vary more than 1/64 in. from the dimensions shown.
- (*c*) The size of the head shall not vary more than 1/16 in. from the dimensions shown.
- (*d*) The outside dimensions of the nut shall not vary more than 1/32 in. from the dimensions shown.
- (*e*) The shoulder of the bolt shall not vary more than 1/64 in. from the dimensions shown.

The heads and nuts shall be free from checks or burrs of any kind. They shall have the United States standard upset thread unless otherwise specified. The threads may be either cut or rolled and shall be full and clean with not less than two, nor more than five, finger threads.

4. Inspection:

When required, the manufacturer shall furnish samples of bolts from a preliminary rolling before proceeding with the filling of the order and shall give sufficient notice in advance of the date when they will be ready for inspection.

The railway company's inspector shall have a free entry at all times, while the work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered.

The inspection shall be made at the mill and the manufacturer shall afford the railway company's inspector, free of cost, all reasonable facilities to satisfy himself that the bolts are being furnished in accordance with these specifications. The tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

Tests shall be made of samples of the finished product selected by the railway company's inspector from each lot of 100 kegs. Two pieces shall be selected for each test and if both meet the requirements of the specifications the lot will be accepted, but if both fail the lot will be rejected. If one of the test pieces fail a third piece shall be selected and tested; if it meets the requirements of the specifications the lot will be accepted, but if it fail the lot will be rejected.

If, after shipment, any bolts are found to be defective, due to material or manufacture, they may be rejected.

5. Marking and Shipping:

When the bolts are shipped they shall have the nuts applied for at least two threads, and shall be properly oiled to prevent rusting. They shall be packed in good serviceable kegs of 200 lb. each. All kegs must be plainly marked as to material, size of bolts, and name of manufacturer. Each keg shall also bear the name and shipping address of the consignee.

ciation. The facts contained in this report emphasize the importance of insuring a certain minimum in the ultimate strength and elastic limit of the materials entering into the manufacture of the bolts, and these factors are largely controlled by other elements in the specifications.

The tests referred to were made on what are commercially known as 1-in. x 4¾-in. bolts with eight threads per inch, and hexagonal nuts. The bolts were tested in a Riehle testing machine, the initial load being applied by a trackman with a wrench under conditions which approximated very closely those met with in the track. No attempt was made to obtain uniformity of load with the same length of wrench, the trackman using his own judgment in determining when the nuts were tight. Six bolts were tightened with each size wrench. The results follow:

Length of Wrench	Load Registered
30 in.	23,600 lb. to 31,200 lb.
36 in.	23,500 lb. to 34,360 lb.
42 in.	33,000 lb. to 42,600 lb.
48 in.	43,600 lb. to 46,350 lb.

A 1-in. diameter bolt has an area of 0.7854 sq. in. and with an elastic limit of 35,000 lb. per square inch for carbon steel, the elastic limit or strength of the bolt is only 27,489 lb. From this it is evident that it is not a difficult matter permanently to stretch a bolt with even a 30-in. wrench, which is the length ordinarily used on electric railways. It also strongly indicates what may be expected where material is substituted whose elastic limit falls below the above figure. In this connection, it might be well to call attention to the fact that these loadings were obtained on a 1-in. bolt, whereas the usual diameters in use on most electric railways are ¾-in. and ⅞-in., so that with the 30-in. wrench such bolts can readily be stretched beyond the elastic limit of the material.

Considering next the question of workmanship and finish, imperfections in the material will affect the strength, and threads which are too tight will add to the difficulty of removing nuts from the bolts when they are to be used. It is also necessary to limit the variation from given dimensions for several reasons, one of the principal ones being that if this is not done there would be a tendency for manufacturer to use his dies after they had worn beyond a reasonable amount, and the result would be to produce oversized or otherwise unacceptable bolts.

As to the cost of inspection to insure compliance with the terms of the specifications, this cost for bolts is not more than 10 cents per keg of 200 lb. The cost of track bolts is at the present time approximately $5 per 100 lb., and the inspection therefore adds only 1 per cent to the purchase price. The satisfaction obtained from the knowledge that specifications are being lived up to more than compensates for the small additional cost of the bolts.

New York Lines Fight Snow and Ice

Details of the Recent Storm and Methods Employed to Clear the Underground Conduits in Manhattan Borough

THE latest snowstorm of Feb. 4, 5 and 6, appears now upon analysis to be the heaviest snow ever recorded in New York. The storm of 1888 has been cited as the equivalent, at least, but in 1888, while the snowfall measured 20 in. as against 17 in. this year, the water equivalent was only slightly over 2 in. as against 4½ in. this year. In other words, the snowfall this year weighed almost 24 lb. per cu. ft. Moreover, much of the precipitation was in the form of a sort of hail in grains about the size of bird seed or large sized sand; it didn't pack but shifted like sand in the heavy wind, and blew down into the slotted conduit which it filled as sand would fill such a duct. Subsequent rain and slight thaws followed by freezing made the conduit filling more like ice, particularly in the slot. Similar ice, from 4 to 12 in. thick, covered the tracks and pavements.

SNOW-FILLED CONDUIT, REMOVING ICE FROM TRACK AND STALLED CARS, NEW YORK RAILWAYS

Two general methods have been employed to clear this ice—one, the manual, the other, electrical and manual. For the first, practically the entire force of trainmen and shopmen were mobilized and put to work with hand tools. Picks had to be used to reach the street surface, and then more muscle was necessary to open the slots with sharp pointed tools. Poking and scraping with long tools and with hoes inserted through the slot, gradually loosened the snow in the conduit so that it could be shoved by hand tools or by heavy power tools to manholes and then removed. In this way on the New York Railways lines, progress was made at the rate of about 4½ mi. per day. The New York & Harlem Railroad (Fourth and Madison Ave. lines) used streams of water to loosen the snow and make it easier to push along to the manholes. This could be done only on warm days, however.

The second method tried was suggested by R. B. W. Peck, cable engineer of motive power department of the New York Railways. This consisted of sending a current of 1,000 amperes through the channel rails. The four channels on about 2,500 feet of track were connected by jumpers to form a big M and the 10,000 feet thus placed in series across 585 volts gave 1,000 amperes. This melted a cylindrically shaped hole in the snow around the channel as a core and later the remaining snow was pushed manually or by a power pusher to the manholes. The temperature of the channel rails by this method was kept at about 104 deg. F. and no insulation failures occurred.

The New York Railways Co. has kept close account of the results of the various methods for future use in case a similar emergency arises. While these figures are perhaps not conclusive, indications are that while in actual cost per mile the electrical method is cheaper, it is slower, and, counting lost revenues due to the longer time in resuming service, is more expensive after all. The major part of the work, including the more important lines, were cleaned manually.

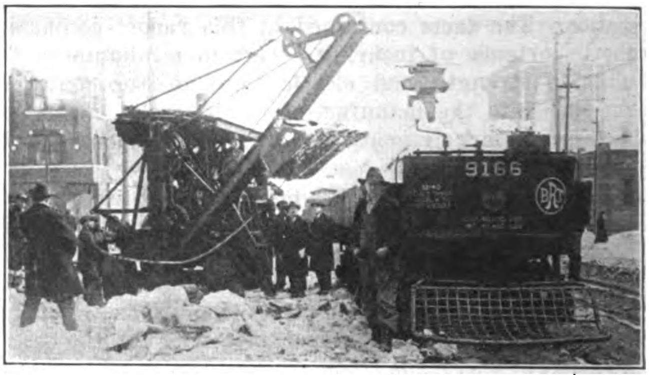
B. R. T. Digs Out With a Steam Shovel

Recent Severe Storm Brings Out Novel Means of Getting Rid of Vast Accumulations of Snow and Ice

THE use of steam and electric shovels for loading snow has increased this winter. An accompanying illustration shows a Keystone loader loading snow into a flat car on one of the principal lines of the B. R. T. system in Brooklyn, N. Y. Similarly, in Boston, after the recent storm, a large Brownhoist equipped for snow loading by means of a grab bucket was used with good results. The first instance of which this paper has record of the use of steam shovels for snow-removal work was that reported from Milwaukee last winter, when a Thew shovel was used.

In Boston automatic dump cars are used in connection with the snow work. In Brooklyn special snow-dump tracks are installed at wharves along the East River and a special "pusher" device pushes the snow overboard from the regular flat cars.

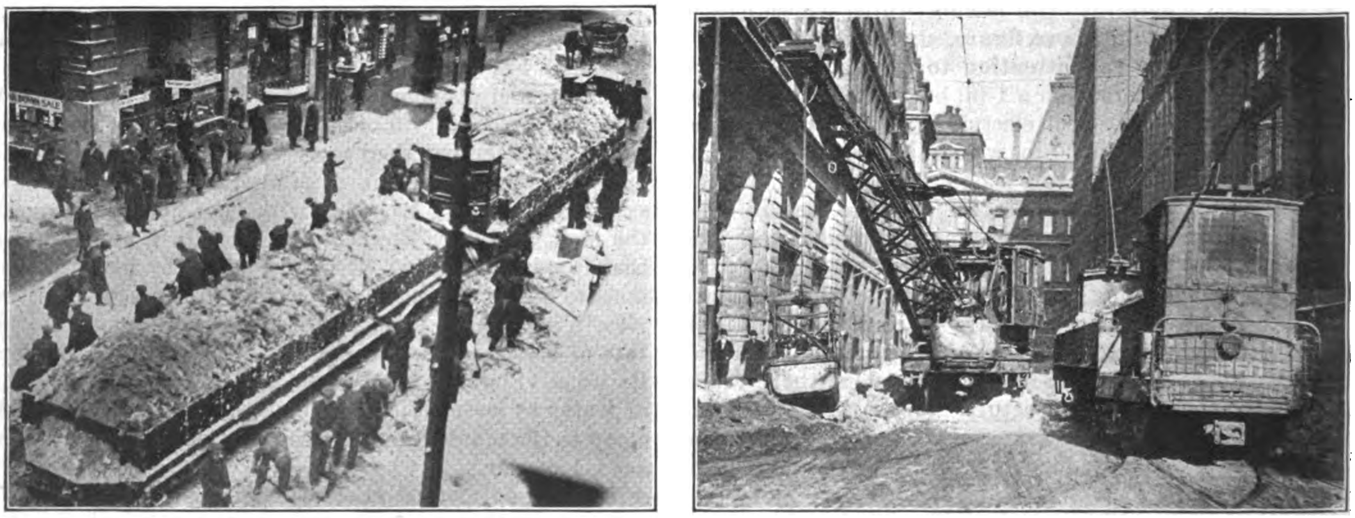
A number of properties have taken advantage of available sewers and use the sewer manholes as a convenient disposal point, the snow being pushed to the manholes and also carried to them in concrete carts and dump wagons of various kinds. It has been found in Brooklyn that an 18-in. sewer, when aided by water from fire hose attached to near-by hydrants, will permit the disposal of as much snow at each manhole as six men can shovel into it, working continuously. In order to prevent clogging, very large lumps and cakes of ice are not allowed to reach the manholes except in cases where the sewer is 36 in. in diameter or larger, and carrying a very heavy flow of sewage.



GRADER WITH ¾ CU.YD. BUCKET LOADING SNOW ON ST. JOHNS PLACE, BROOKLYN

In Brooklyn it is estimated that a snow gang of from fifteen to twenty men can handle as much snow through the manholes, even allowing for the comparatively long distances between manholes, as they can load upon flat cars during a day's work. Part of this result is due to the fact that snow cars must not stand long enough to delay regular car traffic, which requires constant shifting and some idle time for the loading gang. This is the first season in which the railroad company has been permitted by the city authorities to use sewers for snow disposal.

The scheme of placing portable crossovers and loading the snow cars upon a "dead" track is not practicable, as there is too much congestion of team and car traffic, particularly because both kinds of traffic would have to try to move over the single-track space, directly upon the single-track area, which alone is available when the snow is piled high in both roadways. It is reported from Brooklyn that the cost for manhole disposal is about 35 cents per cubic yard, while car disposal costs from 65 to 85 cents per cubic yard, depending upon length of haul to dump.. The steam-



REMOVING SNOW ON FEDERAL ST., BOSTON, AFTER THE RECENT SEVERE STORM. PHOTOGRAPHS THROUGH COURTESY OF THE BOSTON POST

LOADING SNOW WITH $\frac{5}{8}$ CU.YD. BUCKET GRADER IN BROOKLYN

shovel loading method costs about 70 cents per cubic yard with the same average haul to dump. The latter cost is higher than it would be if the shovel were owned instead of rented, the rental alone amounting to about $35 per 8-hr. day. All of the foregoing costs are based upon loading labor at 50 cents per hour and a 9-hr. day, with no allowances for supervision, timekeeping or other forms of "overhead" charges. The work-car charges in Brooklyn are based upon regular freight tariff tonnage rates and the cost for freight haulage or car service, which includes car, crew and power as well as wear and tear on equipment, will average $12 per load of approximately 30 cu.yd. or 40 cents per cubic yard. The records in Brooklyn also indicate that snow removal is now costing about three times what it cost, on a cubic-yard basis, in 1917.

Use of Pneumatic Tools in Track Construction

Tamper Has Many Uses—Author Gives Practical Suggestions as to Auxiliary Tools and Shows Importance of Using Best Tool Steel

By Thos. W. Bulpin
Executive Engineer Los Angeles (Cal.) Railway

IN THE early part of 1919 the Los Angeles Railway Corporation purchased a pneumatic tie tamper in order to minimize the use of high priced and inefficient labor. The results so far have been very satisfactory. We find that with the use of this machine we have been able to construct a much better track than heretofore, and at a very considerable saving.

The machine, when delivered at our yard, was mounted, as customary, on the ordinary flanged-wheel truck. As this mounting required the use of tracks upon which to operate, the truck was removed and the machine was set on a four-wheeled trailer, making it possible to transport it to and from the work by an ordinary auto car, and to station it alongside the track where it would not interfere with the operation of service cars.

Some slight improvement has been made in the trolley pole, also, making it possible for cars to operate through or under the point of contact without necessitating stoppage of the machine or attention from the operator. This trolley pole, or "stinger," as some people call it, consists of an upright pole which can be fastened to the machine, hinged at about the height of the trolley so as to permit the wire which connects with the motor to make contact with the top of the trolley wire. No difficulty has been experienced with this pole, and it saves not only the services of one man, but does away with the stopping and starting of the machine and the consequent loss of time.

While no accurate estimates have been made of the efficiency of this machine, nor of the actual saving of money it effects per track-foot, we do know that with this equipment and about six men it is possible to do the work of probably from twenty to twenty-four men. This is quite a saving, especially when one considers the inefficiency of the average laborer now available for this kind of work. However, the saving in money is not the principal element of efficiency. The fact that it is possible to construct track which is thoroughly and scientifically tamped—thus minimizing the chance of poor work being done by individual workers—is in itself worth many times the cost of the equipment.

While we appreciate the usefulness of this machine as a tie tamper, we believe that its greatest value is as an excavator of concrete paving. To adapt it for this purpose, a set of C.C.25 drift-bolt drivers are used. These tools are fitted to ordinary steel gads, which are driven through the concrete base of the pavement, breaking it into pieces sufficiently small for removal by hand. Our experience with this class of work has been most trying, and we have found that under ordinary conditions it is best to remove the asphalt wearing surface by the usual methods, reserving the drift-bolt drivers for the concrete. We have used this machine for excavating, breaking concrete and tamping in and around special work in busy street intersections, where speed is usually of the first importance, and instead of being obliged to marshall all the forces of the department, we find that we are able, with ordinary sized gangs, to be ready in the morning when the first car goes over the line.

As to the cost of excavating concrete pavement, we had occasion to construct a piece of double track in a street already paved, the pavement consisting of a 6-in. concrete slab, with a concrete wearing surface which was not of the ordinary contract variety, but a job constructed by the municipality; and if I am any judge it was "some concrete." Seven-foot trenches were required for our ties. We found that the most economical method was to cut a trench not over 12 in. wide along one side of the 7-ft. strip, then with bars and hammers to break out the balance of the work. The cost of this work was about two cents per square foot.

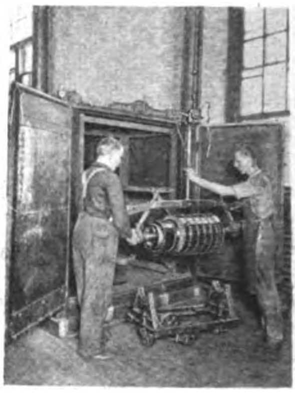
HOME TOOLS NOT SATISFACTORY

I wish to add a word regarding the tamping bars and steels necessary for gads. It is not advisable to attempt too much saving in the selection of steel for these tools, as ordinary steel will not stand the strain to which the tools are subjected. Our experience has shown that the better policy is to have the compressor company furnish the tools, or at least the steel, as delays are costly. While we have broken a great many homemade tampers, the original set which came with the equipment is still in use and has not been broken in service.

We have also purchased grinders, drills, and other useful tools which can be operated with the same equipment, making it possible to meet any ordinary requirement connected with track work; and as we have another of these machines on the way, it is needless to say that we believe in them, and are more than satisfied with the results we get from them.

Shop, Track, Power and Line

These Articles and Ideas Are From Men on the Job Who Find Special Applications and New Methods an Incentive for Greater Effort — If You Have Something Good Pass It Along



Keeping Down the High Cost of Work

By Use of Labor-Saving Devices for Track Maintenance the Cleveland Railway Has Kept Cost Down in Spite of Wage Increases

By Charles H. Clark
Engineer Maintenance of Way, Cleveland (Ohio) Railway

With the large increase in the wages paid for labor the problem of keeping down the cost of renewing tracks and pavements has developed into a question of machinery vs. brawn.

On Jan. 1, 1914, was paying a base rate of 19 cents per hour for labor. About one-sixth of the men received 20 cents, and a few as high as 30 cents. We also had about five men who received 40 cents. These wages prevailed during the year 1914. Jan. 1, 1915, we increased the base rate to 20 cents and 21 cents. In April, 1915, we increased to 22½ cents, and 23½ cents. This rate was carried along until February, 1916, when we again advanced the rate to 25 cents, and again in April, to 27½ cents. The next raise occurred in April, 1917, when we paid 30 cents, and June 1 saw another increase to 32½ cents, followed in August, 1917, to 35 cents. This was the base rate until July 1, 1919, when the men were all given an approximate advance of 20 per cent, which gave them 42½ cents an hour as a base rate, and all others were raised proportionately.

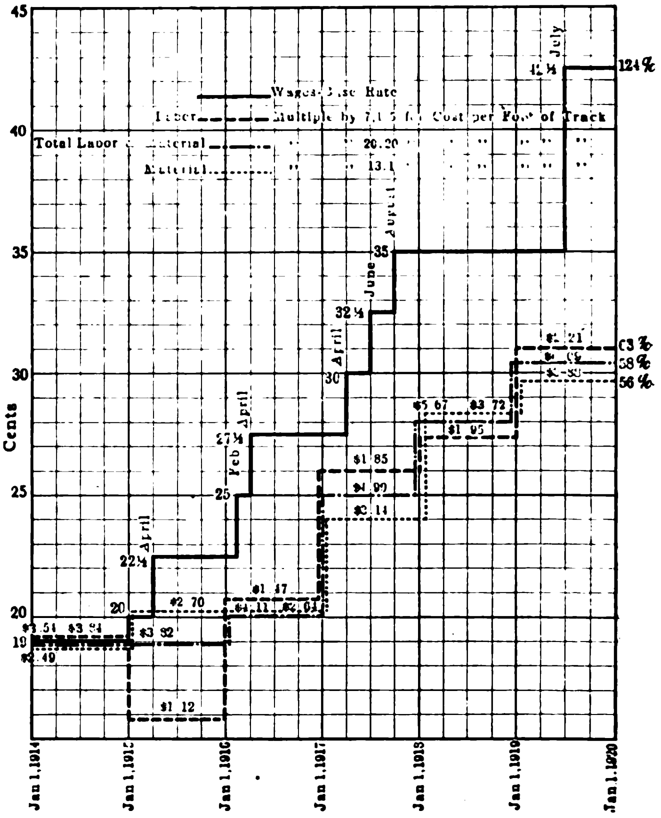
Now let us note the effect of this advance and the causes for the increases and decreases in the labor cost per foot of track:

In 1914, labor per foot of track averaged................	$1.354
In 1915, labor per foot of track averaged..............	1.12
In 1914, material per foot of track averaged............	3.84
In 1915, material per foot of track averaged...........	3.82

This shows that material had not been affected, as we had ordered enough ahead to cover any advance for a year. The cost of labor per foot of track decreased 23 cents. During the year we designed and constructed a pavement plow, purchased a Brown Hoisting 5-ton derrick car, two Universal dump car trains of three cars each, and also installed a machine for cleaning concrete bags.

In 1915, labor had advanced 45 per cent over 1914, and the cost per foot of track had increased about 9 per cent. During this year we added a Differential dump car train of three cars, and improved the pavement plow. We also installed a 60-ft. hammer-head full swinging gantry crane in the yard, which travels along a special track about 800 ft. with a storage space on either side, 50 ft. in width.

In 1917, wages had advanced about 84 per cent, but the track work per foot of track had advanced only 37 per cent, which was a natural increase. We, however, purchased a 15-ton, 50-ft. boom, locomotive derrick, and one pavement grouting machine. We also used a Thew shovel rearranged for breaking concrete.



GRAPHS SHOWING COSTS FOR APPLIED LABOR

In 1918, the increase in wages remained the same but the cost of track work advanced 5 per cent over the previous year, and 44 per cent more than the year 1914. Our only alibi for this was the scarcity and quality of labor we had to contend with during this period of the late war. We purchased three more grouting machines, but these were used on pavement and so did not affect the cost of track work.

In 1919, wages had advanced to 124 per cent over 1914, and track work advanced to 63 per cent more than the same year. We added to our equipment, two concrete conveyors for feeding the mixers.

One must not forget that, in the last two years, the laborer has been rather independent and certainly has not produced in proportion to former years. Thus the diagnosis shows that, although wages were increased far beyond the most extreme vision of 1914, we have been able to keep the cost of labor applied down very materially by the use of labor-saving devices. In other words, we have studied the situations diligently, and our efforts to combat the H. C. L., or would you say the H. C. W. (high cost of work)? have not been in vain.

Butt-Welded Joints Installed on the Lines of the Pittsburgh Railways

Molds Placed Around the Rail Joints Hold the Heated Flux While Clamps Force the Rail Ends Together

DURING December, 1919, the Lorain Steel Company installed twenty-six electric butt-welded joints, Jacobs patent, on the 134-lb. trilby rail of the Frankstown Ave. line in Pittsburgh. The equipment used and the method of making the weld are shown in the accompanying illustrations.

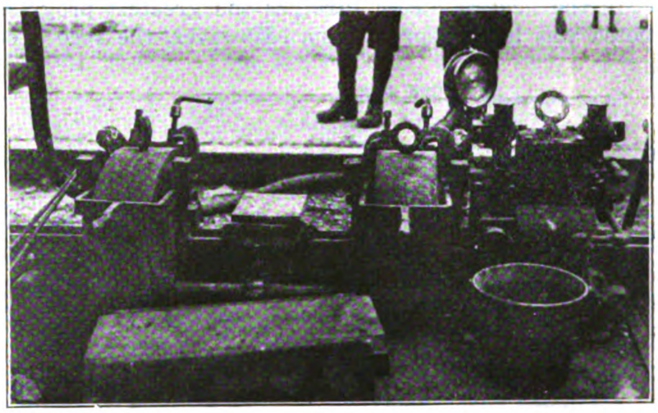
A motor-generator set was used for supplying the welding current. This consisted of a 30-kw. alternating-current generator direct connected to a direct-current motor of 65 hp. This motor was essentially an inverted variable-speed motor operated at constant speed on voltages varying from 350 to 650. The welding current averaged about 1,500 amp. at 30 volts.

For heating the flux used in the welding, an oil-burning furnace lined with fire brick was used. A motor-driven air compressor supplied air at about 50 lb. pressure for operating this burner.

The molds used for making the joints were of baked fire clay, such as are used with thermit welding, except that they were baked before use and not baked around the joint with a preheater as is customary with the thermit weld. A clamp was used for holding the molds around the rail joints, and for drawing the rails together. This supplied the necessary pressure for making the welds.

The clamp consisted of two crossheads, into which the rails were clamped by means of wedges, and a hydraulic pump capable of supplying a pressure of 5,000 lb. per sq.in. was rigidly connected with one of the crossheads by means of two side rods. The other crosshead slid on the side rods, and the two rams of the hydraulic jacks acted against this crosshead so that when pressure was applied to the rams the crossheads were forced toward each other, carrying the rails with them. This equipment was mounted on a car equipped with the ordinary street railway motor and control apparatus.

After the molds had been secured around the joint with a clamp, the flux previously heated was poured into the mold and the welding current was turned on. When the temperature in the mold, as determined by pyrometer tests, indicated between 2,400 and 2,500 deg. the rails were drawn together by means of the hydraulic jack. A pressure of about 3,000 lb. per square inch was used. It required about twenty minutes to complete the weld after the heated flux had been poured into the mold and the current turned on.

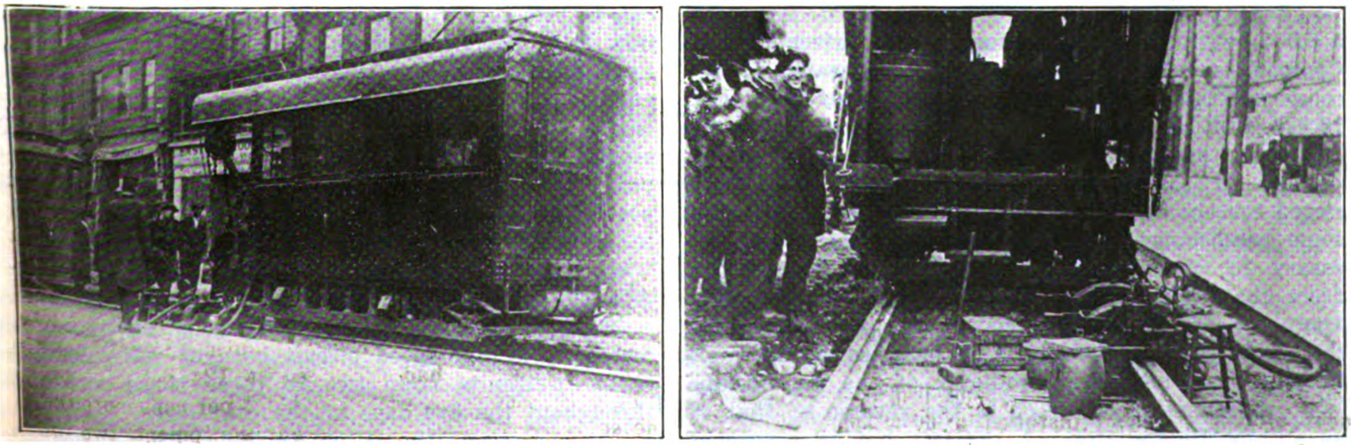


RAILS AS PREPARED FOR WELDING BY THE BUTT-WELDING METHOD

In carrying out this operation it is necessary that the first two rails welded be laid loose with their ends ½ in. apart. The drawing together of the rails when the welding point has been reached provides space for the succeeding joints, so that all the rails are laid tight after the first two. The fact that the rails must be pulled together to make the weld, makes this type of joint unsuitable for use in repair work.

After the weld is made the joint has to be ground both on the head and gage side of the rail. On this particular work the grinding was done with the same grinder that is used for grinding thermit welds.

Present results indicate that this type of joint is most satisfactory and should it prove as good as it looks under heavy traffic it will be an excellent joint for new construction.



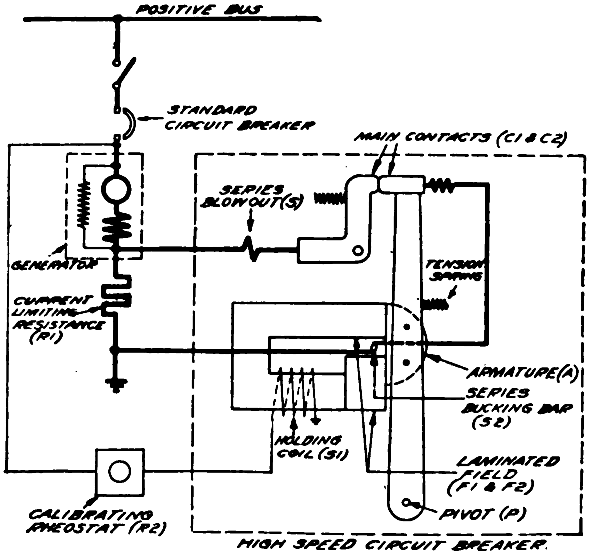
AT LEFT, WELDING CAR IN PLACE READY FOR OPERATION. AT RIGHT, CONNECTION FROM THE WELDING CAR TO THE TRACK EQUIPMENT

Some Technical Electrical Developments of the Past Year

A Partial Summary of the Progress Made by One of the Large Manufacturing Companies in Electrical and Steam Machinery

EACH year John Liston, of the General Electric Company, prepares for the *General Electric Review* a comprehensive summary of the developments in the electrical industry during the preceding year. This is frankly confined to the work of the General Electric Company, but it is valuable for general reference and comparison. The following notes are based on the latest summary just issued.

In the field of steam turbines the greatest progress noted was in ship propulsion. However, the record of a 6,000-kw. turbine in the plant of the Arizona Power Company merits attention. With cool water in the condenser this machine produced a kilowatt-hour from 18,628 B.t.u., or at a thermal efficiency of 18.3 per cent.



SIMPLIFIED DIAGRAM OF HIGH-SPEED CIRCUIT BREAKER

F_1 and F_2 represent a laminated field structure something like that of an ordinary alternating current magnet. The poles of F_1 and F_2 are bridged by a very light armature A pivoted at P, which is held in contact with the field by a shunt coil S_1 energized from any convenient constant voltage source, such as the exciter circuit or the main bus.

The series bucking bar S_2, which electromagnetically trips the breaker, is located between the poles of the field magnet in a plane perpendicular to the plane of the laminations and in very close proximity to the armature, so that a given current flowing in it produces a maximum change in the armature flux with a minimum change in the flux interlinking the shunt winding S_1.

The tension spring attached to the armature provides a means of adjusting the breaker and also gives the high speed opening of the contacts. The main contact tips C_1 and C_2 are of the solid copper type used so successfully on railway contactors. The blowout coil S is of the series type and designed to give a very intense magnetic field at the contacts.

Among the latest features considered in the development of turbine-driven alternators is that of a closed system of ventilation, which is desirable under some conditions. With this arrangement it is necessary to remove the heat of the generator losses from the cooling air, which is used over and over again. Generally an air washer may be utilized for this purpose, but sometimes it has proved desirable to utilize a water-cooled radiator of the fin-and-tube type, the function of which is the reverse of that of an automobile radiator. A radiator having a core of 100 cu.ft. would have a good margin in capacity for cooling the air from a 25,000-kva. alternator.

In heavy electric traction, attention is naturally focused on the section of the St. Paul electrification between Othello and Seattle and Tacoma, on which two freight locomotives were placed in operation in October, 1919. These released for other service five steam engines ordinarily used as "pushers" on this grade. The electrification of the government-owned steam suburban lines radiating from the City of Melbourne, Australia, also progressed materially during the year. About 200 miles of line are now operating electrically. The Salt Lake, Garfield & Western Railway completed its change-over to electric operation during the past summer, and is now operating about 21 miles of lines with multiple-unit equipment and automatic substations. Another electrification which will begin operation during the present year is the Hershey Cuban Railway, which will operate a line about 60 miles long between Havana and Matanzas, Cuba. About one-half of this road is now operating with steam engines and the remainder will be new construction.

In the field of automatic substations, the largest unit so far constructed is a 2,000-kw. synchronous motor-generator set, now being installed for supplementing the power supply to the Michigan Central Railroad operating electric locomotives through the Detroit River tunnel. At the end of 1919 there were approximately fifty G. E. automatic-substation equipments in operation and about twenty more were under construction or being installed. In the line of safety cars, approximately 1,400 of the two types of motors made by the company for this service were sold during the year. These two types differ mainly in the style of bearings used.

Among miscellaneous features of equipment, the power-limiting and indicating system installed along the lines of the Chicago, Milwaukee & St. Paul electrification has shown interesting possibilities. By the use of this scheme a high load factor has been maintained.

The intensive study of methods to protect direct-current machines, particularly the 60-cycle, 600-volt synchronous converter, from flashing was continued during 1919 with important results, and there were developed three graduated forms of protection which will now give immunity under all operating conditions. These are as follows: (1) Commutating poles of a high-reluctance type, with much stronger field windings than those previously used were designed, tested in service and adopted as standard. This insures ample protection where operating conditions are favorable. (2) Where greater protection is required, the machines can be provided with a type of flash barrier, which has now fully demonstrated its value in railway service on lines where severe short-circuits are of frequent occurrence. (3) The highest degree of protection includes the use, with the foregoing, of a high-speed circuit breaker, which has fully demonstrated its value under tests of much greater severity than those imposed by the most unfavorable conditions encountered in actual service. The accompanying diagram illustrates the principal features of this breaker. At the Atlantic City Convention of the American Association a 300-kw. 600-volt, 60-cycle synchronous converter protected by a high-speed circuit breaker was subjected to short-circuits from two to three times per hour throughout the five days of the convention.

The success of the automatic generating station at Cedar Rapids, Iowa, and the many railway automatic substations in service have encouraged the development of other generating and substations along automatic lines. For example, such a station at Ontario, Cal., consists of a 500-kva. 60-cycle generator, direct connected to a Pelton water wheel. Instead of being entirely automatic, this station is controlled by pilot wires from a manually operated station a few miles below on the same stream. When the operator desires to start the remote-control plant, he closes the control circuit which opens the nozzle to the Pelton wheel. When the machine is up to speed, he synchronizes it, and then increases the load to any desired amount by a further opening of the nozzle. The machine can be shut down at the will of the operator by closing a second control circuit, but in case of necessity, due to overload or hot bearings, this generator will shut down automatically.

In alternating-current machinery, the maximum unit capacity for synchronous condensers will soon be doubled as compared with existing units by the installation of a 30,000-kva., 600 r.p.m., 6,600-volt, three-phase, 60-cycle condenser at Los Angeles, Cal. Here in combination with two 15,000-kva. condensers already installed it will be utilized to maintain constant voltage on a 150,000-volt transmission line about 240 miles long. Another record-breaker is the 32,500-kva. 12,000-volt water-wheel-driven generator now being installed by the Niagara Power Company, which represents the maximum capacity for machines of this class.

The use of alternating current for arc welding has led to the development of a special transformer for supplying this current. Alternating current arc welding requires an operating potential of from 25 to 30 volts across the arc; while to strike the arc and hold it with the ordinary bare metallic electrode, an open-circuit potential of about 100 volts is required. Varying operating conditions also require that the welding current be adjustable through a considerable range, generally from 100 to 200 amp. The transformer designed for this special service consists of primary and secondary coils assembled on the center leg of a five-legged core. The secondary coil is generally placed at the bottom of the core and firmly secured. The primary coil is placed above the secondary and attached to a suitable mechanism by which it can be raised or lowered, varying the distance between the primary and secondary coils, thus giving a means of adjusting the welding current. The transformer is inclosed by a metal screen and is mounted on casters, so that it may be readily moved from place to place.

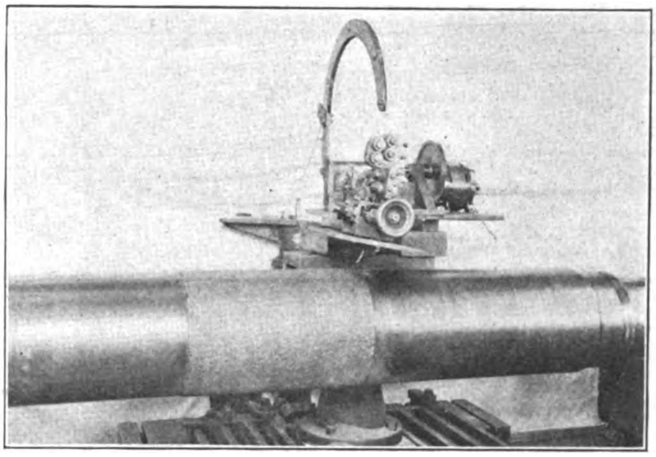
In switching apparatus progress was continued during 1919 in the development of safety inclosed equipment of this type; and the line of truck-type safety panels which previously covered feeder circuit control only was extended to include generator, synchronous motor, and lightning arrester panels. In addition to their essential safety features these panels are very convenient for installation and repair.

In an endeavor to reduce the noise of its electric cars, the Seattle Municipal Street Railway, Seattle, Wash., has recently equipped the motors of one of its cars with helical gearing. Experiments are also being made by fitting felt and canvas under the floor of the car and suspending canvas from the lower edge of the sides of the car so as to reach nearly to the pavement. The theory is that this will absorb the sound waves and thus reduce the noise.

Automatic Welding Developed

AUTOMATIC arc welding is now accomplished by a new device perfected by the General Electric Company, and soon to be put on the market, which is known as the automatic arc welder. This welder, for use with the regular welding set, is designed to take the place of the hand controlled electrode. It consists of a pair of rollers, called feed rolls, driven by a small steady supply of wire. The whole is controlled from a small panel which automatically maintains the best working distance.

The welding head is held by a suitable support with a certain amount of hand regulated adjustment, and consists of a steel body carrying feed rolls and straightening rolls which are made adjustable for various sizes of wire. The arm is supported on a gear box, together with the motor. This box contains gears which give three gear ratios, thus extending the range of the device while allowing the motor to operate at its most favorable speed.



DIAMETER OF SHAFT FIT INCREASED [illegible] IN. BY AUTOMATIC WELDING

The control panel carries an ammeter and voltmeter for the welding circuit, as well as rheostats, a control relay, and the contactors and switches for the feed motor. It is possible to start and stop the equipment from the work by a pendant push button, but adjustment of the feed must be made from the panel.

The adjustment for arc conditions by regulation of the speed of the feed motor, as the arc voltage varies, is taken care of by the panel equipment. The result is a practically steady arc, which is greatly superior in smoothness of operation to any hand controlled arc, consequently increasing the speed of the welding.

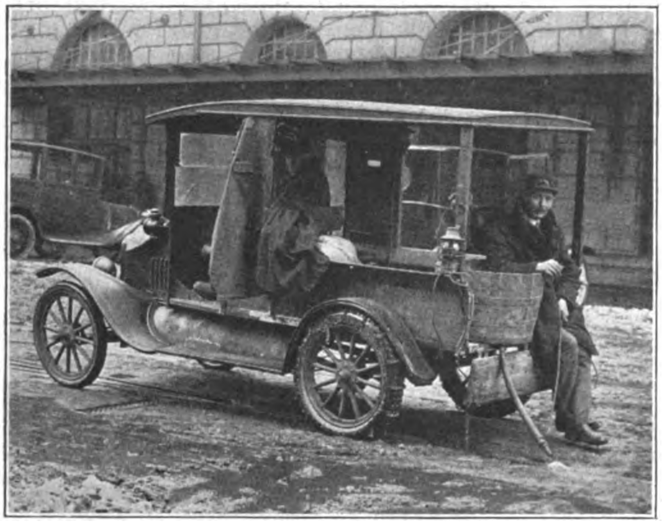
The whole apparatus is mounted on a base which can be bolted to any form of support. Thus a great variety of working conditions can be met, but provision must be made for carrying the arc at uniform speed along the weld. For instance, for straight seams, a lathe or planer bed may be used, and for circular ones, a lathe or boring mill. However, the local conditions will dictate the method to be followed.

The device is especially valuable where a large amount of routine welding is to be done, since it is capable of from two to six times the speed possible to skilled operators and gives uniform weld of improved quality. It is adaptable to welding seams of tanks and plates, rebuilding worn or inaccurately turned shafts (as shown in the illustration), rebuilding worn treads and flanges of wheels, and many other kinds of work.

A Sanding Car Which Is a Great Time and Labor Saver

THE New York State Railways, Utica lines, has found the sanding outfit shown in the accompanying illustration to be a very useful device in sanding slippery rail and salting switches. It consists of a 1-ton Ford truck, carrying a sand tub and several extra bags of sand or salt. A 1-in. flexible hose 3 ft. or so in length leads from the bottom of the tub, and a ½-in. iron rod about 4 ft. long is attached at the lower end of the hose, to serve as a handle, so that the operator sitting on the floor of the truck can guide the stream of sand or salt.

This sanding truck normally is held at one of the carhouses subject to the orders of the dispatcher. It is especially useful in September and October when the leaves are falling, and is superior to a sand car running on the track in that it can take short cuts to a point where it is needed in a hurry.


A USEFUL SANDING AND SALTING TRUCK

In salting switches the truck replaces ten men who would otherwise be required to patrol the track by sections to insure proper working of the switches. The truck darts from switch to switch, keeping them in good condition without difficulty.

The above facts and the illustration were supplied by E. P. Roundey, engineer of way and structures of the Utica lines.

Armature Dipping Tank With Air Pressure and Air Control

THE United Railroads of San Francisco for over a year have been dipping armatures in baking varnish as they go through the shops for repairs, with the result that there has been 40 per cent less trouble with grounded armatures when equipment is so treated. An arrangement for applying the compound has been worked out which requires a minimum of time and affords a convenient means of very accurately controlling the level of the compound in the dipping tank.

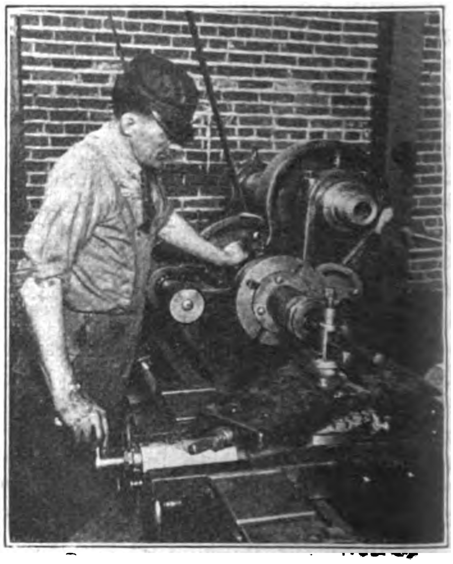
This consists of a tin-lined wooden tank supported at convenient height by a substantial timber framework. The bottom slopes to the center, from which a 1-in. pipe connects with the reservoir holding the compound. The reservoir consists of old car air reservoir tanks, as these were the most convenient form of container available. Four were used to get the desired capacity. The tanks are connected in parallel and by means of a motorman's valve, air at 40 lb. pressure can be admitted at the top. This forces the compound up into the dipping tank. When the dipping process is finished the compound is removed from the dipping tank into the reservoir by applying a vacuum in the top of the reservoir tanks. This is obtained by connecting a pipe line to the intake of a car air compressor. Through this system it is easy to bring the height of the compound to any mark required in the dipping tank.

The tank is rectangular in plan so that long armatures can be rested upon it with the shaft lying lengthwise, while short armatures are placed crosswise. A sheet-metal cover is used to keep dirt out of the tank, when it is not in use, and also as a safety measure to be used in case the compound catches fire. The armatures are placed on and removed from the tank by means of an air hoist suspended above it. The methods of dipping, pre-heating and baking are those used in standard practice.

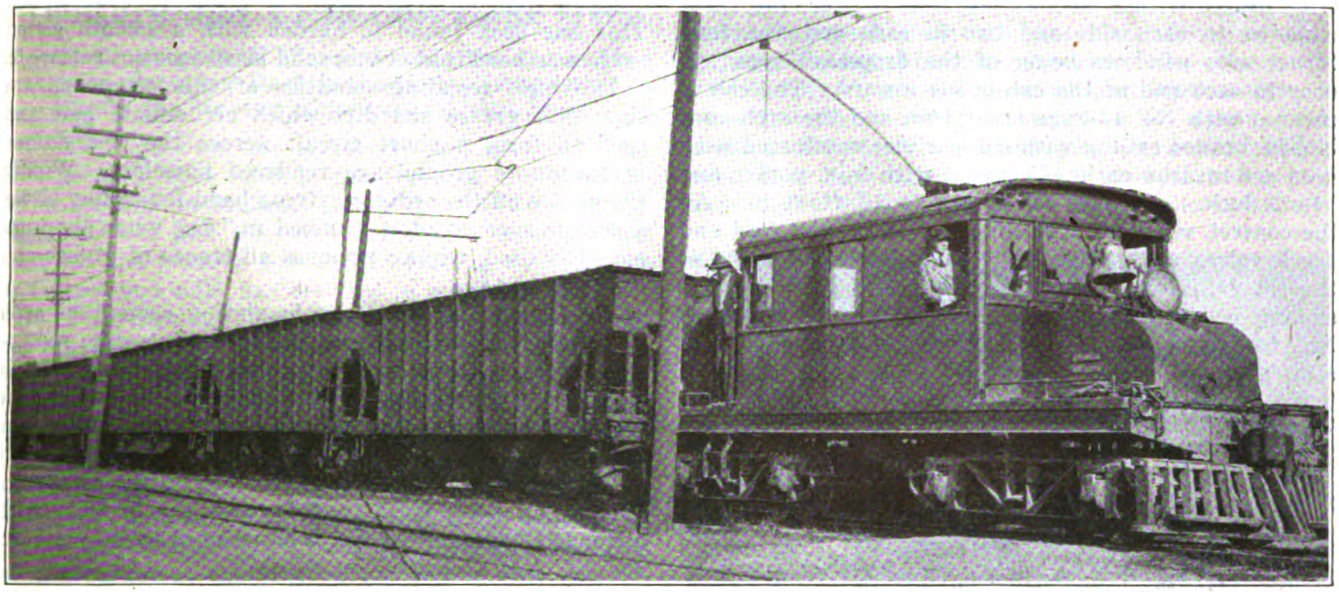
When new armatures are taken from the baking oven, two strap iron clamps are put on, one around the end of the coils at each end of the armature, and the clamps are drawn up tight by means of bolts. This keeps the coils in place while the armature is cooling, and eliminates the necessity for banding while it is hot.

Handy Chuck for Boring Armature Bearings

THE setting up of an armature bearing for boring in the ordinary lathe consumes considerable time, and most shops have adopted some special means or use a special chuck for facilitating this work. The accompanying illustration shows a self-centering chuck devised by William Mohr, master mechanic, Pennsylvania-New Jersey Railway. It consists of a cylinder with a flange at one end for fastening to the lathe headstock. The inside diameter of the cylinder is made 0.01 in. larger than the diameter of a standard bearing, and the end is tapered and threaded on the outside for a distance of 2½ in. This threaded portion of the cylinder is slotted, so that by running up a tapered nut on the tapered thread, the chuck will clamp the bearing firmly.


BORING AN ARMATURE BEARING HELD IN A SELF-CENTERING CHUCK

In addition to its use as a chuck for facilitating the boring of the bearings, it also serves as a gage for detecting excessive wear of bearings, as any bearing which cannot be clamped securely with this chuck will be found to have been worn so that it is unfit for further use.



NEW LOCOMOTIVE HAULING EIGHT CARS OF CRUSHED STONE

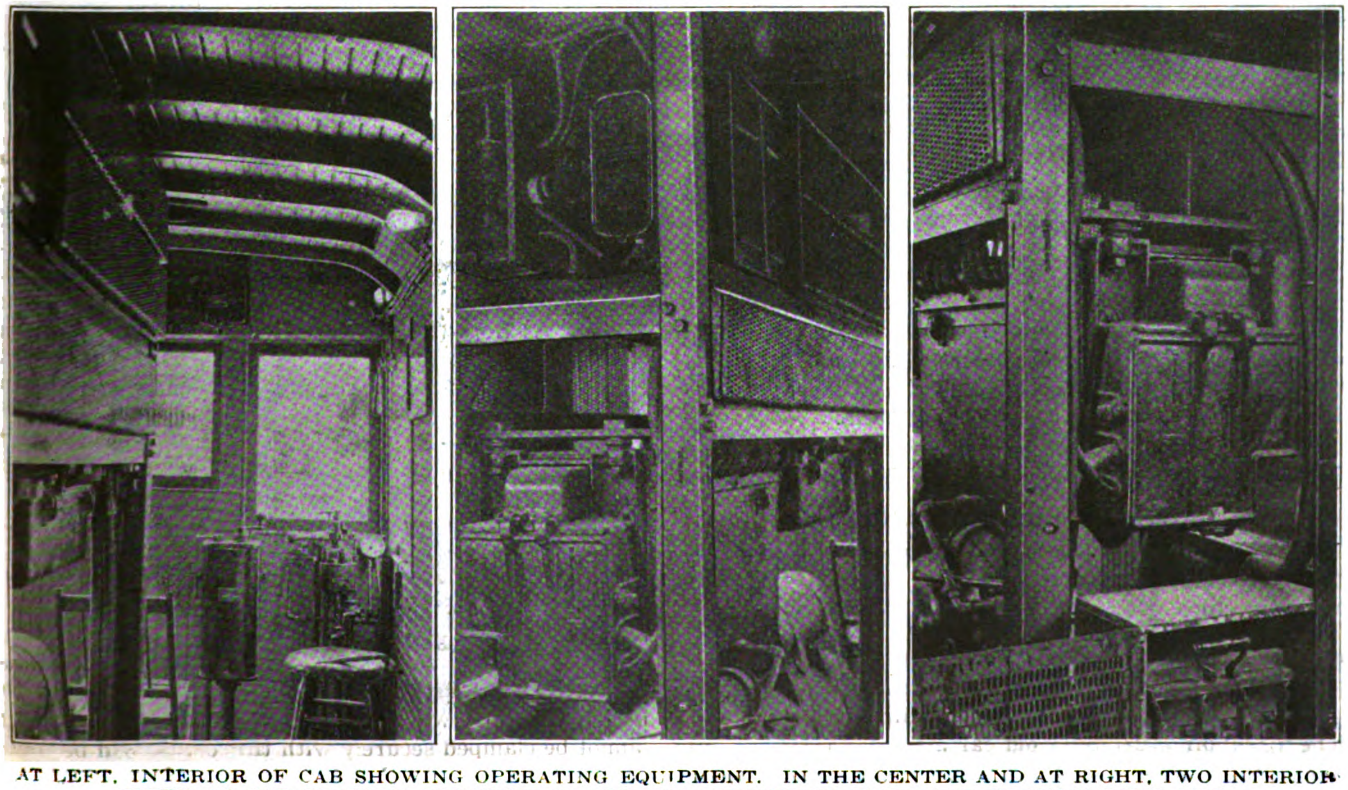
45-Ton Freight Locomotive Built in Indiana Shop

Indiana Railways & Light Company Builds Up-To-Date Locomotive for Handling Products of Stone Quarry and Other Freight

A 45-TON electric locomotive designed for use in handling freight trains between Marion and Frankfort, Ind., a distance of 53 miles, has recently been built in the Kokomo shops of the Indiana Railways & Light Company. The Kokomo Stone Company has a large quarry adjacent to the right of way of the railway, and the locomotive is used to move the product of this quarry to various points along the line and onto foreign lines for use as road-building material.

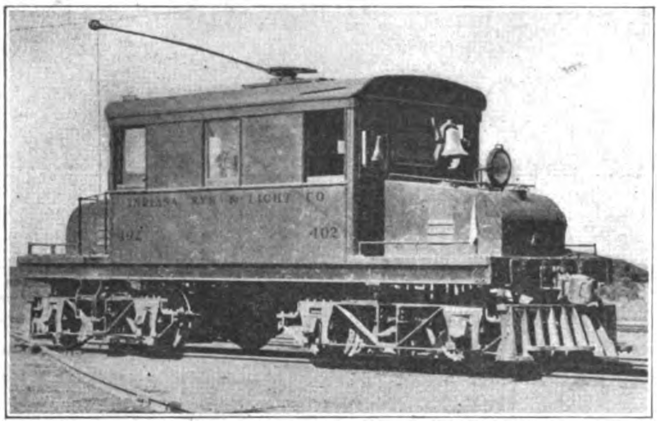
The underframe of the locomotive consists of 6-in. 25-lb. steel I-beam longitudinal and intermediate sills and 6 in. 18 lb. channel cross-sills. All corners are reinforced with 12-in. x 12-in. x ½-in. gusset plates and 6-in. x 12-in. x ½-in. angles. All work is hot riveted with ¾-in. rivets. Corrugated iron sheets are supported on the lower flanges of the I-beam and channel sills and concrete with reinforcing rods and wire mesh is filled in to the top of the sills. The flooring is 1¾-in. plank. The end sills are 6-in. channels with the web space filled in with 2-in. oak and the whole covered with a 1-in. plate as shown in the illustrations. The over-all length is 26 ft. and the over-all width 8 ft.

The cab is 14 ft. x 8 ft., built with 5-in. x 5-in. yellow pine corner posts and 3-in. x 3-in. intermediate posts



AT LEFT, INTERIOR OF CAB SHOWING OPERATING EQUIPMENT. IN THE CENTER AND AT RIGHT, TWO INTERIOR VIEWS OF CAB SHOWING LOCATION OF CONTROL, RESISTORS, FEED AND CHECK VALVES, ETC.

cross-braced with 3-in. x 3-in. lumber. There are three windows in each side and two in each end, the four corner side windows being of the drop-sash type. A door in each end of the cab opens inward. The cab is covered with No. 14-gage sheet iron and the arch roof is ⅞-in. beaded ceiling with oak carlines reinforced with ½-in. x 2-in. iron carlines covered with ⅜-in. poplar and 14-oz. duck. The over-all height is 12 ft. 3 in. All the control, resistors, lightning arresters, and feed and check valves are mounted on a frame in the center of the cab built of 3-in. x 3-in. x ⅜-in. angle iron. The sloping hoods at either end of the cab are built from No. 14-gage sheet iron supported on 1-in. x 1-in. x ¼-in. angles and are 5 ft. long. The air compressor is located under one hood and a tool box under the other. A sand box is also built in the end of each hood, thus giving a straight drop from the trap to the rail.



45-TON LOCOMOTIVE DESIGNED AND BUILT IN INDIANA RAILWAYS SHOP

The trucks are Peckham interurban with bolsters spaced 16 ft. centers and a 6-ft. 10-in. wheelbase. Axles are 5 in. in diameter with 34-in. steel-tired wheels. Four Westinghouse 93-A motors are used with a gear ratio of 16 to 71 and a free running speed of 35 m.p.h. For very slow running, or in case of trouble with any motor, all motors can be operated in series. The control is Westinghouse HL double end with Westinghouse double-end A.M.M. air brakes and Westinghouse D-3 E.C. compressor. Other equipment includes Gould No. 1080 couplers, Ohio Brass Company sanders, General Electric headlights, Baldwin Locomotive Company bell, Electric Service Supply Company gongs, Nuttall No. 13 trolley base, Dayton drop-handle hand brake and Hartman center bearings.

This locomotive was designed by and built under the direction of M. S. Ferguson, master mechanic. Its use for snow plow operation was described in last week's issue of the ELECTRIC RAILWAY JOURNAL.

Paint Substituted for String Band Reduces Grounded Commutator Trouble

IN THE SHOPS of the United Railroads of San Francisco string bands are no longer used on the commutator mica rings of armatures which have been rewound or repaired in the shop. It has been found that a much better method is to apply a special paint compound which incidentally can be put on more quickly and more cheaply than the ordinary string band.

After the armatures come from the baking oven the ends of the commutators are given three coats of paint while the armature is still hot. The paint is made up of oxide of iron mixed with any good grade of shellac. This has been found to harden with a smooth glazed surface so hard that even a sand blast does not remove it.

The high resisting qualities of this compound are such that grease and dirt which accumulate here and tend to form a short circuit across the commutator insulation to ground are rendered harmless. Wiping the grease off the ordinary string band invariably leaves a certain amount of it "rubbed in," but when the compound is used, wiping removes all traces of grease and dirt.

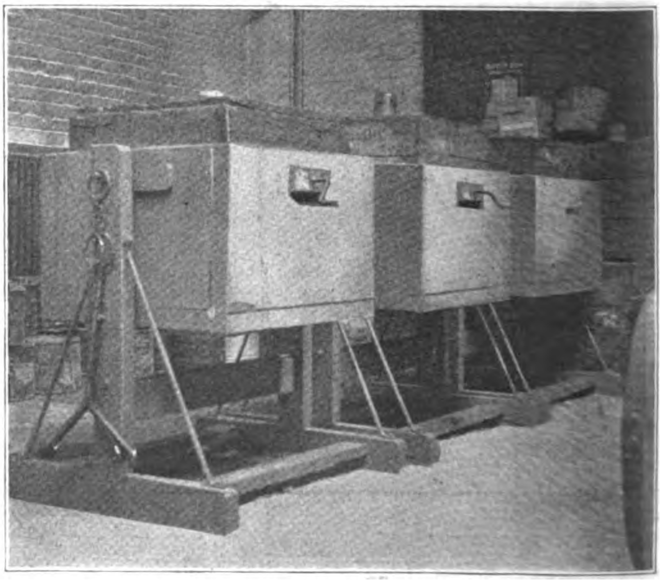
This compound forms an insulating cement of such good adhesive qualities that it has been used in repairing the insulation between commutator bars. It is applied for that purpose in the same way as any cement would be applied, using the mica as a filler. When the desired surface has been built up the surplus is ground off in smoothing up the commutator. Since this compound has been used in this way the trouble with grounded commutators has been reduced by 80 per cent.

Getting Liquid Out of the Carboy

THE Cleveland (Ohio) Railway uses in its paint house, which forms one of a group of buildings comprising the Harvard Avenue shops, a carboy holder of the type shown in the accompanying illustration. This device facilitates the handling of chemicals which are received in glass carboys. It was made in the local shop and consists of a box mounted in trunnions on a substantial, well-braced wood frame. The carboy case is clamped in the box by means of a clamp screw which terminates in a crank at its outer end.

The illustrations show also, hanging on the side of the frame, a pair of hook-irons, which fit over the carboys and form an attachment for the hook of the small crane which is used to lift the carboys into boxes.

CLOSE-UP VIEW OF IRONS



ROW OF CARBOY CARRIERS IN CLEVELAND RAILWAY PAINT HOUSE

Armature and Field Coil Bake Oven

Special Dipping Tank Placed Beside the Oven Also Aids in Securing Best Insulation—Transveyor Handy for Moving Armatures About Shop

A NEW bake oven for armatures and field coils has recently been built in the shops of the Newport News & Hampton Railway, Gas & Electric Company at Hampton, Va., and this, together with a new dipping tank and the practice followed in heating and dipping armatures and coils, has resulted in a notable improvement in the insulating qualities of the motors. The oven measures 12 ft. x 7 ft. on the outside, and is constructed with double walls, with the space between filled with sawdust. This insulating material was used in lieu of mineral wool which could not be secured at the time the oven was built. The oven is lined inside with a ⅛-in. layer of asbestos. It is equipped with four double-wall doors, each of which has an inspection window, as seen in an accompanying photograph. Ventilation holes were provided at the bottom and top of the oven by boring ½-in. holes through the walls and ceiling, so that there would be no chance of gas collecting and exploding. One complete four-motor equipment can be overhauled and taken care of in the oven at one time. This is more capacity than is usually required, but it was the basis on which the oven was planned. The oven is heated by two circuits of five panel type heater coils each, supplied with energy from the 600-volt trolley supply.

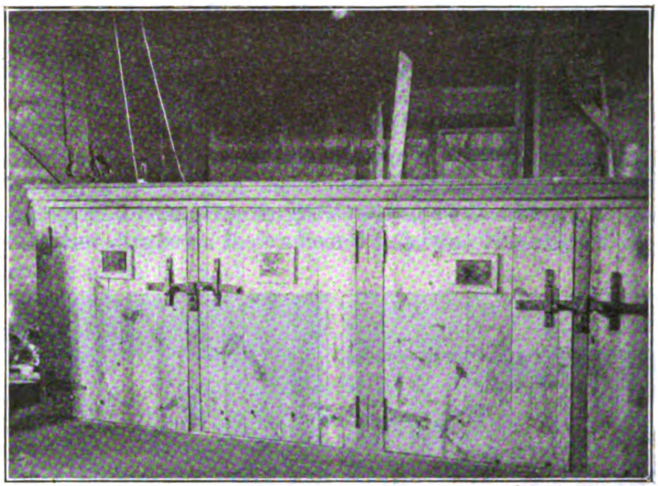
DIPPING TANK MADE AT SMALL COST

A steel dipping tank for armatures and coils forms another important auxiliary equipment used in the maintenance of motors in the Hampton shops. This is located adjacent to the baking oven so that armatures may be readily taken from the oven, dipped in the varnish, and returned to the oven according to the practice outlined below. A triplex chain block is so located in front of the oven that it serves for use in this dipping process.

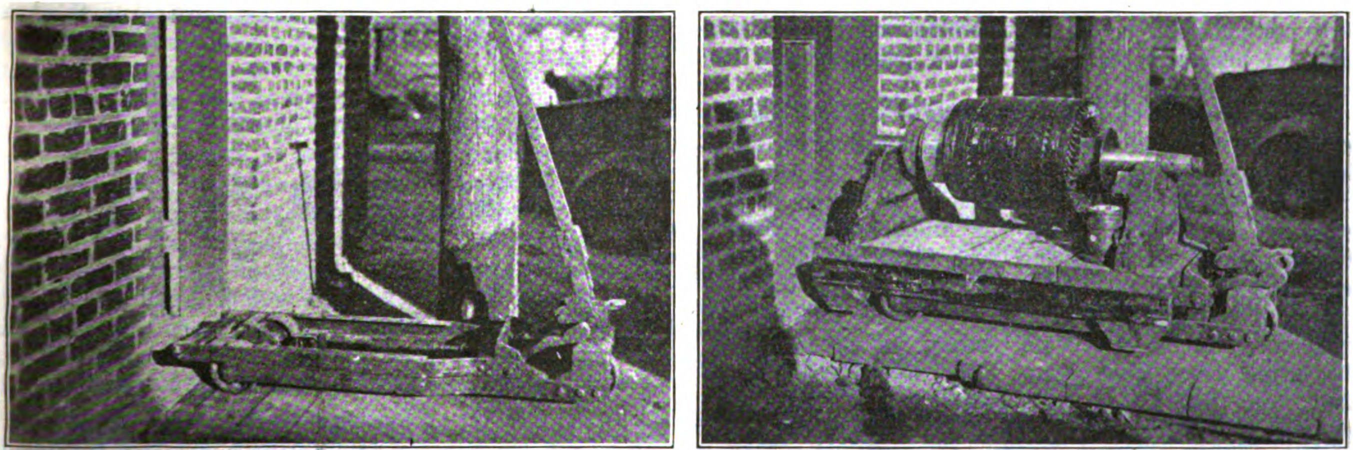
The dipping tank was made in the company's shop from a sheet of No. 10 steel, bent around into a cylinder and the joints welded and riveted. A steel bottom was electrically welded to the cylinder. The tank was set in the ground about a foot to stabilize it. It measures 24 in. in diameter x 4 ft. 6 in. in height.

For conveying the armatures and field coils from the truck repair shop to armature room and thence to the bake oven, and in fact for the movement of almost any heavy equipment about the shops, the Hampton company has found the Cowan transveyor to be exceedingly helpful. This is a small three-wheeled device having a sur-table which is elevated about 3 in. by means of the handle used to draw the transveyor. A number of platforms have been built upon which motor armatures or other heavy equipment can be placed, the transveyor backed underneath the platforms, the sur-table elevated, and the equipment easily hauled to the point in the shop at which it is desired. Hauling the transveyor is made easy by its ball bearings. The platform is lowered to the floor by tripping a foot lever, and an oil cylinder and plunger prevent the load from dropping suddenly. One of these transveyors was purchased in June, 1918, at a cost of $80 and has been used eighteen months at the time of this writing without any expenditures for maintenance. This transveyor is shown in an accompanying illustration.

After an armature or field coil has been repaired in the armature room, it is placed on one of the transveyor platforms and hauled to the bake oven. The transveyor with its load is then pushed back into the oven, the sur-table lowered and the transveyor released for other use, leaving the armature in the oven for heating. The armature or field coils are allowed to remain in the oven



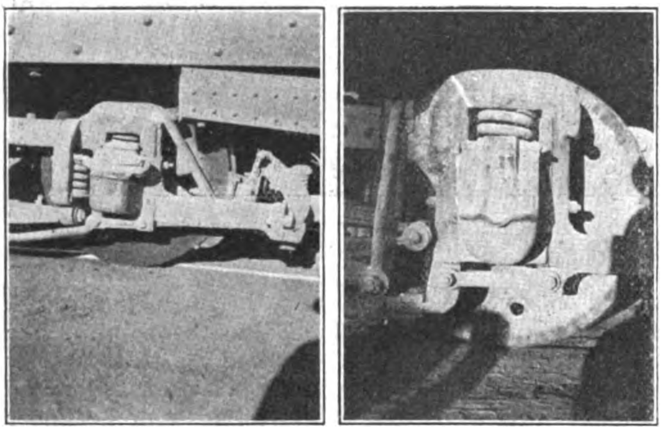
PARTIAL FRONT VIEW OF ELECTRIC BAKE OVEN AT HAMPTON



AT LEFT, THE TRANSVEYOR USED TO MOVE ARMATURES AND OTHER HEAVY EQUIPMENT ABOUT THE SHOP. AT RIGHT, ONE OF THE SPECIAL ARMATURE PLATFORMS WHICH HAS BEEN PICKED UP BY THE TRANSVEYOR for 10 or 12 hours, usually over night, before dipping, in order that they will be thoroughly hot at the time they are subjected to the varnish treatment. It is considered very important to dip the armatures and coils while hot, in order to expel all moisture. The heat thins the varnish so that it penetrates the small crevices to better advantage. The immersion in the varnish is continued until all bubbling stops, and then the armature or coils are placed back in the oven and baked for 48 hours at a temperature of approximately 110 deg. C.

Welding Broken Pedestals Without Removing the Truck

THE welding of broken truck pedestals has been worked out by R. J. Morrison, Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., with satisfactory results not only as to mechanical strength, but also as to method. The accompanying illustrations show two kinds of breaks in Brill 27-F truck pedestals and the scheme of repairing.



AT LEFT, REINFORCING WELDED TRUCK FRAME WHERE BREAK OCCURRED ON SIDE OF PEDESTAL. AT RIGHT, REINFORCING BROKEN AND WELDED PEDESTAL WHERE BREAK OCCURRED AT TOP

In the first case the pedestal broke where the journal box hinge wing, in the picture, casts a shadow. The first step in making the repair was to remove the side frame of the truck so that it could be placed in any position for working with the Indianapolis electric welder without removing the truck from the car. This was done by removing the four bolts holding the side frame to the end frame, the four bolts holding the transoms, and the two bolts holding the spring plank, the latter being blocked up. The side frame of the truck was then placed on a power saw and a section was sawed out of each piece of the pedestal at the break to make a wide-open "V." The two pieces were then blocked in the proper relative position and the "V" was filled with metal, using a hard steel electrode for the purpose.

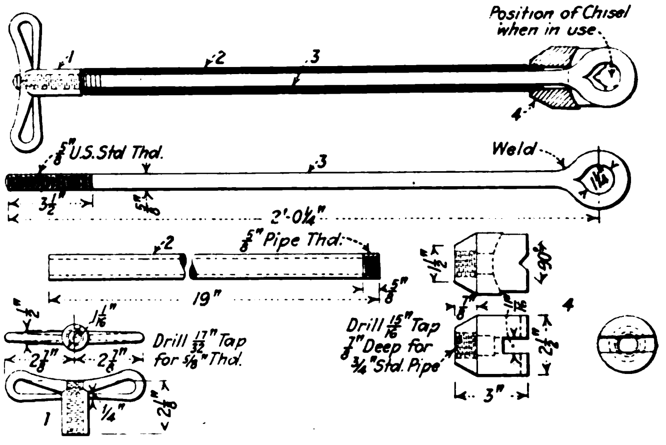
A 1-in. x 3-in. piece of iron bar was then forked at one end to fit over the end piece of the frame which supports the transom, and bent to fit over the top of the pedestal, as seen in the picture. This bar was then electrically welded along both edges to the top of the pedestal, and at the forked end, thus providing a substantial reenforcement or brace for the broken side of the pedestal.

The truck frame was then slid back into place on the truck and bolted up and the car was ready for service. The entire job was completed in seven hours, of which four hours were required to do the actual welding. A similar break has been repaired in the same manner on three cars with complete success.

In the second case illustrated the break of the pedestal was at the upper left-hand corner, as indicated by the white chalk mark. In this case the side frame of the truck was removed as described above, and a power saw was used to cut a wide "V" in the pedestal at the point of the break. The straps across the bottom of the pedestal were then put in place to help in holding the two pieces of the pedestal in proper relative position and the "V" was filled with metal. To reinforce this break, a strap of 1-in. x 3-in. iron bar was bent completely over the top of the pedestal and forked at the left-hand end to straddle the side frame. All edges of this bar were then thoroughly welded to the pedestal, forming a very substantial reinforcement.

Good Type of Chisel-Bar Holder

THE accompanying illustration shows details of a very convenient type of chisel-bar holder which, due to the adjustments provided, can be used to fit on a chisel of almost any diameter or length. It consists essentially of four parts: a long rod ⅝ in. in diameter with an eye at one end and threaded at the other; a socket made of machine steel, case-hardened, which fits over the rod and provides a clamp for the chisel; a piece of ¾-in. pipe which serves as a sleeve and to which the socket is screwed, and a hand nut which is screwed on the threaded portion of the steel rod or stem. By tightening the nut the pipe sleeve, together with the socket, is forced against the chisel, so as to clamp it in position. By the use of a rubber or leather bushing in the socket, the jar and vibration occasioned by striking the chisel can be absorbed, so that very little of it will be felt by the man holding the bar. The information regarding this holder was secured from the Rochester Railway and Light Company.


Position of Chisel when in use
1
2
3
4
⅝" U.S. Std Thd.
3
Weld
1¼
3½"
⅝
2'-0¼"
2
⅝" Pipe Thd.
19"
⅝"
1½
90°
⅞
1/16
4
2½
3"
Drill 15/16" Tap ⅞" Deep for ¾" Std. Pipe
½
1 1/16"
2⅞"
2⅞"
Drill 17/32" Tap for ⅝" Thd.
1
¼"
2⅝

DETAILS OF CHISEL-BAR HOLDER

The above note is based on a poster forming a part of a recent issue of the National Safety Council weekly news-letter.

P. H. Hooper, water works superintendent, Winnipeg, Man., has been instructed to report upon the cost of examining 25 miles of Winnipeg water mains, which are alleged to have been injured by stray currents from the return circuits of the Winnipeg Electric Railway. The city is now suing the company for $18,000 damages said to be due to this cause.

A. I. E. E. Holds Eighth Midwinter Convention

From the Electric Railway Standpoint the Most Important Session Was That Devoted to the "Super Power System" Advocated by W. S. Murray

THE American Institute of Electrical Engineers held its eighth midwinter convention on Wednesday, Thursday and Friday of this week at the Engineering Societies Building in New York City. A registration of about five hundred indicates the continued success of these conventions and the interest in the subjects under discussion.

Registration opened Wednesday, but, aside from inspection trips and attendance at a session of the American Institute of Mining and Metallurgical Engineers, there was no convention schedule until the evening meeting. At this meeting President Calvert Townley delivered an impressive address. He re-outlined and explained the recommendations of the joint conference committee of the four national societies with reference to the type of organization engineers should effect to express most efficiently the sentiment of engineers at large on national questions and to formulate policies which concern all engineers as differentiated from individual groups. Three papers were presented; on "Daylight Saving," by P. S. Millar; on "Essential Statistics for the General Comparison of Steam Power Plant Performance," by W. S. Gorsuch of the Interborough Rapid Transit Company; and on "Standard Graphic Symbols," by E. J. Cheney, engineering staff Public Service Commission of New York. Mr. Millar gave an impartial analysis of the effects of daylight saving, discussing coal saving, the habits of the people and many other points. Mr. Gorsuch made a plea for a system of reports of steam power plants which would allow general comparison, the chief argument being for a uniform system of questionnaires from governmental authority. Mr. Cheney showed the wide variation in graphic symbols used in electrical drafting and made suggestions looking toward standardization of at least some items.

The session Thursday morning was devoted entirely to a symposium on an "Economical Supply of Electric Power for the Industries and the Railroads of the Northeast Atlantic Seaboard." This was the result of the efforts of W. S. Murray, chairman of the traction and transportation committee of the Institute, who requested some nine others to make contributions on particular parts of the general subject such as generators, turbines, railroad electrification, coal saving, transmission problems and insulation. Mr. Murray presented the whole symposium in a covering paper. The subsequent discussion emphasized many of the more important aspects of the proposed plan. The plan has been outlined in the technical and public press. It is, specifically, a tying together of the northeastern Atlantic seaboard district into one electrical network, the more economical production and utilization of power and the electrification of the railways in the entire zone. Mr. Storer, Westinghouse Electric & Manufacturing Company, made the point that the railways must take a leaf from the housewife's notebook and say "Do It Electrically," not only as to motive power but also as to all other places along the line where electricity might be applied to save labor. The sentiment of the meeting seemed to be that some answer would have to be found and that an impartial committee should be formed to investigate and formulate methods of attack.

On Thursday afternoon, parallel sessions were held. At one, devoted to communication, there were papers on "Printing Telegraph Systems," by J. H. Bell of the Western Electric Company, and on "Maximum Output Networks for Telephone Substation and Repeater Circuits," by G. A. Campbell and R. M. Foster, of the American Telephone & Telegraph Company. At the other session there were papers on "A Method of Separating No-Load Losses in Electrical Machinery," by C. J. Fechheimer of the Westinghouse Electric & Manufacturing Company, on "Inherent Regulation of d. c. Circuits," by A. L. Ellis and B. W. St. Clair of the General Electric Company, and on "Measurement of Projectile Velocities," by P. E. Klopsteg of Leeds & Northrup Company and A. L. Loomis, formerly major, Ordnance Corps, U. S. A.

On Thursday evening, the convention dinner dance was held at the Hotel Astor.

Friday's morning session was devoted to detailed apparatus such as "A New Form of Vibration Galvanometer," by P. G. Agnew of the Bureau of Standards; "Precision Galvanometer for Measuring Thermo. E.M.F.'s," by T. R. Harrison and P. D. Foote of the Bureau of Standards; and "Notes on Synchronous Commutators," by Prof. J. B. Whitehead of Johns Hopkins University. In the afternoon the following papers were on the program, on "Oscillographs and Their Tests," by Prof. A. E. Kennelly of Harvard University, R. N. Hunter of the American Telephone & Telegraph Company and A. A. Prior of the Case School of Applied Science; and on "The Accuracy of Commercial Measurements," by H. B. Brooks of the Bureau of Standards.

A more complete abstract of some of the papers presented and the discussions following will be given in a later issue of this paper.

February Meeting of the New England Street Railway Club

THE February meeting of the New England Street Railway club was held at the American House, Boston, on Feb. 5, 1920. Owing to the severity of the snow storm, a small attendance resulted. The papers prepared by Mr. Bennett and Mr. Lindall were postponed until the April meeting of the club. The afternoon session was adjourned.

At the dinner Mr. Atwill, chairman of the Commission on Public Utilities of the State of Massachusetts, gave a short address on 100 per cent Americanism. Announcement of the annual dinner to be held March 25, 1920, at the Copley-Plaza, Boston, was made. The speakers for this banquet will be Matthew Brush, Governor Sproul of Pennsylvania, Governor Coolidge of Massachusetts, and Mayor Peters of Boston.

A note in a recent issue of *London Engineering* states that the work on Simplon Tunnel No. 2 had to be suspended in July, 1918, owing to the dearth of labor and materials. The operations were resumed at the beginning of November, 1919. By the end of 1919 more than 87 per cent of the tunnel had been completed. The tunnel will be nearly 11½ miles long.

Association News

Association at Coal Hearing

Representatives Make Protest at Washington on Increased Prices for Fuel

PROTESTS against the passing on by the operators of the 14 per cent wage increase allowed coal miners by Dr. Garfield were registered before the President's coal commission, Feb. 17, by representatives of several of the public utility associations. Confiscation and diversion of public utility coal by the Railroad Administration also came in for severe condemnation. Several of the public utility witnesses advised the Commission that they regarded as essential to continue in force the Government restrictions on coal until normal conditions have been restored. It was stated, however, that the distribution of fuel should be placed with an agency other than the Railroad Administration. A seasonal rate on the railroads for coal and operators' discount were recommended to assist in the effort the utilities associations are making to induce their members to buy more coal during the spring and summer.

George W. Elliott, of the National Committee on Gas and Electric Service, was the first witness. He called attention to the fact that public utilities use 50,000,000 tons of coal annually. With 98 per cent of this coal bought on contracts the public utilities have been hard hit by the action of the coal operators in passing on the 14 per cent increase to them. He, as well as practically all the other witnesses, asked that the public utilities be relieved of that increase in their price. Mr. Elliott also dwelt at length on the difficult situation which had been brought about by their failure to receive coal after it had been ordered.

Chairman Robinson asked Mr. Elliott to furnish a statement showing the quantity of coal consumed in normal times by the public utility companies of the country. He also asked that a tabulation be made to show a record of the deliveries of coal by months during 1919. A third request was for an estimate as to the storage capacity which is available at public utility plants.

Mr. Robinson also asked if it is the policy of public utility companies to take advantage of the fact that they are second only to railroads in the matter of priority of fuel supply and delay purchases of coal when there is a prospect of making a better bargain at a later time. Mr. Elliott replied to the effect that if such a practice were indulged in the cases were insignificant in number.

A. W. Brady, president Union Traction Company of Indiana, said that the point had been reached where traction lines cannot recoup their revenues by increasing fares. Any further increases, he said, would result in decreased receipts, and as a consequence traction companies must curtail their service if they are to absorb the 14 per cent increase in coal price or any further increases which might be made in the cost of coal.

Charles Edgar of Boston, representing the National Electric Light Association, told how the Boston Edison Company has a storage capacity for 100,000 tons of coal but is unable to utilize its entire storage capacity due to the fact that deliveries of coal cannot be secured in summer months. It has been the practice with the company to store three months' supply of coal during the summer, he testified, while the practice of the New York Edison Company is to enter the winter with a two months' supply. Inability to get coal last summer found the New York Edison Company at Christmas time with a margin of only 20,000 tons of coal. He declared that public utilities companies generally are in entire sympathy with the storage plan. He also told of the many difficulties which the Railroad Administration's distribution program had brought to large consumers of coal.

Paul Thompson, of Philadelphia, representing the United Gas industries, brought out the need for prohibiting the confiscation of gas coal for steam purposes. He said that the railroads had confiscated and burned in their boilers large quantities of this special coal which was so needed by the manufacturers of artificial gas.

M. H. Aylesworth, general manager of the National Electric Light Association, among other things urged that steps be taken to make it profitable for public utilities companies to buy coal at summer prices for storage. He told of the additional expense occasioned by the rehandling made necessary by the storage of coal. At this point in his testimony, Chairman Robinson asked whether in view of the general public's dependence on public utilities and because many thousands of mine owners are seriously affected by the seasonal character of the purchases of coal, it is not the duty of public utilities companies to store coal even if the cost to them should be greater. Mr. Aylesworth replied that it is his personal conviction that it is their duty.

Oscar H. Fogg, secretary of the American Gas Association, testified that it was the usual practice for manufacturers of artificial gas to store a three or four months' supply of coal during the summer.

With the completion of the testimony of the representatives of the utilities associations, Ralph Crews, representing the coal operators of the central competitive field, asked permission to make a statement regarding the passing on of the 14 per cent advance. He explained that price control had been lifted by the fuel administration, and for eight months contracts had been entered into in good faith without any provision for a reinstating of the price control. For that reason the fuel administration had ruled that where contracts provided that price agreed upon is to be augmented by any wage increase, it is only fair and business-like that the contract shall be strictly lived up to.

The same points were made before the Frelinghuysen sub-committee which is investigating coal for the Senate.

Instructions to Committees

SECRETARY BURRITT has sent to officers and committee members of the Engineering Association, copies of a pamphlet containing a code of instructions and regulations governing the style of specifications. This is in form for insertion in the covers of the Engineering Manual.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Ottawa for City Ownership

City Officials Take This Stand, but Company Conducts Campaign for Service-at-Cost

On Jan. 19 the Ottawa (Ont.) Electric Railway sent a letter to the Board of Control of the city suggesting that they investigate the service-at-cost plan of operation for the railway in Ottawa. The company did not do this with the intention of opposing municipal ownership at the expiration of its franchise in 1923, but because the adoption of this plan would enable it to continue to provide adequate service during the declining years of the franchise.

RAILWAY TAKES FIRM STAND

The company hoped that the city authorities would inquire carefully into the proposal. The city clerk has written that the City Council "is not prepared to enter into any service-at-cost scheme such as suggested, and therefore considers it unnecessary to discuss the general principles of this method of operating."

The railway is so firmly convinced that service-at-cost is the best plan that could possibly be devised for the operation of public utilities that it proposes to continue to discuss with its patrons through the *O. E. R. News* the theory of the plan, and its practical application to the local situation.

Supplementing in a way the statement of the general rejection of the company's proposal by the city, Mayor Fisher subsequently addressed well attended meetings of the Board of Trade on the matter. At one of these meetings the Mayor said the proposition of the company that it should be guaranteed 6 per cent not on the money it had put into the business but on the capitalized value of the system now, was not a fair proposition. He said:

> If the company does not recede from its position, there can be only one conclusion, that it is a hold up, a deliberate attempt to take money from the people that they are not obligated to pay. If the company wants to deal honestly and fairly with the city, it should be prepared to carry out its contract in a decent and honorable way.

MAYOR WILLING TO HELP

The Mayor was emphatically in favor of municipal ownership and against the service-at-cost proposition. He was willing to consider the city assisting in financing the purchase of necessary equipment to put the service in proper shape, to have the city agree to take over new equipment at present prices, less depreciation, or the city might buy the equipment and rent to the company at a sum sufficient to cover the interest on investment and depreciation until the end of the franchise.

That the proposal of the company was misinterpreted in some of its phases by the city appears quite plain, for as the company pointed out after the talks by the Mayor, the company's capitalization has no bearing upon the settlement question.

In a statement addressed to the public the management of the company has explained that when the city decides to take over the property it will not be interested in the capitalization, but will ask a board of arbitration to decide what the property is worth in dollars and cents. The proposal of the company is that after the worth of the property has been ascertained by some one competent to judge, the company carry on the business with the understanding that the fares received from passengers be sufficient to pay the usual cost of operation and 6 per cent on the valuation to the owners of the property. Any revenue remaining at the end of the year, over and above the cost of operation, would belong to the city.

As stated previously the Mayor favors municipal ownership. The company feels that service-at-cost affords the best solution. It is, however, open to suggestion. This is indicated by its stand as follows:

> When the counter proposal of the Board of Control is received by the company, it will be given most careful attention, but we do not want the people of Ottawa to have a wrong conception of service-at-cost because we, as life-long students of this business, consider it the most equitable plan of street railway operation that can possibly be devised.

Reorganized Company Plans Improvements

Several hundred thousand dollars are to be spent by the San Francisco-Sacramento Railway, the successor under reorganization to the Oakland, Antioch & Eastern Railway, for improvements during the coming year, according to the expenditure budget just adopted. The work contemplated includes the construction of a branch line between Clyde and the plant of the Pacific Coast Shipbuilding Company, the purchase of additional motor equipment and rolling stock and extensive improvements on roadbed, maintenance and general equipment.

In addition to six new passenger coaches to handle intercity traffic, new transforming substations will be installed, catenary construction employed between Saranap Junction and Bay Point; the tunnel between Shepherd and Redwood Canyons constructed at a cost of $150,000, and the entire roadbed reballasted.

Work has already started on the Clyde extension.

Loop Subways in Chicago

Their Cost to Be Estimated—$90,000 Spent in Fight Against Increased Fares

At its meeting on Feb. 6 Mayor Thompson's traction commission designated George W. Jackson, engineer, to prepare an estimate of cost of building subways in Chicago's loop district under Lake, Randolph, Washington, Madison, Monroe, Adams, Van Buren and Harrison Streets, from Halstead Street to Grant Park, and under Wells, La Salle, Clark, Dearborn and State Streets, and Wabash Avenue from Twelfth Street to Erie Street.

MORE MONORAIL TALK

Chairman Samuel A. Ettelson explained that the commission was not committed to the subway, or any other plan as yet, but wanted to have at hand the data for subways under those streets. Mr. Jackson is the engineer who built the freight subways under Chicago operated by the Illinois Tunnel Company.

The monorail proposition, referred to previously in this paper had another inning before the commission at this meeting, and a special representative of the Mayor tried to incite the commission to immediate action in building a 5-mile experimental installation of the system. F. D. Flint, promotor for the monorail, took occasion to correct the figure which had been given in the newspapers as the estimated cost of building and equipping a monorail system. He stated that a double-track line could be built and completely equipped for $200,000 a mile. This figure provides for a structure weighing less than 400 lb. per lineal foot and gives a clearance below the bottom of the cars of 15 ft. The proposed cars will weigh only 12 tons.

The principal reasons for the traction commission taking so great an interest in the monorail system are its low cost and the fact that it is claimed that a 5-mile structure could be installed by the middle of next summer. This is compared in the minds of the commissioners with enormous cost and twelve years' time required to build a subway system.

$90,000 SPENT FIGHTING FARES

It was learned on Feb. 5 that $90,000 of the $105,000 appropriated for the city's fight against the increased railway fares has already been spent. Eleven $60-a-day engineers and fifty-one $30-a-day appraisers had been on the pay roll in this fight, according to the report made to the finance committee of the Council.

Service-at-Cost Terms

New Toledo Proposal Is for Twenty-five Year Franchise With Six-Cent Initial Fare

The proposed service-at-cost franchise for the settlement of the railway problem at Toledo, Ohio, drafted by a commission of business men appointed by Federal Judge John M. Killits, has been submitted to Henry L. Doherty, operating head of the Toledo Railways & Light Company, and a committee of ten prominent Toledo lawyers. All objections will be made in writing. The measure will then be submitted to Council for passage, after which it will have to be ratified by a vote of the people.

INTERURBAN PROVISIONS CHANGED

The most important change made during the past week was in the section affecting interurbans. Rather than be required to turn over all fares collected in the city, they will be allowed to contract with the local company and in case of dispute will refer all matters to arbitration for settlement. Council will have to approve all contracts.

The following is a summary of the most important provisions in the new service-at-cost measure:

Franchise is for twenty-five years.

A new company, to be known as The Toledo Street Railway, is to be organized to take over the railway system, except the power houses, and operate it independently of the lighting and power business of the Toledo Railways & Light Company.

Provision made for sliding scale of fares, with initial rate of 6 cents with 1 cent for transfer. Possible maximum fare, 7 cents, with 1 cent transfer; possible minimum fare, 3 cents.

The company is to place $400,000 in a stabilizing fund. All receipts of company above expenses are to be placed in this fund. When the fund reaches $500,000, fares are to be decreased automatically. If a deficit is shown and the fund is reduced to $300,000, fares are to be increased.

Provision is made for creation of maintenance, depreciation and sinking funds. The sinking fund is to be invested in bonds of the company, which are to become the property of the city, but stamped as junior securities.

In event of purchase of the property by the city, the price is to be reduced by the amount of the sinking fund.

City reserves right to lease or purchase railway at any time.

Mayor may investigate affairs of company, board of control or traction commissioner at any time.

After franchise has been in effect ten years it may be renewed or the city may begin process of gradual purchase by creation of an amortization fund, by adding a small amount to the rate of fare—enough to pay one-fifteenth of the value the first year of amortization period, one-fourteenth the next year, and so on down until the entire amount is paid and the car lines become municipally owned.

Interurban cars can be operated on city tracks by contract between interurban and local companies, but subject to regulation of Council.

Contract for electrical power shall be between the Toledo Street Railway and the Toledo Railways & Light Company, but subject to approval of the city commissioner. In case of disagreement as to rate, State Public Utilities Commission or board of arbitration may make adjustment.

If freight cars are operated, it shall be under regulation of Council.

Capital value of company, based upon appraisement of its physical property, is yet to be determined. City's appraisement is $7,111,000; while Henry L. Doherty's maximum is $17,000,000.

Company's bonds bear 6 per cent interest and have a call premium of 4 per cent.

Stock dividend shall be 7 per cent and there shall be a call premium on stock of 8 per cent.

Stock issues must not exceed 40 per cent of capital value, the remainder to be represented by bonds.

Toledo Street Railway must provide $1,000,000 cash, for which stock will be sold. This will be used for betterments and extensions, including cross-town line and rerouting. Also $500,000 must be provided for repair and rehabilitation of the property, to put it in good operating condition generally.

Mayor is to appoint a board of railway control, consisting of three members, who are to serve without compensation and act in a general advisory capacity to Council and the city transportation commissioner.

Transportation commissioner to be appointed by the Mayor, upon recommendation of the board of control, his salary to be fixed by the board subject to approval of the Mayor. Commissioner is to employ necessary assistants, engineers and clerks to aid in supervision of operating of the lines and checking receipts and expenditures of the company, having access to the books of the company at all times

Board of control is to employ expert engineers to plan rerouting and rearrangement of car lines at a cost of $10,000 or more if necessary, subject to approval of Council.

Company is required to pay for new street pavement between car tracks and one foot on each side, but is not required to pay for repaving.

Company is required to operate modern, comfortable cars.

Schedules are to be fixed by City Commissioner and Council has authority to order improved service on any line, at its discretion.

The hope for a municipal ownership measure to submit to the people of Toledo at the same time their cost-of service franchise is up for ratification now lies in a favorable decision from the Supreme Court of Ohio on the test case brought by the city to determine whether or not a municipality can issue general credit bonds to purchase a transportation system. Decision was expected either Feb. 17 or 24.

New York Mayors State Their Plans

William P. Capes, Albany, N. Y., secretary of the State Conference of Mayors of New York, has made public the program of legislation of the Mayors and other public officials. Many sweeping changes are suggested, among them home rule for the cities, reforms affecting the Public Service Commission law and a plan advocating hydro-electric utilities.

The members of the conference believe that the public utility bill presented at the last session of the Legislature is "the most practical and the safest plan yet proposed." They say:

It is not a municipal ownership bill—it does not even express a preference for that solution of the problem. It is simply a utility measure by means of which a city and its public service corporations may cure utility ills in any way that will be equitable to the corporation and give adequate service at as economical a cost as possible. At the present time the cities have no power to do this. All that the cities seek is this authority so that they may exercise it when needed. The cities are opposed to any legislation which will confer upon the Public Service Commission power to regulate rates, irrespective of franchise restrictions. They also are opposed to any legislation which will permit a utility to unload on a municipality.

The conference also has something to say about the matter of valuations. On this point it says:

The cities believe that the Legislature at its 1920 session should grant to the Public Service Commission, Second District, sufficient funds whereby the commission can make an independent appraisal of the properties of the telephone companies in this State for the purpose of determining equitable service rates.

"The Street Cars Must Go"

Publicity copy which appeared under the above caption is being distributed by a motor truck manufacturer. It is apparently intended to be a broadside aimed at the electric railway industry to retire the railway by condemnation and substitute the motor bus by acclamation. There is a good laugh in it for anyone who knows anything about the transportation business. At the same time a lesson may be drawn. The statement follows:

It becomes daily more apparent that the motor truck has sounded the death knell of the street car. Traffic congestion in large cities make the street car just as awkward and unnecessary as its predecessors the horse car and the stage coach. The day of the surface car has gone forever, and it will not be long before the large cities are trackless and free from the unsightly and abominable overhead wires with their appurtenances.

A single street car out of order can hold up traffic for hours. When a motor bus is out of order, the passengers are simply transferred to another bus, and the derelict is repaired at their leisure by a wrecking crew or hauled to the garage. There is no break in the service, the strength of which lies in its constancy. A fire can hold up an entire street car system, but motor buses are not subject to the limitation of tracks, and they can readily change their route to another street when one is closed to them.

Motor buses mean faster service. While one bus is taking on passengers at a corner, the bus following can keep on going and pick up the passengers at the next corner. There is no waiting for one car to complete its loading and discharging of passengers before those behind can go ahead. In this way every motor bus bears its full share of the day's work, and the spectacle isn't seen of some crowded to the roof, while others go by empty.

The motor bus is the poor man's limousine. It gives him all the comforts and delights of closed-car motoring with none of the expense. It is swift, sure, silent, comfortable, and even luxurious.

What astonishes street car companies unable even to meet their dividend requirements is the appalling cheapness of motor bus transportation. Statistics procured by the Commissioner of Plant and Structure in New York showed that 100 buses operating on a 5-cent fare basis would pay a profit of $376.80, after allowing for every expense, including 30 per cent for depreciation.

The Fifth Avenue line of buses in New York charge a 10-cent fare. This company has been highly successful from its beginning. Subjected to the fierce competition of three different four-track subway lines, and a number of elevated and surface routes, it not only survives but continues to roll up dividends year after year. People prefer it to street cars and are glad to pay the higher fare.

City transportation of the future will consist of subways, working in conjunction with motor buses. As for the street car, it is now in its decadence and must give way to the modern motor truck, easy to operate, efficient in all kinds of weather, economical, and, most important, standing high in the graces of the riding public.

Emergency Aid for Employees

President Alexander has announced that an official of the Monongahela Valley Traction Company, Fairmont, W. Va., has been designated to look after the employees of the company who are on the sick list. Many of the employees have been losing time because of influenza. It is the duty of the agent to visit all the men who are incapacitated, to see if any service can be rendered them by the company, ascertain if a nurse is needed, and if so, to attempt to secure one, and to look after other needs that might arise when a man is suddenly stricken.

Construction Program Announced for Minneapolis

The Minneapolis (Minn.) Street Railway in the spring will begin construction of a new loop in the downtown district and two through lines, one across the new Third Avenue bridge to the East Side, and one across the Seventh Street N. bridge, thus making a new outlet to the North Side now reached only by one avenue for all lines, or by company motorbuses. This work, with the construction of front exits for 300 cars, will cost $1,000,000. The order issued by the Council on Feb. 18 has been accepted by the company.

Operation of two-car trains, which have been tried out for a long period, will be impossible, the company reports, while the reconstruction of the 300 cars is in progress. In St. Paul 225 are to be equipped for front exit. Although John A. Beeler's recent suggestion that the need in Minneapolis is relief from loop congestion, the proposed plan to bring him into consultation has been given up by the City Council.

The directors of the company at the recent meeting in New York had authorized the construction of the proposed North Seventh Street line. This additional construction will also be begun. Horace Lowry, president of the company, said the directors have voted to use every available fund for making the extensions and improving the service.

Seven Socialist Aldermen tried for two hours in the Council meeting to block the improvements, as they had done in the committee meetings, on the ground the company might make more money if the orders were carried out and that the public had not received an opportunity to express an opinion.

Application for a writ of mandamus was granted on Jan. 18 in the District Court to compel the Minneapolis Street Railway to build the Seventh Street line as ordered by the Council on April 27, 1917. This order had not been pressed pending a vote on the proposed new service-at-cost franchise by the people. After defeat of the franchise the Aldermen renewed the request for the railway extensions.

Atlanta Wage Negotiations Progressing

A strike of the union carmen in the employ of the Georgia Railway & Power Company, Atlanta, Ga., is more or less of a remote probability. H. O. Teat, business agent for the union, declares that no strike vote had been taken and that the men are negotiating with the company for an amicable settlement of the difficulty. The demands of the men have not been announced, but it is understood from good authority that they want an increase from 40 cents an hour, which is provided by the 1919 contract, to from 58 to 60 cents an hour; time and one-half for overtime, Sundays and holidays; and an annual vacation of two weeks with pay.

It was previously stated that the men demanded also a closed shop, but it is now understood this point has virtually been abandoned, making an amicable settlement still more probable.

H. M. Atkinson, chairman of the board of directors of the company, stated that no crisis is at hand and that he believes the matter will be settled shortly to the satisfaction of both sides.

By some sources it is denied that the men have asked for a two weeks' vacation annually, and time and one-half for overtime, Sundays and holidays. Definite information is not obtainable as neither side will divulge the exact demands. It is probable, however, that these demands were contained in the first contract presented, and that they have since been withdrawn, the only demands in the 1920 contract being increased pay to 58 and 60 cents an hour.

Economist Analyzes New York Situation

David Friday, of the Department of Economics of the University of Michigan, who was an expert economist and statistician in Government bureaus during the war, has issued a booklet dealing with the New York traction companies in particular. The booklet was published and is being distributed by the firm of Thompson & Black, legal and financial accountants and engineers, New York City. It is the first of a series which that firm will publish dealing with general financial problems as they affect the public.

Mr. Friday shows that while the New York traction companies have been held to their 1913 rates, the net earnings in 1919 were but 61.8 per cent of what they were in 1913. In 1913 all of those companies earned about $39,000,000, but by 1919 this had dropped to slightly more than $24,000,000. The companies must pay for what they buy in terms of a price level more than twice as high as it was in 1913, while they must sell what they have to sell on the basis of the 1913 level.

Mr. Friday holds that public utilities, especially the New York traction companies, will be utterly unable to compete in the market for new capital. This may postpone perhaps indefinitely the time when the additional traction facilities which the city needs will be provided. Mr. Friday says that new capital will not be attracted to the traction companies unless it can earn at least 8 per cent, but that would be impossible unless the companies are permitted to increase their fares.

Mr. Friday has discussed the New York traction situation from the standpoint of fairness to the companies and to the public interest. In its essence, he says, the problem is entirely one of adjusting the price of transportation on the general level of prices prevailing at the present time.

Commissioner Nixon for Square Deal

Anent the talk of legislation on a service-at-cost proposal at the present session of the New York body at Albany, Lewis Nixon, Public Service Commissioner for the First District, does not believe permissive legislation is necessary. He sees nothing to prevent the adoption of a flexible fare as matters stand at present. His statement reviewing the workings of such an arrangement is largely of interest to the general public not acquainted with methods of procedure under service-at-cost. Mr. Nixon did, however, include in a recent statement this interesting summary of his attitude:

> Every fact drawn out at the investigation, now slowly dragging along, but emphasizes the city's duty. Why is the matter not being so handled that at least an attempt should be made to end the present deplorable condition of the traction situation?
>
> Does the city fear that it may be worsted in a battle of wits? The entire people are keenly alive to the situation and every step will be carefully watched and in the end no solution not satisfactory need be concluded.
>
> Is it considered bad politics to recognize property rights in any degree? Every citizen is jealous of the city's credit and just recognition of honest investment honestly applied will be applauded. This city must from time to time borrow money and must not even by implication be accused of desire to repudiate just obligations.
>
> My desire is not to raise fares for a few months to put the systems back on their feet, but to reduce fares for many years.
>
> A self-respecting people such as ours will not commend forcing even a corporation to supply its product at less than cost unless it is the expressed policy of the people that city transportation shall be free and paid for out of the tax levy. We must not forget, though, that the city is already taxing our people millions a year to provide transportation on the subways, and this in addition to the fares they pay.
>
> The longer a meeting of the issue involved is avoided the greater will the bill become against the people to pay for neglect.
>
> Blind ignoring of existing facts and fundamental economic laws only increases the peril of forcing essential factors of transportation to fall into the hands of certain underlying bondholders. This might be most advantageous to the bondholders, but the responsibility of those who wilfully cause such result must be faced from every standpoint of criticism.
>
> This commission has no power to escape its responsibility. It must insist upon service and maintenance requiring great expenditures, even if it means bankruptcy to the companies furnishing such service.
>
> But such bankruptcy can be avoided if the problems involved are met with a sincere desire to preserve the integrity of our transportation systems in the direct interest of the public welfare.
>
> The city government has full power in the matter and this carries with it full responsibility.
>
> The people will soon begin to ask in a mighty voice why is responsibility avoided and duty neglected.
>
> This cannot be answered by saying someone made too much money in the past when inaction will result in such profits being repeated in the future.

Trainmen at Toledo Want More

High prices for uniforms, caps and shoes will be cited by trainmen of the Toledo Railways & Light Company, Toledo, Ohio, in asking for a 12 per cent increase in wages this spring. The wages asked by motormen will range from 45 cents to 55 cents an hour with a possibility of a demand for a 50-cent minimum for experienced men. The present contracts expire on April 1. Business Agent Harry Power of the Carmen's union declared that the men would be forced into other lines of business if not granted more wages.

Court Makes Railway Sprinkle Streets

The electric railway system of Sacramento, Cal., is operated by the Pacific Gas & Electric Company under a franchise granted many years ago by the city and in which there is no provision requiring the company to do any street sprinkling. In 1913 the city passed an ordinance requiring any railway operating within the city limits to sprinkle "between the rails and tracks and for a sufficient distance beyond the outermost rails thereof so as to lay the dust effectually and prevent the same from arising when cars are in operation." A violation of the ordinance was declared to be a misdemeanor.

The Pacific Gas & Electric Company, operating the railway, believed the ordinance was unconstitutional and for that reason refused to comply. The company was tried in the Police Court of the city, found guilty of the misdemeanor and fined the sum of $400. Later the District Court of Appeal sustained the validity of this judgment. The company then took the case to the Supreme Court of the United States. Here it sought to obtain a reversal of the judgment on the ground that the natural and necessary effect of the enforcement of the ordinance would be to shift from the taxpayers of the city to the company the public burden of sprinkling 24 miles of the streets at an expenditure of not less than $2,200 annually for the benefit of the public without any compensation. It also contended that the company would thereby be deprived of its property without just compensation or due process of law.

The United States Supreme Court, however, affirmed the decision of the District Court of Appeals on the ground that the adoption of the ordinance was not an unreasonable exercise of the police power of the city of Sacramento and consequently the exercise of such power was not controlled by the due process clause of the Fourteenth Amendment of the Constitution of the United States and that such ordinance did not deny to said company the equal protection of the laws.

Arbitrators Decide Interurban Wages

The unanimous finding of the board of conciliation which investigated the dispute between the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., and its employees, members of the Amalgamated, has been filed with the Minister of Labor. It recommends a nine-hour day for all passenger trainmen to be completed within eleven hours and a wage scale ranging from 36 cents an hour for the first six months to 45 cents an hour for employees with three years' service. All overtime to be paid for at the increased rate of 15 cents an hour over the scale suggested for the first hour or fraction thereof over nine hours, and at the rate of time and a half for all time served over ten hours.

The hours of freight trainmen are fixed at ten hours, six days a week, to be completed in the least number of hours possible. The board recommends that the wages of freight conductors during the first, second and third years of their service shall be 47 cents an hour and after the third year 48 cents an hour and after ten years a bonus of 2 cents an hour shall be allowed.

The wages recommended for brakemen and polemen are 41 cents an hour for the first six months and 43 cents an hour after the first year. All freight trainmen, according to the report, should receive extra pay at the rate of 15 cents an hour for the first hour or fraction thereof after ten hours and time and a half after eleven hours' service.

The Minister of Labor will hand down a decision based upon the report of the board.

Approach the Problem With an Open Mind

Conditions of electric railway operation which made municipal charges just at one time have so entirely changed that there is no longer any justification for such charges, A. W. Thompson, president of the Philadelphia Company, Pittsburgh, Pa., controlling the Pittsburgh Railways, made plain in an address before the Pittsburgh Economic Club on Feb. 4. He said:

> Lasting improvements in traction affairs call for all parties to approach the problem with open minds, and with a determination to be fair, with an appreciation both of what the communities have done for the railways and what the railways have done for the communities, the absolute necessity of each for the other, and their positive interdependence. This aspect was early recognized by local legislative bodies in their franchise enactments and in their imposition of certain obligations on the railways, such as street paving requirements, street cleaning assessments, park taxes, etc. The public, through its duly-authorized representatives, bestowed on the traction companies more or less circumscribed monopolies, and it was deemed proper to secure something in return for the franchise.
>
> In the days of horse cars, the animals wore ruts in the pavings and littered the streets, so that paving and street cleaning assessments, if properly imposed, could not be considered unreasonable. Then, too, it was supposed, with the convenient transit for those days, that people would flock to the public parks, and that the railways should bear a part of their upkeep; hence the park tax.
>
> With the development of the electric car from the horse stage and laterly the development of the automobile, conditions have changed. The electric car neither wears ruts in the pavements nor litters the streets. The advent of the automobile has considerably increased the expense of maintaining the parks. Yet the car rider still has to pay for these things when the modern service provided for him has no relation to them whatever.

Small Municipal Line Doing Well

The earnings from the operation of the Pekin (Ill.) Municipal Railway are now in excess of $100 a day. The traffic has become so heavy that the city has purchased three new cars. The road in Pekin is being operated on a 5-cent fare with six tickets for a quarter.

Kaw River Power Plant Closed

The Kaw River power plant which was built by the old Metropolitan Street Railway, Kansas City, Mo., and placed in operation on May 26, 1897, has been closed and the machinery will be placed on the market for sale. This marks the passing of another power plant which was considered a special engineering feat and an exceedingly large plant at the time of its construction.

The Kaw River plant was equipped with six 250-hp. Babcock & Wilcox boilers and six Aultman & Taylor 500-hp. boilers which operated under a steam pressure of 180 lb. The engine room contained four Corliss engines direct-connected to generators. The largest of these engines had a cylinder measurement of 36 in. x 72 in. and it was considered about the largest engine imaginable in the power generation field of that day. In fact it was large enough to pull the entire electric railway load at that time. There was one 1,320-kw. direct current 550-volt Walker generator direct connected to an E. P. Allis Company tandem compound engine; and a similar unit of 1210-kw. capacity. The largest unit was a 1,550-kw. direct current General Electric Company generator.

It required a crew of thirty men, exclusive of three men who handled the unloading of coal on a piece-work basis, to operate the plant which consumed daily 150 tons of coal. This personnel was distributed as follows: Two engineers, eight firemen, six oilers, two boiler washers, two repairmen, four ash and coal men, one wiper and two general hands.

Recent Bills at Albany

Bills introduced at Albany recently affecting electrical interests follow:

Senate Intro. No. 269, Print No. 273, Introduced Feb. 2 by Mr. Dodge. Adding new section 453-a code of civil procedure, providing that in an action wherein the validity of a rate or charge made by a public service corporation is involved the municipality granting the franchise shall be a necessary party to the action.

Assembly Intro. No. 434, Print No. 458, Introduced Feb. 4 by Mr. Donohue. Inserting new subdivision 27, section 29, General City Law authorizing cities to acquire by purchase or condemnation and to own, lease, construct maintain or operate or contract for operating of gas or electric light, heat or power, telephone or railway works or systems or any other public utility, the local authorities to determine the necessity or expediency of such acquisition, etc., in the city of New York the local authorities shall be the board of estimate.

Assembly Intro. No. 443, Print No. 470, Introduced Feb. 5 by Mr. Bourke, Incorporating the Motor Corps of America to render without charge vehicular transportation and personal service to the government, state and municipalities of the United States in any emergency and to generally render patriotic and civil service.

Senate Intro. No. 380, Print No. 392, Introduced Feb. 10 by Mr. McGarry. Providing that all street cars in the cities of Greater New York and Buffalo shall be manned by a crew consisting of at least two persons.

Senate Intro. No. 408, Print No. 434, Introduced Feb. 11 by Mr. Walker. Adding new article 12 to General City Law, authorizing cities to acquire by condemnation or purchase and to own, lease, construct and operate or contract for operation gas or electric light, heat or power telephone or railway works or systems or any other public utility, the local authorities to determine the necessity or expediency of such acquisition. In the city of New York the local authority shall be the board of estimate and apportionment.

Oil Burning in Stand-by Station to Make Big Saving

The Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., has a 2,700-kw. steam stand-by station which is used only four or five weeks during a year. For this very limited use, it is very expensive to keep an organization together to operate the plant, or very difficult to get a satisfactory one together in an emergency if it is not maintained regularly. The company is now putting in oil burners and will henceforth burn oil instead of coal because of the great advantages which are possible under the particular conditions prevailing at this plant. By using the oil, a very small organization will be needed, so that it can be maintained permanently. The boilers can be readily forced to carry 200 to 250 per cent overload with the oil whereas practically no forcing could be secured under hand-fired coal operation. It is expected that the burning of oil will save the company $15,000 a year.

News Notes

Mayor Starts Cincinnati Subway.—Mayor Galvin of Cincinnati, Ohio, on Jan. 28 operated the steam shovel which dug the first scoopful of earth in the actual work of constructing Cincinnati's rapid transit subway.

Carhouse Burned.—Thirty-three cars of the Saginaw-Bay City Railway Saginaw, Mich., were destroyed when the carhouse just outside of the city was burned. The loss is estimated at $175,000, all of which is covered by insurance.

Object to One-Man Cars.—The trainmen employed by the Trenton & Mercer County Traction Corporation and the New Jersey & Pennsylvania Traction Company, Trenton, N. J., are complaining against operation of one-man cars. Committees from both railway unions as well as a committee of various labor unions of Trenton have been appointed to act on the matter.

How the Dollar Shrinks.—The rapidity with which the dollar dwindles was described recently before the Illinois Public Utilities Commission by a witness in the Chicago Elevated Railways case. He asserted that as compared with 1915 the value of the dollar had dwindled in purchasing power to 93 cents in 1916, to 82 cents in 1917, 69 cents in 1918, 54 cents in 1919, and 47.74 cents thus far in 1920.

Wants City to Take Over Line.—Thomas W. Slick, city attorney of South Bend, Ind., has been instructed to proceed immediately with an action which would give the municipality power to take over and operate the cars of the Chicago, South Bend & Northern Indiana Railway in South Bend. Councilman Charles B. Beyers said that the company had failed to live up to its obligations. It is believed, however, that the matter was brought to a head by the failure of the company to operate cars at all times this winter on city lines on account of deep snows.

Third Arbitrator Chosen. — Hugh Ogden of the firm of Whipple, Sears & Ogden, has been named as third arbitrator on the board of arbitration to decide the compensation for men who will operate the one-man cars which the public trustees of the Eastern Massachusetts Street Railway, Boston, Mass., will soon place in operation throughout the system. The other two arbitrators are James H. Vahey, counsel for the union, and Philip G. Carleton, counsel for the railway. The union has agreed to the operation of the one-man cars pending the outcome of the arbitration proceedings. The wages decided upon by the arbitration board will be retroactive to the date when the cars are placed in operation.

Service-at-Cost Suggested for Syracuse.—An attempt to secure an investigation of the railway service in Syracuse, N. Y., has been defeated by the Common Council. Mayor Harry H. Farmer proposed a commission of representative citizens to investigate the situation, but the Common Council declared the project impracticable as the committee would have no official power to act and could offer no relief. The Council made an attempt to start its own investigation, but left the question unsettled. The problem is being agitated, and Senator J. Henry Walters, Syracuse, who is majority leader of the State Senate, promises to introduce a measure to empower the city to adopt the service-at-cost plan.

Brooklyn Men Accept Delay. — The offer of the Brooklyn (N. Y.) Rapid Transit Company to put into effect 70 per cent of its proposed new working schedule on Feb. 24, and the remaining 30 per cent on March 6, has been accepted by the members of the Amalgamated Association representing the surface, elevated, shop and maintenance departments. Some of the employees were apparently inclined to favor a strike unless the company met their demands on Feb. 24, but later assumed a more conciliatory attitude when the company officials assured the men of their good faith in the matter. The sensational stories that followed of an impending strike were denied by union leaders, who explained that violent differences of opinion were not unusual, particularly when so many men were involved.

Toledo Men Want More.—Trainmen and electrical workers employed by the Toledo Railway & Light Company, Toledo, Ohio, have put in demands for increased wages to go into effect when their contract expires on April 1. The trainmen, it is said, are asking 72, 76 and 80 cents for work for which they are now being paid 42, 44 and 46 cents. Linemen are rated as high as $1 an hour and other electrical workers accordingly. In some cases the increases amount to 50 per cent. Frank R. Coates, president of the company, will confer with Henry L. Doherty before replying to demands which have been submitted to him. If fares have to be increased it may be necessary to take the matter to the federal court.

One-Man Car Explained to City Representatives.—Walter Jackson has contributed to *The American City* for February an illustrated article "Modern Car Service at Moderate Fares," in which he tells for the benefit of officials connected with city administration how the light weight automatic or safety car operated by one man is solving for many cities the problem of modernized service at little or no increase in fare. In conclusion Mr. Jackson says that the millennium of unlimited rides, unlimited service and unlimited courtesy at zero fares or less is not going to come through mass production of car miles with the automatic tool known as the safety car, but that the safety car is at least one thing that can prove of equal benefit to both the community and the electric railway that serves it. He made a plea to let 1920 apparatus and 1920 service go hand in hand.

Programs of Meetings

Illinois Electric Railway Association

Owing to the coal situation in December it was thought best to postpone the annual convention of the Illinois Electric Railway Association, which under the by-laws is held in January, until some future date. It is the intention now to hold this the latter part of March or the first of April. This will be settled definitely, within a few days.

Southwestern Electrical & Gas Association

The sixteenth annual convention of the Southwestern Electrical & Gas Association will be held at Galveston, Tex., on May 13, 14 and 15. The Hotel Galvez will be the convention headquarters.

From reports and engagements made by members, the attendance promises to be a record one, and from the programs of papers, addresses and discussions outlined by the various chairmen of the different sections of the association, the proceedings of this coming convention will surpass all previous ones in interest and value.

Many of the delegates from the East and South to the convention of the National Electric Light Association, which will be held in Pasadena, Cal., the week following the convention of the Southwestern Association, will go there by way of the Southern Pacific Railway and invitations to all such will be issued to arrange to make a "stop-off" at Galveston and attend the convention there as guests of the Southwestern Association.

Financial and Corporate

Local Financing Planned

Springfield Sees Advantages of Subscribing $300,000 of Bonds to Help Its Railway

According to a plan of rehabilitating the Springfield (Mass) Street Railway, outlined on Feb. 12 by Clark V. Wood, president of the company, at a conference of business men called by the jitney committee of the City Council, residents of that city may be called upon to subscribe about $300,000 for bonds of the company. This is a part of a $5,000,000 bond issue which Mr. Wood anticipates will eventually discharge present indebtedness and furnish the new money that will be needed to assure Springfield the transportation facilities that will be necessary to meet and encourage the city's industrial development.

IMPROVEMENTS NECESSARY

Mr. Wood said that if the company did not secure the money needed to expand its facilities, it would struggle along as best it could, but without promise of aiding in the growth of the city. He said:

> The ultimate result does not worry me. Either this or some other City Council will see the right and wrong of it. The street railway is bound to grow. It is to stay here and the public will make use of it.
>
> I don't want any donations, but I do want support and all who buy bonds will do so with the knowledge that there is good security behind them and that they will receive a fair interest.

Mr. Wood justified his plan to sell bonds locally by contending that it is a local proposition and should be financed by those who derive the benefit. The bonds should be purchased, not to make a lot of money, but because good security is offered and to help the company to give that service which the city needs to prosper and grow. He did not believe the company could expect outsiders to go in on any such basis.

TRAFFIC SURVEY PLANNED

On Feb. 13 there was a conference on the subject between President John J. Lester of the Board of Aldermen and Clifton D. Jackson, secretary of the Chamber of Commerce. In a statement issued after the conference, Messrs. Lester and Jackson said that an agreement had been reached, subject to approval by the executive committee of the Chamber of Commerce, whereby the chamber will co-operate through a special committee of merchants, manufacturers and employees, with the City Council jitney committee to accomplish two things: First, to make a definite and practical traffic survey to assist the street railway officials in working out a practical revision of downtown routing in order to relieve congestion, and possibly suggest new routes and extensions; second, to work out the details of disposing by popular subscription of the $300,000 bond issue proposed as an immediate necessity by Mr. Wood.

Mr. Jackson said further:

> If the local railway is our road, as President Wood said it was, it means that we will make it our business to take an active part in investigating ways and means of rerouting in the business section to eliminate the serious congestion which now exists, and to see that the promised extensions are carried through. We will take an active interest in the affairs of the company, not as a closed corporation, but as a representative body with the interests of Springfield at large given first consideration.

The plans for floating the bond issue will probably be arranged so as to dispose of most of the issue to individuals. On this point Mr. Lester said:

> We believe that these bonds should be taken by hundreds of people in Springfield first as a safe investment and second as the people's share in solving the problems that mean so much to them. We intend to see that the railway company goes through with its program, and if it does, and if the company is able to do what it claims can be accomplished by these extensions, it will mean a great deal for the future of Springfield.

Mr. Lester said that it must be clearly understood that present interest was only in the proposed $300,000 for immediate extensions.

It is possible, according to Secretary Jackson, that an organized movement will be started to sell the street railway bonds at popular subscription in the same manner and with a similar organization as during the Liberty bond drives. The business people of the city will be asked to help, and the people as a whole will be given the opportunity in this way to help the city.

Mr. Ham Asks a Square Deal

William S. Ham, president of the Washington Railway & Electric Company, Washington, D. C., testifying on Feb. 11 on the railway merger bill before the House district committee, expressed the belief that the Public Utilities Commission has been influenced in its treatment of public utilities in the District by the opinion entertained by its members regarding the advantages of public ownership of utilities.

He emphasized that for a year and a half the Washington Railway & Electric Company has been pounding at the doors of the Public Utilities Commission for relief; has proved the justice of it; the commission admits the need for relief, "but is not giving it to us. We must have this relief or we must discontinue to serve the public."

He said further:

> I do not think the Washington Railway & Electric Company will go into the hands of a receiver, and one of the means to prevent the parent company from going on the rocks will be to allow the unprofitable lines running into the suburban territory to appeal for their rights in the courts.

B. R. T. Doing Better

Company Kept in Bankruptcy Largely by Increase in Wages to Employees

A statement of Carl M. Owen, counsel to Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, shows a progressive advance in the earning power of the corporation. The gross earnings of the rapid transit and surface lines, as made public, were $3,000,000 in excess of operating expenses from March, 1919, to December, 1919. The advance in wages prevented the company from emerging from receivership.

The figures show a gain for every month on the subway and elevated lines except in August, when the strike took place, and in September, and October.

From February to December inclusive, the total revenue was $14,814,987, and the total operating expenses were $11,914,268. Income deductions amount to $155,000 a month, including interest on receiver's certificates and on 4 and 5 per cent bonds.

Mr. Owen continued:

> The operating revenue of the six months ending Dec. 31 last amounts to $9,057,492 and the operating expenses were $7,375,169, which left an excess of earnings over expenses of $1,682,322. It is the interest on the $60,000,000 of 5 per cent bonds which were issued for the building of the subways which the company defaulted on and which threw the company into bankruptcy. This interest, plus the increased wage scale, are the two charges which are keeping the company in bankruptcy.

This table shows the difference between the gross earnings and the operating expenses:

RAPID TRANSIT LINES

1919	Gross Income	Operating Expenses
February	$1,150,893	$789,323
March	1,324,839	891,322
April	1,364,757	881,609
May	1,451,442	842,958
June	1,465,625	933,893
July	1,522,779	1,312,104
August	1,347,095	1,199,176
September	1,452,557	1,136,414
October	1,522,289	1,743,916
November	1,548,411	1,168,475
December	1,664,300	1,415,083
Total	$14,814,987	$11,914,268

Gross income and expenses of the Nassau Electric Railroad, the most important surface line in control of the B. R. T., follow:

SURFACE LINES

1919	Gross Income	Operating Expenses
March	$433,424	$383,240
April	452,196	368,334
May	495,249	389,897
June	505,128	403,334
July	505,599	379,037
August	457,910	488,775
September	432,013	499,782
October	539,179	501,165
November	513,089	472,501
December	537,289	467,721
Total	$4,971,076	$4,353,780

The net corporate income of the company per month was: December, $44,569; November, $15,897; October, $13,105; September, $12,573; July, $24,641; June, $27,155; May, $30,346. In August, during the strike, there was a deficit of $36,348, in April $12,270, and March $49,207. This left a total net profit for the ten months of a little more than $50,000.

Deficit of $1,033,379

Report Just Made Public Covers Practically First Year of Rhode Island Receivership

The Rhode Island Company, Providence, R. I., operated its lines at a loss of $1,033,379 during 1919, according to the financial statement filed on Feb. 11 with the Public Utilities Commission. This report covers practically the first year of receivership which began in January, 1919.

The total operating revenue for that period was $6,970,675, an increase of $659,390 over the previous year. At the same time the total operating expense was $5,928,262, an increase of $812,711. These figures show a net operating revenue of $1,042,412, which was $153,321 less than for the previous year. Added to this sum was non-operating revenue of $37,852, making the total net income for the year $1,080,265.

Expenditures to be deducted from this amount, including taxes, rentals and miscellaneous expenses, totaled $2,113,644, leaving a deficit for the year of $1,033,379.

The total operating revenue increased during the year $659,390, but at the same time the total operating expense jumped to $812,711, showing a loss of $153,321. The non-operating income for the year dropped $73,481, and the total net income for the year shows a loss of $226,802.

The rentals for the year alone, charged off against the net income, were $1,161,874, or $80,000 more than the entire balance of the net operating income. Taxes for the year were $621,885, an increase of $17,635 over 1918. The increase in the rentals was only $380. Interest and discount expenditures for the year of $328,254.78, increased $11,752. The miscellaneous expenditures were $1,630, a decrease of $715.18.

The passenger earnings for December last, included in the report, shows the revenue to be $651,799. This is an increase of $109,941 over December, 1918. The receipts per car-mile for the month were 54.75 cents, an increase of 9.39 cents, and the receipts per car per day were $87.07, an increase of $14.81.

The report shows that the receivers continue to reduce the car-miles operated, the total for December of 1,190,606 being 4,058 less than the same month a year ago.

The total operating revenue for December was $687,807, an increase of $110,584. The total operating expense for the same month was $730,301, an increase of $259,000. This makes a decrease of $42,494 in the net operating revenue for the month, and a decrease of $148,422 in the operating revenue when compared with December, 1918.

After deducting the fixed charges for the month, amounting to $172,926, added to the loss in operating revenue, leaves the company with a deficit of $213,344 for December.

The financial returns of the company are shown in the accompanying tables.

INCOME ACCOUNT OF RHODE ISLAND COMPANY FOR DECEMBER, 1919, AND FOR TWELVE MONTHS ENDED DEC. 31, 1919, COMPARED WITH 1918

	December, 1919	Per Cent	12 Months to Dec. 31, 1919	Per Cent
Total operating revenue	$687,807	+19.16	$6,970,675	+10.45
Total operating expenses	730,301	+54.96	5,928,262	+15.89
Net operating revenue	$42,494	—140.12	$1,042,412	—12.82
Non-operating income	2,076	+212.45	37,852	—66.00
Total net income	$40,418	—137.92	$1,080,265	—17.35
Deductions from income:				
Taxes	$49,280	—20.20	$621,885	+2.92
Rentals	97,116	+0.34	1,161,874	+0.03
Interest and discount	26,523	......	328,254	+3.71
Miscellaneous	5.4	—68.25	1,630	—30.49
Total deductions	$172,926	—6.57	$2,113,644	+1.39
Deficit	$213,344	+171.79	$1,033,379	+32.91

OPERATING STATISTICS OF RHODE ISLAND COMPANY

December	1918	1919	Per Cent
Passenger earnings	$541,857.52	$651,799.42	+20.29
Car miles run	1,194,663.18	1,190,605.66	—0.34
No. 18-hour cars	7,499.11	7,486.34	—0.17
Average No. 18-hour cars run per day	241.91	241.49	—0.17
Receipts per car mile (cents)	45.36	54.75	+20.70
Receipts per car per day	$72.26	$87.07	+20.50

Dallas Has Good Month

The Dallas (Tex.) Railway transported during January more than 5,000,000 passengers. During the month cars handled approximately 161,500 passengers daily. Of the total number of passengers transported in January 13.31 per cent were transfer passengers.

The Oak Cliff-Second Avenue car line topped the list with the greatest number of passengers handled for the month, carrying 1,089,418. The Bryan-Ervay Street line came second with slightly more than 1,000,000 passengers transported.

The cars of the Dallas Railway traveled 618,159 car-miles during January, averaging about eight passengers per car-mile. Trainmen in the employ of the company were in service during the month 67,435 car-hours, and the average speed of the cars was slightly more than 9 m.p.h.

Pottsville Outlook Better

Prospects Improve for Railway and Light System Operating From Pottsville as Center

The J. G. White Management Corporation, the operating managers of the Eastern Pennsylvania Railways, Pottsville, Pa., have made an exhaustive study of the probable sale of power and the needs of the company to take care of the business. Moreover, the protective committee representing the bondholders retained the services of A. Merritt Taylor, Philadelphia, Pa., who engaged Ford, Bacon & Davis to make a study of the power demands of the territory and the needs of the company in order properly to serve the territory with power. It is expected that from these two studies a plan will be formulated for the reorganization of the financial structure of the company which will provide for the company's immediate and future capital requirements.

THINGS IN COMPANY'S FAVOR

Hopes are expressed for the future of the company. Many increases have been obtained in light and power rates and in the railroad tariffs to meet the several demands of the company's employees and to offset other increasing expenses.

On most sections of the company's railway fares have been increased by successive stages from 5 cents to 10 cents per section. These increases have been obtained without undue friction or expense for hearings before the Public Service Commission of Pennsylvania. The relations of the company with the public, with the miner's union so active in the Pottsville territory and with its own employees are very friendly. The company has not yet, however, reached the point where it earns a fair return on a fair valuation. That it is doing better is attested by the accompanying statement of earnings for the year ended Dec. 31:

Year	1919	1918	Per Cent Increase
Gross revenue	$1,632,911	$1,192,994	36.87
Operating expenses	1,157,072	892,251	29.68
Operating income	$ 475,839	$ 300,743	58.22
Taxes	26,466	22,409	18.10
Gross income	$ 449,372	278,333	61.45
Total deductions	297,094	276,305	7.52
Balance	$ 152,278	$ 2,028	

In August, 1919, a bondholders' protective committee was formed by certain bankers to whom it appeared the company might not be able to meet its bond interest due on Jan. 1, 1920, and for the further reason that the company is in need of additional power generating plant capacity and has no funds which can be used for that purpose and no means through which such funds can be obtained. It is explained that since the bondholders' committee was formed the company has made a contract for its immediate needs for power with the Metropolitan Edison Company, Reading, Pa. The connecting transmission line is now in process of erection. This power contract places the company in a position to take ample time to formulate a comprehensive plan for providing itself with ample power, either through the erection of a power plant or the purchase of all its needs from one or another of the power generating companies serving contiguous territory.

The annual meeting of the company will be held on March 10.

$11,846,034 Memphis Value

Tennessee Commission Fixes Value for Determination of Proper Return and Adequate Fare

The State Public Utilities Commission of Tennessee has fixed the valuation of the Memphis Street Railway at $11,846,034. This sum will be the basis for the determination of a proper return and a fare necessary to provide such return on the investment.

VALUATION REVIEWED PREVIOUSLY

The valuation was referred to at length in the ELECTRIC RAILWAY JOURNAL of Jan. 10. Referring to the table shown on page 7 of the report of Albert S. Richey and reproduced in part in this paper, Chairman Enloe and Commissioner Hannah adopted the figures of Professor Richey except that they substituted $1,752,413 for superseded property. As noted on page 24 of Professor Richey's report, this figure represents the cost of property superseded since 1905 and amounts to a reduction of about 10 per cent in the professor's allowance for superseded property.

Commissioner Welch voted for a valuation of $11,000,829, made up by the use of Professor Richey's figures for all except development cost and superseded property. The total of the professor's figures, with these two exceptions, is $9,306,042, including physical property, working capital, cost of financing, and all other overhead except development cost. Commissioner Welch arbitrarily allowed 10 per cent of the previous figure ($930,604) for development cost in place of the professor's figure of $787,579. He thus allowed superseded property to the amount of $764,183. This was the figure shown by Professor Richey in his detailed report as that supersession due to causes originating with the public.

FARE MATTER IN ABEYANCE

A further hearing was set for Feb. 10 on the matter of fares, including the rate of return to be allowed on the above rate base and the proper allowance for renewals and replacement reserve. Professor Richey testified before the commission on the subject of rate of return on Jan. .16. Later he sent to the commission a statement of his views on the proper amount of renewals and replacement reserve.

Financial News Notes

Pennsylvania Line Sold. — The Bloomsburg, Millville & Northern Railroad, Bloomsburg, Pa., has sold all of its personal property and expects to sell its real estate soon.

Dismantlement Proposed.—The Shore Line Electric Railway proposes shortly to set about removing the rails and the other equipment of the line from Atlantic Beach at New London, Conn.. to Weekapaug.

Foreclosure Sale on March 15 — March 15 has been set as the date for the sale under foreclosure of the holdings of the West Virginia Traction & Electric Company, Wheeling, W. Va., the decree of sale of which was referred to in the ELECTRIC RAILWAY JOURNAL for Feb. 7, page 307.

Kansas City Western Railway Sold. —The Kansas City Western Railway was sold under foreclosure at Kansas City, Mo., on Feb. 18 for $250,000 to Walton H. Holmes, representing a committee of the bondholders. Suit to foreclose was brought by the Guaranty Trust Company, New York.

Permission Granted to Foreclose.— Permission has been granted by Federal Judge Mayer to the Bankers Trust Company, New York, N. Y., to bring a foreclosure suit against the Coney Island & Brooklyn Railroad in default of $44,600 interest due July 1, 1919, on $2,232,000 in bonds. The company is a Brooklyn Rapid Transit subsidiary.

Receivership Hearing Postponed.— The hearing on the position of C. H. Walsh for the appointment of a receiver for the Rock Island (Ill.) Southern Railway set for Feb. 9 before United States Judge Louis Fitzhenry has been postponed indefinitely. The case will doubtless be called before Judge Fitzhenry in Springfield at the spring term.

Sarnia Appraisal Completed.—The Hydro-Electric Commission experts, who have been conducting an appraisal of the property of the Sarnia (Ont.) Railway under the direction of Alexander McDougal, have completed their work. It is reported that the municipality will open negotiations soon for the purchase of the system and its operation and extension as a public utility.

May Scrap Interurban. — George Whysall, president and manager of the Columbus, Marion & Bucyrus Railway, says that the stockholders have become so discouraged over the prospects of its operation they have authorized him to dispose of the line or junk it if necessary. He says that the 18 miles of rails are worth much more now than they were when the line was laid down in 1908.

Would Abrogate Lease.—Cancellation of the 999-year lease on the Narragansett Pier Railroad, and the reversion of the properties of that corporation, valued at approximately $500,000, has been asked of the Superior Court by the receivers of the Rhode Island Company, Providence, R. I. Filing of two suits, aggregating more than $100,000, against the Rhode Island Company by the Pier corporation for non-payment of rentals, depreciation of the property and other specifications is the cause of the action toward cancellation of the lease.

Appraisal to Start.—Appraisal of the lines and properties of the Seattle & Rainer Valley Railway, Seattle, Wash., will be started at once by Councilman William Hickman Moore, to determine what price the city would be willing to pay, to add the only private-owned railway remaining in the city limits to the municipal railway system. The property has been offered to the city for $1,656,000 by M. E. Sampsell, president, who has also submitted an itemized estimate of the value of the line. This estimate will form the basis for Mr. Moore's investigations.

Successor Company Elects. — Directors of the Erie County Traction Company elected at the organization meeting include Robert B. Austin, Jamaica; John L. Cummings, New York; Edward L. Frost, Brooklyn; William M. Griffith, Jamaica; Edward B. Porsons, David N. Rumsey, East Aurora; William G. Taylor, Reading, Pa., and William B. Wheeler, Brooklyn. The Erie County Traction Company has an agreement with the International Railway, Buffalo, N. Y., for the operation of interurban cars into Buffalo over the International tracks. The company is the successor to the Buffalo Southern Railway.

City Wants New Receiver.—The city of New York through Assistant Corporation Counsel Edgar J. Kohler, asked Justice Callaghan, in the Supreme Court in Brooklyn on Feb. 10 to appoint a receiver for the Staten Island Midland Railway in order that operation of the company's lines may be resumed and to supplant Jacob Brenner, who was appointed receiver by Federal Judge Chatfield, to wind up the company's affairs. This action followed an effort by the city several days ago to have the officials of the company punished for contempt for failing to obey an injunction issued by Justice Faber directing the company not to cease operation of the lines. Justice Cropsey decided that the order was not served on the proper persons and dismissed the matter so far as the contempt was concerned. During the proceedings on Feb. 10 it came out that the city had obtained from Justice Faber a continuation of his order. Bertram G. Eadie, counsel for the company, contended that Justice Cropsey had closed the matter when he decided the injunction order issued by Justice Faber had not been properly served. Counsel were directed to submit briefs.

Traffic and Transportation

Seeks Traffic Solution

Indianapolis Board of Works to Appoint Expert to Co-operate With Company

The Board of Public Works of the city of Indianapolis, Ind., suggested to the Indianapolis Street Railway on Feb. 13 that a traffic expert be employed by the Board of Works at the expense of the company to work out a solution of traffic problems in the city of Indianapolis.

COMPANY'S AID SOUGHT

Numerous suggestions have been made as to the operation of trailers, rerouting car lines, establishment of cross-town shuttle car lines, diverting cars to certain lines during peak hours, and endeavoring to work out with manufacturing establishments a system of having their employees go to work and quit in shifts, so as to relieve congestion.

The board stated that all these matters must be considered in relation to the practical operation of the railway system, and that a man who has had experience in dealing with such problems would be able to assist the board in handling the problem intelligently.

Company officials advised the board that on account of the influenza more than 200 of the company's men were on the sick list. This curtailed service. The company has also been handicapped by delay in receiving the thirty-five cars now being built. It was estimated that between twenty-five and fifty new cars in addition to those now ordered would give the company sufficient equipment to handle traffic. The attention of the board was called to the fact that it would be necessary for the city officials and the public to co-operate with the company, so that it would be able to finance its additional requirements.

The letter of the board follows in part:

> The board of works insist on your company giving better service than you are now giving. We are tired of promises and we must, from now on, insist on immediate action. We firmly believe that you have capable officers who are able to work out some kind of a system whereby more cars in the early morning service can be run to these industrial plants from the downtown junction points so as to enable these laboring men to get to work. Are you willing to agree to pay the expenses of an expert whom we will employ to make a survey of the condition of the street car situation of our city? Please advise us as promptly as possible what you are going to do in the matter.

DEPRECATES CITY'S POLICY

In an editorial in its issue of Feb. 14, headed "Street Cars by Magic" the Indianapolis *Star* takes exception to the letter of the Board of Works in asserting that the railway must immediately provide improvements in large numbers, and that the city authorities are not interested in the company's financial difficulties. The editorial follows in part:

> A more or less justifiable resentment over sharp practices in former conduct of the car company has about spent its force in this community, owing to the change in the company's attitude and especially to the enormous costs of operation, from which no business whatever has been free.
>
> The company's credit is practically nil, because of its inability to promise returns on investments with any assurance of those promises being redeemed. The only method the city authorities seem able to suggest in the way of rehabilitating the company's credit, is to demand the impossible in harsh tones. It takes money to buy street cars and time in which to procure them.
>
> If it is determined to make the company go along at 5-cent fare, then the city authorities, in co-operation with the Public Service Commission, should try to think up some way of assisting the company to strengthen its credit, rather than continue the old and discredited method of demanding the impossible. This petulant and unjust ragging of the company will never build a street car or enable the company to borrow a dollar, and nobody can possibly know the fact better than these municipal statesmen, who might just as well strike at Aladdin's lamp and command a hundred cars to spring into being.

Detroit Earned 40.76 Cents Per Car-Mile

Owing perhaps to the city's enormous growth in population, the total number of passengers carried by the Detroit (Mich.) United Railway in the year ended Dec. 31, 1919, was 525,410,880 or an increase of 94,542,610 over the previous year. The passenger statistics follow:

	1919	1918
Revenue passengers	394,374,451	319,843,176
Transfer passengers	122,422,145	103,608,353
Employee passengers	8,614,284	7,416,741
Total	525,410,880	430,868,270
Receipts per revenue passenger	0.0585	0.0553
Receipts per. passenger	0.0440	0.0410

Car mileage traveled during 1919 was 60,550,950, compared with 53,931,394 in 1918. Earnings per car mile were 40.76 cents in 1919 compared with 35.26 cents in 1918, and expenses per car mile were 32.68 cents compared with 27.36 cents, leaving net earnings per car mile in 1919 8.08 cents compared with 7.90 cents in 1918. These figures supplement the statement of earnings of the company which were published in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 14.

During the year the track mileage of the company increased from 915.46 miles to 928.39 miles. Additions to the properties reached the sum of $1,799,301.76.

The companies' rolling stock comprises 1,895 passenger cars, 284 freight and construction cars, 38 line cars, 104 express cars, 21 miscellaneous cars, 4 locomotives, 4,880 motors and 3,806 trucks.

Would Retain Lines

Interborough President, Testifying at New York Hearing, Declares Against Public Ownership of Road

The inquiry into the need of the Interborough Rapid Transit Company, New York, N. Y., for more revenue was resumed on Feb. 18 for a day. It will be continued on Feb. 25.

There was considerable talk back and forth about the poor widows and orphans, Irish dividends and the state of individual prosperity of the present directors of the company. The Mayor wanted to know why the company hung on so desperately to a losing venture.

Mr. Hedley explained that he did not think the road a losing venture in the long run, but that for the time being the company had to have more money. Asked if he were willing to turn the subways back to the people and let the city run them, Mr. Hedley said he didn't want to see the people imposed upon.

SUBWAY'S GOOD SHOWING

A report prepared by A. F. Weber, chief statistician of the Public Service Commission, detailing the results of his investigation into the company's financial affairs, was read into the record. Mr. Weber, who was also a witness, declared in the paper that the most striking thing to him was the relatively good showing of the subway division of the company and the poor showing of the elevated. The report said in part:

> The financial statement submitted by the Interborough Rapid Transit Company indicated that the necessary cash disbursements made, or expected to be made, in the months of July, August and September would exhaust its cash resources, despite the fact that in its published reports the company set out a corporate surplus in excess of $19,000,000. If such surplus is not now represented by cash or other liquid assets, it must have been expended in the acquisition of fixed assets or securities of other companies, for which the Interborough Company would be entitled to issue its own securities. If the acquisition of such assets was made out of the surplus earnings, why might not the company now sell its own securities and thus secure the reimbursement of its treasury for the expenditure of surplus earnings?

A corroborative report was offered in evidence by Fred W. Linders, chief accountant of the Rapid Transit Construction Commission. Mr. Linders wrote that in face of the fact that the net income for the fiscal year 1918 of $4,600,000 approximately amounted to only 50 per cent of the net income of the previous year, nevertheless dividends were declared aggregating $6,125,000, or approximately $1,500,000 more than was earned. Likewise, during the fiscal year 1919, dividends were declared despite the fact that the operations resulted in an actual loss of $3,810,000, Mr. Linders reported.

Dr. John Bauer, transit expert of the Corporation Counsel's office, was among the witnesses. Dr. Bauer continued along the lines of his testimony at the hearing on Feb. 11 and went into detail as to the value of the company's outstanding capital stock. He declared that its assets were much inflated.

Changes at Louisville

President Minary and Four Directors Resign at Mayor's Demand—Higher Fare Request Refused

The Louisville (Ky.) Railway has followed a plan proposed by Mayor George W. Smith, who handed the company an ultimatum calling for the reorganization of the company before he would consider an increase in fares over the franchise agreement.

At a meeting of stockholders on Feb. 18, T. J. Minary, Oscar Fenley, W. S. Speed, John W. Barr, Jr., J. D. Stewart and John Stites were reelected directors and seven new directors were named, all of whom are prominent bankers, manufacturers and business men. Four old directors retired, these being F. S. Wicks, Syracuse, N. Y.; Hardin H. Littell, Buffalo, N. Y.; Judge Alex. P. Humphrey, former vice-president and general counsel of the railway, and Samuel G. Boyle.

At a meeting of the directors on Jan. 20, T. J. Minary resigned the presidency after forty-seven years' active service with the company, and accepted the position of chairman of the board of directors. Samuel G. Boyle, who resigned as director, was re-elected secretary-treasurer.

WILL CHOOSE NEW PRESIDENT

The directors just elected have not decided who will be elected president, but it is planned to retain the best operating talent the financial condition of the company will permit. Samuel Riddle, general superintendent, and James B. Wilson, of the Louisville Water Company, are two men whose names have been mentioned, but it is reported in Louisville that a manager from out of town will probably be secured. For the present the active management will be under a board composed of W. S. Speed, John W. Barr, Jr., and W. H. Kaye.

The report of Mr. Minary showed that the 1919 income was $458,938 less than in 1916 and expenses $1,232,859 greater. No dividends were paid. The income from city lines from Jan. 1, 1920, to Feb. 16 showed a loss of $3,667 as compared with the corresponding period of last year. He stated that to take care of deferred maintenance and pay dividends of 5 per cent on the common stock and 6 per cent on the preferred stock, an increase of 20 per cent in gross earnings would be necessary.

The strike last summer cost the company $327,000 net. Wages paid to the employees have increased 97½ per cent and taxes 16⅔ per cent since 1916.

In spite of the large attendance of stockholders at the meeting on Feb. 18, control of the company remained as before and plans for the reorganization were adopted by a single ballot cast by Secretary Boyle, representing the investors.

Announcement has been made that meetings will be held every other day by the directors to shape up the new program and to arrange for an experienced executive to take charge as president.

A policy of retrenchment will be put into effect during a four months' trial period, it being planned to cut off a number of parallel lines, save the more profitable ones, or at least decide during that period which lines should go.

MAYOR SMITH'S STATEMENT

The Mayor on Feb. 19 in referring to the reorganization said:

> The Louisville Railway must convince the Louisville public that it has been reorganized to furnish better service. I'm convinced that the new management will strive to show that it is going to do its best, but it must give the public service before the stockholders are considered. The company must not forget that its duty does not lie wholly with persons who have money invested in it. It must show more efficiency than it has in the past, regardless of the incentive for getting increased fares.

These changes in the company's personnel came as the result of an ultimatum from Mayor Smith issued on Feb. 9, in which the Mayor refused point-blank to consider the company's request for an increase in fare. The Mayor in his statement declared that the solution of the company's difficulties did not lie in an increase in fare. He branded the management as inefficient, and asserted that "the public had lost confidence in the ability of some of the officers, directors and managers of the company to operate the railway economically and efficiently."

The Mayor's statement was addressed to John W. Barr and Oscar Fenley, directors, who had represented the company in its demand for an increase in revenue. It called for a change in administration of the company's affairs, and suggested the election of a new directorate and new officers. Such action on the part of the stockholders was essential, the Mayor asserted, if the company hoped to receive any consideration at the hands of the city administration.

Although refusing to consider the request for higher fares under existing conditions, Mayor Smith made a counter-proposal for the eventual relief of the company. He announced that, if a new set of officers were chosen, and if, after four months of operation under the new management the company were still in need of an additional source of revenue, he would recommend to the General Council that relief be given through increased fares.

MAY GRANT RELIEF LATER

He stated his willingness to allow the present 5-cent fare provision of the company's franchise to be waived if this plan were followed. He declared, however, that the new management must clearly demonstrate the need for more revenue before it could hope for relief. After outlining his proposition he said:

> I conclude by reminding you and every one of your stockholders that you are bound by contracts of many years' standing to operate under a 5-cent fare, but as we are going through a period of time that no man could foretell, it is possible that temporary relief should be granted to you. At this time I am not willing to recommend relief except along the lines indicated above. The matter rests with you.

City Sees Need

Investigation by Portland, Ore., Officials Confirms Plea of Company for Relief

The hearing is under way before the Oregon Public Service Commission in Portland of the case of the Portland Railway, Light & Power Company, in regard to the railway system. After the most painstaking investigation on the part of city officials, through J. P. Newell, consulting engineer, and Alexander Young, expert accountant, the city has frankly admitted that its findings practically coincide with the statements laid before the commission by Franklin T. Griffiths, president of the company. The opinion is expressed that relief must be found for the company either in a flat increase in fares, or a zone system of charges. Suggestions for relief include an 8-cent fare, with books purchasable at a reduction of 1 cent on each fare, school tickets to remain the same.

Suggestions offered by Mr. Newell for relief to the company are: establishment of central zone for free transfers, with charge for all traffic originating outside of it; authorization of such fares on lines built to develop land values and thinly settled districts as will pay the cost of such operation, or failing that, their abandonment, establishment of one-way traffic, rearrangement of loops in center of city to avoid unnecessary crossings, and adoption of traffic regulations which will facilitate the movement of cars without undue increase of maximum speed.

DANGER OF DISINTEGRATION

Relative to the gravity of the railway company's financial situation, Mr. Newell pointed out that the situation cannot be fully comprehended without consideration of the possible results of bankruptcy of the company. If a movement for separate receivers for the constituent companies should succeed, each system would be operated independently and there would be no exchange of transfers.

Mr. Newell points out that to effect any satisfactory arrangement, "the approval and co-operation of the representatives of the city must be first secured, and it must be made clear to the public that any changes proposed are to be made, not for the profit of the company, but for the benefit of the patrons."

The case of the Portland Railway, Light & Power Company was originally brought before the Public Service Commission in September. At the time the company contended that on account of the increased cost of materials and the advance in wages, an increase in fares was necessary to allow the company to pay expenses and obtain a fair interest return on its investment. After hearings, the case was postponed to allow engineers for the city and officials of the company an opportunity to examine the evidence submitted and to investigate the company's books.

Courtesy Campaign

Kansas City Railways Calls on Employees to Help Company By Considerate Treatment of Riders

"The public be pleased." This is the motto which the transportation department of the Kansas City (Mo.) Railways has adopted in an effort to secure closer co-operation between its employees and its patrons. The transportation department of the company is conducting a campaign with the object of encouraging trainmen to show every courtesy toward car riders. It is believed that this policy will react favorably on the company by improving its relations with the public.

The company is using its official organ, the *Railwayan*, to bring home to its men the principles of courteous service. The *Railwayan* said in a recent issue:

> The old saying, "A man is judged by the company he keeps," has been changed to "A company is judged by the men it keeps." Exercise care, patience, forebearance and self-control. Take pride in keeping your temper. Smile in the face of everything. This is difficult, of course, otherwise there would be no effort to do it. Rules are made for you in a book which has been given you, but rules cannot be made to cover every situation.
>
> You must use common sense. Never quarrel with a passenger over a fare. If too much fare is dropped into the box, do not refuse to adjust the matter in a civil manner. See that the passenger leaves the car satisfied. Make change upon request in an agreeable manner. Remember you are selling the ride.
>
> A good rule to avoid controversy is to call the amount of the bill given you and ask the patron to "please drop the fare in the box" as the change is given. Conductor should not "load up" passengers with small change unless it is absolutely necessary. In that event kindly say, "I am sorry, but this is the best I can do." If a passenger gets on your car by mistake let him off at the next block. Do not insist on collecting fare and issuing transfer unless you are sure the transfer will be taken on the car he wants. No good can result from telling him to "keep his eyes open next time." We all make mistakes.
>
> Trouble is bound to occur on cars at times. In cases of this kind common sense plays an important part. Never lose your self-control under such circumstances. Do not talk back to passengers who contend you did not call the street. It takes two to start an argument. Be sure you are right, then be firm in your position—but do not argue. Watch for passengers closely. You do not want to be "passed up." Every time you pass up a passenger you make an enemy for the company and for yourself if the passenger knows you. The company is judged by what you do. Never forget that if you are in the wrong, you cannot afford to get mad; if you are right there is no need of it. The angry man cannot think clearly. Give "the soft answer that turneth away wrath" at all times.
>
> There is no place where the golden rule of life can be so effectually employed as in the street railway business. Treat every passenger exactly as you would like to be treated if you were a passenger. Every victory over discourtesy makes you a better citizen—a more efficient employee for any concern. Be pleasant—and smile.

Milwaukee Interurban Order Suspended

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., will continue to run its interurban cars over its city tracks in Milwaukee for ninety days despite the injunction issued by Circuit Judge Fairchild restraining the company from carrying on its interurban service into the city after midnight on Feb. 5. An agreement between the court, City Attorney Clifton Williams and attorneys for the railway resulted in a stay of execution of the court order.

City Attorney Williams won his fight for the writ on the ground that the company has no franchise for the operation of interurban cars inside the city limits.

After S. B. Way, general manager of the traction company, had announced that all passengers would have to alight at the city limits and walk across an imaginary line which forms the city boundaries, the stay was decided upon pending an investigation of the situation to be made by a committee composed of city officials and business men. Nine interurban lines were hit by the order.

City Attorney Williams seeks to unscramble the interurban system from the city lines, to force the company to return to a 5-cent fare and to contribute to the upkeep of city streets and bridges.

Electric Railway Held Blameless

Responsibility for the accident which took place at Parmaco, a small station between Parkersburg and Marietta, on Aug. 14, 1919, when a car of the Monongahela Valley Traction Company, loaded with excursionists, crashed into a Baltimore & Ohio switching engine, has been fixed upon the Baltimore & Ohio Company, by Ex-President William H. Taft, who inquired into the matter. Eighteen persons, mostly little children, met death in the accident.

An investigation into the accident and its cause was made by a coroner's jury. The Public Service Commission of West Virginia then inquired into the disaster through its engineer. Finally the Interstate Commerce Commission went into the matter through representatives of the Bureau of Safety.

Subsequently, by agreement, the United States Railroad Administration, as the operator of the Baltimore & Ohio Railroad, and the Monongahela Valley Traction Company, combined and made settlement with all persons injured in the accident and with the dependents and representatives of the persons who died as a result of injuries received in the accident. The two parties then agreed to submit to arbitration the question as to which company was responsible for the accident and as to what portion of the amount paid out in making settlement for the persons injured or killed should be paid by each company. Ex-President Taft was agreed upon to decide the question of responsibility for the accident and the amount of damages each should pay. In his finding Mr. Taft said:

> There are fewer difficulties in this case than in most cases involving judgment of speed, time and distance. To me the case is very clear. The award is that the Railroad Administration operating the Baltimore & Ohio Railroad shall pay the entire cost of settlements of all claims, suits, court costs and other expenses growing out of this collision, including the injury to traction car 625 and its equipment, and thus save the Traction Company harmless therefrom in accord with the terms of the contract of Aug. 1, 1910.

Tacoma Hearings Start

Railway Manager Promises to Furnish Valuation Figure Regarded by Company as Its Minimum

The first hearing before the City Council of Tacoma, Wash., began on Jan. 27 in the controversy between the city and Tacoma Railway & Power Company over the 10-cent fare that the company is asking. The company is now operating under a 7-cent fare. Little progress was made at the hearing, the discussion being chiefly on the question of valuation of the company's properties.

R. T. Sullivan, manager of the railway, agreed to furnish the City Council a valuation upon the properties of the Tacoma Railway & Power Company and the Pacific Traction Company, based on what the companies feel must be taken as a minimum in any plan to guarantee a reasonable return, and establish a service-at-cost plan of operation of the Tacoma railways similar to that in effect in Cleveland. He promised also to submit a statement of the earnings and cost of operation of the companies for 1919.

The valuation to be submitted is to be understood as one given for no other purpose than that of determining a minimum return on the investment, the idea of sale and purchase or other purpose being excluded from consideration it was agreed.

The Council made it clear that it would expect a valuation based on what the properties are worth as a business concern, rather than on what the properties have cost. The Councilmen apparently have in mind a generous scaling down from the $7,000,000 valuation established by the State Public Service Commission.

M. M. O'Shaughnessy, city engineer of San Francisco, Cal., who recently investigated the railway situation in Tacoma, expressed the opinion that a 10-cent fare was not the solution of the railway problem. He states it was his belief that a 10-cent fare would produce less revenue than the present one.

Chicago Commission Order Upheld

The Chicago (Ill.) Surface Lines and the Illinois Public Utilities Commission won another victory in the State Supreme Court on Feb. 18 when the court upheld the original 7-cent fare order of the commission as applied to the surface lines of Chicago. This case was the outgrowth of an appeal from the decision of the Circuit Court of Sangamon County. The city brought action in this court against the original order of the commission on the ground that it had not had an opportunity for a full hearing. The circuit court sustained the city's contention, and the case was then taken direct to the Supreme Court. The fare order in the meantime continued in force.

The original order of the commission was made as an emergency ruling coupled closely with the strike of trainmen in Chicago. The present decision of the Supreme Court would, therefore, indicate that the commission is clothed with full authority to issue an order determining the rate of fare in an emergency case as well as in a regular case where all parties are given full opportunity for presenting evidence. Since the temporary order made in August establishing the 7-cent fare the commission has issued a new temporary order reducing the fare to 6 cents.

Wants Temporary Transfer Charge in Buffalo

Retention of the 5-cent fare with a charge of 3 cents for transfers is asked by the International Railway, Buffalo, N. Y., in a communication to the City Council. Herbert G. Tulley, acting president, requests that the municipal authorities join with the company in seeking to have the Public Service Commission amend its 7-cent fare order so as to provide for a 5-cent fare with a 3-cent charge for transfers.

The city is inclined to favor the company's suggestion. The 5-cent fare is still in effect, Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, and a factor in the operation of the International system on behalf of the bondholders' committee, being opposed to a 7-cent fare.

In his communication to the City Council, Acting President Tulley says that a transfer investigation made by Philadelphia experts revealed that only 40 per cent of the passengers carried over the lines in Buffalo used transfers. He said it would not be fair to charge 7 cents for all passengers when a 3-cent additional charge for 40 per cent of the passengers would, in all probability be sufficient to place the company once more on a sound financial basis.

Mr. Tulley says that the suggestion of the company is merely as a temporary step to relieve the present situation whereby the company is operating at a loss. It is proposed that the city and company enter into negotiations for a service-at-cost plan similar to the proposal made some time ago by Mayor Buck and approved by members of the City Council.

Enactment by the City Council of a resolution joining with the International Railway in a request to the Public Service Commission to make a charge for transfers would be subject to a referendum by the voters if petitions were circulated. It is generally believed that the voters would overwhelmingly reject such a proposition the same as they did the higher fare proposition on two previous occasions. If the plan is rejected, the company will have the right automatically to charge a 7-cent fare as authorized by the commission unless an injunction is obtained pending the determination of the case in the higher courts of the state to which it has been appealed by the city.

Court Stays Collection of Second Fare

Justice Greenbaum, in the Supreme Court in Manhattan on Feb. 14 declined to grant permission to the Brooklyn City Railroad, recently separated from the Brooklyn Rapid Transit System, to charge an extra fare of 5 cents, under the zone system, on its Flatbush Avenue line. At the same time Justice Cropsey granted a temporary stay in a motion brought by the city to strike from the calendar a suit brought by the railroad to show cause why the city should not be restrained from using buses in competition with the cars of the company.

In its application to Justice Greenbaum the railway offered to issue a refund ticket with each second fare received on the Flatbush Avenue line, pending the outcome of proceedings to review an order of the Public Service Commission forbidding the collection of more than 5 cents for a fare.

Colonel William N. Dykman, counsel for the company, issued the following statement:

> I have hurriedly read Justice Greenbaum's opinion. He does not touch upon the merits of the claim of the Brooklyn City Railroad that it may charge a second fare on Flatbush Avenue. He apparently denies the power of the court to issue a stay or an injunction in the proceedings by certiorari to review the action of the Public Service Commission. The merits of the controversy will be submitted to the Appellate Division of the Supreme Court in March.

The proceeding before Justice Cropsey followed the introduction by the city of an amended answer to the complaint in the company's suit to stop the use of buses. Jackson Dykman counsel for the company, declared that the amended answer was filed for the purpose of delay. Justice Cropsey said:

> If the amended pleadings were served for the purpose of delay—and there are indications that such was the purpose—they may be stricken out. But that can be done only on motion. The case will be set over until the 16th to permit the making of such motion if it is desired to do so.

Jitneys Become Menace in Storm

The police court at Hartford, Conn., through Judge Alexander W. Creedon. has taken the position that when a railway clears its tracks of snow it has the right to those tracks to such an extent that when an automobile is warned by a motorman's gong that the right of way is desired, the auto must give way. Two jitney-bus drivers have been fined $5 each in the police court within the last ten days and they have taken appeals to the Superior Court. Their attorney, who represents a jitney bus association, says he will go to the Supreme Court if necessary.

Meantime public spirit has reached such a pass that the people are demanding that the jitneys obey the laws which require that they stop their overcrowding and keep lights inside during night use. This sentiment is reflected in the action by Alderman Ithamar B. Davis, warning Milton Bacharach, counsel for the jitneymen, that if the overcrowding is not stopped, he will introduce a city ordinance that will "put the jitneys out of business."

The police board's meeting brought a protest from Commissioner John A. Pilgard that the jitneys ought to carry lights inside at night. The chief of police was instructed to enforce the law in this respect. The jitneys will also be watched to prevent overcrowding.

Three jitney drivers who were "frozen out" in eastern Massachusetts have applied for the right to drive their buses in Hartford. Under the Connecticut law the driver of a public service car must get from the chief of police in the town which he wants to serve, a clean bill of health. The three applicants, one from Brockton and two from Salem, come recommended by the chiefs of police of their respective towns, but as yet no action has been taken. The number of jitneys operating in Hartford is very small. Plans of a jitney company operating on all lines served by trolleys in Hartford are in abeyance.

Won't Order More Service for Rochester

Public Service Commissioner John A. Barhite, after hearing the defense of the New York State Railways, Rochester Lines, in the complaint of the municipal authorities against alleged inadequate service in Rochester, said the commission would never order the company to provide a service which the revenues would not pay for and also provide a reasonable return on investment. At the hearing it developed that the company is in need of funds to rebuild many lines in Rochester and provide additional equipment to handle increased travel. The company is restricted to a 5-cent fare.

James F. Hamilton, president of the New York State Railways, testified it would cost $2,000,000 and an annual maintenance fund of $500,000 to put the tracks in Rochester in proper operating condition. It would also cost $370,000 to bring car equipment into first-class condition, including the renewal of fifty cars with modern trucks at a cost of $5,000 each and inside remodeling of thirty cars at an estimated cost of $4,000 each. In the past two years practically no renewals have been made.

It developed at the hearing that 28 per cent more service would meet the requirements of travel in non-rush hour periods. A greater increase, perhaps 35 per cent, it was said, would be required in the rush hours. There has been an increase in travel of about 30 per cent in the last few months.

The Bankers' Trust Company, New York, N. Y., and the Lincoln Trust Company, Rochester, are among the banks which have recently called notes of the company. Mr. Hamilton says that if the Public Service Commission orders the company to give additional service, the railway will face receivership proceedings.

Transportation News Notes

Wants More in Jacksonville. — The Jacksonville Railway & Light Company, Jacksonville, Ill., has applied to the State Public Utilities Commission for permission to increase its fare from 6 cents to 7 cents and to sell four tickets for 25 cents.

Postpone Fifth Avenue One-Way Trial.—Owing to the condition of the New York City streets resulting from the recent blizzard, the thirty-day trial of one-way operation of vehicular traffic on Fifth Avenue has been postponed. The one-way rules were to have gone into effect on Feb. 16.

Seven Cents in Gary.—The Gary & Southern Traction Company and the Gary & Hobart Traction Company, Gary, Ind., have received permission from the State Public Service Commission to charge 7-cent fares on their lines in Gary. The companies have been charging 6-cent fares.

Wants Seven Cents in Ottawa.—The Northern Illinois Light & Traction Company, Ottawa, Ill., has filed with the State Public Utilities Commission a petition for an increase in the fare within the Ottawa city limits from 6 cents to 7 cents. The company is part of the Illinois Traction System.

Buses Running in St. Louis.—Nine motor buses began operating in St. Louis, Mo., on Feb. 10. The vehicles are of the double-deck type, each seating sixty-one persons. They are owned and operated by the Missouri Motor Bus Company. The fare is 10 cents. More buses will be placed in service in the near future.

Announces Seven-Cent Fare in Phillipsburg. — The Phillipsburg (N. J.) Transit Company has announced its intention of increasing its fare on March 1 from 5 cents to 7 cents, with the consent of the Interstate Commerce Commission. The company operates in Phillipsburg and neighboring towns in Pennsylvania.

No More Jitney Licenses.—The City Council of Springfield, Mass., has passed an amendment to the municipal jitney ordinance temporarily suspending the clause giving the Police Commissioner authority to issue jitney licenses. A committee of the Council is investigating the jitney situation in Springfield to determine the city's future policy toward the vehicles.

Seven Cents Asked in Easton.—The Easton (Pa.) Transit Company has notified the State Public Service Commission of its intention to raise its fare from 6 cents to 7 cents. This company and the Lehigh Valley Transit Company have also filed notice of increases in joint rates between Allentown and Easton and other points in Lehigh and Northampton Counties.

Ten Per Cent Increase in Traffic.—The number of passengers carried by the Georgia Railway & Power Company, Atlanta, Ga., was nearly 10 per cent greater for 1919 than for 1918. The increase in fares amounted to more than 8,000,000, or 9.49 per cent. The number of pay passengers increased 8.83 per cent, the number of those riding on transfers, 12.63 per cent.

Six-Cent Fare Upheld. — The Public Service Commission of Pennsylvania has dismissed a complaint against the 6-cent fare now in effect on the lines of the Harrisburg Railway. The commission in its report endorsed the proposed short-line between Harrisburg and Steelton and approved the quality of service furnished by the company. The 6-cent fare became effective on Dec. 1, 1918.

Survey of Scranton Lines. — Engineers of the Pennsylvania Public Service Commission are conducting a survey of the property of the Scranton Railway to obtain a basis for the fixing of a permanent rate. The present fare of 7 cents with four tickets for 25 cents, was allowed last year by the commission with the understanding that a report of the earnings for the period covered by the increased fare be made to the commission, also that a survey of the property be made so that later a permanent rate might be fixed.

Long Beach Buses Prosper.—Motor buses during 1919 carried nearly 2,700,000 passengers in Long Beach, Cal., a city of 25,000 persons. The Long Beach Transportation Company, which operates twenty-six buses over four routes, carried 2,670,000 persons during the year ended Dec. 14, 1919. The company charges a 5-cent fare and gives free transfers. Its gross receipts during the period amounted to $136,473. The company pays an annual franchise tax of $4,094. The bus drivers receive $4 a day, the total labor cost for the year amounting to $50,000.

Interurbans Want Part of Six-Cent Fare. — Attorneys for six interurban lines entering Toledo, Ohio, have notified the commissioners who are writing a cost-of-service franchise for the Toledo Railways & Light Company that a provision by which the company would collect the entire 6-cent city fare would necessitate the raising of intercity fares on all interurban lines entering the city. They declared that their six lines brought 3,241,495 persons into the city in 1919. These lines paid the local company 3 cents for each passenger carried. This yielded a profit to the company of more than $50,000, the attorneys told the commissioners.

Fare Reduced by Georgia Road.—The Albany (Ga.) Transit Company on Feb. 2, voluntarily reduced fares from 10 cents to 7 cents. The reduction was accompanied by an appeal for increased patronage as the only means of preventing the ultimate dissolution of the system. Heavy losses have been suffered by the company in the past few years because of the increased use of automobiles. The Railroad Commission early last year permitted the company to increase rates from 5 cents to 10 cents. The company has notified the City Council that if it is required to pave its right-of-way in the sixteen blocks the city plans to lay this year, it will be forced into bankruptcy.

Sixteen Rides for a Dollar.—At a meeting of the home rule committee of the city of Qunicy, Mass., on Feb. 10, it was announced that the new rate of fares on the Eastern Massachusetts Street Railway within the city limits would be sixteen rides for $1 with no transfers issued. Furthermore a new rate is ordered for the following lines: 6¼ cents to Houghs Neck, Neponset Bridge, Fore River Bridge, Fore River Loop, Newcomb Square, Braintree Line and East Milton, all from the Quincy Square starting point. Under the new plan of operation whereby co-operation on the part of the citizens is given through the home rule committee, the books of the railway will be open to inspection by the public on application to the committee.

Jurisdiction Lacking, Says Florida Commission.—The Railroad Commission of Florida has petitioned the State Supreme Court to quash an alternative writ of mandamus issued by the court on Jan. 20 requiring the commission to take jurisdiction of the application of the Jacksonville Traction Company for an increase in fare. The commission contends that it has no power to act on the company's request for a higher rate. The company was placed in the hands of a receiver last October following the rejection by the voters of Jacksonville of an ordinance providing for a 7-cent fare. After an attempt to have the commission pass on the petition for an increased fare, the receiver applied to the court for a writ of mandamus to bring the matter before the former body.

Storm Ravages in New York City.—All told, including rapid transit and surface railway systems, there are in greater New York more than 1,500 miles of track. In the boroughs of Manhattan and the Bronx there are more than 300 miles of underground conduit system. All conduit lines were put completely out of operation by the recent storm and the great bulk of it remained out of operation for more than a day. On Feb. 16 it was reported by the Public Service Commission that service had been restored on practically all of the underground conduit lines, except the Thirty-Fourth Street crosstown, the Ninth Avenue and a few other lines of lesser importance, in Manhattan. The trolley lines in Queens are operated entirely on the overhead system; and they were practically all out of service for a time. In Brooklyn the overhead trolley is used by all the surface lines. The system there was kept in operation continuously except for a few of the shuttle lines and roads in the outlying districts.

Personal Mention

Mr. Cooke Out of E. F. C.

Charles B. Cooke, Jr., has resigned as assistant manager of the passenger transportation and housing division of the Emergency Fleet Corporation. Mr. Cooke is a member of the firm of Kelly, Cooke & Company, consulting engineers, Philadelphia, specialists in financial operating and economic problems of public utilities. He was called into Government service early in 1918 as chief engineer of passenger transportation and was later made assistant manager of the transportation and housing division in charge of all railway operations of the United States Shipping Board.

Mr. Cooke's work included the investigation of transportation conditions at all shipyards throughout the country and the determination of steps necessary to provide adequate facilities for transporting shipyard workers. He personally directed in the field the investigation in the important Delaware River district where owing to the sudden concentration of enormous war industries the problem of local transportation of workers rapidly became so acute as to retard and threaten the shipbuilding program. Mr. Cooke also developed comprehensive plans for systematic study of transportation deficiencies which were successfully applied to situations throughout the country where conditions were reported as affecting ship production. Over $12,000,000 was expended by the government under his supervision for the construction and operation of facilities which it is estimated, provided transportation for 125,000 shipyard workers daily.

Mr. Cooke has also written extensively on financial engineering subjects concerning the construction and operation of public utilities. Last fall he contributed to the ELECTRIC RAILWAY JOURNAL articles on the simplification of corporate structures and on the valuation of public utility properties.

J. H. Moir, superintendent of the Edmonton (Alta.) Municipal Railway, has resigned.

William H. Newell has assumed the duties of vice-president and counsel of the Androscoggin & Kennebec Railway, Lewiston, Me.

Miss G. E. Fitz has been elected treasurer of the Androscoggin & Kennebec Railway, Lewiston, Me., the successor to the Lewiston, Augusta & Waterville Street Railway.

E. E. Nicholson, superintendent of the eastern division of the Chicago, South Bend & Northern Indiana Traction Company, South Bend, Ind., has resigned because of poor health.

Robert H. House, superintendent of the electrical department of the Knox County Electric Company, which operates trolley lines in Rockland, Me., and neighboring towns, has resigned.

Robert W. Hewins, formerly superintendent of the Norton, Taunton & Attleboro Street Railway, Norton, Mass., has been appointed treasurer and general manager of the company.

A. S. Kidd has been appointed superintendent of the eastern division of the Chicago, South Bend & Northern Indiana Traction Company, South Bend, Ind. Mr. Kidd succeeds E. E. Nicholson, resigned.

William Porter, assistant engineer of motive power of the Interborough Rapid Transit Company, New York, N. Y., has resigned to join the sales department of the Electric Service Supplies Company.

W. O. Cline, assistant general passenger agent of the Twin City Rapid Transi Company, Minneapolis, Minn., has been promoted to general passenger agent of the company. Mr. Cline succeeds A. W. Warnock, resigned.

William B. Skelton of Lewiston, has been elected president of the Androscoggin & Kennebec Railway, Lewiston, Me., the successor to the Lewiston, Augusta & Waterville Street Railway. Mr. Skelton is a prominent member of the Maine bar.

Lloyd Benner has been appointed superintendent of the electrical department of the Knox County Electric Company, Rockland, Me., to succeed Robert H. House, resigned. The company operates trolley lines in Rockland and nearby towns.

Donald Goodrich, superintendent of the Minneapolis division of the Twin City Rapid Transit Company, Minneapolis, Minn., has been appointed general superintendent of the company. Mr. Goodrich has been in charge of the Minneapolis city lines since 1915.

Alston Green, second vice-president and assistant general manager of the Alabama City, Gadsden & Attalla Railway, Gadsden, Ala., has resigned. Mr. Green has been connected with the company for several years. He was formerly in the clothing business in Gadsden.

W. R. Robertson, superintendent of the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., has resigned to accept a position with the Ontario Hydro-Electric Power Commission. Mr. Robertson is on the staff of the commission's railway department and has been placed in charge of operations.

F. J. Bjorck has been appointed acting superintendent of the Minneapolis city lines of the Twin City Rapid Transit Company, Minneapolis, Minn., Mr. Bjorck succeeds Donald Goodrich, the latter having assumed the duties of general superintendent of the company. He occupied the position of supervisor previous to his new appointment.

N. S. Cumming has been appointed superintendent of the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont. Mr. Cumming succeeds W. R. Robertson, who has resigned to accept a position with the Ontario Hydro-Electric Power Commission. Until his new appointment he was chief clerk of the railway department of the Dominion Power & Transmission Company, Hamilton, Ont., which operates 107 miles of track.

C. B. Goodsell, formerly superintendent of the Minneapolis division of the Twin City Rapid Transit Company, Minneapolis, Minn., has been placed in charge of the company's St. Paul lines. Mr. Goodsell has been connected with the company since 1907, when he was appointed secretary to the general manager. In 1913 he was made assistant to the general superintendent. He was subsequently appointed superintendent of the Minneapolis lines, serving in the latter capacity until his transfer to St. Paul.

Frederick J. Frey has assumed the duties of superintendent of the Fresh Pond division of the Brooklyn (N. Y.) Rapid Transit Company. Mr. Frey has been acting superintendent of the division since June, 1919. He joined the company as a motorman in 1895. Three years later he was promoted to inspector, and in 1905 he was made chief inspector of the Lower Fulton Street district. He was subsequently appointed general inspector, holding this position until his appointment as acting superintendent of Fresh Pond division, the largest of the company's surface transportation divisions. In his present capacity he has charge of more than 800 men.

A. Merritt Taylor, formerly director of the Department of City Transit of Philadelphia, Pa., and recently head of the housing and transportation division of the Emergency Fleet Corporation, is the author of an article in *The Manufacturers' Record* for Feb. 12 on the effect of the present system of taxation upon building construction and all other business. Mr. Taylor takes the position that the present excess profits tax paid by corporations and excessive surcharges to individuals are an important factor in maintaining high prices and diverting capital from railroads, public utilities, and other business enterprises. He gives examples to show the effect of these taxes on building construction and says that owing to this factor the building of homes has been brought practically to a standstill. He urges all manufacturers and merchants to appeal to Congress for prompt elimination of these taxes, as otherwise there will be a period of business depression, unemployment and untold suffering of the American people.

Brooklyn Surface Operation Unified

H. Hobart Porter and C. E. Morgan Placed in Charge by Receiver Garrison—Lines' Status Unchanged

Unified management and operation of all the Brooklyn (N. Y.) surface lines have been secured through the appointment of H. Hobart Porter, vice-president and general manager of the Brooklyn City Railroad, to direct the surface lines of the Brooklyn Rapid Transit Company. The appointment was made by Lindley M. Garrison, receiver for the Brooklyn Rapid Transit System, to take effect on Feb. 16. The operation of the surface lines will be in direct charge of Clinton E. Morgan, assistant general manager of the Brooklyn City Railroad.

New Arrangement Explained

The new arrangement re-establishes, so far as operating conditions are concerned, the unity of control which existed prior to Oct. 19, 1919, when the lines of the Brooklyn City Railroad, until that date operated as a part of the Brooklyn Rapid Transit System, were returned to their owners because of the inability of the latter company to meet rental payments. These lines, which comprise approximately one-half of the Brooklyn surface line mileage, have since been operated as an independent system under the direction of Mr. Porter, assisted by Mr. Morgan. The remaining B. R. T. lines continued to be operated by the Brooklyn Rapid Transit Company.

C. E. MORGAN

Mr. Porter in Charge

The present arrangement is for the purpose of affording a unified and harmonious service by the various lines. The new plan brings under the headship of Mr. Porter, under the receiver, the lines of the Nassau Electric Railroad, the Brooklyn, Queens County & Suburban Railroad and the Coney Island & Brooklyn Railroad. While these lines will be operated in unison with those of the Brooklyn City Railroad, the two systems remain distinct as to ownership and control.

Mr. Porter has been general manager of the Brooklyn City lines since their separation from the Brooklyn Rapid Transit System. He is a member of the engineering firm of Sanderson & Porter and is also president of the American Waterworks & Electric Company, Inc., which owns and operates a number of waterworks and electric properties in various parts of the country. A biography and a portrait of Mr. Porter were published in the ELECTRIC RAILWAY JOURNAL for Oct. 18, 1919.

Mr. Morgan, who assumes direct charge of all the Brooklyn surface lines, has achieved marked success in the operation of the Brooklyn City Railroad, of which he has been in charge under Mr. Porter since last October. In announcing the new arrangement, Receiver Garrison stated that Mr. Morgan's efficient handling of difficult problems during the past five months gave assurance to the public that the system as a whole would be managed "efficiently and in the best interest of the community."

Mr. Morgan was formerly general superintendent of the Michigan Railway, Jackson, Mich. He began his railroading experience as a clerk in the office of a steam road. For the next five years he acted as assistant to the president and other officers of the Indianapolis & Greenfield Electric Railway. In 1905 he had charge of the work of rebuilding and operating the Indianapolis line, and was also superintendent of the Danville line of the Terre Haute, Indianapolis & Eastern Traction Company. Four years later he accepted the position of general manager of the Indianapolis, Crawfordville & Western Traction Company. He resigned in 1912 to become connected with the Michigan Railway.

Alfred Sweeney, formerly general manager of the Lewiston, Augusta & Waterville Street Railway, has been elected general manager and clerk of the Androscoggin & Kennebec Railway, Lewiston, Me., the successor to the former company. Mr. Sweeney is also assistant general manager of the Cumberland County Power & Light Company, Portland, Me. A biography and a portrait of Mr. Sweeney were published in the ELECTRIC RAILWAY JOURNAL for Nov. 3, 1917.

C. Nesbitt Duffy, formerly vice-president of the Manila Electric Railroad & Light Company, Manila, P. I., has joined the staff of the Philadelphia (Pa.) Rapid Transit Company as assistant to the vice-president in charge of accounting and finance. Before going to Manila Mr. Duffy was connected with the Milwaukee Electric Railway & Light Company. The work that he has done in the industry and in the interest of the industry through the American Electric Railway Association is so well known throughout the industry that little need exists to reiterate it at this time.

J. A. Munroe at Omaha

John A. Munroe, vice-president of the Union Pacific System, will retire from steam railroad service on March 1 to assume the duties of first vice-president of the Omaha & Council Bluffs Street Railway, Omaha, Neb. Mr. Munroe, who was elected to the vice-presidency of the Omaha company at a recent meeting of the board of directors, will succeed W. A. Smith, formerly vice-president and general manager, who was recently elected president of the company to succeed the late Frank T. Hamilton.

The selection of Mr. Munroe to be vice-president will give the Omaha & Council Bluffs Street Railway the benefit of his experience, extending over a period of forty years, as a railroad operator. In addition to his duties as vice-president of the Union Pacific, he has for some time acted as traffic manager of that road, and also as traffic manager of the Oregon Short Line Railroad, the Los Angeles & Salt Lake Railroad, and the St. Joseph & Grand Island Railroad, controlled by the Union Pacific. He has been a director of the Omaha & Council Bluffs Street Railway since 1913.

J. A. MUNROE

Mr. Munroe was born in Bradford, Mass., in 1853. Soon after his graduation from Dartmouth College in 1878 he went West and became a clerk in the employ of Green Bay & Minneapolis Railroad. In 1881 he was appointed general agent of the Chicago, St. Paul, Minneapolis & Omaha Railway at Omaha. A year later he was promoted to assistant traffic manager of the same road, with headquarters at Minneapolis. Joining the Union Pacific in the same year, he was made assistant general freight agent of the company, continuing in that capacity until 1901, when he was advanced to freight traffic manager in charge of traffic. In 1911 he became vice-president of the company.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Cotton Yarn Advance Forces Up Tapes and Webbings

Varnished-Cambric Tapes and Flexible Non-Metallic Conduit Marked Up 10 Per Cent

Cotton materials have again advanced in price. Flexible non-metallic conduit prices are about 10 per cent higher than they were a week ago. Price at time of shipment is rather generally ruling. Prices on tapes and webbings, which had been withdrawn, were greatly increased in varying amounts last week. Varnished-cambric tapes and cloth advanced about 10 per cent. Friction tape has been advancing more or less sporadically, with the common grades of splicing tape quoted around 45 and 50 cents a pound.

The spot-cotton market slumped early in February, but started to recover at the end of last week and at this writing is at 38.45 cents. The yarn and fabric market has been rising for several months. Inability to secure sufficient labor in the process work of making the semi-finished products in the face of the heavy demand is given as the cause for the continued increases in price of these materials.

Loom manufacturers are booked up for many months ahead, and their policy of price at time of shipment shows the uncertainty of the cotton-yarn market for the coming months. Orders for varnished cotton insulating tapes and cloths are extremely heavy, but they are for rather short delivery. The buying seems to be much of the hand-to-mouth variety rather than for long shipments, showing an expectation on the part of the users of a drop in the market.

Painting Materials Advance

White Lead, Turpentine and Brushes Marked Up—Heavy Demands to Be Met for Spring Work

Increased activity is noted in the paint, varnish and enamel market. Recent large car orders which have been placed, have broken up the usual lull which follows after the first of the year. The volume of business has been improving in the railway field since late in the fall and with the present heavy buying of equipment sales no doubt will continue to increase.

White lead has advanced from ½ to 1 cent per lb., according to the quantity ordered. The latest quotation for white lead, 100 lb. keg, is 15c., with quotations ranging from 15c. to 15½c. for smaller quantities.

Turpentine during the past two weeks advanced to $2.04 per gallon, the highest price recorded in the history of the industry. It has now fallen and the Feb. 16 quotation is $1.98 per gallon. There has been little buying at the advanced figures, and wherever possible paint and varnish manufacturers are waiting for the new turpentine crop on which prices are now quoted at $1.25 to $1.30 per gallon for second quarter.

Linseed oil is holding firm. Present prices are $1.80 per gallon for raw linseed oil in 5-bbl. lots and $1.82 for the same amount boiled. Prices for second and third quarter deliveries recently have declined gradually to $1.55 per gallon on carload lots. Future prices, however, will depend somewhat on the amount of flaxseed shipped in from Argentina and India.

Paint brushes have been advanced 15 to 25 per cent by a number of important manufacturers. Material for brushes is scarce and expensive.

Safety Car Equipment Prices Increased

Motors, Control Equipment and Air-brakes Increased in Price This Week—Options Closed Feb. 16

An increase, which has been long expected, was made recently by manufacturers of safety car equipment, on motors, control equipment and on air-brakes. According to reports, Feb. 16 was the last day on which safety car orders could be contracted for at the old price. The increase, according to reports, amounts to $50 on equipment formerly quoted at about $1,650.

Many railway companies are known to have obtained options at the former price, and accordingly safety car orders for the next few months are expected to be exceedingly heavy, owing to the placing of orders by the different companies which now hold options.

Heavy Buying of Rolling Stock Continues

Orders Placed for 334 Cars During Week, Which Amounts to 14 Per Cent of Entire Number Purchased During 1919—Inquiries Out for Additional 350 Cars

The heavy buying movement of all kinds of equipment by electric railways, noted in the February 7 issue of the ELECTRIC RAILWAY JOURNAL in which orders for more than 200 cars were announced, has continued steadily with the result that during the past week, orders have been placed for 339 cars of which 239 are safety cars and 100 cars double-truck trailers. In addition, there are inquiries out for 350 cars, a considerable number of which will no doubt be placed during the month.

United Railways & Electric Company, Baltimore, Md., is the heaviest purchaser this week, having just placed an order with the J. G. Brill Company, Philadelphia, Pa., for thirty-three safety cars and for 100 double-truck trailers. The safety cars are for single-end operation and will seat twenty-eight persons. The trailers are of the center-entrance type and designed to seat sixty-two passengers.

Stone & Webster, Boston, Mass., on Feb. 14, ordered eighty-three Birney safety cars to be distributed among its properties as follows: Northern Texas Traction Company, Fort Worth, Tex., twenty-five; Baton Rouge (La.) Electric Company, eight; Tampa (Fla.) Electric Company, eight; Galveston (Tex.) Electric Company, fifteen; El Paso (Tex.) Electric Company, ten; Columbus (Ga.) Railroad, nine; Tacoma Railway & Power Company, Tacoma, Wash., six; and the Everett Railway, Light & Water Company, Everett, Wash., two cars.

Another large holding company has placed an order for 118 safety cars for its different properties. Announcement as to the properties on which the cars are to be used and the number of cars for each property will appear shortly in the ELECTRIC RAILWAY JOURNAL.

Among the inquiries, is one just issued by the Brooklyn Rapid Transit Company, which is for 200 subway cars. According to reports the company desires to purchase 100 cars immediately and to leave 100 cars on option for a short period. Other large orders pending are those of the Hudson & Manhattan Railroad, twenty-six cars for the Hudson tubes; and the Connecticut Company, which is expected to buy a fairly large number of safety cars. Many small orders ranging from two to ten cars, also, are pending.

Among the small orders placed recently but not included in the 334 cars, are the following, Chambersburg & Shippensburg Railway, Chambersburg, Pa., two safety cars; Pekin (Ill.) Municipal Railway, three safety cars, with National Safety Car & Equipment Company, Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., two safety cars with the National Safety Car & Equipment Company, and the Danbury & Bethel Street Railway, Danbury, Conn., four safety cars.

Brill Profits for 1919 Show Slight Decrease

Sales During 1918, Which Included Much War Work, Were Double Those of 1917

The sales value of the combined output of four plants operated by the J. G. Brill Company, Philadelphia, Pa., for the past year amounted to $14,201,622, as compared with $16,761,154 for 1918 and $7,706,099 for 1917. Although sales dropped off slightly over two million dollars or approximately 17 per cent, largely because of completion or cancellation of war contracts, the profits for the year after deducting $833,292 for depreciation, maintenance and repairs, amounted to $916,869. From this amount, Federal taxes, estimated at $85,000, must be deducted leaving a net profit of $831,869, or approximately 9 per cent less than for the year 1918. This amount was sufficient to pay to the preferred stock holders all the accumulated dividends and the full dividend of 7 per cent on the preferred stock for the year. On Jan. 14, 1920, a full quarterly dividend of 1¾ per cent was declared on the preferred stock for the quarter ending Feb. 1, 1920, which was paid on Feb. 2, 1920.

As the Wason Manufacturing Company was manufacturing aëroplanes for the Springfield Aircraft Corporation during 1918, this plant was greatly handicapped for the first few months of 1919 on account of putting its plant back into condition to manufacture cars. Final settlement with the Government of the Springfield Aircrafts Corporation's contracts has not been made fully, but when completed it is very likely that additional profits will accrue to the Wason Manufacturing Company.

Total orders on hand as of Feb. 1, 1920, amounted to a total of $6,904,792 as against orders on hand as of Feb. 1, 1919, for $8,204,448. Prospects for a considerable amount of work is encouraging, especially as the plants begin the year with a large amount of work on hand.

Westinghouse Additions at Lester to Cost $5,000,000

New buildings and equipment to cost $5,000,000 will be put up at Lester, Pa., near Philadelphia, by the Westinghouse Electric & Manufacturing Company. Contracts for the construction have been let to Westinghouse, Church, Kerr & Company, who will start the work at once.

An erecting shop, 130 ft. x 300 ft. with balcony; a machine shop for large work, 130 ft. x 750 ft. with balcony; a three-story warehouse, 40 ft. x 600 ft. and a one-story machine shop, 130 ft. x 500 ft., make up the buildings. It is believed the buildings will be ready for occupancy by July 15, 1920. When completed the entire plant will provide work for from 4,000 to 5,000 men, the number employed at the present time being approximately 3,000.

Rolling Stock

Brooklyn Rapid Transit Company, Brooklyn, N. Y., has sent out inquiries for 200 subway cars.

Cumberland Railway & Power Company, Fayetteville, N. C. are in the market for a number of new cars.

Chambersburg & Shippensburg Railway, Chambersburg, Pa., has placed an order for two safety cars.

Knox County Electric Company, Rockland, Maine, is in the market for one safety car and one semi-convertible double-truck car.

Beach Grove Traction Company, Indianapolis, Ind., expect during the coming week to place an order for three Birney safety cars.

Danbury and Bethel Street Railway, Danbury, Conn., through its receiver J. Moss Ives, has placed an order for four safety cars.

Pekin (Ill.) Municipal Railway, reported as being in the market for three cars, has placed this order with the National Safety Car & Equipment Company.

Toronto Civic Railway, Toronto, Ont., Canada, through its commissioner of works, R. C. Harris, is reported to be in the market for cars to the value of $200,000.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., has placed an order with the National Safety Car & Equipment Company for two safety cars.

United Railway & Electric Company, Baltimore, Md., has placed an order with the J. G. Brill Company for thirty-three safety cars and for 100 center-entrance trailers.

Saginaw-Bay City Railway, Saginaw, Mich., recently lost thirty-three cars in a fire. The equipment destroyed included old open summer cars, two interurban cars, several snow plows and sweepers and work cars.

Sandwich, Windsor and Amherstburg Railway, Windsor, Ont., Canada, will be taken over by the Hydro-Electric Power Commission of Ontario. The commission will purchase new cars and additional equipment. T. U. Fairlie, Toronto, Canada, is engineer in charge.

Los Angeles (Cal.) Railway has placed an order with the St. Louis Car Company for twenty-two safety cars and with the American Car Company for twenty-three instead of forty-five safety cars as was incorrectly stated in the Feb. 7 issue of the ELECTRIC RAILWAY JOURNAL.

Recent Incorporations

St. Malo, Que.—An electric line from St. Malo to Limoilu, Que., is being promoted by John T. Ross and J. G. Scott. The cost of construction will amount to approximately $500,000.

Wilmington, Cal. — Wilmington citizen are working out plans for building a municipally owned electric railway in Wilmington. Engineers estimate the cost of the entire project at $247,000. It is proposed to vote bonds to cover this amount. H. E. Carter is working out plans for holding a bond election.

Franchises

Boothbay Harbor, Me.—Luther Maddocks of Boothbay Harbor has secured a charter for an electric line ten miles long connecting that town and South Newcastle. At South Newcastle the road would connect with the Maine Central Railroad. The cost of construction and equipment is estimated at $200,000. Work will be started this spring.

Track and Roadway

Calgary (Alta.) Municipal Railway.—The City Council of Calgary has endorsed plans for improvements to the lines of the Calgary Municipal Railway to cost $14,000.

British Columbia Electric Railway, Vancouver, B. C.—The British Columbia Electric Raliway will extend its tracks on Granville Street and remove the tracks on Wilson Road, east of Granville Street, Point Grey, B. C.

Miami Beach Electric Company, Miami, Fla.—The Miami Beach Electric Company is completing its line between Miami and Miami Beach, and plans to have it in operation before the end of the winter.

Baton Rouge (La.) Electric Company.—The Baton Rouge Electric Company will build four addtional passing tracks on its three belt lines.

Androscoggin & Kennebec Railway, Lewiston, Me.—This company, the successor to the Lewiston, Augusta & Waterville Street Railway, plans to expend more than $800,000 on permanent improvements. The company will spend $500,000 on improvements to its roadbed and transmission lines.

Granite City Railway, St. Cloud, Minn.—The Granite City Railway will relay one mile of track with 60-lb. rail.

Erie County Traction Company, Buffalo, N. Y.—The Erie County Traction Company, which recently acquired the property of the Buffalo Southern Railway, plans to extend its line from Ebeneezer to East Aurora, a distance of ten miles.

Cumberland Railway & Power Company, Fayetteville, N. C.—This company is building about eighteen miles of track. The company is completing a concrete bridge.

Trenton, Ont. — The Bloomfield City Council has passed a resolution requesting the Hydro-Electric Power Commission of Ontario to complete estimates for a hydro-radial line from Picton to Trenton. The Hallwell Council has passed a similar resolution.

Quebec Railway, Light, Heat & Power Company, Quebec, Que. — The Quebec

Railway, Light, Heat & Power Company has received permission to construct a line from Quebec to Loretteville, Que. Work will start in April.

Nashville Railway & Light Company, Nashville, Tenn.—The City Commission of Nashville, Tenn., has passed an ordinance granting a franchise to the Nashville Railway & Light Company to lay tracks in Deaderick Street, Sixth Avenue, Fifth Avenue, and Commerce Street. The company has filed amendments to its charter embodying these changes.

Power Houses, Shops and Buildings

Glendale & Montrose Railway, Glendale, Cal.—This company has completed a new carhouse at Glendale.

Aurora, Elgin & Chicago Railroad, Aurora, Ill.—The Aurora, Elgin & Chicago Railroad plans to build an addition to its repair shop at Wheaton, Ill.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.—This company has installed a new 600-hp. boiler and underfeed stoker.

Escanaba (Mich.) Traction Company.—The Escanaba Traction Company will build a new carhouse, shop and office during the present year.

Cumberland Railway & Power Company, Fayetteville, N. C.—This company is building a power house. It will install a new steam plant in the near future.

City Electric Company, Albuquerque, N. M.—This company has under construction a repair shop at Albuquerque.

Hamilton, Grimsby & Beamsville Railway, Hamilton, Ont.—The carhouse and three of the cars of this company were recently destroyed by fire. The loss is estimated at $40,000.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—This company has ordered 14,000 pounds of overhead trolley wire for replacements.

Trade Notes

Western Electric Company, New York, N. Y., announces that W. F. Abely, sales manager at Boston since June 1908, has been made assistant manager of the Boston branch.

H. R. Worthington Company, Harrison, N. J., manufacturer of pumps, is rushing work on the construction of its three new additions. The structures will be each two-story, 50 ft. x 137 ft., steel and reinforced concrete, and will cost about $100,000.

Waclark Wire Company, New York, N. Y., has sold its plant in Elizabeth, N. J., to the American Copper Products Company, a Delaware company capitalized at $14,000,000. Besides manufacturing various wire products the Waclark company operates a brass mill.

Maher Engineering Company, 30 North Michigan Avenue, Chicago, Ill., has opened a branch office at 708 Schofield Building, Cleveland, Ohio, for handling the distribution of Erie engines, Dayton-Dowd centrifugal pumps and Galland-Henning hydraulic presses.

National Association of Purchasing Agents, New York, N. Y., has adopted as a national standard the catalog size, 7½ in. x 10⅝ in., with its half size, 5¼ in. x 7½ in., when saddle stitched so that it may be opened up flat for filing. This size was arrived at by the standardization committee after a very thorough research.

J. E. Moody, chief engineer of the Massey Concrete Products Corporation, Chicago, will take charge of the concrete pipe division of the American Concrete Pipe Association at its convention which will be held at the Great Northern Hotel and the rooms of the Western Society of Engineers on February 20 and 21.

New York Switch & Crossing Company, of Hoboken, N. J., manufacturer of railway track special work, announces that Chester F. Gailor has been appointed sales agent of the company. During the war, Major Gailor rendered efficient service in the U. S. Army, and will again continue to devote his activities to the electric railway industry.

Locke Insulator Company, Victor, N. Y., will commence immediately the construction of a 24-kiln factory in South Baltimore, Md., for the manufacture of fine porcelain for insulators. The plant will occupy about 15 acres, and according to reported estimates will cost from $1,000,000 to $1,500,000 and will employ from 7,000 to 10,000 persons.

Lewis E. Ashbaugh, hydraulic engineer with the J. G. White Companies and clients for the past twelve years, has become connected with John R. Proctor, Inc., of Bayonne and New York. Mr. Ashbaugh is to be the sales-engineer at the New York office, in charge of installations of fuel-oil apparatus and other electrical equipment for power and lighting purposes.

American Coin Registering Company, Emeryville, Cal., manufacturer of Voglesong fare boxes, announces that James Lynch, for many years Pacific Coast manager of the Herring-Hall-Marvin Safe Company, has been made vice-president and sales director. This company recently received an order to equip with its fare boxes a large number of safety cars for the Brooklyn Rapid Transit Company.

Railway Audit & Inspection Company, Philadephia, Pa., at the annual meeting of the board of directors, January 23, accepted the resignation of E. C. Hathaway as president. He was subsequently elected chairman of the board. H. N. Brown was elected president; T. C. Cary, 1st vice-president and general manager; C. E. Horney, 2nd vice-president and treasurer, W. W. Groves, 3rd vice-president and sales manager and Walter H. Taylor, secretary.

Blaw-Knox Company, Pittsburgh, Pa., has purchased the C. D. Pruden Company of Baltimore, Md., manufacturer of standardized steel buildings. J. Grier Campbell, purchasing agent of the Blaw-Knox Company, has resigned to become assistant treasurer of the C. D. Pruden Company. William S. Boyd, formerly assistant purchasing agent of the Crucible Steel Company, and purchasing agent of the Page Steel and Wire Company, has been appointed purchasing agent of the Blaw-Knox Company.

New Advertising Literature

Trump Manufacturing Company Springfield, Ohio: Booklet "B" on its hydraulic turbines.

Barnes Drill Company, Rockford, Ill.: A circular on its self-oiling all geared 24-in. drill and tapper.

De Laval Separator Company, New York, N. Y.: Bulletins No. 101 and 102 on its method of reclaiming oils.

Trumbull-Vanderpoel Electric Manufacturing Company, Bantam, Conn.: Bulletin No. 9 on its line of safety switches.

Thompson Electric Company, Cleveland, Ohio: A bulletin "Do Your Reflectors Reflect" describing its safety disconnecting hangers.

Milliken Bros. Manufacturing Company, New York, N. Y.: Catalog No. 10 on transmission towers, radio towers, poles and steel buildings.

Walter A. Zelnicker Company, St. Louis, Mo.: A pamphlet listing products such as rails, cars, locomotives, machinery and equipment.

Belden Manufacturing Company, Chicago, Ill.: Bulletin 1208 on Beldenmold molded pieces made from "Condensite," "Bakelite" and "Redmanol."

Allis-Chalmers Manufacturing Co, Milwaukee, Wis.: Bulletin 1537 giving details of its oil engine, diesel type, for ordering repairs and spare parts.

Industrial Products Company, 1001 Chestnut Street, Philadelphia, Pa.: Illustrated booklet on new electrical lineman's belt and collapsible canvas toolbag for linemen.

Midwest Engine Company, Indianapolis, Ind.: Copies of a Diesel engine paper delivered at the company sales convention by N. McCarthy are being distributed by the company.

Ohio Brass Company, Mansfield, Ohio: A pamphlet illustrating a number of safety cars fitted with one or more O. B. specialties. O. B. trolley bases and catchers, sand traps, and types Z. P. and W. D. F. imperial headlights, also are shown.

Metal & Thermit Corporation, New York, N. Y., has issued and will distribute on request a large 1920 map calendar showing railroad time zones in the United States and Canada, also showing illustrations of interesting Thermit welding jobs as applied to sternframes of ships, rail special work and locomotive frame repairs.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 55 New York, Saturday, February 28, 1920 *Number 9*

Chicago Court Takes Novel View of Crowding Case

A DECISION which is of particular concern to transportation companies as setting a dangerous precedent for additional cause of liability, was recently announced by the Appellate Court of Cook county, Illinois. The opinion is abstracted in this week's issue of the JOURNAL. The court holds, in brief, that if street car companies accept too many passengers and suffer cars to become badly overcrowded they must be held responsible for any accident or injury which results directly from the inevitable, foreseeable effects of such overcrowding. It distingushes this case from a previous ruling in the Massachusetts courts where a passenger assumed a certain amount of risk by entering a car which was already crowded.

The equity of the precedent established in the Cook county decision would appear to hinge on the question whether transportation companies are able to prevent overcrowding. Were the European system of limiting the number of passengers to a car in vogue here, we could more readily understand why a company should be penalized for accidents resulting from an excess load. However, in the absence of such regulations, which might properly be imposed by the authorities if the riding public were so inclined, we cannot but believe that this court stretched a point against the utility company. It is probably true that many companies throughout the United States have not been able, for financial reasons beyond their control, to keep up with the requirements for additional cars. This has resulted in unusual crowding of existing equipment, and while laboring under this handicap the utilities should not have questions of liability interpreted too strictly against them. We are pleased to note that the company defendant in the above case is endeavoring to have the decision set aside and a rehearing granted.

Americans Will Pay for Luxury

A RECENT news item to the effect that the French wife of one of our overseas veterans suffered temporary nervous prostration because she could not make ends meet on her husband's salary throws a serio-comic light upon the typical extravagance of the American contrasted with the equally typical frugality of the Frenchman. When the young wife in question was being examined at the hospital, she kept repeating that it was not right that the meat of persons in her station should be delivered by automobile. Instead of being adjudged insane, she was complimented for her clarity in seeing that it is just this sort of vainglory that adds unnecessarily to the cost of living.

But we are not telling this story to point a moral as to thrift. We consider the American people past cure on that score, and that being so, why not "play up" to this craving for luxury and comfort in the way that all other sales interests do? That the American will pay a special price for a special ride if speed is an important ingredient is brought home to us again and again in studying traffic right here in New York. It is a fact that many thousands of people who travel daily between New York and Brooklyn voluntarily pay two fares instead of one merely to save a few minutes. The trolley car passing over the Brooklyn Bridge would bring them ten minutes later to the same destination in downtown Manhattan. It is not because their minutes are so precious—watch 'em at a scoreboard next summer—but because the American is eternally itching to keep moving on the fastest vehicle in sight. So if there is a moral to be derived from the shocking discovery of our welcome citizeness from France, it is that the American rider will willingly pay a higher fare if some tangible improvement in the service goes with it. Those who are considering more trolley service or auxiliary motor-bus service, please take notice!

Ford's Railway Car Still in Experimental Stage

IT WILL be some time before Henry Ford's street car will be seen on the city streets in regular passenger service. We do not say that he will not ultimately succeed in developing a car that will operate on rails satisfactorily, but from present knowledge of his project, we do not think that the competition offered will be overwhelming to the modern electric car, as has been so freely predicted.

However, we can see a real field for the interurban car which is now nearing completion and which is described elsewhere in this issue. There has already been found a field for gasoline-engine propelled cars in local passenger service on branch-line steam roads where the volume of traffic does not warrant the use of a regular train. This Ford car will probably ultimately form a valuable addition to the equipment now available for this character of service and perhaps an improvement over present types of self-propelled cars, owing to its lighter weight and the prospects for dependable service and low price which the Ford production methods and policies imply. We can readily imagine that the Ford interurban may prove a real boon to the steam roads. It may even find application on some new interurban projects as a temporary expedient to postpone the investment in overhead and substation equipment until traffic has built up to a density to justify the greater investment for the sake of more economical operation. But it stretches our imagination rather severely to picture the Ford street car, running on rails, as presenting such a great advantage as to spell the "doom of the electric street car."

Nevertheless we are glad that Mr. Ford is planning to build a city car after he finishes his present interurban car. If it should be possible for such a car to operate at a lower cost per car-mile than the modern electric street car, then the street railway companies would be the first to welcome its arrival. Who would be in better position to operate such cars than the present companies, having the tracks already available and the knowledge of handling traffic? But until such a car is built predictions on its possibilities are idle.

Clear Cut Decision Determines Fares in Chicago

"AS THE streets are for the use of all citizens of the state, the question of rates of fare is not one of local concern, merely, or of local politics." In this pointed sentence we find the keynote to the sound views of the Illinois Supreme court as expressed in the Chicago Surface Lines fare case which was abstracted in last week's issue of the JOURNAL. The decision was a sweeping victory for the companies, reversing the lower court and sustaining the liberal stand taken by the members of the Public Utilities Commission. It gave little consolation to the municipal authorities who have been insisting on the inviolability of the 5-cent fare provisions in the contract ordinances.

While the Supreme Court had previously taken the positive stand that the general assembly had never relinquished to municipalities the power to regulate rates of fare, the city lawyers contended that the Chicago situation was different because the ordinance creating the contract was adopted under a special law. This position, the court said, is untenable.

The city also expressed the fear that its rights to 55 per cent of the net receipts would be jeopardized by the establishment of the principle that the commission would have authority also to lower the rates of fare. On this point the court said: "The General Assembly has the power and is charged with the duty to see that rates of fare in the use of streets are reasonable within the limit, on the one hand, of a fair return to the railway company and reasonable compensation for the service rendered, and the interest of the city cannot affect the exercise of that power and duty."

Perhaps the most important feature of the decision so far as Illinois utilities are concerned is that in which the Supreme Court dismisses the objection that the commission had no authority to fix a temporary rate based upon increased operating expenses, and could only make a change upon a full hearing and examination which would demonstrate what a permanent rate ought to be. Some outside authorities had expressed the opinion that the Illinois utilities act was defective in this particular. The court holds that the commission has full authority to provide for emergency orders. It sets aside the contention that the city did not have a reasonable opportunity to be heard and says the commission would be justly chargeable with neglect of duty if it had not taken prompt action to save the companies from bankruptcy at a time when the employees had secured a considerable increase in wages following a strike.

The Illinois Public Utilities Commission has established a reputation for fair dealing with the public, employees and utilities alike. At a time when service was brought to a standstill because the platform men were insisting that they were not receiving a living wage, the commission acted as arbitrator and brought about an adjustment of the difficulty. This settlement was pleasing to the employees and to the public. A prompt adjustment of fares brought relief to the companies, yet when the amount of revenue produced by the increased fares appeared excessive, the rates were again lowered. The companies are still insisting that the interests of investors were not properly taken care of because the temporary valuation figures are too low. However, they are not discouraged by the outlook. Several recent decisions of the state's highest court have strengthened the position taken by the commission, and it is expected that when the present valuation proceedings are concluded substantial justice will be done. Meanwhile those who have opposed the higher fare petition for political purposes are finding that innuendo and threats have failed to swerve either the utility commissioners or the courts.

Mass Production of Car-Miles Cuts Overhead

THE savings in fuel and labor afforded by modern one-man car operation are so satisfying that one is hardly inclined to look for other economies; "sufficient unto the day is the good thereof"—to "optimize" an old proverb. However, one cannot stop the enthusiasts from digging out other sources of saving. Not all track engineers will see eye to eye with J. C. Thirwall, for example, as regards the reduction in track upkeep to be expected from safety cars; but even they cannot deny the arithmetical fact that if you double the car mileage without increasing the tonnage going over the rail your track maintenance charge per car-mile will be cut in half! So, too, if the total tax charges per car-mile amount to 3 cents now, they will be close to 1.5 cents per car-mile when the output of car-miles is doubled. Without multiplying examples, it is clear that overhead and similar over-all charges per car-mile must decrease in approximate proportion to increase of car-miles produced.

Of course, if the revenues failed to increase while the total overhead and other over-all charges remained stationary, there would be no advantage in splitting up these expenses among a greater number of units. Fortunately, it is the common experience of safety-car operators that the earnings per car-mile of the smaller car tend to equal those of the larger car. In one specific case, the big cars were averaging 31 cents with no margin for overhead! When the safety cars began in the same town with 100 per cent more miles they earned only 20 cents, but even this was already 5 cents above operating expenses and taxes! Within one year, the thirty-two-passenger car was earning as much per mile as the forty- to forty-four passenger car, leaving a margin of 16 cents on twice as many miles for fixed charges and that almost obsolete dividend declaration. It is thus evident that mass production of car-miles by means of light-weight automatic cars also cuts overhead and foreign departmental charges appreciably; the only exception being that comparatively small proportion of taxes based upon gross earnings. After all, then, those who assert that safety-car operation cuts costs all along the line have in their favor the experience of Henry Ford and others who have mastered the secret of mass production.

Making a Park Pay Means Making It Good

IN TESTIFYING before the Federal Electric Railways Commission last summer, T. E. Mitten's representative pointed to the success which had been attained in operating an amusement park in Philadelphia by spending the necessarily large sums of money required to secure excellence in entertainment. In this issue is presented a story about the success gained in New Orleans with Spanish Fort Park, a story which reaffirms the thought that it is the well conducted, high grade park which pays its way. The public seems surely to appreciate good things. The well kept park offering clean, wholesome amusement of a superior character wins out. And any park which does not pay its own way should be closed, for the days have passed when it can be figured that a park deficit is justified by the additional riding which it induces on the cars. The margin of profit on the car ride, usually a long one to a park, is too small to pay any part of the park expense. As long as the park can be made to break even, just that long may it be considered a worth while traffic stimulator.

There is also a vast difference between good park management and extravagance in securing attractions. In other words, to operate a park on a profitable basis requires the exercise of very careful judgment. At best the street car parks are not abundant money makers. The railway operators who have them on their hands as part of the inheritance of earlier less wise days in the industry, can perhaps improve the park showing by applying the principles which Mr. Brown in New Orleans has found pertinent. But the theorems of park management presented should not be taken as an inducement to start any new park as subsidiaries of the street railway business, for the experience has often been disappointing.

Staten Island Insists Upon an Answer

ON STATEN ISLAND, New York's island borough, there is a receiver with a railroad and no rolling stock to operate on it. Assuming at first that he would have to run the railroad, the receiver said he knew nothing about railroading. He even wondered why he had been appointed. Later, it turned out that he did not need to know anything about railroading. The receiver had assumed too much at the start.

In like manner the residents of the territory formerly served by the Staten Island Midland Railway assumed too much at the start. They signified to the city their willingness to pay a 7-cent fare. Then they signified their willingness to pay a 10-cent fare. A delegation from Staten Island even made the perilous trip to Manhattan on the municipal ferry to tell the Mayor that the residents were willing to pay a 10-cent fare.

Only those feel who have suffered. Cars are still running in Brooklyn. Even if they were not the Mayor has a nice limousine and there are obliging policemen on the Williamsburg bridge to speed the city's chief executive on his way from Brooklyn to Manhattan. The Mayor told the delegation from Staten Island he didn't intend to be bamboozled. One of the Staten Islanders then had the temerity to ask Controller Craig if he had ever ridden in the municipal buses on Staten Island. For this lese-majesté the speaker was told to tell the receiver to go to the federal court and have that court vacate the receivership. "Then we will apply to the State Court for a receiver, and if the application is granted the city will operate the road." As if Staten Island hasn't had enough of paternalism! What with the municipal ferry and the municipal buses and now the threat of a municipal railway, the delegates went away sad. They are thinking things over.

But the delegation is possessed by a single idea. That idea is to get the cars back. A single idea in an individual is likely to degenerate into hallucination. But when a number of people are moved to action by a single idea, events take strange form. Carrie Nation, an individual with a single idea, became a pest. Several thousand less militant Carrie Nations with a single idea put across prohibition. Those who have been on Staten Island—and stayed there any length of time—will readily appreciate why Staten Islanders do not intend to remain content with turning toward teleology as possibly offering an answer to the abandoned service riddle.

Complete Electrification Along Atlantic Seaboard Urged

THE plan of unifying the power supply of the entire northeastern seaboard region and at the same time electrifying all the railroads therein, was under discussion last week in the midwinter convention of the American Institute of Electrical Engineers. That part of the paper and discussion which pertains to electric railways is printed on another page of this issue. This is a national proposition. The government is requested to finance its investigation. Questions will be asked all over the country and electric railway men will have to answer many of these. While the plan as a whole involves large aggregations of power supply and large or universal application of electricity to industry, it also involves, and may largely be made possible by, the complete electrification of the railways of the entire area. Local interests may see the problem more acutely, but the industry as a whole must solve it.

The estimated combined economic benefit of the plan is so great as to compel interest. If the preliminary figures are borne out by more complete investigation, the original cost at present prices of the whole tripartite plan is about $1,240,000,000 and the annual saving or return is $300,000,000 or over 24 per cent. Any plan which is seriously said to pay for itself in four years is worth examination. The agencies which may make this possible should share in the benefits. And the first question is, is it feasible? The electric railway must answer a large part of that question. The plan involves much greater economy in the use of coal, largely reduced coal haulage, and increased efficiency in use of power. The electric railway's part is to increase efficiency and economy of rail transportation and consequent greater efficiency of the use of coal and reduced coal haulage, as well as the more efficient use of the physical plant or fixed investment. It may involve much standardization of equipment of all sorts and many changes in operating methods and agreements, and joining hands of local and trunk line systems. We cannot now foresee or name the many points which may come up and have to be solved to make it possible. The spirit of the discussion in the Institute convention was that it is possible and necessary. If it is a good thing, it will ultimately be done and it can be financed.

The Place of the Bus—I

In This Opening Article, the Author Outlines the Extensive Development in Great Britain of the Motor Bus in Co-ordination With the Electric Railway

BY WALTER JACKSON
Consulting Engineer

IN TRYING to set forth the respective fields of the electric car and the motor bus through the medium of specific examples taken from both foreign and American circumstances, it occurs to the writer that the spirit in which he approaches this inquiry could not be set forth to better advantage than in the words of Ralph Waldo Emerson's poem entitled:

THE MOUNTAIN AND THE SQUIRREL

The Mountain and the Squirrel
Had a quarrel;
And the former called the latter "Little Prig";
Bun replied:
"You are doubtless very big,
"But all sorts of things and weather
"Must be taken in together
"To make up a year,
"And a sphere.
"And I think it no disgrace
"To occupy my place.
"If I'm not so large as you,
"You're not so small as I,
"And not half so spry.
"I'll not deny you make
"A very pretty squirrel track;
"Talents differ: All is well and wisely put;
"If I cannot carry forests on my back,
"Neither can you crack a nut."

This poem by the Sage of Concord has an appositeness for today that is almost uncanny. We have been calling the motor-bus, particularly the jitney type, something stronger than "Little Prig"; but it has continued to occupy a place, although it is hardly fair to make a pretty motor-bus track on the electric railway's back! Above and beyond all are the facts that, while the electric railway mountain is the one to carry the forests of passengers, its inability to be half so spry leaves many a transportation nut that can be cracked only by the motor-bus.

As a people renowned for practicality, are we going to permit the wastefulness of competition between car and bus, or are we going to follow the sensible plan of putting all popular-price transportation under one co-ordinating head?

UNFAIR COMPETITION SHOULD NOT OBSCURE BUS ADVANTAGES

The American electric railway man can hardly be blamed for feeling hostile toward the motor-bus, because practically all bus operation in the United States has been unjustly competitive and not co-operative. He has heard a lot about the flexibility of the motor-bus, but the only kind of flexibility that has come to his notice has been flexibility in quitting when the going is bad and the takings are poor, or flexibility in shortening runs and raising fares when the opportunity offered.

He has heard a lot, also, about the ability of the motor-bus to take short cuts via diagonal avenues or to make use of nearby parallel streets, but he notes grimly that the motor-bus prefers to use already congested highways, because it is easier to steal than to create traffic.

Then, too, he has been told that the motor-bus is the ideal vehicle for reaching isolated communities, but alas, the actual jitney operator seems too timid to venture into open country, for he has a habit of turning back even before reaching the electric railway terminus.

In brief, the nut-cracking advantages of the motor-bus are rarely displayed by the irresponsible jitney operator, for the good and sufficient reason that the conditions for which buses are most suitable are rarely self-supporting from the basic standpoint of capacity or volume of business. The jitney operator, therefore, prefers to poach on the traffic which has been built up by the electric railway along definite channels after years and years of effort. On the other hand, if the true applications of the bus are exploited by the street railway company itself two desirable results ensue: isolated or remote sections really will receive service, and such services, although rarely self-supporting, will often help to produce large savings in the railway department and so throw off an actual over-all profit, as will be shown in later analyses of actual urban situations. To prove that such co-ordination of car and bus service under one head is possible, we shall now proceed to a general survey of the development of motor-bus traffic by British tramways, both publicly and privately owned.

WHY GREAT BRITAIN HAS SO LITTLE UNPRODUCTIVE TRACKAGE

In his series of articles in this paper on "The Zone Fare in Practice" the writer had occasion to point out that British tramway trackage was puny in comparison with American trackage for the same populations because of a number of reasons that had absolutely nothing to do with the "pay-for-what-you-get" system. Among these reasons were practical absence of formerly competitive trackage and of premature or speculative extensions into open country. Another reason hardly touched upon at the time, was that for the last decade or more no British road has built a track extension into thinly-peopled territory if it could secure the right to build up such districts through a bus service first. Privately-owned roads have been able to install such routes without much red tape, but municipally-owned roads usually have been obliged to secure the permission of Parliament exactly as in the case of a track extension. The wide powers conferred on the new Ministry of Transport apparently will not alter this disadvantage, since municipal tramways are specifically exempt from the control of this body.

Now what is the situation with regard to the extent and usefulness of such co-ordinated bus services? Roughly speaking, the majority of British roads either have, or are arranging to have, some form of bus operation, from the operation of a few "char-a-bancs" or sightseeing summer vehicles to extensive, permanent services such as those desired by the London County Council Tramways, in its application now before Parliament.

BUSES ON ONE-HALF OF BRITISH ELECTRIC TRACTION COMPANY'S PROPERTIES

Approximately twenty-nine electric railways (approximate because some of the properties are in process of sale to municipalities) in the United Kingdom are owned and operated as individual concerns by the British Electric Traction Company. Of these, about one-half operate motor-bus services. The list following also includes several out-and-out cross-country bus lines, but does not show other bus services in which the British Electric Traction is simply one of several shareholders:

Barnsley & District Electric Traction Company.
Barrow-in-Furness Tramways.
British Automobile Traction Company, London.
British Automobile Traction Company, Macclesfield.
British Automobile Traction Company, Reading & Thames Valley.
Birmingham & Midland Motor Omnibus Company.
Gravesend & Northfleet Electric Tramways.
Northern General Transport Company (Tyneside District).
Peterborough Electric Traction Company.
Potteries Electric Traction Company.
Scottish General Transport Company.
Sheerness & District Electric Power & Traction Company.
South Wales Transport Company (Swansea).
Wrexham & District Transport Company.
Yorkshire (Woollen District) Electric Tramways.
B. E. T. service between Chorley and Preston opened late in 1919.

Most of the B. E. T. services are of suburban character. Where trackway and bus route overlap from the center of a city up to or near the end of the car line, an extra high fare is charged to keep the facilities of the motor buses for the long-distance suburban riders for whom they were inaugurated. In the opinion of B. E. T. officials, the time for the tram is when the business has grown to the point of justifying, say, a ten-minute headway.

Through the courtesy of the British Electric Traction Company, the writer has been furnished with a great array of detail figures on the revenues and expenses of the several properties. However, as these were supplied in confidence it will be proper to use them hereinafter only without reference to the names of the individual properties. An idea of the importance of this company's bus operations may be gleaned from the fact that for the fiscal year ended Dec. 31, 1918, it operated on the systems named close to 300 buses and carried on them 19,000,000 passengers, exclusive of those carried with 700,000 bus-miles in the London district of the British Automobile Traction Company, for which no "passengers-carried" data are available. These figures are doubtless far below the results to be expected in 1920 and thereafter, since it was practically impossible to get new buses during the war years. Indeed, the number of buses operated in 1918 shows a decrease in several instances. The varying nature of the bus routes operated is indicated by the fact that "passengers per bus-mile" range from 2.2 to 6.6.

LONDON GENERAL OMNIBUS IS CHIEF OF ALL-BUS CONCERNS

The references to the bus undertakings of the British Electric Traction Company are sufficient to establish the fact that co-ordination of car and bus is not a chimera. In addition to these privately owned co-ordinated services, the United Kingdom has a larger number of privately-owned all-bus systems, ranging from tiny rustic livery undertakings and feeder services for steam railroad stations to the enormous system of the London General Omnibus Company. Although the latter was discussed in considerable detail in the ELECTRIC RAILWAY JOURNAL for Oct. 11 and Nov. 1, 1919, it will not be out of place to summarize here those points which bring out the scope of this organization. This is necessary because of the many misconceptions and misstatements which have been recently scattered by certain types of bus promoters.

The need for such a summary will be granted when it is stated that a recent bus promotion circular says of buses that: "They are practically the only means of transportation in London." The fact is that in the year 1918, the buses of London did carry the impressive number of 682,000,000 passengers, but they were helped out slightly by the underground lines, which carried a mere 699,000,000 passengers and by the street railways, which managed to take care of 992,000,000 riders, although the cars have but two good points of contact with the business and pleasure area of the world's metropolis.

It cannot be repeated too often that the great bus development in London was made possible almost solely by the physical impracticability of operating street cars in narrow, winding, congested or dead-ended streets, of which there are many in the British metropolis. The profits which the bus company made in the short-haul district enabled it to compete directly also with the street railways of the London County Council, the West Ham Corporation, the Croydon Corporation and other municipalities in the same fashion (except for steadiness of service) as jitneys compete with our electric railways. In other words, the privately-owned buses do not have to bear anything like the same charges as the publicly-owned cars—a truly anomalous situation! If they did, they could never have expanded beyond the area for which the bus is ideal, aside from the long joy-riding routes into the country.

The articles in question also brought out the fact that the 34-seat double-deck London bus used up to the present time does not average more than 8.5 m.p.h. This is nothing to brag about when the 78-seat cars of the London County Council Tramways (trailers often included) average 9.05 m.p.h. morning, 8.92 m.p.h. midday and 8.75 m.p.h. evening. The greater capacity of the car surely sets off any disability suffered by the operation of part of the bus mileage in the most congested area. What these figures prove is that alleged superiority in speed would be a poor reason for adopting buses on heavy traffic thoroughfares where electric car operation is a physical possibility.

The largest number of buses, 2,906, in use by the London General Omnibus Company was attained early in 1914 just before the World War. Drafts by the Government for war purposes and the impossibility of replenishment caused the number to sink to 1,758 by the time of the armistice, November, 1918. Nearly 1,000 buses have been added since. In all, the London General Omnibus Company expects to have a total of 4,000 buses, about one-half of which would be new 46-seaters to replace the outworn 34-seaters.

As has been pointed out, part of the L. G. O. bus services are competitive with the municipal tramways with resultant economic waste. There was a time when the buses also competed with the underground lines, but this was eliminated in large measure when all the privately-owned bus, tram and underground properties of the London metropolitan district were brought under one management by Lord Ashfield of Southwell, the former Sir Albert Stanley.

The use of the motor-bus for short-haul travel is brought out by the fact that in 1918, 60.3 per cent of the bus passengers were penny riders, much of this traffic comprising less-than-a-mile rides to and from the underground stations. In the summer time, however, certain of the bus routes are very popular for long rides into the country.

CO-ORDINATION OF BUS AND CAR BY MUNICIPALITIES

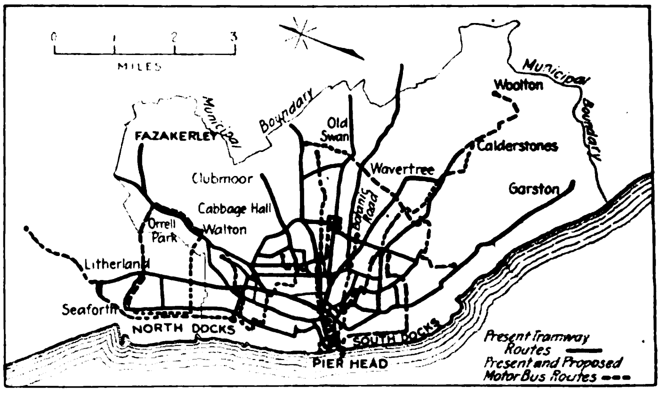
Birmingham, Liverpool, Manchester and Sheffield are among the important municipal tramways which have found a legitimate place for the motor bus. The Birmingham Corporation Tramways took over the city business of the Birmingham & Midland Motor Omnibus Company, Ltd., in 1914. There were then thirty buses; it now has sixty, the largest number in use by any city undertaking up to the placing of the Liverpool order hereinafter mentioned. For the year ended March 31, 1919, the fifty-two buses then on hand carried 7,486,852 passengers. The attitude of the Birmingham Corporation Tramways as to the use of motor buses first and cars afterward was expressed by A. Baker, general manager, at the 1919 conference of the Municipal Tramways Association, when he said:

> We have one route running 5 miles into the country as an extension of a tramway route. It runs to one of the lungs of the city. We often have a 5-minute bus service thereto in the summer months. In the evenings, we sometimes get a queue 300 yd. to 400 yd. long which it takes us hours to clear. Now we have decided that the time for a tramway there has arrived. I think you can take it that if you have a population sufficient to satisfy a quarter-hour service, that is the time when you should begin to think of laying down a tramway line.

The Liverpool Corporation Tramways acquired the Woolton Motor Omnibus Company, Ltd., in 1911. At first, it operated but three routes on headways varying from 20 to 60 minutes. These routes handled 1,504,496 riders in 1918. Since the war, 100 motor buses have been ordered for operation over eight additional routes. Both old and new routes are shown in the accompanying map together with the tramway routes. It will be noted that the buses are not competitive but supplementary, particularly the Aigburth Road-Old Swan route, which ties together half a dozen or more tramway routes in suburban territory. Of the Liverpool routes that follow, Nos. 1, 2 and 3 are old; and Nos. 4 to 11 are new:

1—Woolton and Calderstones Park.
2—Aigburth and Old Swan.
3—Seaforth and Walton.
4—Moss Lane, Green Lane and Pier Head.
5—Everton, North Docks and Walton.
6—Gateacre, Woolton, Smithdown Road and Pier Head.
7—Aigburth, Smithdown Road and West Derby.
8—Seaforth, North Docks and Walton.
9—Lodge Lane and South Docks.
10—Edge Hill and Pier Head.
11—Sefton, Litherland and Sandhills.

The Manchester Tramways Corporation has been running motor buses since 1914. Three routes are operated from the Palatine Road tramway terminus to Northenden, Cheadle and West Point with nine buses on 30 to 60-minute headways. During the fiscal year ended March 31, 1919, 1,821,310 passengers were carried on these motor-buses. In referring to these services, General Manager McElroy said at the Municipal Tramways Association conference of 1919 that where, as in Manchester, double-truck, double-deck cars had to be run every quarter minute, there was no chance for the motor bus. It was fallacious to consider the London bus development as a normal example. In London, the bus had the field to itself, could charge what it liked and did not have to start in much before 8 a. m. after the great tide of traffic had already been brought in by the tramways (and underground electric and steam suburban railways). On the other hand, he tended to favor the bus for suburban routes because of the high cost of permanent way. He would hesitate to parallel a car route except in special cases.



BUS ROUTES IN LIVERPOOL SUPPLEMENT RATHER THAN COMPETE WITH THE TRAMWAYS

The Sheffield Corporation Tramways secured authorization as early as 1907 to run motor buses both within and without the city limits. Actual operation began in February, 1913. The ten routes now in operation total 37 miles, of which only 15 miles are within the city. For these routes, twenty-six buses were employed to give headways varying from 6 to 20 minutes. Passengers carried in 1918 numbered 4,995,997. The number of buses is now forty. Additional routes are under consideration in addition to those shown on the accompanying map reproduced from the ELECTRIC RAILWAY JOURNAL for Dec. 13, 1919. Most of these routes plainly are suburban extensions to small communities. As compared with Sheffield's half-million, it is interesting to note that the outlying communities vary in size from 1,000 to 23,000 and total only 58,000 people.

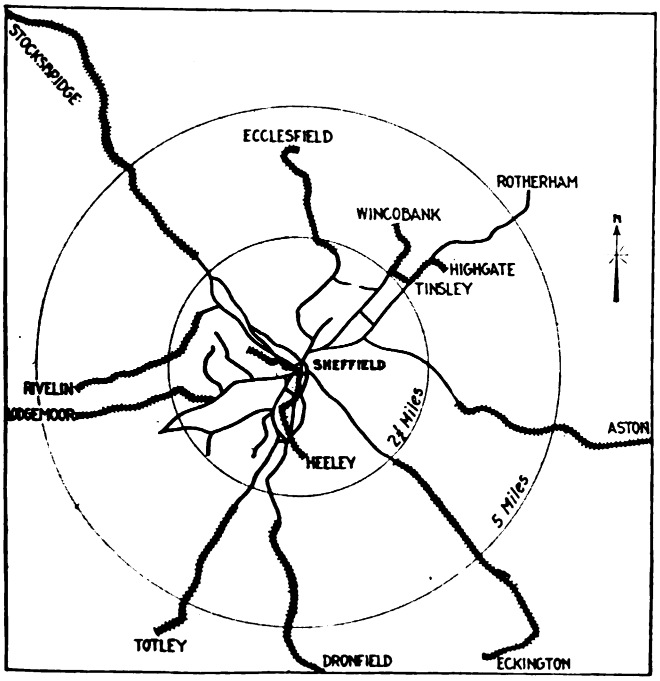
The paper presented before the 1919 conference of the Municipal Tramways Association by A. R. Fearnley, general manager Sheffield Corporation Tramways on the relative fields of motor bus and car (see ELECTRIC RAILWAY JOURNAL for Dec. 13, 1919) is the classic on this subject and will be referred to in detail in the following article. However, it is appropriate to summarize Mr. Fearnley's conclusions here, as follows:

1—The motor bus is an excellent vehicle in acting as a feeder to tramway routes and services and in connecting them up.
2—An unsuitable vehicle for satisfactorily dealing with heavy town traffic. (Note: Largest Sheffield bus seats 37; largest Sheffield car, 76.)
3—Quite inadequate for dealing with Sheffield's peak loads.
4—Financially impossible for workmen's reduced fares.
5—No advantage over tram in regard to average speed maintained throughout the day.

In addition to the routes described by Mr. Fearnley, others have been opened between the Forth Park terminus and Chapeltown, and between Midland Station and Brocco Bank. Powers have also been sought for running a service to Worksop.

According to a letter of Dec. 4, 1919, from Ernest Hatton, engineer and general manager, the Newcastle-on-Tyne Corporation Tramways now operate buses from two points outside the city limits. They run from the terminals of the existing tramways and act as feeders. The district in which they operate is largely a mining and agricultural one, whose needs are satisfactorily served by the buses, the district not being sufficiently developed at present to warrant the laying of much track. Powers are being sought for the right to operate motor bus routes for urban traffic. The type of bus used has gas-electric drive. For the fiscal year ended March 31, 1919, 81,590 bus-miles were run to carry 567,738 passengers, averaging a return of 32.6 cents per mile.

The Leeds Corporation Tramways is a large municipal system which is notable for making use of both the gasoline bus and the trackless trolley. The bus route (Moortown-Shadwell, 2.72 miles) is an extension of a tramway route. One trackless trolley (4 miles to Farnley) runs from the heart of the city and makes use of a trolley route for part of the way. The Guiseley-Otley (3.2 miles) and the Guiseley-Burley (2.9 miles) routes are operated from the tramway terminus at Guiseley. J. B. Hamilton, general manager Leeds Corporation Tramways, set forth his ideas on the motor bus as early as 1912 in his paper on "Urban Passenger Transport" before the Municipal Tramways Association (see ELECTRIC RAILWAY JOURNAL for July 5, 1919) in which he emphasized the inferiority of the bus for handling large masses.



IN SHEFFIELD THE BUS ROUTES (HEAVY LINES) ARE EXTENSIONS OF THE TRAM ROUTES (LIGHT LINES)

At the 1919 conference of the Association, discussing Mr. Fearnley's paper, Mr. Hamilton remarked dryly that to serve industrial centers with buses was "taking soup with a teaspoon or . . . of eating haggis (the famous Scotch meat and oatmeal dish) with a toothpick." In discussion with the writer, Mr. Hamilton said that he believed it more economical to use the bus only up to the point where the service justified a 10-minute headway for say a population of 5,000 per mile. For the lightest traffic he was using gasoline buses and for the medium traffic he preferred the trackless trolley which, where good roads were available, was "putting down a tramway on the installment plan."

SOME FORTHCOMING BUS SERVICES

In addition to the foregoing bus installations and others not mentioned hereinbefore, the current year is likely to see many more applications by British trolley systems of motor buses in co-ordination with electric railway service. Among the municipalities which applied to Parliament in November, 1919, for permission to run motor bus services are the following: Blackpool, Cardiff, Erith, Coventry (resumption), Huddersfield, Lowestoft, Newcastle-on-Tyne, Nottingham, Salford and southampton. Glasgow and Aberdeen have bus routes under consideration and Edinburgh is operating buses.

The London County Council Tramways are also seeking the right to run buses, especially for the tying-together of dead-ends.

The Reading Corporation Tramways have just entered the motor-bus field with a city route between Caversham Heights and Tilehurst. This is entirely independent of the country bus routes operated by British electric traction interests using Reading as a Station.

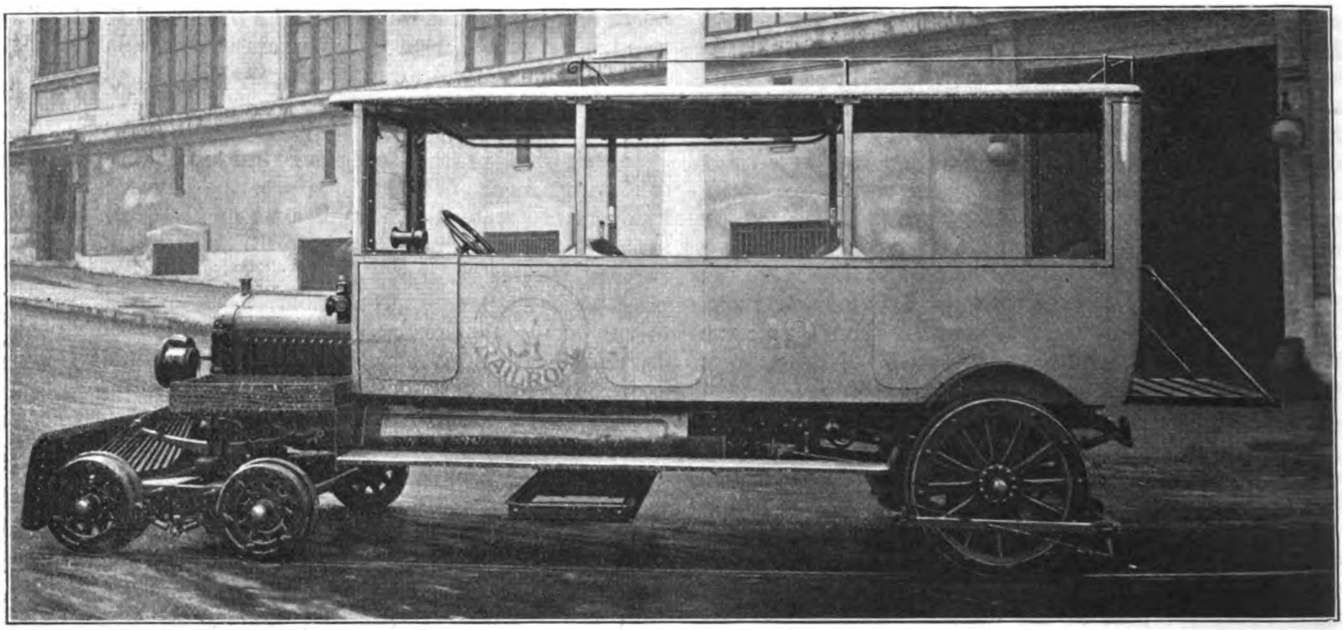
To conclude: It is obvious from the foregoing that the motor bus has found a definite and useful place in the operation of British street railways. The following article, discussing relative costs of car and bus operation, will serve to emphasize the fact that while these motor-bus installations are not cheaper but dearer to operate than standard electric railways, they are nevertheless justified because the bus, like the squirrel in the poem, can crack many a nut beyond the ability of the electric railway.

Diesel-Electric Cars in Sweden

A NUMBER of Diesel-electric cars have been in regular operation on some of the Swedish railways since 1913. In a recent article on these cars, written by Prof. Hubendick in *Teknish Tidskrift Elektroteknik*, some interesting statistics are given, covering about 500,000 ton-miles of regular traffic, with these cars.

The driving equipment consists of a 500-volt direct current dynamo, rigidly connected to a 75 hp., 500-r.p.m. Diesel engine, and electrically direct-connected to the series-wound driving motors. Speed variation is obtained by varying the generator voltage. A Jugner storage battery (Ni-Fe) is suspended underneath the car and supplies power for starting the engine by means of the dynamo, which is provided with a special series winding. The battery is automatically re-charged during the run.

The operation of a Diesel-electric car thus is somewhat similar to that of a self-starter automobile, except that there is a single control-lever, and a reversing switch. During stops and while coasting, the supply of fuel is cut off, which permits a considerable saving. As the engine delivers full output at normal speed, the car shows a very high efficiency in the ratio of fuel to ton-miles. For this 75 hp. type of car, the fuel consumption (Texas oil) runs about 7.5 grams per ton-mile for 80-ton trains, up to double that for trains of 30 tons weight. This corresponds to about 43 ton-miles per pound of oil. In other words, a 50-ton train would run something like eight miles per gallon. The conclusion reached by the author is that the results of these experiments indicate that the Diesel-electric cars may have a future where traffic conditions will not justify a full electrification.



THIS TWELVE-PASSENGER CHASSIS IS EQUIPPED WITH PONY TRUCK, FLANGED WHEELS AND TURNTABLE FOR OPERATION ON STANDARD GAGE RAILWAY TRACK

New Gasoline Motor Car for Hetch Hetchy Railroad

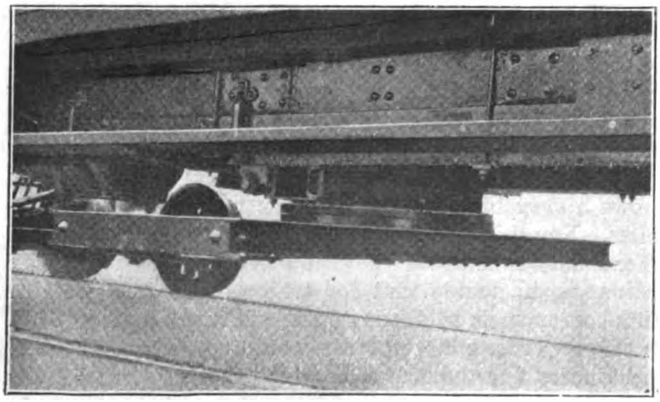
Automobile Trucks Replace Steam Equipment in Mountainous Territory Leading to San Francisco's New Water Supply System

THE city of San Francisco operates a 69-mile railway extending from a junction with the Sierra Railway to the site of the Hetch Hetchy dam, which is being built as part of the city's water supply system. This road is all in mountainous territory, has grades up to 4 per cent and a maximum curvature of 30 deg. Although geared steam locomotives are used for handling most of the freight, automobile trucks and remodeled touring cars render important service. The city engineer's office reports, "the operation of this class of equipment has been extremely satisfactory and very much more economical than steam equipment could possibly be in the kind of service for which it is used."

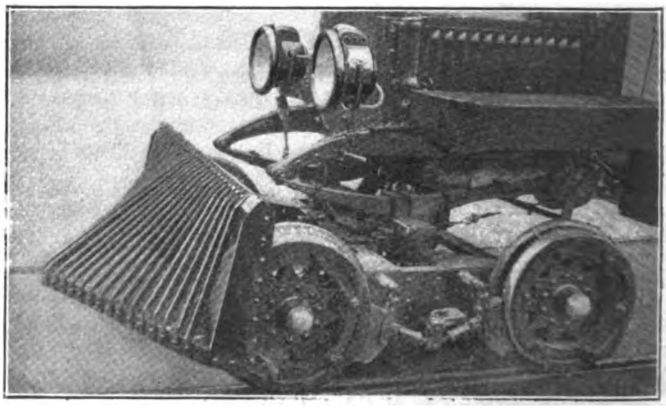
These cars are all equipped with flanged steel tires and pony trucks. In fact, improvements are continually being made as the result of experience. For example, neither steel wheels nor wooden wheels would meet requirements, but there has been developed a satisfactory wheel with wood spokes and fellies with steel tires.

A new light-weight inspection car embodying all improvements developed to date, has just been placed in service. This car is built upon a ¾-ton White chassis which was lengthened by splicing in an extra piece in the frame. On the chassis is mounted a twelve-passenger body, equipped with seats such as are used in standard passenger automobiles. The forward end is supported on a pony truck which takes the place of the standard front axle and steering gear. The roof is made sufficiently strong to carry light-weight baggage and mail sacks, and a baggage rack on the rear may be used for heavier freight. Small reinforced wooden trays are substituted for the usual fenders over the front wheels and are found very useful for carrying jacks or spare equipment.

On account of the long grades it is sometimes necessary to apply the brakes for considerable periods of time. It was found that the heat generated in the standard automobile brake drum was sufficient to dry out the wood enough to loosen up the wheels after a few thousand miles of such operation. This car was therefore equipped with brakes on the pony truck and the rear wheels that are applied by turning the steering wheel. Of course this wheel is not needed for steering. Two flexible steel strand cables lead from the base of the steering post to forward and rear brake levers.



THE TURNTABLE CARRIED UNDER THE CAR PERMITS QUICK REVERSAL



THE BRAKES ON THIS PONY TRUCK ARE SET BY TURNING THE "STEERING" HANDLE

The standard foot and lever brakes were left in place as built at the factory. The car is equipped with a 30-hp. motor which, with the standard gear reduction at the differential furnishes sufficient power to readily operate over a grade as high as 4 per cent on direct drive.

A "turntable" is slung from the under side of the chassis at the center of gravity. The whole car is raised through this device using a track jack at each side of the car. When the wheels have been lifted clear of the rails the turntable is blocked up and the jacks removed. The car may then be turned around. A driver can reverse the car by himself in about twenty minutes. This arrangement has made it unnecessary to install turntables or wyes along the line for the purpose of turning the light-weight equipment.

For use as an ambulance the car is provided with a stretcher which is ordinarily slung up out of the way on the under side of the roof. When in use this is supported on the backs of front and center seats and is steadied by attachment to the roof posts.

Reboring Motor Shells with Home-Made Equipment

Special Machine Constructed in Shops of Newport News Company Has Proved Effective in Reboring Bearings and Housings

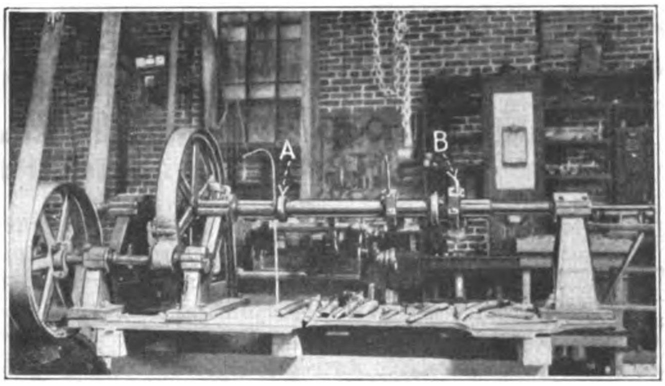
By N. E. Drexler
Chief Engineer Newport News & Hampton Railway Gas & Electric Company, Hampton, Va.

The older class of motors in service on the lines of of the Newport News & Hampton Railway, Gas & Electric Company, such as Westinghouse types 93 and 101, became worn to such an extent that it was impossible to keep the armature bearing housings and axle bearings tight. Some steps had to be taken to remedy this condition, and the motor-boring machine shown in the accompanying illustration was designed and built in the railway company's shops at a cost of about $250.

The necessary bedplates and pillow blocks were cast in a local foundry. The boring bar was made from an old car axle turned to 2¾ in. diameter at the center and 2¼ in. at the bearings. Toolholders in the form of collars, shown at *A* and *B* in the accompanying illustration, were keyed to the boring bar in order to hold the necessary cutting tools. A long keyway was milled in the bearing sections of the bar, thus permitting the boring bar to slide laterally through the driving gear. All other parts except the gears and pulleys were made in our own machine shops.

The machine is belt-driven from a countershaft and the gear ratio adopted is such as to give 14 r.p.m. at the boring bar. The feed is automatic and consists of a feed screw, shown at *C* in the illustration, connected to the boring bar by means of a ball thrust bearing and actuated by the threaded pulley shown at *D*. The threaded pulley is belt-driven from a countershaft located underneath the bedplate, and this countershaft in turn is driven from a countershaft at the opposite end of the machine. The rate of feed is $\frac{1}{32}$ in. per revolution of the boring bar.

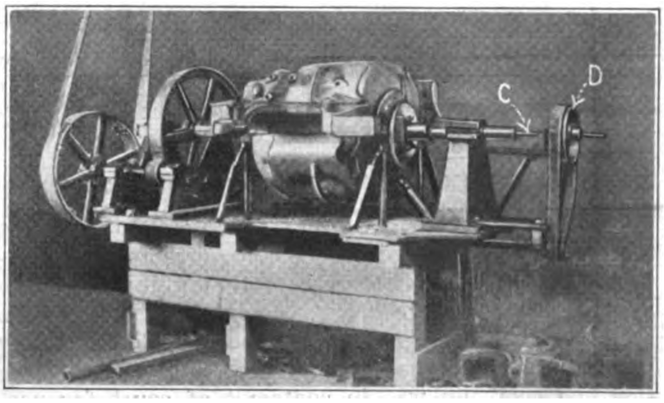
The bed of the machine is mounted on a wood frame which is bolted to the floor. A motor frame is mounted in position for boring by setting it on four stud bolts, which are screwed vertically into the bedplate. Each of these stud bolts is equipped with two heavy nuts. The motor frame is placed over the ends of the stud bolts, resting on the lower set of nuts, which are then adjusted to secure the proper centering of the motor frame. When this is secured the motor is locked in position by four other nuts screwed down on the stud bolts on top of the motor lugs. The stud bolts are braced against vibration by four extension bolts which are braced against the vertical stud bolts and rest on the bedplate in a depression made for the purpose. A split-frame motor is placed in position one-half at a time, and a box-frame motor is placed over the boring bar by sliding the latter to its extreme left-hand position, thus leaving an opening inside the right-hand pedestal for swinging the motor frame into position. The bar is then slid back to the right to engage with the bearing in the right-hand pedestal, the position of the frame adjusted on the stud bolts and the tools properly gaged and set. In boring, the boring bar travels to the right, it being pulled in that direction by a threaded extension at the right-hand end of the bar, which engages with a stationary threaded block.



HOME-MADE MOTOR-BORING MACHINE IN SHOP AT HAMPTON, VA.

To provide sufficient metal for boring out the armature housings and axle bearings to the size necessary for new parts, the parts worn are built up by arc welding. After the welding operation has been completed, the frame is set up on the machine and bolted in place as shown in a second illustration. The reboring to the size desired is then carried out. The most difficult part of the operation and the one that consumes the most time is the setting up and centering of the motor frame.

The cost of welding and reboring 101-B motors averages $21 per motor.



MOTOR FRAME SET UP ON THE MACHINE READY FOR BORING OPERATION

Buses Begin on Staten Island

Staten Island Midland Railway Trolley Service Withdrawn and City Supervised Buses Substituted—Five-Cent Fares But No Transfers Issued

THREATENED discontinuance of trolley car service by the Staten Island Midland Railway caused the Board of Estimate and Apportionment of the City of New York, on Jan. 16, 1920, to authorize Commissioner of Plant and Structures Grover A. Whalen to operate or to regulate and supervise the operation of motor vehicles for the purpose of carrying passengers, until March 31, 1920, over such routes as may be necessary to provide service for the inconvenienced public of the Borough of Richmond. The fare was fixed at 5 cents per ride per bus. The staff of the Department of Plant and Structures was to be used in so far as it was necessary to carry out the purpose of the authorization of the board.

REASON FOR DISCONTINUING TROLLEYS

In the latter part of 1919 the Midland Railway Company petitioned the Public Service Commission, First District, New York, for the right to increase its fare saying that unless this was granted, discontinuance would be necessary. A hearing was held by the commission at St. George on Dec. 29, 1919, which led to the appointment of a committee of representative citizens of the Borough of Richmond, to consider the Midland Railway situation and formulate recommendations to keep the cars in operation. The report of this committee was presented to the Mayor and Board of Estimate on Jan. 9, 1920, with the recommendation that the trolley fares be increased from 5 to 7 cents. Due, however, to the refusal of the Board of Estimate to consider the matter favorably, the railway company refused to postpone discontinuance any longer and at 12:01 on Monday morning, Jan. 19, 1920, withdrew from service thirty cars on four routes affecting some 17,000 persons as follows:

Mileage Involved

Name of Route	First Main Track	Sec. Main Track	Sidings etc.	Total Mileage
1. Concord, Newdorp and Richmond	7.10	5.66	0.17	12.93
2. Midland Beach Shuttle..........	1.56	1.56	0.10	3.23
3. Concord and Port Richmond....	4.96	4.93	.06	9.95
4. Manor Road (Westerleigh)......	2.56	4.93	0.25	2.81
Total discontinued	16.18	12.15	0.58	28.91

The Midland Company also had sole trackage rights over the Richmond Turnpike between Clove Road and Central Avenue, where service has been maintained by the Richmond Light & Railroad Company, the owners of the track, since Jan. 19. The locations of the abandoned routes are shown by dotted line on the accompanying map.

CITY BRINGS INJUNCTION TO PREVENT SUSPENSION

The Board of Estimate on learning definitely that the company would suspend service directed Corporation Counsel Burr either to obtain an injunction to restrain the company from ceasing operation or to apply for a receiver for the property. The company ignored the order and, the city brought suit holding that the company was in contempt of court for noncompliance. Supreme Court Justice Cropsey of Brooklyn, before whom the contempt proceedings were held, decided that the company had been improperly served, holding that since the restraining order had been secured by the Corporation Counsel on Saturday evening the seventeenth, it had not been served until the following night, only a few hours before the cars were scheduled to cease operation, and then on a subordinate, who although he had charge of the actual physical operation did not have the power to order the service to continue in accordance with the order.

Justice Cropsey censured the corporation counsel's office for its delay and failure to obtain proper service and indicated that the proper officials could have been reached on Sunday. The practical dismissal of the case of the city was thought to remove any legal controversy over the rights of Jacob Brenner who was appointed receiver by the Federal Courts.

The city, however, undaunted by the decision of Justice Cropsey in the Supreme Court, again on Feb. 9 made application before Justice Callaghan, in the Brooklyn Supreme Court, to appoint a receiver for the Staten Island Midland Railway in order that operation may be resumed and to supplant Jacob Brenner, the present temporary federal receiver.

The city, represented by Assistant Corporation Counsel E. J. Kohler, stated that his purpose was to enforce specific performance of the obligation and contracts contained in the company's franchise; that the paramount duty of the company was to serve the public and that the city was creditor to the amount of nearly $100,000. No railroad company, he contended, had a right to discontinue service without the consent of the Public Service Commission and the authorities from whom the franchise was obtained. He further held that the federal receiver should turn the operation of the property over to a state receiver, who, he said, could issue receiver's certificates. The present receiver, Jacob Brenner, he held, was appointed to wind up the affairs of the railway company and not to continue operation. Justice Callaghan reserved decision.

RECEIVER APPOINTED FOR MIDLAND RAILWAY

Failure on the part of the Board of Estimate to provide the needed financial relief or to take seriously the report of the citizens' committee, even though the company was losing upwards of $100,000 per year, caused the railway directors on Jan. 16, 1920, to adhere to their previous determination to close down on the nineteenth. They were ready and willing to forfeit their franchises when demanded by the city and to apply for a receiver to wind up their affairs, even though the city threatened to run city-operated motor buses over their routes.

On Monday, the day service was suspended, Jacob Brenner was appointed temporary receiver for the company until Feb. 17, 1920, by Federal Judge Thomas I. Chatfield on petition of the Westinghouse Electric & Manufacturing Company.

On Jan. 19, in compliance with the authorization of the Board of Estimate, four bus routes, all of which terminate at the St. George Ferry, started operation with about thirty privately owned buses under the supervision of Commissioner Whalen. After the first day's operation it was found to be impossible to provide adequate loading and unloading spaces unless the buses were operated from the upper level of the viaduct at the St. George Ferry terminal. The city therefore at its own expense boarded over the tracks leading to the loop on the viaduct and closed up three tracks at the terminal. Special parking places were also provided for both private automobiles and taxicabs as well as loading and unloading spaces for the buses. Under the plans of the department of plant and structures the privately owned buses are scheduled to operate from 6 a.m. to 2:55 a.m. the following morning on all routes starting from the ferry terminal. Under this arrangement, it is of course necessary to have two operators for about one-half of the buses although many chauffeurs usually work from the first trip in the morning until after the evening rush hour, i. e. until about 8:30 p.m. Such buses as are jointly owned or whose owners have a relief man to help them out usually split the day into about equal parts. In general such buses operate into the night and meet the late ferry boats from New York.

The accompanying table shows the bus routes in operation together with their estimated length, the scheduled running time and headways. When compared with the trolley car service previously rendered although the headways are shorter in some cases, the amount of service actually rendered is less, due principally to the great difference in car capacity. During the early part of February service was curtailed to some extent, due to the severe snow storm and the existing conditions of the highways. With the snow off the ground the buses will operate over good macadam or asphalt roads.

BUS ROUTES BEGUN IN STATEN ISLAND

Bus Routes Operated	Estimated Length (Miles)	Running Time (Min.)	Normal and Rush Hr. Headway	Headway after 8:30
Routes from St. George Ferry Terminal:				
1. Richmond, Newdorp and Dongan Hills	7.1	45	10	20
2. Concord	3.5	15	10	20
3. Four Corners and Castleton Ave.	4.5	18	10	20
4. Westerleigh	5.0	18	5	20
Other Routes:				
5. Crosstown: Concord to Port Richmond Square (in effect Feb. 2, 1920)	4.5	20	10	20
6. Special school trips from Grant City and Midland Beach to Richmond, at 8:00 a.m. and return from Richmond at 3.00 p.m. (In effect Feb. 2, 1920)	5.0	..	..	..

By reference to the accompanying map it will be noticed that the buses in general follow very closely the suspended trolley routes. Routes 1 to 4 each have one terminus at the St. George Ferry. Route 1 follows practically the same route as that formerly used by the Newdorp and Richmond trolley line. The Concord line, Route 2, serves practically the same territory although it does not follow the same streets as the Richmond route. These two routes are planned to give 5-min. service from Concord to the New York Ferry.

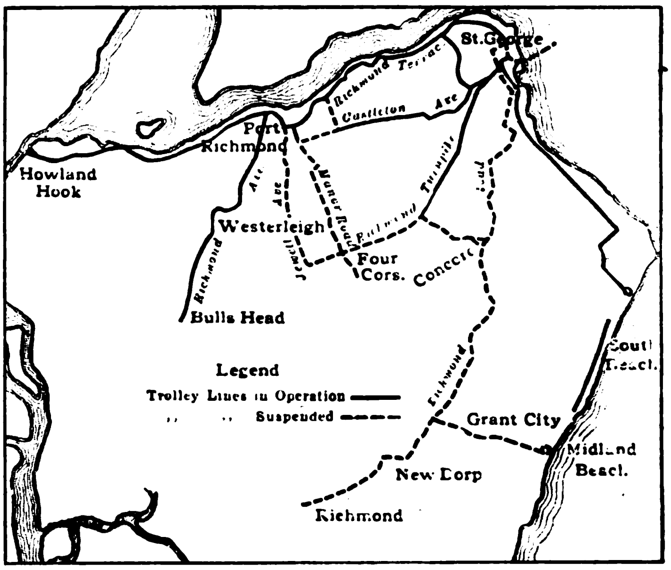
Route 3, the Four Corners and Castleton Avenue line, follows the shore along Richmond Terrace to Lafayette Ave. and then cuts across back of Sailors' Snug Harbor via Castleton Avenue to Manor Road and Four Corners. Route 4, Westerleigh, follows the shore along Richmond Terrace to Jewett Avenue through Westerleigh to Myer's Corner.

The Crosstown route, No. 5, was put into effect on Feb. 2, and operates from Concord to Port Richmond, via Clove Road, Richmond Turnpike, through Four Corners and Myer's Corner and thence down Jewett Avenue to Port Richmond Ferry.

At the time trolley service was suspended normal headways of 20 minutes were maintained to Midland Beach, Concord and Port Richmond, Westerleigh and Silver Lake. In rush hours trippers were operated to meet the boats and the company planned 7½ min. headways to Newdorp and double headers on a 15 min. headway on the Silver Lake-Port Richmond line.

TYPE OF BUS OPERATED

The type of buses operated are for the most part Reo speedwagons having longitudinal seats and seating thirteen in addition to the driver. Some Winther-Marwin, Commerce and Stewart trucks with larger seating capacities are also used. Standing is permitted between the seats and alongside the driver, but passengers are not allowed to block the operator's view nor to ride on the bus steps. Entrance and exit are by the front. A folding door protects the opening, which is kept closed when the bus is in operation. Little or no lighting is provided in the bus body, nor is there any provision for heating. The cash fares charged are the same as were formerly permitted by the trolley company—namely 5 cents. No provision is made, however, for free transfers and it is doubtful if any satisfactory participating arrangement could be worked out under the existing conditions of bus operation. On the school trips from Midland Beach, Grant City, etc. to Richmond, the school children are not permitted to ride at reduced rates.



THIS MAP SHOWS THE TROLLEY LINES ON STATEN ISLAND ON WHICH OPERATION HAS BEEN DISCONTINUED AS WELL AS THOSE STILL IN OPERATION

In order to eliminate the necessity of the bus drivers returning to their homes after the day's business with their buses, the Department of Plant and Structures has secured the use of a two-story garage at Tompkinsville where the drivers can put up their cars over night. The use of the garage, however, is not gratis. The owner charges $1.00 per night, or $22.00

per month for space, including also ordinary garage services. These rates, it is said, will be reduced with the advent of warmer weather when it is no longer necessary to heat the garage.

Buses in the morning when the traffic is all toward New York do not wait for connections with the ferry boats but endeavor to make as many trips over their routes as possible. In the afternoon and evening, however, when the traffic is in the opposite direction, buses leave the ferry terminal only on condition that they get at least a seated load, and consequently it oftentimes happens that a bus will lay over from five to ten minutes for a ferryboat to arrive. This of course means delay for those who are on hand at the time the bus arrived and leaves little or no opportunity for passengers enroute to be picked up. However, the amount of business picked up outside of the terminal is very small compared to what is taken away from the terminal. In the opinion of Deputy Commissioner William Wirt Mills much additional revenue can be obtained if the short-haul traffic, between the different localities on the various bus routes, can be developed. This he says was one of the troubles of the former railway company with their schedules.

While no actual figures are obtainable for the traffic actually handled by the buses it is reported that the trolley car traffic has decreased about 20,000 passengers per day. Many have become patrons of the steam railroad—the Staten Island Rapid Transit Company—while others walk. It is, however, estimated that the buses carry not more than 10,000 passengers per day, and that each bus earns from $15 to $16 per day, when operating from 6 a.m. to 8:30 p.m. This is slightly less than what the trolleys actually took in on any regular nine-hour run.

The department of plant and structures has arranged for traffic policemen at the ferry terminal to care for the motor vehicle traffic on the viaduct. Two officers are on duty practically all the time, one at the entrance to the viaduct and the other at the bus terminal. The city also maintains a starter to take care of the bus drivers and endeavor to keep them on some sort of headway. Two men who are regular department employees are each on duty eight hours per day: one from 6 a.m. to 2 p.m. and the other from 2 to 10 p.m. These men are paid their regular wages.

SOME COMMENTS RE BUS SERVICE

Counsel for the Richmond Borough Utility Company which operates a bus line from St. George Ferry Terminal to the Fox Hills Base Hospital, a distance of 3 miles for a 15-cent fare, is quoted as saying that it is impossible for the city to make a success of its bus undertaking on a 5-cent fare.

Public Service Commissioner Nixon, commenting on the buses, is quoted as saying: "The fare will probably have to be increased as the service develops, but buses with up-to-date equipment are better than the time worn railway system. Large crowds, however, cannot be carried for long distances by buses as well as by cars. We can learn in a few weeks the weak points of both systems. In the meantime every effort should be made to restore the railroad service and build it up to a high state of efficiency. Unless this is done progress on Staten Island will be checked."

Undoubtedly there is some dissatisfaction with the buses, for the residents of Richmond and Stapleton and others in the interior who were cut off from other parts of the island have written the Midland Company asking that trolley service be resumed, saying they are willing to pay a 7-cent fare.

Due to infrequent headway and the small carrying capacity provided as compared with the trolley, many persons have denounced the bus service because unless they boarded the bus at the end of the route they were unable to get aboard. Then too, there is no attempt to make connections between the various routes, and passengers desiring to travel from one town to another have longer waits than with the former trolley car service, when some pretense of connections was made.

Some complaints have also been made that the drivers overcharge. This, however, is alleged to be due to the manner in which the buses are operated. Commissioner Whalen has expressly stated that any driver convicted of this practice would be severely dealt with.

On Feb. 2, more buses were put in operation, but the heavy snowstorm a few days after put many out of the running. In a subsequent article it is hoped to give more information as to the traffic and cost of service.

Linseed Oil Substitutes

IN DISCUSSING some of the substitutes for linseed oil, in the February issue of the *Railway Maintenance Engineer*, A. H. F. Phillips, master painter, New York, Ontario & Western R. R., Middletown, N. Y., states that there is considerable demand for substitutes now. Due to the general shortage of flaxseed, many railways have been receiving paint oils as substitutes for linseed. While these include mineral, animal, and vegetable oils, the last-named furnishes the largest assortment.

Among the most important of the vegetable drying varieties is Chinawood or tung oil. This is particularly adapted for use in resisting the effect of water but has not shown itself adapted to replace linseed oil in making oil paint. Poppy-seed oil is prominent for grinding the finer grades of zinc white and artist's colors. It dries nearly as rapidly as raw linseed oil. Bombay nut oil was at one time offered at a price somewhat lower than poppy-seed oil. It is very clear and its drying properties are fully equal to those of bleached linseed oil. Soy-bean oil requires full ten days to dry to a film and then the film will not be as firm as that of raw linseed oil, which requires only about six days to dry. Corn or maize oil has been used in paints for many years. It has very little, if any, drying properties and will harden to a brittle and rather a mealy film in from twenty to thirty days. Cotton-seed oil has no drying properties but is used to adulterate linseed oil. Pine oil and tar oil are products from the distillation of wood spirits and of rosin, and are used where semi-drying and water-resisting oils are necessary.

Among other vegetable oils mentioned are hemp-seed, sunflower-seed, "nigger"-seed, tobacco-seed, Scotch fir-seed, peanut and cocoanut oils.

When linseed oil that is adulterated with mineral or rosin oils is placed on a strip of glass painted jet black it shows a bloom or iridescence. Admixtures of linseed oil and corn oil or linseed oil and cotton-seed oil can be detected by placing some of the oil between the palms of the hands, rubbing briskly and noting the odor thus emitted. The presence of soya, however, cannot well be ascertained by simple tests, and a chemical analysis is necessary.

Results of Fare Increase in Spokane

After Six Months the 6-Cent Fare Appeared to Be Producing a 20 Per Cent Increase in Passenger Revenue

BY H. C. BENDER
Superintendent of Public Utilities, Spokane, Wash.

SPOKANE is the largest city on the Inland Empire. We have a population of about 135,000, ranking second in size in the State of Washington. The city covers an area of nearly 40 square miles, with about 2000 acres of parks. Our assessed valuation on an approximate 40 per cent basis is $76,700,000.

We are served by two independent electric railway systems. The first, the Washington Water Power Company, controls 52.4 miles of city line, 34.6 miles of which is double tracked. This system was the first in the field, so serves the more thickly settled and the more permanent population. The second system, the Spokane & Inland Empire Railway, controls 41.7 miles of city line, 11.8 miles of which is double tracked. This road serves the outlying districts to a greater extent and is in competition with the former company in certain sections of the city.

On April 6 both companies, by order of the Public Service Commission of Washington, raised the fare on the city lines from 5 to 6 cents, school tickets remaining at 4 cents. The object of this paper is to show what I believe to have been the effects of this 20 per cent raise in fare on the revenue passenger traffic of the city.

We had practically no war industry, so our general progress during the war was materially slackened. The migration of our workers to the more lucrative fields in the coast cities was keenly felt, but since the first of 1919, these workers have been gradually returning and general business conditions have been increasingly good. The business of all utilities, except the street railway passenger travel, has shown a steady increase throughout the year, so that any loss in this passenger travel can only be attributed to the increase in fares.

For purpose of comparison of the data before and after the increase in fare, I have averaged the months of 1916, 1917 and 1918, and have also compared 1919 with the "normal" year, 1917. Any comparison of 1919 with 1918 is apt to be misleading, because the latter was such an erratic year; a comparison with 1917 is more reliable because this year was at least an average year. In my studies I have laid stress on the three-year average comparison and I find that one of the companies used the three-year average comparison in its published report on the last month's business. The comparison shows that the average number of revenue passengers carried per year during the three-year period is 0.4 per cent less than the average for a five-year period, for the Washington Water Power Company, and 5.3 per cent less for the Spokane & Inland Empire Railway.

The data are shown in a number of graphs, Figs. 1 to 9, to which the following comments apply:

Fig. 1 clearly indicates the trend of the finances of the two operating companies for the past two years. The average increase in revenue of the Washington Water Power Company is clearly contrasted with the decline in revenue of the Spokane & Inland Empire Railway. The average betterment for the city would lie between these two lines. Figs. 2 and 3, showing passenger traffic, emphasize the conditions indicated above. The influenza epidemic which occurred at about the time of the signing of the armistice, produced a depressing effect on the traffic. From this, there was a prompt recovery with an excessive drop in April, 1919

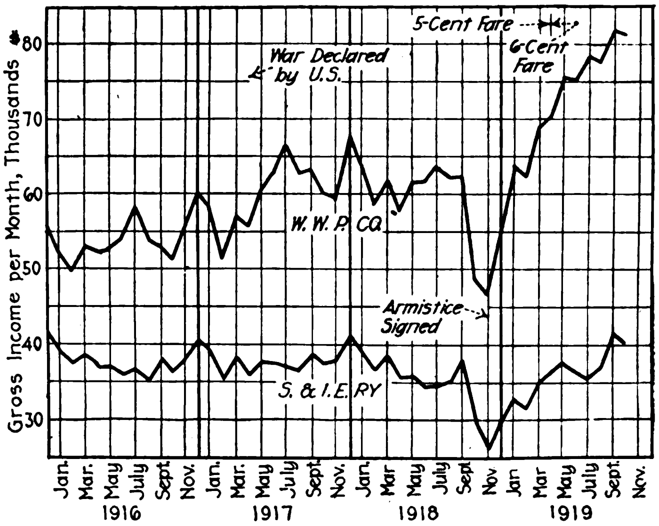


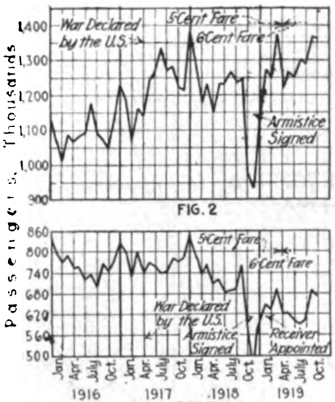
FIG. 1. GROSS INCOMES OF THE TWO RAILWAY COMPANIES OPERATING IN SPOKANE

The actual car mileage operated by the companies during the past few years is given in Figs. 4 and 5. These are introduced to show that the betterment in financial return is not due to a betterment in service to any appreciable extent.

Figs. 6 and 7 show a comparison of 1919 with the "normal" year, 1917, the percentages of increase or decrease over 1917 being plotted. Fig. 6 shows that the traffic in February and March was about 18 per cent above that for 1917. As stated before, all utility activities except street car traffic showed a steady increase in business throughout the year. If the 5-cent fare had been maintained, the increase in traffic would have shown a steady improvement in addition to the 18 per cent above noted. This comparison indicates that the one company, see Fig. 6, had not recovered all of the travel lost during the first month of the 6-cent fare, while the other, see Fig. 7, had just recovered.

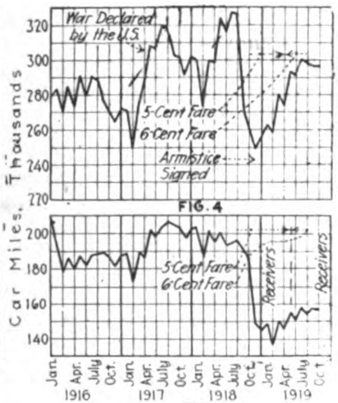
In Figs. 8 and 9 a comparison is given of 1919 with an average of the years 1916, 1917 and 1918 by months. To my mind these diagrams show clearly the effect of the increase in fare. If we assume that the percentage of increase in travel over the three-year average would have continued to improve about as indicated by the dash lines, if the 5-cent fare had been maintained, (which I believe is a fair assumption if the experience of the other utilities can be used as a barometer of conditions), then the results due to the increase in fare can be read directly from the chart. I consider Fig. 8 more reliable than Fig. 9 because the company whose results are plotted in the latter was in the hands of a receiver during the period covered by this comparison.

As indicated in the diagrams the income showed a considerable increase during the first two months of the higher fare, then fell off to the point of diminishing returns in July. Then the tide turned and a big increase has been shown since. In July I stated my belief that, if the fare had been maintained at 5 cents the companies would have received a gross income just as great as they did receive under the increased fare.



FIGS. 2 AND 3—PASSENGER TRAFFIC ON CITY LINES

Top—Washington Water Power Co. Bottom—Spokane & Inland Empire Railway.



FIGS. 4 AND 5—CAR MILEAGE OPERATED ON CITY LINES

Top—Washington Water Power Co. Bottom—Spokane & Inland Empire Railway.

The data for the last four months indicate that the traffic has thoroughly recovered from the effect of the increase in fare; in other words, the companies are reaping the full benefit of the 20 per cent increase without loss in traffic. In my opinion from now on the improvement in travel will depend upon the improvement of general conditions in the city; however, any comparison with any previous period, including 1918, will not bear me out in this prediction.

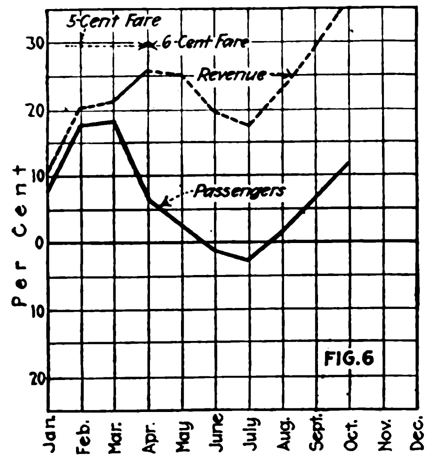


Fig. 6—Percentage Change in Revenue and Passengers Carried During 1919 over 1917 by City Lines of Washington Water Power Company

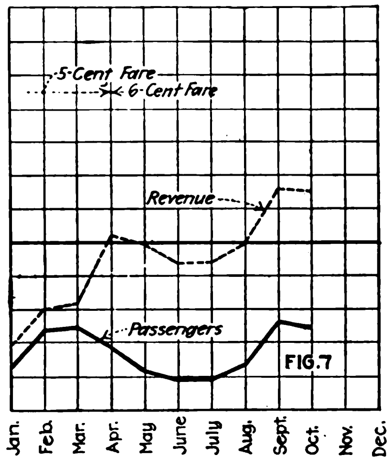
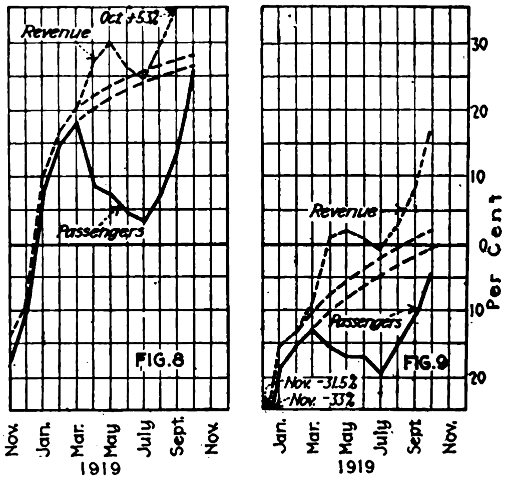


Fig. 7—Percentage Change in Revenue and Passengers Carried During 1919 over 1917 by City Lines of Spokane & Inland Empire Railway



Figs. 8 and 9—Percentage Change in Revenue and Passengers During 1919 over Average for Three Previous Years. Left—Washington Water Power Company. Right—Spokane & Inland Empire

In conclusion I would say that there is a general agreement on the causes of our present street railway condition. I believe a big factor in the future handling of transportation travel will be the extent to which we are governed by the policy: "The public be served." Interrelated with this policy is "commercialization," the keynote of which is service. If the management of a large department store allowed his vehicle for service, that is the store, to become out of date; if he permitted his clerks to dress shabbily and to treat the public in a careless manner; if he allowed the paint on his floors to become worn through; if he never changed the dressing of his windows, no one would expect his sales and profits continually to improve. The up-to-date manager caters to his customers almost to the *n*th degree. He furnishes his customers with what they want, and in the manner and in the size of package which please them. This is commercialization and it is, I believe, the goal toward which the street railway companies must strive in the future. The jitney has played up one feature of this service, namely, rapid transit. The light, one-man safety car goes further by supplying rapid service in a safe and comfortable manner. Along with this, improved roadbeds, properly designed and maintained schedules, and careful routing of lines, will help also. And then the employes must do their part, and the provision of proper surroundings and recreation will assist in enlisting their co-operation.

Properly Made Carrying Case Protects Tools from Rust

EMERGENCY repairmen as well as other railway shopmen are continually carrying on work at points where it is necessary to carry a small kit of tools for the work. Nearly all tools, with the possible exception of hammers, are rendered less efficient by rust. A few simple precautions are well worth while to save the tools, as the shopman will find out when he has occasion to buy new ones.

One of the most convenient and best tool protectors and carrying cases for a small kit may be made in the shape of a roll, from a piece of pyroxylin-coated fabric having a napped or fleecy back. This material is thoroughly waterproof and, if care is taken in wrapping the tools in it after use, it will prevent moisture from reaching them and effectively prevent rust. The material is durable and will last a long time. It can be readily obtained at a department or general store where it is sold under the general name of leather substitutes. In addition to this material there are other leather substitutes on the market, sold under various manufacturers' trade names, practically any of which will serve for the purposes mentioned.

Super Power Plan Discussed by A. I. E. E.*

W. S. Murray Presents Symposium on Huge Plan of Super Power Plants and Their Interconnection, Electrification of All Industries and Railroads in Northeastern District—Immense Economies Held Possible—Leading Engineers Contribute Discussion on Specific Topics to Prove Feasibility of Plan

AT THE EIGHTH mid-winter convention of the American Institute of Electrical Engineers, held in New York City from Feb. 18 to 20, the feature of greatest interest to electric railway men was the symposium on the so-called "super power plan" held on Feb. 19. This was presided over by W. S. Murray, consulting engineer, New York City, who had charge of the production of this important program. Mr. Murray has devoted a large part of his time and energy to this project for several years but notably during the past few months. He read a general paper outlining the plan and epitomizing the contributions which were to follow. After the paper had been read an informal discussion concluded the program. The meeting was considered one of the most remarkable ever held under the auspices of the Institute.

What the Super Power Plan Is

By W. S. Murray

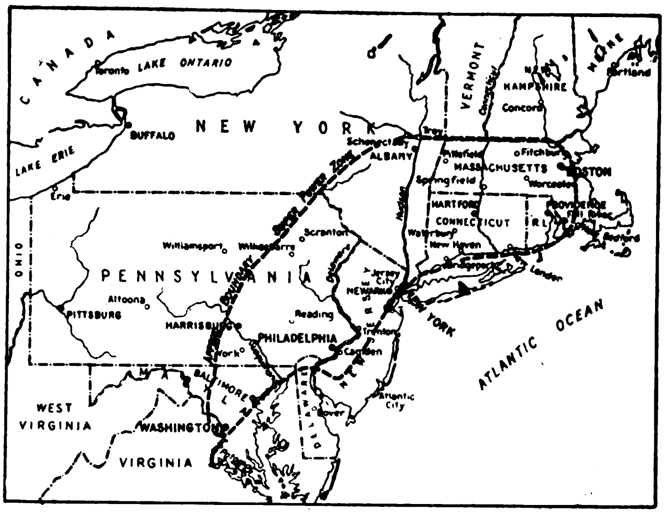
THE super power plan, briefly summarized, provides a means by which a present estimated machine capacity of 17,000,000 hp.—divided 10,000,000 hp. for industrial purposes and 7,000,000 hp. for the railroads—in a region between Boston and Washington and inland from the coast 100 to 150 miles, now operating with a load factor not exceeding 15 per cent, can be lifted to a load factor of greater than 50 per cent and possibly to 60 per cent. It furnishes a means by which, conservatively speaking, one ton of coal will do the work of two, and the railroads within the above zone, and those carrying coal into that zone, will be relieved of transporting one-half the amount of coal required for power and lighting purposes.

This means that a present plant capacity of 17,000,000 hp. can be replaced by one of not greater than 5,500,000 hp. and that not less than 30,000,000 tons of coal per annum can be saved. This at $5 a ton will represent $150,000,000 a year.

Besides the above savings, two great departments of economy will be created; one applying both to the railroads and the industries, in the reduced cost of maintenance of machinery, and the other applying to the railroads alone, in the reduction of train-miles, by virtue of this plan permitting consolidation of trains with resultant savings in train miles. It is estimated that these latter economies will effect a saving of another $150,000,000 annually thus making a total saving of $300,000,000.

The above are the direct savings as estimated from data collected from actual past operations of the specific order contemplated to be put into force in the zone under consideration.

The situation of the railroads in this country is too well known to need any brief upon it in this paper. Not secondary to the concern of those private interests from whom the money has come to build and maintain them is that, now, of the people to whom their service means so much. Forgetting for the moment the much-mooted question as to who will own and control them, we cannot afford however, from a national standpoint, irrespective of ownership, operation, or control, to overlook any means, large or small, which will be conducive to reducing expense to keep the standard of American transportation upon its past high plane, and which will operate to hold the roads solvent.


CANADA
Toronto
LAKE ONTARIO
LAKE ERIE
BUFFALO
Erie
NEW YORK
Schenectady
ALBANY
Troy
VERMONT
NEW HAMPSHIRE
Concord
MAINE
Portland
Pittsfield
Fitchburg
MASSACHUSETTS
BOSTON
Springfield
Worcester
HARTFORD
CONNECTICUT
R.I.
PROVIDENCE
Fall River
Bedford
Waterbury
New Haven
London
Hudson
OHIO
PENNSYLVANIA
Williamsport
Wilkesbarre
Scranton
Altoona
PITTSBURG
HARRISBURG
Reading
PHILADELPHIA
York
Jersey City
NEWARK
NEW YORK
Trenton
Camden
Atlantic City
Dover
DELAWARE
NEW JERSEY
MARYLAND
BALTIMORE
WEST VIRGINIA
WASHINGTON
VIRGINIA
ATLANTIC OCEAN
SUPER POWER ZONE BOUNDARY

MAP SHOWING APPROXIMATE SUPER POWER ZONE IN NORTHEASTERN ATLANTIC SEABOARD REGION

This plan offers immediate relief from the present intolerable congestion by automatically increasing rail capacity without increasing track mileage, and reducing power equipment investment to a minimum. By the creation of an overhead common carrier system of power the cargo space now required for industrial coal will be cut in half; train equipment in all classes will have its service factor doubled, and the present steam power equipment, replaced by electrical equipment, can be transferred to other divisions, where it is so vitally needed.

The super-power plan has lately been given much space in the pages of the technical and public press, and, except to say that it contemplates the general application of electricity wherever economically possible in the factories or on the railroads, in the zone described, it will not be necessary to add length to this paper by a more detailed description. The Department of the Interior has requested an appropriation of $250,000 as a part of the sundry civil bill to provide money for making an investigation in the district, this to be followed by an extended report with recommendations.

A letter was addressed to W. Le R. Emmet, consulting engineer General Electric Company; J. F. Johnson, engineer turbine department Westinghouse Electric & Manufacturing Company; H. G. Reist, assistant consulting engineering department General Electric Company; F. D. Newbury, manager power engineering department Westinghouse Electric & Manufacturing Company; W. B. Potter, chief engineer railway and traction department General Electric Company; N. W. Storer, general engineer Westinghouse Electric & Manufacturing Company; Philip Torchio, chief electrical engineer New York Edison Company, and P. H. Thomas, consulting electrical engineer, New York City; analyzing the situation and requesting each of them to contribute his ideas on this plan. After writing that letter, contributions were asked from W. D. A. Peaslee, electrical engineer Jeffry-Dewitt Insulator Company, and A. O. Austin, chief engineer Ohio Insulator Company. What follows is therefore a symposium of the contributions from these men, treating the subject as a whole, however, and not commenting individually on these authors' opinions.

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*Abstract of symposium, supporting papers and subsequent discussion presented at the Midwinter Convention of the American Institute of Electrical Engineers, New York City, Feb. 19, 1920. Reprints of the complete symposium may be obtained from Institute headquarters, 33 West 39th St., New York City.

It appears as though these authors say in unison, "We are ready and the conditions are ready to put this thing together." It is opportune here to quote from the address delivered by Past-President Charles F. Scott before the New England Section of the National Electric Light Association, Sept. 24, 1919: "The goal is the super power system, the interconnection of hydraulic and steam stations—a single comprehensive power system, and the universal use of electric power"; and again, "A still larger view shows the power problem from New York to Washington to be closely related to that of New England. * * * the wider and more varied the field, the more favorable the diversity factor. Power plants at water powers, at coal mines and on tide-water at the cities, combined into one system insure the highest economy in power production."

Mr. Emmet more than confirms the statements made by the writer to the Connecticut Chamber of Commerce relative to the great economy of electric over steam locomotives and draws deserved attention to the more reliable operating characteristics of the electric engine over that of the steam during the winter months. Traction requirements in such season "go up" and the electric locomotive's capacity automatically "goes up" to meet them, while the steam locomotive's capacities when they are most needed "go down." Who has not had the experience when upon a steam train during bitter cold weather, of having his question, "What's the matter?" answered by the conductor, "We can't make steam."

Mr. Emmet's contribution, though brief, not only brings out the fact that individual turbine sizes are now available for zone power application, but his closing paragraph, while summarizing important conditions to be satisfied, points to his belief that real results can be accomplished by co-operating in the art of power production—this to my mind is the crux of the situation, for if plant *A* is inter-connected with plant *B*, then the customers of district *A* and those of district *B* both can enjoy the fruits of economical power production, as upon those joint districts could be impressed the voltage from selected machines of high efficiency synchronized upon a common transmission bus.

RAILROAD ELECTRIFICATION AND SAVING

Mr. Potter furnishes a complete contribution on the traction side of the problem. In short, he tells us that every form of railroad service, passenger, freight or switching can be performed and better performed, by the electric locomotive. The record of electric motive power now in service doing terminal, level and mountain service, and the mileage electrified, bespeak the practicability of electric traction in the zone under contemplation.

Table II is indeed a consolidation of interesting facts and I am pleased to note that by divisions and rates he arrives at 14,000,000 tons of coal as the amount to be saved by electric traction over steam which is 2,000,000 tons greater than the figures I have named in an approximate preliminary study of the situation. On the other hand, I think Mr. Potter has been conservative in his estimate regarding the maintenance figures, as I believe the savings here will be *much* more instead of "more" than the amount he has named.

Of great interest comes the check by Mr. Torchio of Mr. Potter's figures of coal to be saved by the electrical operation of the railroads. Mr. Torchio has studied the United States as a whole, but if we compute the saving in this zone as proportionate to the locomotive horsepower, we get 13,160,000 tons—a figure lying between my own estimate and that of Mr. Potter.

The link between generation and utilization of power is transmission and distribution. Mr. Thomas has contributed a valuable discussion of this factor and shows that the great base load of the super power system must be carried on the large, high-economy steam plants supplemented by water power; peak loads and regulative features of the system being taken care of, in the main, by "present large generating stations." I recommend very careful perusal of this paper as a study of the electrical characteristics and regulation of the transmission and distribution system necessary for this development.

With these savings in sight, and with the means at hand to effect them, these means being but the placing in operation of intensive practices long tried out and demonstrated as sound in principle—can this nation afford to be classed as one drunk with the wealth of her natural resources, and rolling in a criminal debauch of their treasure? Is it to be the Americanism of the future to permit this intolerable record of waste to go on?

SIGNIFICANT POINTS ADVANCED FAVORABLE TO CONSTRUCTION AND FINANCING OF REGIONAL PLANT

It is hardly within the province of this paper to make suggestions regarding the methods of procedure looking toward the financing and construction of the regional plant required. The following points, however, are significant.

1. The savings in money equivalents are approximately $300,000,000 per annum on a total zone investment of $1,240,800,000.
2. The highest representative engineering talent in the country is in full agreement that the plan is entirely practical.
3. The securities, however underwritten, will carry a low interest by virtue of their great national importance.
4. A cheap and reliable power must be available to the northeast Atlantic seaboard to maintain the nation's supremacy.
5. Industrial concerns, already behind in their power requirements, will gladly finance their motor requirements.
6. The railroads in this zone are ready for electrification, as only by it will capacity be increased.

Views of the Super Power Plan From Several Angles

FOLLOWING Mr. Murray's symposium were given the papers by those invited to contribute to the subject. Messrs. Emmet, Johnson, Reist, and Newbury discussed turbines and generators, all agreeing that the present state of the art was such as to be able to produce necessary generating units. Mr. Torchio gave figures to indicate the small part which water power could play in the development, at the same time pointing out how water power should be developed for continuous use in order to utilize it to the greatest economic advantage. He showed the coal conservation and resulting economies from a carrying out of this scheme. In his oral discussion, he said that we see now the "engineer-citizen" speaking. Mr. Thomas gave an extended discussion of the electrical relations on a supposed transmission system for the development, indicating its safety with reference to short circuit and its naturally excellent regulation for the necessary interchange of load. Messrs. Peaslee and Austin indicated that the present state of insulator art guaranteed satisfactory insulator performance at the proposed voltage of 250,000.

S. T. Dodd spoke for Mr. Potter, and, emphasizing the saving in coal and the increased reliability of the electric locomotive, showed that most of the electrifications already made in this country were in the zone under discussion. The problem of complete electrification in this zone is not, then, something new so much as it is an extension of present methods. Future practice can be based upon present and past experience. Data from the roads studied as a basis are shown in Table I.

TABLE I—STEAM RAILROAD ELECTRIFICATION IN THE SUPER-POWER ZONE

Railroads	Date of Electrification	Route Miles	Total Miles of Track	Number of Locomotives	Motor Cars
Baltimore & Ohio R. R	1895	3.6	8.	9	0
Long Island R. R.....	1905	88.63	218.	0	477
N. Y. C. & H. R. R. R.	1906	54.00	258.	73	221
W. J. & Seashore R. R.	1906	74.60	150.26	0	109
N. Y. N. H. & H. R. R.	1907	81.63	527.49	106	27
Penn. R. R.(New York)	1910	18.73	97.49	33	8
Boston & Maine R. R..	1911	7.97	21.50	7	0
N. Y. West & Boston...	1912	18.23	54.41	1	40
Penn. R. R. (Phila.)....	1915	30.5	116.3	0	115
Totals		377.89	1451.45	229	997

A study was made to try to get a general picture of the railroad traffic which would be affected in the district. While it was not possible to obtain definite data confined exactly to the zone in question, estimates could be made from data at hand to show approximately the railroad traffic affected to be represented by Table II.

TABLE II—RAILROAD TRAFFIC IN THE SUPER-POWER ZONE (PASSENGER, FREIGHT AND SWITCHING)

Miles of route..	12,000
Miles of single track....................................	30,000
Locomotives in service..................................	8,100
Locomotive miles annually............................	185,000,000
Gross ton miles annually, including main line and switching movements of passenter trains, freight trains and locomotives	170,000,000,000
Tons of coal consumed annually...........................	21,000,000

From data available, it would appear that the ton-miles moved by 6½ lb. of coal in a steam locomotive is approximately equal to that which can be moved by one kilowatt-hour delivered from the power station. Applying this ratio to the last item in Table II the electric energy required to handle the traffic now handled by the 21,000,000 tons of coal to steam locomotives would be approximately 6,500,000,000 kw.hr.

If the figure of 40 watt-hours per ton-mile at the power station be assumed, which checks fairly with the records of a mixed service of main line and switching, the total energy for moving the assumed traffic of 170,000,000,000 ton-miles, would be approximately 6,800,000,000 kw.-hr.

The actual requirements would, however, be something less. It has been estimated that of all the tonnage moving over the railroad, approximately 12 per cent is taken up with the movement of railroad coal to points of distribution, including a second movement of the same coal in the locomotive tenders. Making an allowance for railroad coal that would still be required, a reduction of 10 per cent would seem a fair estimate. This would correspondingly reduce the yearly power requirements to about 6,000,000,000 kw.hr.

On the basis of probable load factor, this would call for about 1,250,000-kw. of power station equipment.

MR. POTTER'S CONCLUSIONS

The conclusions to which this discussion points may be summarized as follows:

1. Of the whole mileage included in the zone, a not very large proportion has been electrified, but main line electrifications now in operation are of sufficient extent and carry tonnage of a character to present data which can be fairly applied to the traffic of the whole district.

2. The traffic within the zone now handled by steam locomotives, if handled electrically, would require an average output of less than 750,000 kw. and if produced entirely by coal-burning electric power stations, would reduce the coal requirement for transportation purposes from 21 million tons to 7 million tons annually.

3. As a certain proportion of the electric power will be produced from hydraulic power stations, this coal requirement will be reduced in proportion as advantage is taken of hydraulic operation.

4. The reduction in cost of maintaining the motive power units would be a large amount which estimated from the locomotive mileage would be in the order of $15,000,000 or more annually.

"DO IT ELECTRICALLY," SAID MR. STORER

Mr. Storer, who had been prevented by illness from making a written contribution to the symposium, then spoke extemporaneously. He started with the assumption that the electric locomotive could do more, and do that better, than any steam locomotive. Electrification means the conservation of fuel and labor and there is need for both. The country was never so short of labor and the railways need to take a leaf from the housewives' notebooks and "Do it electrically." Electrification by the railroads must not be limited to locomotives—the principle must be applied wherever it can save labor. This can be done in a multitude of places along the line. Railroads cannot get labor and particularly in heavy traffic districts, such as the one under discussion, cannot give adequate transportation service unless some radical change is made. The lack of developing this transportation service will prove the greatest handicap to the country.

As to coal conservation, two-thirds of the coal used for railroads would be saved by electrification. Data collected by the Fuel Administration uphold this statement.

Using the figures given by so strong an advocate of the steam locomotive as is J. E. Muhlfeld, steam railway consulting engineer, electrification can be "proven in."

In addition to the main drive, consider the auxiliaries such as the steam driven air compressor which requires 70 to 85 lb. of steam per horsepower-hour. This is from seven to ten times the requirement for electric motor drive of the same equipment. The big questions of capacity, fuel conservation, shortage of labor and improvement of terminals, will exert all the pressure toward electrification that the railways can stand.

Discussion From the Floor

IN THE DISCUSSION by non-contributors to the symposium, additional points of interest were brought out. Prof. C. F. Scott, of Yale, in commenting on what has been called Mr. Murray's vision, showed that what is proposed now is something applicable now and in the immediate future, and not something which is a dream for the far distant future. Recalling that the engineering societies had entered their building just thirteen years ago, he stated that in that comparatively short period, the industrial production of the country has more than doubled, the railroad freight traffic has more than doubled; the electrical industry, which doubles approximately every five years, produces ten times as many kilowatt-hours per year now as in 1907. In transportation, something must be done to keep up. Electrification of transportation machinery, wherever possible, will help. H. McL. Harding, consulting terminal engineer, New York City, predicts, according to Professor Scott, that electricity must solve the transportation terminal problem and that in the near future, electrical equipment in terminals will exceed in cost all electric locomotives when all railroads are electrified. The time is now at hand when this super power plan must be analyzed, and if feasible, put into execution.

Prof. Malcolm MacLaren, of Princeton University, stated that he had made an extended study of the power supply for the central part of the Zone—Pennsylvania, New Jersey, and the New York City district. From an analysis of the demand in this district on the basis of 100 per cent electrification, a total of 2,600,000 kw. of installation is necessary, of which 1,000,000 kw. is now installed by public utilities. By locating hydro and steam power plants advantageously, the supply in this district is entirely feasible without doing anything now untried.

D. B. Rushmore, of the General Electric Company, analyzed the human and psychological reasons for the growth of industry as being due to man's trying to be happy, his constant desire for more material conveniences, the consequent shortage of these, and then man's habit of conforming to these demands and trying to produce. Industry, including railroads, produces by a combination of intelligence and power. The second comes from coal, oil, water, etc. The former may be supplied to a certain extent by brains, but there are not enough for all requirements, so brain-power must be multiplied and made available through automatic or labor saving machinery, and the best agent is electrical.

WHERE STANDARDIZATION OF FREQUENCY WOULD HELP

J. W. Lieb, Jr., of the New York Edison Company, made a strong appeal from the standpoint of the central-station industry and, as Mr. Torchio said, as an engineer-citizen. He pointed out that it is fine to have this plan presented now, and the solution must be found immediately. There must not be a battle over systems, he warns, such as hampered electrification for four or five years in its early stages. It is not merely a question of central station willingness; it is a question of the consumer, also. Too much equipment must not be installed in isolated plants, or fitted to present local conditions, later to be removed. For example, something must be done about standardizing frequency before millions more are invested in equipment at five or six frequencies. The necessity for a standard frequency was emphasized during the war when, with New Jersey crying for power and New York with a surplus of power, the New York Edison Company was not able to furnish it to the New Jersey utility because the latter uses 60-cycle power whereas the former used 62.5 cycles. Another point of extreme importance is that absolute continuity of service must be provided insofar as human ability can provide. Cost is secondary to continuity of electric power supply. And above all, the proposition is of national importance. It is not for private business, or local interests or even one branch of industry to decide. It is, however, a situation in which electrical engineers should formulate a program and lead.

MR. MURRAY SUMS UP

Mr. Murray, in his remarks between speakers and in his closing of the discussion, mentioned these five fields which would benefit from the plan and would be concerned in applying electrification and using power: the industrials, the street and interurban railways, the electrified trunk lines, the lighting load and the small power and appliance load. He pointed out that water power could enter the whole zone scheme only to the extent of 10 per cent of the total, but that water power is now judged by its kilowatt-hours and not merely by its kilowatts. As to the present central station or generating and distributing industries there is nothing in the plan which would impair their integrity. It would probably develop that they would take on more the nature of distributing companies in relation to the whole, but they would still remain operating and financial entities and would still generate. The ultimate system must be the outgrowth from present conditions, with increasing interconnections.

IMPORTANT RESOLUTION PASSED

The sentiment of the meeting was so evidently unanimous in believing that some such plan is feasible and desirable and worth the Institute's attention and study, that Mr. Rushmore suggested a committee of the Institute be appointed for this special duty. Mr. H. W. Buck, past-president, accordingly moved that it be the sense of the meeting to recommend to the Board of Directors that the Board appoint a committee with Mr. Murray as chairman to carry on the movement and make investigations and recommendations as to methods of accomplishing the desired end. The motion was passed unanimously.

William S. Turner, consulting engineer, Portland, Ore., who has just returned from a trip in the east in connection with proposed hydro-electric power development, believes that there will be a great increase in work of this kind, particularly on the Pacific Coast. It is expected that the passage of the water-power bill now before Congress will greatly stimulate enterprises of this kind.

Henry Ford's Railway Car

The Car Under Construction at Present Is for Interurban Use—It Will Be Driven by Two 80-Hp. Engines and Capable of Making 70 Miles per Hour—Predicted Weight About 9 Tons

SO MUCH interest has been manifested in Henry Ford's development of a street car driven by an internal combustion engine, that a representative of the ELECTRIC RAILWAY JOURNAL called upon C. E. Sorensen, general manager of the Fordson tractor plant, who is building the new car, in order to present some definite knowledge of the general design without awaiting the début of the completed car. The following story is therefore preliminary in nature and in some respects premature, for the present design, as Mr. Sorensen frankly states, is purely a "trick" car, a rank experiment. Whether it will be any good he does not know, although of course he has faith. If the present designs embodied in the car do not work out well, they will be abandoned for others, so that the car described in a general way here may be a far cry from what will ultimately be approved for production. The present model will not be ready for its trial run for thirty to sixty days.

To get a good idea of the car which is being developed at the Dearborn, Mich., plant, it is best to begin by forgetting all that has appeared in the newspapers about it. In the first place, the car that is being built now is not a street car, but rather an interurban or steam-road proposition, designed to run at 70 m.p.h. As such, there will be less doubt in the minds of electric railway men as to the soundness of the Ford effort. There is a further plan, however, of building a street car if the interurban idea proves successful. This means that the street car will not make its appearance for probably a year or more, for it, also, will require a long development period, although the same engine will be used according to present ideas.

Mr. Sorensen admits frankly that the project is in every sense an experiment and may not prove out in practice at all. There is this angle to be considered also: He states emphatically that Mr. Ford is not developing the railway car because of public spirit or philosophical interest, but is looking at it purely as a cold business proposition. "Mr. Ford likes to build things that he thinks the public will use and use a lot of," was the way Mr. Sorensen expressed it. Witness first the Ford automobile and next the Fordson tractor now being manufactured at the rate of 300 a day. Is the street car to be the next Ford quantity product?

DESIGN OF THE CAR

Generalities only can be given as to the interurban car design at this time. The body is an all-steel very light construction about 38 ft. long and arranged for single-end operation. There is nothing particularly unusual about the body, as compared with ordinary interurban car construction, except its extreme lightness. It is mounted on double trucks and is equipped with M.C.B. couplers to meet the wishes of the officials of the Michigan Central Railroad who have given consent to a trial run on the Detroit-Chicago line ahead of the fastest train, the "Wolverine."

The engine is a unique departure from all previous Ford designs. It is a four-cycle, four-cylinder, double-opposed horizontal engine. Presumably this design was used in order to minimize the clearance height needed to install the motor under the car floor. All four cylinders are cast *en bloc*, including the crank case housing between the opposite pairs of cylinders. The opposite cylinders are bored by one passage of the boring straight through the casting so that they are directly in line. This one-piece casting assures a perfect alignment of cylinders and crank shaft. A new feature is that the piston rods of opposite cylinders are attached to the same offset of the crank shaft which thus has only two offsets for the four cylinders. The cylinder heads are bolted on and are of T-head design.

On one end of the crank shaft is mounted an electric generator and around the outside of this is a blower. The generator serves to charge a storage battery for supplying the car lighting and starting the engine, the same machine acting as both motor and generator. The blower takes in air at its center and forces it both ways over the cylinders and through two cooling-water radiators, mounted just beyond the cylinder heads.

On the opposite end of the crank shaft a two-cylinder opposed air compressor is built into the engine, and the planetary gear transmission is also bolted to the engine casting over this end of the crank shaft.

The engine is designed for its maximum efficiency at a speed of 1,200 r.p.m. It develops 80 hp. over and above the power used to drive the air compressor and generator and blower. The cylinders fire at successively opposite and diagonally opposite corners, thus balancing the impulses. Mr. Sorensen was most enthusiastic about this engine, saying that it was the finest-balanced engine that the Ford plant had turned out, and that it had shown remarkably good operating characteristics on the dynamometer tests, including a fuel consumption of 1.5 lb. of gasoline per horsepower hour while running at 80 per cent full load during a continuous running test of between two and three days.

Two of these 80-hp. engines, complete with their transmission, are mounted entirely underneath the floor and on opposite sides at the center of the car. The two motors so mounted have their crank shafts in a common axis across the car. The transmission cases of the two engines are rigidly bolted to a bevel gear housing between the two, so that the complete power plant for the car forms one rigid unit bolted to the underframing. The pinion at the end of the drive shaft of each engine meshes with a common bevel gear which drives the two longitudinal propeller shafts extending to the far axle of each truck. The transmissions of both engines are operated simultaneously from the same lever in the operating cab, but the dual transmission will make it possible to disengage one engine from the drive shaft in case it is disabled and drive the car with one motor. The motors and auxiliary equipment will clear the rail by about 3 or 4 in.

The trucks embody a radical departure from all railway practices in truck design. They have no fixed or rigid wheelbase. A pair of heavy semi-elliptic springs bolted to the top and the bottom of the bolster, are supported, respectively, at the top and bottom of a shackle mounted inside the wheel on each axle. The entire weight of the car is thus supported on these four springs on each truck, and any action of the springs must vary the length of the truck wheelbase which is normally about 4 ft. 6 in.

Standard steel car wheels, except for the hubs, and standard brake shoes are used, though the brake rigging is unique. The inside axle of each truck is made much like the front axle of an automobile. It has a downward curvature to give clearance for the drive shaft, and the wheels are mounted on ball bearings. The outer axles of the trucks, which form the two driving axles for the car, are built like an automobile axle except of heavier construction. They have a differential at the center and the wheels are fastened to the axle by means of a four-bolt locking device the same as used on the Fordson tractor. The driving shafts have been connected to the far axles apparently to minimize the lateral movement and angular displacement of the shaft alignment. Two universal joints are expected to give the necessary flexibility.

The tank for gasoline or other fuel is mounted underneath the car floor behind the motor, and the air-storage reservoir is similarly mounted in front of the engine. It will be noted that all equipment is mounted underneath the car just as with electric equipment, leaving the entire car floor accessible for passenger use. The complete interurban car is expected to weigh only between 8 and 9 tons.

If the street car is built, one of the 80 hp. engines only will be used. It will be mounted on one side of the car and its weight balanced by hanging the fuel tank on the opposite side. The weight of this car is expected to be only 6 tons complete.

CONTROL OF THE CAR

The car and engine are controlled entirely from the front platform. The spark and throttle for both engines are controlled from a single quadrant, mounted within reach of the operator who works from a sitting position at all times, since both foot and hand control are required. The transmission control is much the same as that used on the Ford automobile. There are a single pedal and two hand-levers. One of the latter operates a transmission brake which can hardly be used to stop the car, but can be used to hold the car in case the air is off for some reason. The other hand lever controls the direction of motion. In its central position, it is in neutral and the engines are disengaged from the drive shafts. When this lever is in the forward position, the operator can start the car by pushing the pedal forward to secure low gear speed. Then by taking his foot off the pedal, the high gear or direct drive from engines to drive shaft is secured.

When this hand lever is placed in the opposite position, a reverse motion of the car is secured by the same low and high gear operation of the pedal.

A standard Westinghouse air-brake equipment forms the main braking facility. There is also a lever-type hand brake auxiliary installed in the cab so that the car is really supplied with triplicate braking equipment.

Undepreciated Valuations Urged

In Briefs Filed Before Commissions Two Companies Claim a Reasonable and Not Merely a Non-Confiscatory Return

THERE have recently been published two briefs in cases before commissions, in each of which the theory of undepreciated valuations is argued and a rate of return of 9 or 10 per cent is presented as just. Some of the arguments in these briefs are abstracted below, as indicative of viewpoints being brought before commissions by electric railway companies.

EAST ST. LOUIS ILL., PETITIONS INCREASE

The company sets forth that there is not much question as to the reliability of Mr. Hagenah's figures which show: cost of reproduction under pre-war trend prices, $2,590,875; present depreciated value, $2,221,636; cost of reproduction under present price levels, $3,603,077; present depreciated value on latter basis, $3,105,837. In all cases working capital and going concern value are included at the same amounts. Actual cost appraisals by two other experts for the company show $2,825,000 and $2,898,000. The usual analysis of accounts is given to show revenues and expenses.

The argument calls for a decision based on "reasonable" rate and not a rate which "just escapes being confiscatory." The rate must be reasonable to both public and utility. "The reasonable rate is the one which must satisfy the conscience of the tribunal . . ." Section 55 of the Utility Law insists "that private capital shall be encouraged in and not discouraged from engaging" in public utility service.

Under the head of "What Is Value?" the argument contends for "present actual exchange value." "So long as our medium of exchange is gold and the value of that medium is dependent upon supply and demand, just so long will market value or exchange value be the true measure of worth." The fact that a property is not for sale is no argument against this. It has, nevertheless, the nature of a commodity. Every element which enters into the whole of the property can be acquired only in exchange value. How can it be said that the aggregate of the exchange value of these elements does not constitute the total value of the property?

"Reproduction cost as against original cost" is urged as the basis for valuation. The company claims that while original cost has been used as a basis by some commissions, using as a reason the inclusion of this as one factor in the Smith vs. Ames case, "it has always been rejected by the courts in favor of reproduction cost." Value at the time of use is contended for. "If it were possible for the public to pay" for its service "the same kind of dollars" (pre-war purchasing power) original cost might be fair. Reiteration of present tense in all great decisions leads to the conclusion "that original cost cannot be the value intended by the court, except as a mere coincidence." The argument on this point is lengthy, for the company states that the Illinois Commission seems committed to original cost theory and it desires to show the error of this position.

On the important question of depreciation, the company argues for 100 per cent reproduction value. What the public pays for and is interested in is "service." If the investor has expended $3,600,000 and by subtraction of "theoretical depreciation" he is allowed to earn on only $3,100,000, his investment has been confiscated to the extent of $500,000, though the service is the same as at the start. "Investment in a going concern . . . rendering adequate service for reasonable rates cannot expire." The investor cannot be required to furnish 100 per cent service on a diminishing return. Depreciation and maintenance are operating charges and when taken care of in this way should not be considered as affecting value.

The usual case is made for the inclusion of going concern value. The argument shows that while this value includes the cost of developing the business it cannot be figured by formula but must be "sensed"; $150,000 is the amount claimed.

Numerous citations from courts and commissions are quoted in support of the various claims and arguments of the company.

Finally, the reasonable rate of return which the company claims is just is said to be from 9 to 10 per cent. Money is a commodity and its price has increased with the cost of other commodities. A reasonable rate is thus argued to be that which should obtain in other legitimate investments of similar risk and based upon the present undepreciated reproduction cost of the property.

HELENA, MONT., WANTS RATES MODIFIED

In the proceedings relative to the rates of the railway the Helena Light & Railway Company argues that the operations of the company as a whole should first be considered. If a company has several departments and each is earning a profit, the cost of service in each department might with good argument form the basis of rates for that service. But such a rule should be applied with reason and discretion and never when it will result in the abandonment of departments rendering necessary service.

Valuations were independently made by the company's engineer and the commission's engineer for the whole property and segregated into three departments—railway, gas and electric. On physical structure, these valuations were very close, the company's figures being: Railway $654,969 and total $1,271,742; the commission's figures: Railway $660,960 and total $1,259,771. The commission's engineer allowed no overhead charges except preliminary organization, while the company claimed legal and brokerage charges, interest, insurance, taxes, bond interest, working capital, and going concern. The total figures were, then: Commission, $654,738 and $1,271,304; company, $930,525 and $1,816,726.

The argument turns to a consideration of the effect of lack of newness on the valuation, the commission's engineer having claimed the property as a whole to be depreciated about 31 per cent. Approximately half the company's argument is directed toward convincing the commission that no subtraction from value should be made for lack of newness.

> If the realm of speculation be entered and 70 per cent conditions be assumed as a reasonable operating standard, his (the commission engineer's) theory necessitates the forced conclusion that either the public on the one hand or the investors on the other must presently be deprived of an amount equal to 30 per cent of the value of the property. This in spite of the fact that it exists in a condition which renders it fully capable of performing the utmost of service which could be demanded of any property, even though it were in the impossible theoretical 100 per cent condition. Either this amount must be paid by the riders and the investors compensated (....) or the investors themselves (....) deprived of 30 per cent of their investment.
>
> It is essential that we have our return on the investment of $100 (taken as a unit) and to maintain credit we be permitted to pay out return in the form of dividends or interest; otherwise we find no one willing to put in the original $100
>
> We are also entitled to keep our property, which originally was worth $100, at all times in $100 condition or worth $100 or are entitled to earn sufficient to set up a reserve for renewals and replacements, so that when our securities mature we can pay over to the security holders $100 in cash or in property in addition to the reasonable amounts we have paid as interest or dividends in the meantime.
>
> Putting into the operating expenses annually the exact cost of all repairs and an allowance as before stated for renewals and replacements (the cost of retirements) clearly perpetuates any public utility in an efficient operating condition, and no unjust burdens are placed upon the consumers.

There is a much further argument as to theory of maintaining plant efficiency and corresponding integrity of investment, finally leading to a previous opinion of the Montana Commission upholding this view.

The company further shows that the independent valuation of the engineers employed by it approximates quite closely the value of the company as indicated by its own book records. Numerous citations are quoted to cover all points raised in the brief, which was prepared by R. C. Hopson of New York.

Finally, a claim for a ten per cent return is made. This is based on the return demanded in Montana for investment in enterprises involving apparently similar risk.

A Good Way to Fill the Hot-Water Heater System

THE spilling of water in the interior of cars while a small amount is being added to the expansion tank through the small funnel at the end of this tank on the Peter Smith hot-water heater system with which many interurban cars are equipped, is the cause of some annoyance. This may be overcome, however, by following the simple practice outlined below, which is in use by several of the larger companies but does not seem to have been generally followed.

When the heater system is filled for the first time in the fall, the water is usually put into the system by connecting a hose from the city water system, so there is no trouble in spilling water at this time. The difficulty comes when a car is discovered with steam pressure up as high sometimes as 60 lb. per square inch, which is due to insufficiency of water. With such a steam head on it is impossible to fill the tank through the funnel at the side of the expansion tank without first permitting the fire to die down, for if the release valve at the top of the tank is opened, considerable water will be blown out. And even without the excess steam pressure, the pouring of a pail of water into the funnel up close to the headlining of the car is very likely to be accompanied by more or less spilling.

All of this trouble is very easily avoided by attaching a union and hose to one of the drain cocks underneath the car and forcing the small amount of water necessary into the system by a hand pump. A simple pump can be devised in any railway shop by attaching an old fire extinguisher pump or any plain hand pump to the side of a water pail. Or, it is understood that the Peter Smith Heater Company will furnish a pail and pump combination of this sort for the purpose at a small cost.

Making a Losing Park Pay

Providing Good Car Service, Conducting High-Grade Park, and Getting the Money Due, Are the Secrets of New Orleans' Success

GOOD transportation, in the mind of Nelson H. Brown, is the first requisite of operating a successful park. It was this principle that he began promptly to apply to Spanish Fort Park which had a long record of red figures to its discredit when he undertook the position of general superintendent of railways, New Orleans Railway & Light Co., in 1917. He had other positive ideas about making a park an asset rather than a liability to a street railway company, and therein lies the reason for this story, his success being attested by the figures in the accompanying tabulated statement of earnings and expenses. The deficit in 1917 was three thousand dollars instead of eight as in 1916, and in 1918 and 1919, the figures show a handsome profit. Let's examine why.

The foremost remedial agent applied to the delinquent park, as already noted, was greatly improved transportation. A seven-minute headway for cars running from the downtown district to the park was replaced by a three and one-half minute headway, and the ride was made more enjoyable by running these through park cars on a skip-stop plan, providing practically express service. The greater number of cars and higher speed of operation, of course, made it possible for park patrons usually to have a seat and to ride in greater comfort. To diminish the crowding always invites more patronage and that is what resulted here.

These through cars are operated with trailers when needed, and it is the company's practice to add sufficient trailers to meet traffic requirements at all times. To quote Mr. Brown on this point, he says, "I would much rather run a few cars in excess of requirements than to fall short. Our road officials are located at points where they can supervise to advantage the operation of this line. This, with our close supervision of the parks, in our opinion, is responsible for the results obtained."

ATTRACTIONS AT THE PARK

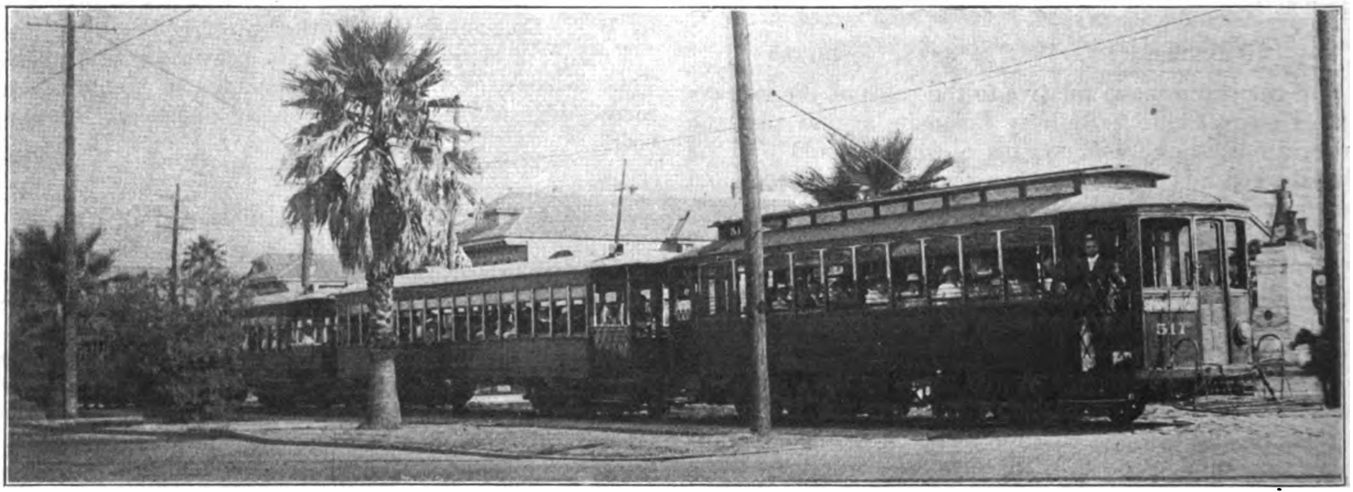
So much for getting the people to and from the park comfortably, quickly, conveniently. With this provided —and the company makes a determined effort to see that it is provided—it does not greatly overtax one's vision to see that people are going to ride if there is an attraction at the end of the ride. So Mr. Brown set out to make Spanish Fort Park a real attraction. He had much natural beauty to begin with and some historic interest centering about the old Spanish fort from which the park takes its name. The park lies along the shore of Lake Pontchartrain, a very large inland body of water which attracts many for swimming and boating. This natural beauty is enhanced by keeping everything about the park clean and in good repair. This practice costs heavily, as witness the lesser net profit in 1919 than in 1918, despite a much higher gross revenue. But in 1919, many of the buildings were renewed, painted, etc., and the similar expense for 1920 will be correspondingly less.

THE POLICY AS TO CONCESSIONS

The accompanying table gives the income from the concessions during the past seven years. These concessions are open during the park season from April to September or twenty weeks. In making its contracts for these concessions the company retains full power of supervision over all their features so that it is in a position to dictate the character of entertainment and treatment of the public. It is thereby able to enforce a high-grade conduct of all features of the park and a high standard of excellence in all things sold. All amusements are leased except the dance hall which the company operates itself.

All concessions are now being made on a commission basis with a minimum guarantee which assures the railway company of a profit. The contracts are usually for a period of three years. The railway builds the plant and the concessionnaire pays for it, but it becomes the property of the railway. The commission is from 15 to 25 per cent of the gross business, according to the expected earning power of the concession. As an example of what this policy means, the company realized a maximum of $516 from the circle swing on the old straight rental plan, but if it had been on the commission basis of 15 per cent, it would have netted over $2,000.

Preserving order is often no small task in conducting a public amusement resort. This problem also has had close attention at Spanish Fort and has been solved in a unique manner. Two policemen and two plain-clothes men, furnished by the city but with salaries paid by the


FOUR-CAR TRAINS ARE OFTEN USED TO CARRY PASSENGERS TO SPANISH FORT PARK FROM NEW ORLEANS

REVENUE FROM CONCESSIONS AT SPANISH FORT PARK

	1913	1914	1915	1916	1917	1918	1919
Booths	$2,658	$2,459	$2,242	$4,367	$3,216	$4,325	$6,525
Coaster	1,395	2,807	2,299	2,718	3,553	4,590	7,206
Casino	700	1,889	1,609	1,613	1,360	1,605	2,065
Circle swing	167	190	144	177	195	263	516
Penny wonderland	502	904	710	901	1,041	1,320	1,581
Carousel	690	801	624	682	641	981	1,210
Bath house	975	900	850	850	900	900	900
Restaurant	750	2,062	2,150	2,150	2,150	2,150	2,337
Dance hall	3,734	2,378	2,469	3,004	2,225	4,384	7,044
Ferris wheel	......	125	125	125	125	125	200
Whip	......	......	......	......	......	......	1,630
Motordrome	......	......	......	......	......	......	499
Hat box	......	......	......	......	......	......	30
Revenue from concessions	$11,574	$14,518	$13,225	$16,589	$15,408	$20,645	$31,748
Expenses	42,240	20,750	23,240	24,962	18,510	13,985	25,847
Net operating loss	$30,666	$6,232	$10,014	$8,372	$3,102	......	......
Net operating profit	......	......	......	......	......	6,659	$5,901

company, are employed to prevent misconduct. But if anyone becomes rowdy and annoying, he not only is apprehended, but he is brought to his senses by a punishment more promptly administered than court martial sentence and quite as effective. To wit:

An open jail was built out in a near-by swamp where there is plenty of stagnant water and swarms of "healthy and ambitious mosquitoes," as Mr. Brown put it. Mr. Rowdy is marched out to this confinement and left there. After the mosquitoes have worked on his "conscience" for an hour or two, he is quite ready to behave himself.

Present Status of Work of American Engineering Standards Committee

A STATEMENT just issued by the American Engineering Standards Committee contains information supplementary to that heretofore available. The committee now consists of twenty-four members, representing five national engineering societies and the United States Departments of Commerce, Navy and War. A. A. Stevenson has succeeded Prof. C. A. Adams as chairman, and Dr. P. G. Agnew, formerly of the United States Bureau of Standards, is now permanent secretary with headquarters at the United Engineering Societies Building in New York City.

The committee is not only ready for business, but has already made practical headway. It has approved specifications for standard pipe threads, for which the American Society of Mechanical Engineers and the American Gas Association are sponsors, and co-operation is in progress with the National Screw-Thread Commission, authorized by Congress and composed of representatives of technical societies. Through this arrangement direct co-operative work with the British is being carried out. The committee is also in active co-operation with Canadian engineers on the subject of bridge specifications, with British engineers on specifications for machine tools and with Swiss engineers on specifications for ball bearings. In each case the detail work is being carried out by sponsor bodies through sectional committees.

A large conference, in which practically all national organizations interested in industrial safety were represented, has unanimously voted that all industrial safety codes should be prepared under the auspices of the committee.

The committee functions in the following way: Any organization may request it to approve standards previously formulated, or to approve committees previously appointed, and by so doing become a sponsor society. Two or more organizations may act as joint sponsors. Approval of a standard is given when it is the substantially unanimous conclusion of a section committee, made up of representatives of producers, consumers and general interests, and so selected that all interests concerned have adequate representation. Approval may be given to a standard as "recommended practice," "tentative standard," or "American standard."

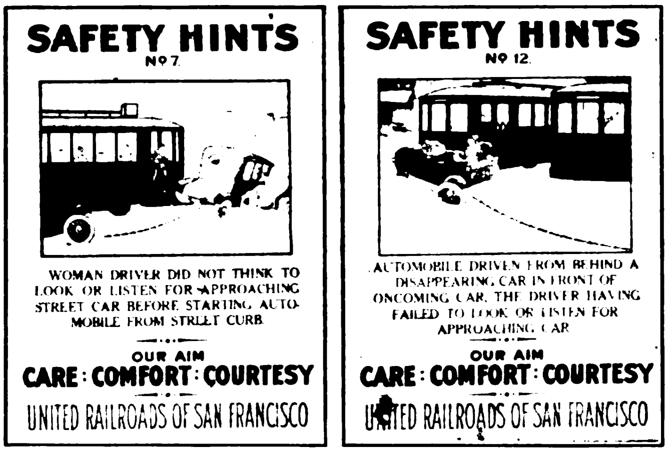
Any standard or group of standards adopted by any organization or in process of preparation prior to Jan. 1, 1920, may be approved by the committee if in the opinion of the committee it has either been developed by a properly constituted committee, or has by actual practice proved its right to become a standard.

In addition to the work of assisting in the selection of committees and certifying that their work has been done under proper conditions, the committee will act as a bureau of information regarding standardization.

A Series of Effective Safety Posters

J. H. HANLON, claim agent United Railroads of San Francisco, some time ago got out a series of posters, using the running caption "Safety Hints." These posters are in color, and measure 12 in. x 16 in. in size. They are copyrighted.

Two of the posters are reproduced. Others in the series contain these legends under appropriate pictures: "Driver of wagon fails to look for approaching street car before entering car track and also violated traffic laws." "Passenger after alighting from standing car did not think to look or listen for oncoming car traveling in opposite direction." "Had this woman waited until the car stopped and faced the front end of the car, she would not have fallen." "Would the passenger fall trying to board a moving car? He took the risk once too often." "It is always a dangerous practice for children to play near the car tracks or to run across the street without looking for approaching vehicles." "Driver of automobile violated traffic rules in not proceeding to far side of street before altering his course, and he should have looked for oncoming car before entering car track." "Driver of automobile tried to drive into garage before observing whether it was safe to proceed." "School boy stealing ride on blind side of car did not think of the risk he took when he jumped onto the car." "Driver of automobile took a chance in attempting to crowd between the street curb and street car as it was rounding the curve."


SAFETY HINTS
Nº 7
WOMAN DRIVER DID NOT THINK TO LOOK OR LISTEN FOR APPROACHING STREET CAR BEFORE STARTING AUTOMOBILE FROM STREET CURB
OUR AIM
CARE : COMFORT : COURTESY
UNITED RAILROADS OF SAN FRANCISCO
SAFETY HINTS
Nº 12
AUTOMOBILE DRIVEN FROM BEHIND A DISAPPEARING CAR IN FRONT OF ONCOMING CAR, THE DRIVER HAVING FAILED TO LOOK OR LISTEN FOR APPROACHING CAR
OUR AIM
CARE : COMFORT : COURTESY
UNITED RAILROADS OF SAN FRANCISCO

SAMPLE SAFETY POSTERS FROM SERIES PREPARED FOR UNITED RAILROADS OF SAN FRANCISCO

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Cities Have Purchase Rights

Attorney General Claims This Privilege for Home Rule Cities in Ohio —Franchise Election in April

Toledo and all other Ohio cities which have adopted home rule charters have the right to issue general credit bonds for the purchase of street railways and any and all other public utilities according to the opinion of Attorney General John G. Price, who filed a friendly brief in the case brought by the Toledo city administration to test the constitutionality of a plan for purchasing the railway lines of the Toledo Railways & Light Company.

The bonds so issued for railway purchase would be payable by a levy of a general tax upon all property in the city.

The State is not a party to the suit, but the Attorney General filed the brief with the Supreme Court as "a friend of the court."

The Attorney General reviewed the history of the Toledo railway situation. He summed up as follows:

> It is useless to confer a power (the home rule power) and then withhold the means of exercising it. To hold that by section 13, article 18 (of the constitution) power is given the legislature to limit not only the amount, but the purpose for which a municipality might incur debt, is to say the people granted municipalities a power by section 4 and by section 13 authorized the legislature to withhold such power.
>
> Surely, the people cannot be charged with doing such a vain thing when the other construction will maintain both the power of the municipality and the legislature as expressed in these two sections, in perfect harmony.
>
> It would seem, when reading all the home rule provisions together, that the power of the general assembly to limit municipalities as to debt is restricted to the power to set a general debt limit. Otherwise, the grant of home rule to municipalities would be practically destroyed. Power to issue general credit bonds should be as broad as the home rule power itself; that is, the bonds should be permitted for any purpose or undertaking in which the city may engage under a home rule charter.

If a favorable decision to a bond issue for purchase of the street car system is handed down the municipal ownership commission will attempt to have a plan ready for the voters at a special election April 27 in connection with the presidential primaries.

California Commission Recommends Library

In its recent report on service, operation, and financial conditions of the Los Angeles Railway, the California Railroad Commission had this to say regarding the value of a company library: "There are many among the company's employees (more than 3,000 in number) who are eager to study the general and detailed aspects and functions of street railway operation, and it would without question be a first-class investment for the company to encourage these men to prepare themselves for better positions and to assist them in their studies. The company could do no better than to make available an up-to-date technical library and to assist the men by arranging such courses of study as they may suggest. Employees who are inclined to make such studies could to great advantage be used by the company for such general and special work of investigation and of research as must continually be carried on by business organizations of the size of this one."

St. Louis Demands Announced

Wage increases for conductors and motormen will be demanded of the United Railways, St. Louis, Mo., by the Amalgamated Association. It is understood that the demands will be about as follows: 75 cents an hour for the first six months; 80 cents an hour for the next six months, and 85 cents an hour for all motormen and conductors employed by the company for more than one year. There will also be a demand for an actual eight-hour day, with change of car crews at the end of eight hours work, instead of paying overtime for work in excess of eight hours.

The present wages of motormen and conductors are 50 cents an hour for the first year of employment, 55 cents for the second year, and 60 cents for all men employed in excess of two years. These wages were set by the Missouri Public Service Commission last summer, after the commission had agreed to act as a board of arbitration at the request of Receiver Wells, who informed the commission that the company could only pay increased wages through the medium of increased fares, which the Public Service Commission alone could grant.

Following the award of increased pay, the commission authorized the 8-cent car fare on Sept. 9 last. According to figures issued by the commission at the time, the higher wages increased the annual expenses of the company $2,826,330. In addition, back pay from June 1, at the new scale was granted, amounting to $600,000.

A strict eight-hour working day, it is estimated, would necessitate the addition of several hundred more car crews than at present employed. The wage increase if granted, it is estimated, would cost the company at least $3,000,000 additional. This would add a total of $5,000,000 to the company's present pay roll of $10,000,000. The increase, it is estimated, would necessitate at least a 10-cent cash fare and a 9-cent token fare if the company is to meet expenses.

$241,000,000 in Subways

City Presents This Figure at Transit Inquiry as Its Stake in New York Lines

New York City has invested more than $241,000,000 in the actual construction of subways on the understanding that the public should have adequate rapid transit at a 5-cent fare, according to data presented by Corporation Counsel Burr on Feb. 25 when the Board of Estimate resumed its inquiry into the affairs of the Interborough Rapid Transit Company.

Mr. Burr offered in evidence a statement of the amount of corporate stock and corporate stock notes issued for rapid transit purposes outstanding Feb. 21, 1920, showing that under Contract No. 1, for the construction of the old subway, the city had contributed $49,435,679; under Contract No. 2, for the Brooklyn extension, $5,417,045, and under Contract No. 3, for the construction of the Seventh Avenue subway, $74,598,686, or a grand total of $129,451,411.

AUDITOR TESTIFIES AGAIN

Mr. Burr said that the city, under Contract No. 4, for construction by the Brooklyn Rapid Transit Company, had also issued upward of $112,000,000 of interest bearing securities, the proceeds of which have been used in the construction of the rapid transit railroads. Mr. Burr's statistics show that the city's total contribution to the completion of the subways is actually more than $250,000,000, for the statement that there should be included $10,995,377, provided from the last two or three years' budgets and the amount which has been provided by means of special revenue bonds for the expenses of the Public Service Commission, the greater portion of which forms a part of the cost of construction under Contract No. 3.

Edward F. J. Gaynor, auditor of the Interborough, was recalled to the stand and questioned regarding salaries and expenses of officers, to which item the company had charged up $270,671. Mr. Burr asked to be told who were the officers and for what period they had received that amount. Mr. Gaynor said that E. P. Bryan, vice-president of the Interborough, had received a salary of $20,000 per annum from May 1, 1900, to March 1, 1913. From April 1, 1903, to Dec. 31, 1904, one-third of a salary of $30,000 was charged against the elevated and two-thirds to the subway equipment, and that from Jan. 1, 1905, to April 30, 1906, he was in receipt of a salary of $30,000, one-third of which was charged against the elevated lines.

State Ownership and Control Suggested

Rhode Island Receivers Suggest Plan Which Takes Into Account System's Relation to Employees, Public and State

State ownership and control, with private operation, for the Rhode Island Company, is the plan of the receivers which was presented to the Rhode Island Legislature on Feb. 24.

The plan proposes that the State of Rhode Island issue $18,000,000 of sinking fund bonds, maturing in 1945, bearing interest at 3½ per cent, payable semi-annually, which shall be used in payment for the entire system now owned or leased by the Rhode Island Company, except the Narragansett Pier Railroad, and the electric lines in Connecticut and Massachusetts.

SOME ROADS TO BE RETURNED

The Narragansett Pier road is to be turned back to its owners. That part of the Providence & Danielson Railway Company in Connecticut is to be returned to the New York, New Haven & Hartford road, and the Attleboro Branch Railroad and the Interstate Consolidated Street Railway of Massachusetts are to be released to the New England Investment & Security Company.

Provision is also made that all the securities of all the companies owning or releasing any part of the present system, and all claims of these companies as well as those of the New England Investment & Security Company shall be wiped out.

After obtaining complete ownership of the traction properties, the plan provides that the State shall lease them to the United Electric Railways for a period of twenty-five years at an annual rental of $1,020,000. This corporation is to operate the system, assume all liabilities of operation and maintenance, under the regulation of the Public Utilities Commission, which is to have increased powers, in regulating the operation.

The United Electric Railways was created by an act of the Rhode Island Legislature approved on April 24, 1919. The incorporators are Governor R. Livingstone, Zenas W. Bliss, one of the receivers of the Rhode Island Company and chairman of the State Tax Commission, and Bank Commissioner George H. Newhall, as individuals.

CHARTER PROVISIONS UNUSUAL

The charter under the act is unusual in that the capital stock allowed is unlimited, but provision was made that the charter should not be issued until the corporation paid in to the State a bonus on $500,000 capital, or $500. Up to this time this fee has not been paid and the charter has not been issued. Under the State law, the corporation has two years in which to take out the charter.

Upon expiration of the twenty-five year lease the United Electric Railways will have the option of buying the entire system for $17,000,000, plus the actual cost of all improvements and extensions made during the period of the lease and paid for by the State. If it does not care to exercise this option, it can renew its lease for another twenty-five years at an annual rental of $835,000.

The receivers in their plan ask that legislation be enacted eliminating all motor bus and jitney traffic, of providing strict regulation by the Public Utilities Commission. They further ask that all paving and franchise taxes be remitted, excepting damage incidental to operation. The operating company, however, is to pay all municipal taxes on land and property as though it were not owned by the State.

An employees' profit sharing plan is also advocated as an inducement to minimize labor difficulties and give the employees a direct interest in the road. The management of the new company is to be vested in a board of seven directors. Four are to be elected by the stockholders; two, neither of whom shall have any personal interest in the securities of the company, and the other by the employees.

LONG, CAREFUL STUDY

The plan, which was presented by Receivers Frank H. Swan, Theodore Francis Green and Zenas W. Bliss, is the result of their long and careful study of the property and the conditions. It is presented at this time, the receivers say, in order that the Legislature may have ample time to consider it and pass legislation that will save the system.

The details of the plan are at this time largely of local interest in Rhode Island. The bill is a start. When the measure as now drawn or as amended becomes a law, the matter will take on national significance. The theory upon which the plan is drafted is that a comprehensive system of transportation should be assumed commensurate with the social and economic demands of the territory served, and that no reorganization can be more than temporarily successful which deals with the problems as if they were financial only or which does not take into account the future of the electric railway system in relation to its employees, the public and the State. The plan as proposed will work out with this result:

> The New York, New Haven & Hartford Railroad gets a cash sum as great as it could realize if the Rhode Island Company were sold and is free from all entanglements present and future.
>
> The United Traction Co. and the Rhode Island Surburban Railway bondholders get for every bond a State bond of equal maturity value, but bearing less interest.
>
> The United Traction stockholders get for every share of stock a share of stock in the new company of equal par value, practically certain to pay at least 4 per cent and possibly 5 per cent.
>
> The public will pay no more in fares than it would have to in the case of a privately owned electric railway system and will have the satisfaction of knowing that all it pays above a moderate return upon a moderate capitalization goes either into improved service or into the State treasury. The public will also be represented in the management.
>
> The employees and the stockholders will both have an added inducement to increased efficiency by reason of their direct share in the financial consequence of that efficiency.
>
> There will be less occasion for labor troubles both for this reason and because of the fact that the employees have a representative in the management who can keep them informed of the conditions of the company and keep the management informed of the feelings and ideas of the employees.
>
> Lastly, the plan has all the advantages of State ownership and none of the disadvantages of State operation—although the State has two strong influences in the control— first, through its representatives in the management, and second through the Public Utilities Commission, whose powers are increased.
>
> And at the end of twenty-five years the State will have retired all the bonds it issued for this purpose and will also either receive at least $17,000,000 in cash or else will receive a net payment of $835,000 a year for another twenty-five years—all without having paid out a dollar.

The Three Railway Blunders

Unit Fare, Nickel Rate and Burdensome Franchises All Lead to the Undoing of Railways

Peter Witt, formerly street railway commissioner of Cleveland, Ohio, is not of the opinion that all the sufferings of the electric railways are of their own making. In a circular which he has just issued Mr. Witt pricks particularly the watered stock bubble. He says:

> The first blunder in our urban transportation (a blunder jointly made by the public and our street railway companies) was in the establishment of a unit rate of fare. This unit rate of fare not only killed the profitable business—the short haul traffic—but at the same time made impossible the collection of what was justly due from the long distance rider.
>
> The second was in making the unit rate of fare (a nickel) the universal rate of fare whether the town was large or small, densely populated or sparsely settled, flat or hilly, streets wide or narrow, car movement fast or slow, and ignoring entirely the most important factor of all, the riding habit; could it be made large or would it remain small.
>
> The third blunder was the piling on by the public and the acceptance by the companies of excise taxes, paving taxes, street cleaning and snow removal charges, car license fees, bridge tolls and numerous other impositions, all to be borne by the car-rider.
>
> That the conditions thus created could not go on indefinitely was known to all who took the trouble to give the problem just a little thought. It was only a question of time when the end would come. The war, with its economic upheaval, hastened the day. In the midst of prosperity the crash came. The most important utility in our city life was laid low; and why? because it could not meet the constantly rising costs while the charge for the service it sold remained fixed. Dividends ceased; bond interest was defaulted; improvements stopped; rail ripping took the place of track laying; and abandonment of service superseded the buying of new equipment.
>
> Out of it all, some relief to some companies has been granted; so today, in Boston, with state control, the fare is 10 cents; in St. Louis, through a receivership, it is 8 cents; in Cincinnati, under a reward for incentive, it is 7 cents; in Chicago, with its division of profits, it is 6 cents; in Cleveland, under service at cost, it is 5 cents, with 1 cent for a transfer.
>
> For the higher rates of fare in Boston, St Louis, Cincinnati and Chicago many different reasons are given. For the lower fare in Cleveland, but one reason is assigned, and that: "The 'water' was squeezed

out." Yes; the "water" was squeezed out, but the statement that its squeezing out has had a material effect on the rate of fare charged is far from the truth.

What are the facts? The city of Cleveland and the Cleveland Railway entered into the present service-at-cost arrangement in March, 1910. Before doing so, however, the outstanding stock and bond obligation of the Cleveland Railway was reduced from $34,000,000 to $24,000,000. On this last sum, by the terms of agreement made, the car-riders of Cleveland have paid, and likewise so on all additions to capital value since made, a return of 6 per cent.

From the figures above given it is very plain that the rolls of the wringer were set tighter than ever before, or perhaps ever again will be, in the settlement of a railway controversy.

WATER WITHOUT FACTS

I am not a defender of "water" in railway securities, but this talk about "water" being the cause of all the trouble the industry is now burdened with is so far from the truth that I feel it incumbent to set out the facts. This, in order that justice may be done this important industry in the hundreds of cities in the United States whose people have been saturated with this talk about "water" but who have never been supplied with the facts.

Let us, therefore, assume that when the settlement in Cleveland was made the $10,000,000 had not been squeezed out. What effect would this have had upon the car-riders of Cleveland last year? They would have been called upon to pay for dividend purposes $600,000 more than they did pay. How many riders did the system carry last year? Three hundred million. Therefore, the increase in the rate of fare, had the "water" remained, would have been one fifth of 1 cent. This completely knocks into a "cocked hat" all the stories afloat to the effect that the low fare in Cleveland is due solely to the fact that the "water" was squeezed out.

The trouble with this industry is that it is trying to function by meeting a post-war outgo with a pre-war income. It cannot be done. The longer the public insists in trying to make it do that which is impossible to be done the worse the situation will become. It is the inflation of currency, rather than the inflation of stock that is causing the trouble. The value of the dollar today, measured by its purchasing power of five years ago, is less than fifty cents. Since many years must elapse before deflation can take place, the present value must continue or still go lower. It is no longer a question of paying dividends on "water" that confronts most of our street railway companies, but the desperate question of getting money enough in the farebox to fill the pay envelopes. It can be remedied only by permitting this industry, if it is to render the service for which it was organized, to charge fares which will make its income commensurate with its outgo.

Labor Provisions of New Railroad Bill

Method of Handling Dispute Between Carriers and Their Employees and Subordinate Officials Abstracted

After many weeks of conference the Senate and House conferees have agreed upon a bill known as "Transportation Act 1920" providing for return of railroads to owners and further for future regulation of railroads. At this writing the bill awaits the President's signature. The labor clauses of this act caused much discussion but a program was finally agreed upon.

In general three methods of settling disputes are provided.

The first of these is a conference between representatives of the employers and the employees; the second is a Board of Adjustment established by agreement between a carrier or group of carriers and the employees; the third is known as the Railroad Labor Board, a government board without, however, power to enforce any of its decisions.

VARIOUS METHODS DEFINED

The first method is defined as follows:

Sect. 301. It shall be the duty of all carriers and their officers, and employees, and agents to exert every reasonable effort and adopt every available means to avoid any interruption to the operation of any carriers growing out of any dispute between the carrier and the employees or subordinate officials thereof. All such disputes shall be considered and, if possible, decided in conference between representatives designated and authorized so to confer by the carriers, or the employees or the subordinate officials thereof, directly interested in the dispute. If any dispute is not decided in such conference, it shall be referred by the parties thereto to the board which under the provisions of this title is authorized to hear and decide such dispute.

The second provision is as follows:

Sect. 302. Railroad Boards of Labor Adjustment may be established by agreement between any carrier, group of carriers, or the carriers as a whole, and any employees or subordinate officials of carriers, or organization or group of organizations thereof.

Disputes involving only grievances, rules, or working conditions, not decided as provided in Section 301, between the carrier and its employees or subordinate officials who are represented upon the Adjustment Board may be brought before such an Adjustment Board. These disputes may be brought before the board by the executives of the carrier or by the employees, either organized or unorganized, upon the board's own motion, or upon the request of the Labor Board.

The third method is provided as follows:

Sect. 304. There is hereby established a board to be known as the "Railroad Labor Board" and to be composed of nine members as follows:

(1) Three members constituting the labor group, representing the employees and subordinate officials of the carriers, to be appointed by the President, by and with the advice and consent of the Senate, from not less than six nominees, whose nominations shall be made and offered by such employees in such manner as the Interstate Commerce Commission shall by regulation prescribe;

(2) Three members, constituting the management group, representing the carriers, to be appointed by the President, by and with the advice and consent of the Senate, from not less than six nominees whose nominations shall be made and offered by the carriers in such manner as the Commission shall by regulation prescribe; and

(3) Three members, constituting the public group, representing the public, to be appointed directly by the President, by and with the advice and consent of the Senate.

The Labor Board is charged with the duties of deciding disputes involving grievances, rules, or working conditions either on an appeal from an Adjustment Board or in case the Labor Board determines that any Adjustment Board has failed or is not using due diligence in its considerations. It shall also decide such a dispute in case an Adjustment Board is not organized which can take care of it.

The Labor Board is also charged with the duty of deciding disputes with respect to wages or salaries of employees or subordinate officials of carriers, not decided as provided in Section 301. The Labor Board may also suspend the operation of any decision made under Section 301, if it is of the opinion that the decision involves such an increase in wages or salary as will be likely to necessitate a substantial readjustment of the rates of any carrier. It shall then rehear the case and make its own decision on the matter as soon as practicable.

No decision by the Labor Board is binding upon the board unless at least five of the nine members agree and in the case of wages at least one of the representatives of the public shall concur in this decision.

The Board has no power to enforce any of its decisions on wages or any other matter except by use of public opinion through publicity.

In determining the justness and reasonableness of wages and salaries or working conditions "the board shall, so far as applicable, take into consideration among other relevant circumstances:

(1.) The scale of wages paid for similar kinds of work in other industries:

(2.) The relation between wages and the cost of living.

(3.) The hazards of the employment.

(4.) The training and skill required.

(5.) The degree of responsibility.

(6.) The character and regularity of the employment;

(7.) Inequalities of increases in wages or of treatment, the result or previous wage orders or adjustment."

The Labor Board shall have a chairman, shall maintain central offices in Chicago, Ill., but may sit wherever else it may determine necessary, shall carry on a continuous investigation and study of relations between carriers and their employees, and shall classify and digest and publish such data and information as may be useful to the various carriers, groups of employees and Adjustment Boards.

The board is given the right to subpoena witnesses, to administer oaths, and other similar powers, similar to court powers, which will make it possible to get necessary information.

Representatives of the principal organizations of railway workers asked the president on Feb. 27 to veto the proposed legislation. They charged that the bill stripped the workers of the opportunity to obtain justice where wage controversies were concerned.

Telephone Courtesy

An acrostic has recently been issued by the Bamberger Electric Railroad, Salt Lake City, Utah, governing the use of the company's private telephone lines. It follows:

Talk distinctly; be brief. While you are talking others may want to use the line.

Explain who you are when you talk. Thus: "Kaysville talking; please ring Ogden."

Listen first. Do not break into other people's conversation. If line is busy hang up immediately.

Every additional receiver off the hook weakens transmission and makes it more difficult for others to carry on conversation.

Preference must always be given to train orders and substation instructions.

Hang up receiver at all times when not actually talking over line.

Obscene language or profanity will not be tolerated.

Necessary communication is encouraged, but gossiping and visiting are objectionable.

Extra caution must be used not to touch 'phone and a grounded circuit at the same time.

Chicago Award Interesting

State Supreme Court in Fare Case Holds City to Be Agency of State. City's Contention Dismissed

In the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 12, announcement was made of the approval by the Illinois Supreme Court of the 7-cent fare award for the Chicago Surface Lines, and the circumstances leading up to the court proceedings. An examination of the decision, just made available, reveals several features which appear to warrant further publicity.

RATE POWER VESTED IN ASSEMBLY

The Supreme Court had on several previous occasions made clear that the power to regulate rates to be charged by a public utility is vested in the General Assembly and that this body had never conferred upon any municipality power to make inviolable contracts for such rates. In the Chicago Surface Lines case, however, the city's contention was that this was a different kind of contract, because the ordinances creating it were adopted under the so-called Mueller law. The Supreme Court holds that there is nothing in this law which either directly or indirectly affects the power of the Legislature to regulate rates.

The city also insisted that it had acquired valuable rights under the ordinance because of the provision allowing it 55 per cent of the net income, and that while the raising of fares would not destroy the contract but would give the city more, the principle that the General Assembly may control rates would permit lowering fares and would thus affect the city's income. The court dismissed this contention, saying:

> A municipality is a mere agency of the State and, whether invested with the fee or a mere easement in streets, it holds them in trust for the people of the whole State, and, so far as their use for street purposes is concerned, every citizen of the state has an equal right, and is represented not alone by the city of Chicago, but by the General Assembly. The General Assembly has the power and is charged with the duty to see that rates of fare in the use of streets are reasonable within the limit, on the one hand, of a fair return to the railway and reasonable compensation for the service rendered, and the interest of the city cannot affect the exercise of that power and duty.

The court said further:

> If power can be given to a municipality to contract where an individual could not, this court has never adopted the rule that the power of the General Assembly to make police regulations can be suspended or parted with as to either. Whenever that rule has been applied the court has held that inasmuch as such a contract has the effect of extinguishing an undoubted power of government, both its existence and the authority to make it must clearly and unmistakably appear and all doubts must be resolved in favor of the continuance of the power.

Answering the city's argument that the companies forfeited all rights under the contract by a departure from the provisions as to rates of fare, the court said:

> The contract being subject to legislative control, the intervention of the State, either on behalf of the public utility to secure a reasonable return for the service rendered or of the city to cause a reduction of rates which have become excessive, does not abrogate a contract, of which the law is an integral part.

Attorneys for the city are preparing to argue for a re-hearing in the fare case. Failing in that they will endeavor to take the case to the United States Supreme Court.

Chicago Commission Buys Underground Data

Subject to the approval of the City Council of Chicago, Mayor Thompson's traction commission recently closed a deal with George W. Jackson to purchase the data on underground Chicago which the latter has compiled. Mr. Jackson asked $10,000 for the use of this information, claiming that it had taken him twenty years to collect it and that it could not be duplicated for less than $100,000. He finally accepted the commission's offer of $5,000 with the understanding that he will be paid $150 per day for his work on sketches and estimates and that the salaries of his assistants will be paid by the city with an additional allowance of 15 per cent for overhead charges. Except for appointing Mr. Jackson as the subway engineer, the Traction Commission has not as yet announced its engineers, if the appointees have been decided upon.

Illinois Central Can Make Plans to Electrify

The voters of Chicago on Feb. 24, approved the six South Park bond issue propositions for improving the lake front from Grant Park to Jackson Park, with which is tied up the electrification of the Illinois Central Railroad and the erection by that road of a new terminal at East Twelfth Street. Permission by the War Department to go ahead with this work was recently granted as outlined in the ELECTRIC RAILWAY JOURNAL on Jan. 24.

It is estimated that the cost of electrification to the railroad will be about $30,000,000. The ordinance provides that work must begin within two years from the passage of the ordinance, provided it is possible to finance the project at that time.

The improvement measure was passed some time ago, but no definite progress could be made in carrying out the electrification work until the people had approved the lake shore improvements. The railroad has not prepared its electrification plans as yet, but it is assumed that work along this line will take definite form in the near future. It will probably be five years before the suburban service is electrified, and ten years before electrification is complete within the city.

Company Pays Tuition of Employees

The West Penn Traction System, of which the Wheeling (W. Va.) Traction Company is a part, has enrolled 250 employees, three of them women, in a correspondence course in elementary electricity undertaken as a part of the company's educational program for 1920. The work is in direct charge of Prof. B. C. Dennison, of the Carnegie Institute of Technology, Pittsburgh, assisted by a staff which includes Walter C. Sontum, constructing and operating department expert of Wheeling.

Practically the whole cost of the course is borne by the West Penn, although in enrolling the student authorizes a deduction of $5 a month for two months from his pay. When he completes his course, he receives a certificate and a refund of $5.

The purposes of the course are to enable employees to do their work more easily, to qualify them for promotion, to make their daily tasks more interesting by a thorough understanding of them and to promote safety.

Strict Interpretation of Law of Liability

An unusually strict interpretation of the law of liability as regards transportation companies was contained in a decision recently handed down by Justice Taylor of the Appellate Court of Cook County, Illinois. This concerned the appeal of a woman who boarded an uncrowded car and, attempting to leave later on while it was crowded, was involuntarily carried along by other passengers and thrust down the step and out into the street. She was injured and upon the trial of the case in the lower court she was awarded a judgment against the company. The Appellate court said in part:

> The habits of passengers are well known. When they are nearing their destination they become impatient and hasten towards the exit, each trying more or less to get ahead. If the car is crowded, confusion and anxiety make them push and surge towards the exit. We take judicial notice of the well known characteristics of human nature. Carriers have the same knowledge and are bound to conduct their business with these characteristics in mind. If, in the face of such knowledge, they accept too many passengers they must be held to be responsible for any result which reasonably ought to have been anticipated.
>
> Counsel for the defendant argues that the crowding and pushing off of the plaintiff was the result of the voluntary conduct of the passengers and that the defendant ought not to be held responsible; that it is only liable in case of overcrowding where the movements of the passengers that cause the injury are involuntary, that is, where they are swayed by the movement of the car. That argument gives rise to the question whether the crowding was the proximate cause of the accident, and whether the casual connection between the crowding and the accident was not broken by the negligence of the other passengers? The answer seems to be that as the tort of the passengers took place concurrently with the carrier's conduct in overcrowding the car, their wrong cannot reasonably be said to alter or lessen the defendant's liability.
>
> It would seem, therefore, that where a carrier permits a car to become overcrowded after one becomes a passenger and so brings about such a dangerous condition that the passenger while in the exercise of care and, in undertaking to get off, is carried out partly voluntarily and partly involuntarily, and so controlled by the movements of the people on the car that she is pushed along and off onto the street against her will and injured—the car meanwhile being at a standstill, it has not afforded the passenger a reasonable opportunity to alight and so has failed to exercise that high degree of care for her safety which the law requires.

The judgment of the lower court was affirmed. Attorneys for the Chicago Surface Lines have asked for a rehearing.

Urges Hydro Take Line

Canadian Municipalities Want Commission to Take Over the St. Catharines Lines

Representatives of municipalities along the lines of the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., at a conference with officials of the Hydro-Electric Commission of the province of Ontario urged the commission to take over the properties of the electric railway so that extensions to the system can be undertaken at once. W. B. Burgoyne, president of the Niagara district, Hydro Radial Union; T. J. Hannigan, secretary of the organization, and other officials expressed the belief that the proposal may be carried out.

The Niagara, St. Catharines & Toronto Railway is a part of the Canadian Northern properties. The Canadian Northern is not desirous of continuing electric branch lines as part of its system. The Hydro Commission will make an investigation of the properties. W. R. Robertson, former superintendent of the Niagara, St. Catharines & Toronto Railway, and now traffic manager of the Hydro lines, said that as the Hydro proposed to build a line similar to the private road it would be better for the commission to acquire the existing property and supervise its reconstruction rather than to parallel the present line with a new one.

Towns and villages between Bridgeburg, Fort Erie and Port Colborne along the north shore of Lake Erie have passed by-laws bonding themselves for the construction of the proposed Hydro line between these places, a distance of about 25 miles. It is proposed to use this line as the connecting line between Buffalo and Port Colborne to Welland and Toronto.

President Burgoyne of the Hydro Radial Union says that about 200 miles of electric railway are to be built by the commission if the plans now under consideration are carried out. The lines would provide for through passenger, express and freight service from Buffalo, N. Y., to Toronto, Ont., connecting about 100 municipalities along the Niagara frontier. The main line would be along the north shore of Lake Erie connecting Buffalo with all of the Canadian summer resorts now connected by boat. At Port Colborne the line will connect with the present hydro properties to points north, including Welland, St. Catharines, Hamilton and Toronto.

London Companies Groping for Relief

Pending any special action by the Ministry of Transport, the London underground railway companies are taking steps on the one hand to cope with congestion of traffic and on the other to secure better financial results. In regard to the former, the Metropolitan Railway Company has received a new train of six cars, the first of an order for 100 cars. Instead of end and center doors, the new vehicles have five swing doors a side, and it is expected that this will lead to the more rapid loading and unloading of passengers, and thus reduce the time of stoppages at stations. Each train will seat 292 passengers, as compared with 268 in the case of the existing trains. Strap-hanging will be abolished, as hand rails at a convenient level are provided.

Toward the end of December the Metropolitan District Railway started an experiment at its Victoria Station, which is a very busy one. An official, perched in a high box on the platform during the rush hours, times the trains with a stop watch. If any fail to get away at the end of 30 seconds he sounds a hooter and the platform staff which has been augmented shut the doors and send the train off. Every effort is made to get the passengers to hurry. The saving in duration of the stops at this station already amounts to 30 per cent.

News Notes

Union Labor Wants Municipal Ownership.—Union labor men of Trenton, N. J., plan to launch a movement for the public ownership of the Trenton & Mercer County Traction Corporation. Mayor Donnelly favors having the company controlled and operated by the municipal authorities.

Arranging for St. Paul Electric Service.—Due to the fact that terminal arrangements have not been perfected from Black River Junction, the end of the Chicago, Milwaukee & St. Paul Railroad's own rails, the electrified service of the system will for the present be operated into Tacoma only. Trains will be hauled into Seattle by steam locomotives. Electrified service from Othello to Tacoma will be started about March 1.

Wage Increase Asked in Salt Lake.—Practically a 50 per cent wage increase has been demanded by employees of the Utah Light & Traction Company, Salt Lake City, Utah. This includes conductors, motormen, shop empolyees and trackmen. The men ask in addition an eight-hour day and that length of service required to reach the maximum pay be reduced from twenty-one to twelve months. Conductors and motormen ask from 67 to 72 cents an hour after one year's service. These men are now receiving 39 cents up to 47 cents, with 37 and 50 cents for shopmen.

Length of Service Seniority Basis.—Superior Court Judge Mitchell Gilliam has sustained the order of Thomas F. Murphine, superintendent of the Seattle (Wash.) Municipal Railway, making the length of service on any railway in Seattle the basis of seniority for choice of runs. The difficulty arose when the city purchased the lines of the Puget Sound Traction, Light & Power Company. Forty street car operatives in the employ of the municipal lines before the purchase of the traction lines, asked for an injunction to prevent the former traction employees, many of whom had worked continuously for twenty years for the company, taking seniority over the civil service men.

Railway Paving to Cost $630,000.—Henry C. Allen, city engineer of Syracuse, N. Y., has submitted to B. E. Tilton, vice-president and general manager of the New York State Railways, a list of streets the city proposes to pave on which cars run. The total cost to the railway for relaying tracks, ties and paving between the tracks is $630,000. Of this amount the paving estimated cost is $280,000 while the rebuilding of the road beds and relaying of track will cost $350,000. The city will be unable to pay for the railway's share of the improvement work, though it did last year. This is due to the fact that enabling legislation is necessary. A bill to allow the city to advance the money and let contracts for the work is to be introduced by Senator J. Henry Walters, Syracuse.

Program of Meetings

Wisconsin Electrical Association

The annual joint convention of the Wisconsin Electrical Association and the Wisconsin Gas Association has been called for March 23, 24 and 25 at the Hotel Pfister, Milwaukee, Wis. The following papers will be presented in addition to the regular committee reports:

"The Relations of the Central Station to the Public," by M. H. Aylesworth, executive assistant to the president of the N. E. L. A.

"Cost of Reproduction Less Depreciation," by Paul Stark, district auditor of the Eastern Wisconsin Electric Company.

"Possibilities of City Street Car Operation," by E. M. Walker, general manager of the Terre Haute Traction & Light Company, Terre Haute, Ind.

"Development of Small Water Powers in Wisconsin," by E. L. Hinchliff, district superintendent of the Ashland Light, Power & Street Railway Company, Ashland, Wis.

"Development of Automatic Substation Equipment," by a representative of the Westinghouse Electric & Manufacturing Company.

The annual banquet will be held on March 24 at the Milwaukee Athletic Club. The Hon. Edward J. Dempsey will act as toastmaster.

The sessions of the Wisconsin Association are held jointly where the papers have an interest common to both.

Financial and Corporate

State Railways Do Better

Notwithstanding all Dividends Were Passed During Year Future Holds Better Outlook

The annual report just issued by the New York State Rys. for the calendar year 1919 shows that conditions have improved considerably over the preceding year, although the net income was not considered sufficient to warrant the payment of dividends.

STATEMENT OF EARNINGS OF NEW YORK STATE RAILWAYS

	1919	1918	Per Cent Changes + Inc. — Dec.
Operating revenue	$9,406,473	$8,472,159	+11.02
Operating expenses	6,505,264	6,272,106	+3.72
Depreciation	429,227	396,596	+8.24
Deferred maintenance	200,000	None	......
Net revenue from operation	$2,271,982	$1,803,457	+25.92
Net revenue—auxiliary operations	562*	2,990*	+72.00
Taxes	602,869	509,668	+18.31
Operating income	$1,668,551	$1,291,789	+29.22
Non-operating income	37,473	38,506	—2.68
Gross income	$1,706,024	$1,330,295	+28.2
Deductions	1,361,816	1,374,077	—0.89
Net income	$344,208	$43,782*	......
Sinking fund appropriations	31,642	31,067	+1.85
Dividends—Preferred stock (1½%)	None	48,281	......
Surplus	$312,566	$123,130*	......
Proportional share of undivided earnings of other companies applicable to stock owned	27,770	24,613*	......
Profit and loss	340,266	147,743*	......
Operating ratio (per cent)	69.2	74.0	......
Taxes—Per cent of operating revenue	6.42	6.02	......

NOTE—1918 figures revised to conform to new classification, effective on Jan. 1, 1919.
* Deficit.

After deducting $193,125 as the dividend on the $3,862,500 of 5 per cent preferred stock, there was left $119,441, equivalent to a return of only 0.6 per cent on the $19,952,400 of common stock outstanding. The profit and loss account for the year was increased nearly $500,000.

Operating revenues increased 11 per cent, while operating expenses including depreciation and deferred maintenance increased only 6.97 per cent, showing an increase in the net revenue from operation of 25.8 per cent. The operating ratio was decreased 4.8 per cent.

Taxes increased 18.3 per cent over the previous year—so that for the year 1919 the taxes paid amounted to 6.42 per cent of the operating revenue.

$3,000,000 of Short-Time Notes Offered

The unsold portion of an issue of $3,000,000 of two-year 7 per cent notes of the Washington Water Power Company, Spokane, Wash., due on Feb. 2, 1922, is being offered for subscription by the Spokane & Eastern Trust Company, Union Trust Company, and Ferris & Hardgrove, Spokane, Wash. The notes are secured by deposit of first and refunding 5 per cent mortgage bonds of the company in the amount of $1,200 for each $1,000 of notes. The proceeds of the note issue will be used almost entirely to refund a similar series of notes maturing on Feb. 2, 1920. The Central Union Trust Company, New York, is trustee of the issue. Among the interests of this company is an electric railway in Spokane, which does about two-thirds of the railway business in that city.

In offering the notes for subscription, it is pointed out that the Washington Water Power Company has a ninety-nine-year contract with the Inter-Mountain Power Company for the supply of power for the electric operation of the Chicago, Milwaukee & St. Paul Railway, under which it is now delivering 16,000 hp. at its long lake power station for the operation of the railway between Beverley and Tacoma, Wash. It is also pointed out that the company has a contract with the Pacific Power & Light Company for the exchange of surplus power. The output of the company's power station for the twelve months ended Nov. 30, 1919, was 225,896,050 kw. hours.

Third Avenue Report Improves

The income statement of the Third Avenue Railway System, New York, N. Y., for January shows improvement as compared with January, 1919, although there was a deficit after all deductions amounting to $74,765. In the corresponding month of 1919 the deficit was $115,980. Operating revenues last month were $941,063, as compared with $800,551 in January a year ago; operating expenses increased from $633,053 to $747,853 and gross income increased from $103,653 to $144,968. The deficit of the company for the seven months ended with Jan. 31, 1920, was $336,884, as compared with $522,571 in the corresponding 1919 period. The gross income of the company in the seven months increased from $1,021,578 to $1,213,387.

York Railways Doing Well

Combined Income Statement of Company Shows Much Improvement Over Previous Year

The combined operations of the York (Pa.) Railways for the year ended Nov. 30, 1919, shows an increase in net income of $105,647 over the previous year, equivalent to a return of 4.2 per cent on the outstanding common stock. The financial results from the railway, lighting and real estate operation are not shown separately. Gordon Campbell, the president, however, comments on the local electric railway situation, saying, in part:

SEVEN-CENT FARES

Railway fares have continued on the 7-cent basis, as established at the close of last year. The decrease in traffic noticeable with the increase of fare has not been permanent and by the end of this year had returned to normal. In fact, the number of passengers now carried by the company is greater than at the former rate of fare, though after deducting operating expenses, the net revenue per passenger is slightly less.

It is hoped that there is a growing recognition of the street railway problem on the part of the general public involving not only the vital need of good transportation but the necessity of sufficient revenues to maintain the property devoted to this service and at the same time attract new capital. A common sense view should prevail of the depreciation in the purchasing value of money and the necessary relation between the cost of public service and the elements of labor and material from which it is produced. Good service is the first requirement and the cost of service to the public is still relatively low.

During the year wages of employees have been increased to meet the increases in the cost of living, with which, in general, they compare very favorably. That the type of operating men now employed is improving is reflected in the decreased number of accidents and the small amount paid out to settle injury and damage claims. A relief association was formed during the year to provide sick and death benefits. The company and employees contribute equal amounts to the dues for its support.

PROPERTY CAREFULLY MAINTAINED

The improved financial condition has permitted the property to be thoroughly maintained and it has been kept in excellent condition—the reserve for depreciation being maintained as heretofore. About two miles of track were rebuilt, on 25 per cent of which new rails were used. The tracks and special work in the Hartley Street car house yard, involving 1,840 ft., were also completely rebuilt with new special work. Only one small track extension of 250 ft. was made by the company during the year.

Schenectady Shows Improvement

Net Income for Year on Right Side of Ledger Due to Increase in Net Revenue

The operating revenue of the Schenectady (N. Y.) Railway during the year 1919 increased 16.95 per cent over the previous year, due principally to the fare increases, effective on May 26, 1919, when the unit rates of fare were increased from 5 cents to 6 cents on the Schenectady urban lines. Increases were also made in the fares at the same time on the interurban routes as follows—on the Troy and Ballston divisions the through fare from Schenectady was increased from 26 to 30 cents and intermediate zone fares from 5 to 6 cents with a minimum fare of 7 cents for a single zone. On the Albany division the only change was in the through fare which was increased from 26 to 27 cents, due to the 6-cent fare in Schenectady.

With a 4.2 point decrease in the operating ratio the net revenue from operation was increased 5.93 per cent. Taxes although actually increasing in amount were less by 0.64 per cent than during 1918.

STATEMENT OF EARNINGS OF SCHENECTADY RAILWAY

	1919	1918	Per Cent Change +Inc. —Dec.
Operating revenue	$1,664,282	$1,422,654	+16.95
Operating expenses	1,380,325	1,244,200	+10.94
Net revenue from operation	$283,957	$178,454	+59.14
Taxes	90,683	86,695	+4.61
Operating income	$193,274	$91,759	+110.8
Non-operating income	3,914	1,079*	.....
Gross income	$197,188	$90,680	+117.5
Deductions	151,485	150,715	+0.511
Net income	$45,703	$60,035*	.....
Operating ratio (per cent)	83.20	87.40	.....
Taxes—per cent of operating revenue	5.45	6.09	.....

* Deficit.

Payment of Fixed Charges Before Court

In the United States District Court at Pittsburgh, Pa., on Feb. 13, Judge C. P. Orr overruled a motion for an appeal from the opinion under which the receivers of the Pittsburgh Railways were ordered to pay $495,150 in "fixed charges." This decision made it almost certain that the receivers will have to make the payment, which will be the largest single payment of fixed charges under the receivership; there was some hint of an attempt to carry the matter to the Circuit Court of Appeals, without the permission of the district court, but no such move has materialized.

In this battle over payments on fixed charges, the receivers have been adopting a rather neutral position, the contest being between two groups of the subsidiaries. The $495,150 is to be paid to the Philadelphia Company, being the sum paid out by that company as interest on "first and primary" liens, whose payment it had guaranteed. The Philadelphia Company is the holding company for the traction system, and it made the payments when the receivers defaulted. The Philadelphia Company asked the court for an order for the payment of $1,250,000 in all, the remaining $755,000 being interest paid on other liens, principally second and subsequent mortgages and rentals.

There is in some quarters a tendency to regard the action by Judge Orr as the adoption of a definite policy in favor of the payment of fixed charges. On Feb. 1, the total interest unpaid on first and primary lines was $678,215 (or a little more than $180,000 in excess of the sum affected by the decision); upon subordinate liens, $1,714,000; and upon rentals, $984,000.

The $495,150 ordered paid is due on thirty-four mortgages of underlying companies, principally underlying companies of the Consolidated Traction Company. It is made up of sums ranging from $250 to $61,125 each.

Stone & Webster Booklet Issued

Stone & Webster, Boston, Mass., have issued for 1920 their annual booklet of information concerning the public utility properties under their management. The usual valuable historical record of each company is included, together with a table of earnings and expenses of the companies for the twelve months ended Dec. 31, 1919. The accompanying table shows the earnings of the railway properties and combined railway and light properties included in the compilation contained in the manual.

EARNINGS AND EXPENSES OF STONE & WEBSTER COMPANIES FOR 12 MONTHS ENDED DEC. 31, 1919

	Gross Earnings	Operating Expenses and Taxes	Net Earnings	Interest and Amortization Charges	Balance	Dividends
Baton Rouge Electric Company	$371,268	$231,572	$139,696	$41,394	$98,301	$36,000
Cape Breton Electric Company, Ltd	583,023	455,032	127,990	64,367	63,623	47,790
Central Mississippi Valley Electric Properties	424,474	339,573	84,901	29,765	55,135	15,000
Columbus Electric Company	1,309,281	697,226	612,055	366,240	245,814	72,000
Eastern Texas Electric Company	1,390,350	853,676	536,673	159,512	$384,660	175,000
El Paso Electric Company	1,574,675	1,122,262	452,413	91,367	361,045	338,432
Galveston-Houston Electric Company	3,095,151	2,276,135	819,016	414,722	404,293	180,000
Houghton County Traction Company	297,151	*252,893	44,257	48,031	**3,774	6,216
Jacksonville Traction Company	(In hands of receiver since Oct. 30, 1919)					
Koekuk Electric Company	317,236	263,855	53,381	27,868	25,512	15,000
Key West Electric Company	227,260	147,749	79,512	24,886	54,623	18,600
Northern Texas Electric Company	3,387,845	2,149,917	1,237,936	299,433	$1,053,503	429,000
†Paducah Electric Company	116,159	76,749	39,409	17,130	22,278	
Pensacola Electric Company	543,592	441,318	102,273	100,484	1,788	
Ponce Electric Company	210,264	151,501	58,762	24,237	34,525	
Puget Sound Traction, Light & Power Company	9,770,666	6,484,702	3,285,963	2,498,666	$1,349,797	221,905
Savannah Electric Company	(In hands of receiver since Dec. 23, 1919)					
Tampa Electric Company	1,269,247	761,673	507,573	54,994	452,579	287,430

*Includes a charge of $24,779,03 for Special Reserve. $ Includes "Income from Other Sources." † For three months ending Dec. 31, 1919. **Deficit.

Service to Its Investors

Edward V. Kane & Company, Philadelphia, Pa., direct attention to "a development which furnishes a splendid illustration of corporation integrity and good faith." Like all other electric railways the Bartlesville (Okla.) Interurban was hard hit by the combined effects of soaring operating expenses and inadequate fares. Added to these influences were the jitneys, a rival bus line, and an ever increasing number of privately owned motor cars.

The company's earnings, however, were largely derived from its light and power business and there was no cause for alarm. Nevertheless, the railway department was losing money every day and it was only a question of limited time when a substantial deficit would be accumulated on that account.

The Cities Service Company, which owns and operates the Bartlesville Company, and Henry L. Doherty, who controls the Cities Service Company, did not say to the bondholders of the Bartlesville Interurban Railway that they were sorry but couldn't help matters. Nothing of the kind! On the contrary they said in substance and in fact:

> Our railway which cost us more than $300,000 has through conditions beyond our control been converted from an asset to a liability. It is no longer of any service to the public. It is worthless and fit only for the scrap heap. We will take it up and sell it for junk; and in its place we will substitute under the mortgage our Bartlesville natural gas property (also costing more than $300,000), which is entirely free of indebtedness and which is earning net an amount sufficient to pay the interest on all the interurban company's bonds. And since the company is no longer to be engaged in the railway business, we will change its name to the Bartlesville Gas & Electric Company.

And this is what is being done—the old bonds exchanged for the new, bond for bond.

As a result the old bondholders have all their original security—and more, for the substituted property is a money maker instead of a money loser. At present the company is earning net more than four times bond interest.

Financial News Notes

Connecticut Company Earnings Improve.—The gross revenue of the Connecticut Company, New Haven, Conn., for January was $948,000, an increase of $177,000, or 23 per cent, over the January, 1919, figures. For the first nineteen days in February the increase was $83,500, or 17.7 per cent over the figure for the same period in February, 1919.

Issue of Notes Authorized. — The Massachusetts Department of Public Utilities has approved an issue of notes or coupon bonds not exceeding $1,500,000 by the Boston Elevated Railway payable thirty years from date. The securities are to bear 7 per cent interest. They are to be issued for the purpose of refunding a similar amount due on March 1, 1920.

A Record Year in Prospect.—In the public utility department of the Cities Service Company, New York, N. Y., forecasts made at the close of 1919 are proving to have been well-founded. The public utility properties of the company as a whole are now operating on a basis of higher demands and larger outputs than ever before in their history and all indications point to a record year with the public utility subsidiaries.

In the Interest of Simplification.—The Tri-City Railway of Illinois and the Moline, Rock Island & Eastern Traction Company have filed a joint petition with the Public Utilities Commission of Illinois asking for its approval of the purchase by the Tri-City Railway of the tracks and equipment of the Moline, Rock Island & Eastern Traction Company. The Tri-City Railway also asks the commission for authority to issue bonds to the amount of $195,000 to cover the value of the Moline, Rock Island & Eastern Traction Company. The arrangement is being perfected in the interest of corporation simplicity.

Parkersburg Valuation $1,226,229.—A report of the valuation of the property of the Monongahela Valley Traction Company in Parkersburg, W. Va., has been made by William Q. Gallagher, chief engineer for the Public Service Commission. He estimates the cost of reproduction of the properties is $1,226,229 and that the present value because of depreciation is $925,534. He estimates that 27.55 per cent of the trackage of the company is in the city limits; that 90.47 per cent of the costs in the carhouse is chargeable to the city lines, and that 13.05 per cent of the total power generated by the company is used in operating the city cars.

Memphis Re-elects Officers.—The annual election of the board of directors and officers of the Memphis (Tenn.) Street Railway was held on Feb. 18. The former officers were re-elected; T. H. Tutwiler, president, General Luke E. Wright, vice-president, and L. LeMay, secretary and treasurer. The only change made in the board of directors was the election of W. W. Mallory to take the place of his father, the late W. B. Mallory. The board members are: T. H. Tutwiler, J. K. Newman, New Orleans; Luke E. Wright, F. B. Jones, J. B. Goodbar, J. S. Pevear, Birmingham; Francis T. Homer, New York; C. W. Butler, Percy Warner, Nashville, and W. W. Mallory.

Consolidation of Maine Lines.—The control of an extensive system of electing railways in Maine by the acquisition of the stock holdings of M. S. Bird and H. J. Chisholm, Portland, Me., is planned by the Central Maine Power Company, Portland. The corporations which would come under the control of the new board include the Androscoggin Electric Company, operating between Portland and Lewiston; the Oxford Electric Company, furnishing electric power in Norway, South Paris and Mechanic Falls and the Knox Electric Company, which operates between Rockland, Thomaston and Camden and supplies power and light to towns in Knox County in the vicinity of Rockland.

Sees Brighter Prospects. — George Whysall, president of the Columbus, Marion & Bucyrus Railway, Columbus, Ohio, in connection with the statement that the road was to be dismantled and sold for junk is quoted as saying: "Such an announcement should not have been made for it was a belated report of the situation which obtained at the time when the Columbus, Marion & Bucyrus Railway, like many others interurban lines, was facing a fare reduction from 2½ cents to 2 cents. Since then the Legislature has increased the fare to 3 cents and the interurban situation has taken on a decidedly stronger aspect, making continued operation of the line not only possible, but in all probability profitable."

Speed Up Public Service Hearings.—John W. Slocum, chairman of the New Jersey Board of Public Utility Commissioners, has notified Frank H. Sommer, representing the League of New Jersey Municipalities that the proceedings in the Public Service Railway valuation case must be speeded up. Mr. Sommer has been advised that the municipalities must wind up their side of the case, which is now in the rebuttal stage, as quickly as possible. Chairman Slocum hopes in this way to secure a final valuation of the company's property before summer. Mayor Gillen of Newark has announced that the cost of the rate case to the municipalities to date amounts to $63,624, and that it will eventually total at least $75,000.

Shuttle Service Abandoned. — Continuous public agitation for six months against a shuttle line to the Greenfield section of Pittsburgh, Pa., prompted the receivers of the Pittsburgh Railways to abandon the shuttle and run direct service to the district. At a meeting between the receivers and officials of the board of trade of the Greenfield section on Feb. 24, the announcement of the company's concession was made. It followed several conferences of the receivers with the protesting residents, and a public meeting before the City Council on Feb. 19, at which the whole matter of the jurisdiction of the City Council over railway matters was called into question. Two members of the Council insisted the Council is without authority to do anything in the premises, but another member took an opposite view and maintained that an appeal to the court might be had if no other relief promised.

No Dividend on Preferred.—The directors of the Washington Railway & Electric Company, Washington, D. C., have passed the semi-annual dividend of 2½ per cent on the preferred stock which is payable on March 1 next. The dividends on common stock were discontinued about a year ago. William F. Ham, president of the company, is quoted as saying: "It was the unanimous conclusion of the board that the present financial situation is such as to make it imperative that no action be taken at this time on the dividend on the preferred stock, one-half of which is payable on March 1 and the balance on June 1. This dividend is not now being earned because of the insufficient rates and until relief is granted it has seemed to the board necessary to conserve the cash resources of the company as being in the best interests of the stockholders and the public. As dividends on the preferred stock are cumulative, holders of said stock will suffer no ultimate loss if the company receives the relief to which it is justly entitled."

Asks That Bonds Be Extended.—The Maumee Valley Railways & Light Company, Toledo, Ohio, has proposed to holders of the $300,000 of first mortgage 5 per cent gold bonds of the Toledo & Maumee Valley Railway maturing on March 1, 1920, that they consent to an extension of the maturity date to March 1, 1921 and optionally till March 1, 1922, provided notice be given to the trustee prior to Feb. 1, 1921, on condition that the interest rate be increased from 5 per cent to 5½ per cent. A circular dated Feb. 2 says in substance: The franchises of the present company, which is the successor by consolidation of Toledo & Maumee Valley Railway, expired in June and September, 1919, and the company is therefore, free of the rate restrictions which those grants contained. Now that the franchises have expired, the management has increased the passenger rates, and is also making certain changes in operating conditions, such as abandoning the unprofitable freight department. Additional time must be had to determine the effect of operating under the new conditions that prevail.

Traffic and Transportation

Portland Case Closed

Oregon Commission Expected to Hand Down Fare Finding Within Thirty Days

The State Public Service Commission of Oregon has taken under advisement the case of the Portland Railway, Light & Power Company, in which an order is sought fixing a rate of fare for passengers sufficient to pay expenses, plus 7 per cent on the investment. Frederick G. Buchtel, chairman of the commission, states that the commission will endeavor to announce a decision within thirty days, if it finds it possible to do so.

Judging from questions propounded by the commissioners, it became evident that the commission intends to make an effort to arrive at some decision whereby adequate relief for the company may be provided without increasing the fare beyond possibly 8 cents straight, with all transfer privileges on this basis, and books with tickets at 7 cents each, or a 7-cent rate with an extra cent for transfers.

TO RECOMMEND RELIEF

It is also expected that the commission will make recommendation to the people, through the City Council, to the effect that if relief from bridge tolls, paving charges and free rides for policemen and firemen, be afforded the company, a decrease in fare would follow in proportion. Figures have not been presented to show just what difference remission of those charges now levied against the company would make in the rate of fares necessary to enable the company to operate its system at its present efficiency, but that it would be an important factor is indicated by the fact that the city's paving programme alone, as now outlined for 1920, will, if it is carried through, require an expenditure on the part of the company of approximately $600,000.

THINKS SEVEN-CENT FARE SUFFICIENT

Two outstanding features of the closing session of the hearing were the showing by J. P. Newell, consulting engineer for the city, by direction of Stanley Myers, assistant city attorney, that a 7-cent fare with 1 cent for transfers would "get the company by"; and the placing of a tentative value on tracks of the company of $4,400,000 by Engineer Clarke of the commission.

Franklin T. Griffith, president of the company, stated that Mr. Clarke's figures were absurdly under the real valuation of the lines. Chairman Buchtel explained that the figures were submitted, along with certain statistics on depreciation so as to clear up the situation, and should not be taken as correct in toto and that they would be further verified should any use be made of them.

COMPANY'S CONDITION IMPROVING

Engineer Newell had originally given figures indicating that no less than an 8-cent fare, with 7-cent book tickets, would afford relief. His original report, it was explained, was based upon last July. Traffic conditions of the last four months of 1919, however, showed a decided turn for the better, Mr. Newell states. With this as a criterion, Mr. Newell states it as his opinion that a 7-cent fare, with a 1-cent charge for transfers, or an alternative of an 8-cent fare with tickets sold seven for 50 cents would, during 1920, provide sufficient revenue to meet all expenses and give a reasonable return on the company's investment. This would provide 4-cent school tickets, as at present sold.

Mr. Griffith stated that should bridge tolls over the Willamette River be remitted, pavement charges annulled as to the future and free rides abolished, it would yield only about $110,000 per annum, as against a present loss of $85,000 per month.

Briefs for submission to the members of the commission will be prepared immediately by Stanley A. Myers, assistant city attorney in charge of the case for the city, and Griffith, Leiter & Allen, for the company. The commission will then render its decision.

Commission Proposed for Tacoma

In an effort to solve the transportation problem in Tacoma, Wash., a plan has been formulated for the creation of a commission of three to draw up an arrangement for operating the railway properties of the Tacoma Railway & Power Company, the plan to be submitted to the voters of the city at a referendum election.

The city has named U. E. Harmon, city attorney, to represent its interests. Scott Z. Henderson, ex-assistant attorney-general of Washington and now advisory counsel of the Tacoma Railway & Power Company, has been selected by the railway to represent it on the commission. The two representatives will elect a third member of the commission.

All meetings of the commission are to be open to the public. The proposal for the creation of a commission may forestall a 10-cent fare. The company's application for a hearing before the State Public Service Commission on the question of a 10-cent fare, which had been set for Feb. 25, will again be postponed. The company originally planned to install a 10-cent fare on Jan. 18. The City Council granted the company a 7-cent fare in July, 1918.

"Move Forward, Please"

New Orleans Company Holds Contest to Induce Riders to Move to Front End of Car

In the hope of solving the vital problem of increasing the capacity of its present rolling stock, the New Orleans Railway & Light Company recently offered a prize of $25 for the best suggestion from patrons tending to induce riders to "move forward" in the cars. The company's officials believed that the publicity resulting from such a contest would in itself help to accomplish this object by "selling" the idea of "moving up front." In addition, they hoped to obtain suggestions of real value.

The immediate necessity for such action lay in the fact that the company has little hope of adding to its equipment under present conditions. The purchase of additional cars being out of the question, the company sought to increase the efficiency of the equipment at its disposal. The officials therefore hit upon the idea of holding a contest to arouse public interest in the company's plight. In this respect the scheme proved a pronounced success, for the New Orleans newspapers devoted much space to the matter. The company received more than 1,000 suggestions, showing that the public took a serious interest in its problem.

The contest was begun by placing a card in the front end of each car which bore the heading, "Want $25?" in large type at the top, with the rest of the message in small type, which could not be read from any distance back in the car. The idea behind this use of type was that the heading would arouse curiosity and the passengers would then move up forward in order to read what it was all about.

General Manager Bleecker, Nelson H. Brown, superintendent of railways, and W. J. Baldwin, director of publicity, acted as judges in the contest and awarded the prize to Emil L. Morgenstren, whose suggestion was as follows:

> Start an advertising campaign with Mr. Glenny, commissioner of public utilities, and representative citizens at the head of it, using posters, newspaper publicity, show-window appeals, motion picture theaters, etc., on the following lines:
>
> To the people of New Orleans:
>
> We must act together and act quickly. No chance to provide more street cars, so we must economize space. Let everyone move to the front of the car as he pays his fare without being urged and it will do the work. Won't you help to facilitate the betterment of your city?
>
> Signed, E. J. Glenny, commissioner of public utilities.

Fully 75 per cent of the suggestions made to the company were to use the rear end of the car for ingress only, and the front for egress. It was pointed out to the contestants that this plan would not be feasible for the reason that a person in the rear of a crowded car could not easily make his way to the front for exit. Many others of the suggestions received had to be rejected because they would necessitate legislation and it was doubtful whether such legislation could be secured.

Connecticut Company Brief Filed

More Than 700 Miles of Railway Will Be Affected by Pending Rate Case

Figures proving that the new system of fare collection on the lines of the Connecticut Company has been progressively successful are given in the brief of the company filed on Feb. 24 with the Public Utilities Commission in the hearing which has developed following protests from cities and towns served by the company that the new system is inequitable and iniquitous.

A second and hardly less important feature is the claim set up by the company's attorney, Joseph F. Berry, that the utilities commission, in being given the right to set a maximum rate of fares on the lines of the company cannot grant cut-rate fares to commuters because of the fact that, if the maximum fare to the casual rider is reasonable, the commuter gets his ride at an unreasonably low rate. So, if the commuter's rate is reasonable, the casual rate is unreasonably high. The Manchester commuters, stormy petrels of the hearing, have had cut rates for the last twenty years not as a right, argues the brief, but as a privilege. Noting the statute under which the utilities commission derives its right to fix rates, the brief sets forth:

> ......the commission may....determine and prescribe an adequate service to be thereafter furnished or just and reasonable maximum rates and charges to be thereafter made by such company.
>
> If, therefore, it is determined that the maximum rates under the system in vogue are not unreasonable then any reduction in that rate would be an unreasonably low rate and the commission as we view the question cannot fix a rate too high under the law in order to grant a commutation or cut rate.
>
> Assuming the power exists to grant a commutation or reduced rate to a few individuals, do the petitioners who make this request, viz. the Manchester Commuters, have any moral right as distinguished from a legal right in the matter? During the last twenty years they have received a benefit, not shared in by the people of the State generally, of a reduced rate. Does the fact that they have been favored in this manner give them any equities which the company or the commission is bound to consider? It is true that Manchester claims that all persons similarly circumstanced should have a commuters' rate, but if so where shall the line be drawn? As remarked so many times during the hearing, shall the man who rides each day have a reduced rate irrespective of distance travelled or shall we place a limit or barrier up to which point no reduced rate shall be granted? The principle of granting commuters' rates has been stated by many witnesses, that he who buys at wholesale should have a lower rate than the retail buyer. If it be true that the commuter can be considered as a wholesaler there is no more reason for granting lower rates to the ten-mile rider than to the three-mile rider, and once the principle is established every daily rider will insist upon the reduced rate for transportation. What does this mean? Simply this: that 75 per cent or more of the riding public will be riding on reduced tickets; this would necessarily force up the price to the regular rider unless the traffic was largely increased by the addition of new riders to make up this difference. This would mean the necessity of increased facilities which would call for large capital expenditures and again the rate would go up to the regular rider in order to pay for these improvements.

The brief is much shorter than that put in by the company in the 6-cent hearing two years ago.

The company pays its respects to the 1919 session of the legislature for its failure to help it, in the following way:

> The directors of this company have attempted by every means in their power to maintain an uphill fight against receivership. The Legislature of the State at the last session was given information of every nature concerning the plight of the railways, but a more unresponsive body as a body never existed. It was a case of "what was anybody's business was nobody's business" and practical assistance of any sort was denied.

COMPANY'S PATRONAGE ANALYZED

The study the company made before putting the zone-fare system in operation convinced it that "50 per cent of all riders on the (company's) system use only two miles for their daily ride—included within which is 68 per cent of all the riders in the four large cities, viz, New Haven, Hartford, Bridgeport and Waterbury. Therefore, 50 per cent of all riders were paying at a rate of 3 cents a mile or more while the other 50 per cent were riding two to twelve miles for 6 cents, or a rate as low as 0.5-cent a mile.

> It was found further that the initial fare of 6 cents could not be reduced to 5 cents in the city areas owing to the fact that 55,000,000 riders in the large cities would thereby be riding for 1 cent less which would be a practical loss of $550,000 and would therefore require 11,000,000 more passengers at 5 cents in order to produce this sum and come out even. To carry 11,000,000 more passengers means an increase in operating expenses as well as a corresponding increase in capital investment which was out of the question, as it was well understood that no additional capital was available for that purpose. A base fare of 6 cents was therefore determined upon as being the lowest which it was justifiable to adopt.

How to fix upon the distance a passenger should be carried in the various communities for the basic 6-cent fare decided upon was the next subject for study. On this point the brief says:

> The traffic and population characteristics were studied in an effort to determine this question in a fair manner. Therefore the cities of more than 100,000 population were given a slightly longer ride than the small cities, towns and villages. The first zone was thereby fixed in the four large cities at 1.5 miles from the center and in the smaller cities at 1.2 miles. The second zone out of the cities in all instances was fixed one mile further distant and all other zones at 0.8 mile each.
>
> While this rate increased for comparatively few riders 100 per cent over the old rate, this is due to the fact that the old rate was unreasonably low rather than the new rate unreasonably high. One need consider only the increased cost of commodities in this country from 1914 to date to realize that many of them have increased more than 100 per cent......It is then not at all unreasonable that fares which were inordinately low during the past years would necessarily be raised to a more nearly reasonable basis so as to produce a fair share of the required revenue.

Taking up what the company conceives to be the objections raised to the system, the brief enumerates them as follows:

> 1. Only 50 per cent of the passengers are affected and therefore the increased revenue must come from only one-half the passengers.
> 2. It will tend to congestion of population in cities.
> 3. It will reduce real estate values in the areas affected by the increase.
> 4. Schedules are delayed due to increased time for operation under it.
> 5. It will tend to increase jitney competition.
> 6. Lines are losing money.

The company denies that the country rider has been made the goat under the zone system. The city rider has long borne the burden of the country rider, it maintains, and to further increase that burden would be aggravating in the extreme. A flat rate of 2 cents a mile all over the system, it maintains, would give the country riders substantially the rate they pay today. An interesting point along line of taking the system as a whole in determining rates is the following statement in the brief:

> The people of this State are to be congratulated on the fact that the New York, New Haven & Hartford Railroad took over the electric railway lines of the State generally and has operated them as a unit. Without the finances of the railroad to assist in keeping them up, many of the constituent companies would have undoubtedly suffered the same fate as others in the State.
>
> The second objection, that of the tendency toward congestion of population, is answered by the company with the statement of Secretary of War Baker, who maintains that the first result of higher fares on the outskirts of a city is to place a premium on tenements in the center. This pulls down the demand for the rural tenements and makes the law of supply and demand operate so that the rents in the rural district came down, so that the final effect is to disperse the population.
>
> The objection that values of real estate in surburban areas will shrink is disposed of along the same lines as is the second objection, namely, that supply and demand will adjust prices to something near their old level. The company claims that, in the past, extensions of lines have subsidized the realty operators.

The company must secure $10,883,765 during the fiscal year ending June 30, 1920, the brief recites, in addition to $1,152,926 in back taxes, to pay its ordinary running expenses. Assuming the same operating revenue for this year as for the year ended Oct. 31, 1919, the company would fall short $3,341,007 of earning a 6 per cent return on the value of the property. If the 6 per cent return were figured on the reproduction cost of the property based on 1917 prices, it would fall short by $5,307,107.

New Subway Door-Operating Device

Application has been made to Transit Construction Commissioner John H. Delaney by the Interborough Rapid Transit Company, New York, N. Y., for approval of the installation of a device by which it will be possible to have one or two trainmen open and close all the doors of subway trains.

What is designated as a "multiple unit car door control" has been invented by President Hedley, of the Interborough Company, and it is his intention if the Transit Construction Commissioner approves, to place the mechanism of this method of control on 982 Interborough Rapid Transit subway cars. Two-thirds of these cars will be equipped with motors and the others to be equipped are trail cars. There are about 1,950 steel cars now in service on Interborough subway lines.

It is estimated by the Interborough officials that the cost of installing the new device on each car will be approximately $1,140, and if approval is secured from the Transit Construction

Commissioner, the company intends spending $1,122,000 in installing the new method of control on about one-half of its steel cars.

According to the application made by President Hedley, the new device will provide a maximum of safety in loading and unloading passengers, and a substantial reduction in the time of stops at stations. The effect of this, he points out, will be to increase subway capacity and comfort, without in any way increasing hazard.

The so-called "multiple unit car door control" consists of a mechanical operating safeguard that automatically controls the movement of the door, and a pneumatic engine that controls the door. It consists of two steel tension springs attached to the vertical or front edge of the door. These springs provide a mechanical cushioning effect, and also automatically provide an electrical controlling circuit to the pneumatic engines. The trainman who will operate the device will stand on foot-boards projecting about 1 ft. out from the steel vestibule that encloses the car platform. These foot-boards are elevated about 1 ft. above the car floor.

In his communication asking the commission to approve the installation of the device Mr. Hedley said:

> Continuous operation during the past four months without a single failure of any kind, has demonstrated that the proposed multiple unit car control is safer in every respect than the present method of operation.

Interurban Free from Crossing Accidents

The Missouri Short Line accomplished a record of "no crossing accidents" during the summer months of 1919. The company operates sixty-three miles between St. Joseph and Kansas City, and thirty miles between Excelsior Springs and Kansas City. It was decided after a special study of the corners where collisions had occurred that a concerted effort would be made to obviate accidents. Bell signals had been installed where cuts, in highways or in the interurban right-of-way, intercepted the view of approaching trains and there were no accidents at such places. The crossings that needed attention were therefore those where the pedestrian or the person in a vehicle approaching the track had presumably an interrupted view.

The company took pains in the spring to cut all weeds on its right-of-way at such crossings. Moreover, it secured permission of the township and county officials, for its employees to cut the weeds on the highways for thirty or forty feet back from the crossings. A third step was even more of an innovation: the company bought from several farmers, triangular patches of growing corn, where fields touched closely the highways and railroad property at crossings. The corn from such patches was cut down, giving to the public at a point twenty feet from the track, a view up the track for 200 feet or more. The cost of these small areas of growing corn ranged from $5 to $10. The total expenditure on the clearing of corners at crossings was small, compared to the value of the result—no crossing accidents.

Exemption from this class of accidents is not due entirely to the cutting of weeds. The company conducted a well-planned and effectively executed safety campaign the previous year, paying particular attention to the education of the younger people of the committees along the route, in carefulness. This campaign had borne fruit in the reduction of damage to property on the right-of-way and in the elimination of crossing accidents.

Transportation News Notes

Would Reduce Ticket Rate. — The Monongahela Valley Traction Company, Fairmont, W. Va., has asked the State Public Service Commission for authority to sell fifteen tickets for $1. The cash fare is 6 cents.

Jitneys Must Not Parallel Railway.—The City Council of Lowell, Mass., at a meeting held on Feb. 11, passed an ordinance to take effect on March 1, forbidding the operation of jitney buses along lines of street railways within the city limits.

Wants More in Columbus. — The Columbus (Ga.) Power Company has applied to the State Railroad Commission for an increase in fare. The company also asks a higher power rate. The commission has not yet set a date for a hearing on the petition.

Many Hurt in Crossing Accident.—Thirty persons were injured, many of them seriously, on Feb. 11, when a car of the Louisville (Ky.) Railway was struck by an engine of the Louisville & Nashville Railroad at a grade crossing in the city of Louisville. This is the second accident at the same crossing within sixty days.

"Double-Berth" Stops for Kansas City.—The Kansas City (Mo.) Railways on Feb. 22, placed in effect regulations for the movement of cars on Tenth Street recommended by John A. Beeler, traffic expert. The loading and unloading stops have been rearranged. "Double-berthing" of cars is provided for under the new arrangement.

Ask Higher Rates in Savannah.—Receivers for the Savannah (Ga.) Electric Company have applied to the State Railroad Commission for an increase in the fare charged by the company. An increase in lighting rates is also asked. The petition names no definite increase, leaving the fixing of a rate to the discretion of the commission.

Ten Cents on "Narrow Gauge" Line.—The Massachusetts Department of Public Utilities has approved the new rate proposed for the Boston, Revere Beach & Lynn Railroad, Winthrop, known as the "Narrow Gauge" line, under which the company will charge 10-cent cash fares. The present fare is 8 cents. The company will sell ten tickets for 85 cents.

Jitneys Barred in Muskogee.—Acting under authority of an ordinance recently passed by the City Council of Muskogee, Okla., the municipal authorities have barred jitneys from using the city streets. Following the arrest of several jitney drivers the operators sent their cars back to their garages. The jitney men plan to contest the validity of the ordinance.

Favors One-Man Cars for Oswego.—Mayor John Fitzgibbons of Oswego, N. Y., has vetoed a resolution of the Oswego Common Council calling for the operation of two-man cars on the city lines of the Empire State Railroad. The Mayor is behind the fight of the company, to use one-man cars on its Oswego lines. Prior to the passage of the proposed ordinance the municipality had conceded that the decision as to the type of car to be used rested with the State Public Service Commission.

Railway Committee for Kansas City.—At the request of Mayor Cowgill of Kansas City, Mo., the two houses of the City Council have appointed a joint transportation committee to consider questions and proposed ordinances regarding electric railway service. Questions relating to car routing, street stops, turnbacks and increased service will be considered. The Mayor has suggested that the committee confer with traffic experts employed by the Kansas City Railways or by the city.

Drops Court Action Against Buses.—Supreme Court Justice Cropsey on Feb. 25 formally marked off the calendar the matter of the application of the Brooklyn (N. Y.) City Railroad for an injunction to restrain the city of New York from operating bus lines in Brooklyn in competition with the company's cars. There was no formal motion, Jackson A. Dykman, counsel for the railroad, simply appearing before the Judge and stating: "My client has requested me to have the case marked off the calendar."

Cease Operation in Fall River.—The Union Street Railway, New Bedford, Mass., on Feb. 10 discontinued the operation of its cars within the city limits of Fall River, Mass. The cars now run only as far as the Fall River city line, where passengers change to the lines of the Eastern Massachusetts Street Railway. The company took this action because of the refusal of the Eastern Massachusetts management to permit it to operate its cars over the latter's tracks unless 10-cent fares were collected, as the Eastern Massachusetts Street Railway's share, from all persons riding in Fall River.

Seven Cents in Penns Grove. — The New Jersey Public Utilities Commission has issued an order allowing the Salem & Penns Grove Traction Company, Penns Grove, to increase its fare in each of the fare zones from 5 to

7 cents, the new rate to become effective three days after the company has posted notices of the order. During the war the company depended for its patronage largely upon employees of the three powder plants, of the Du Pont De Nemours Company, a total of 18,000 men. The working force has been cut down to 6,000 men. The company has also suffered as the result of unrestricted jitney competition.

402 Buses in Newark.—In December, 1919, there were 402 buses in operation in Newark, N. J. For the year just ended the buses carried 36,895,010 passengers. Their gross revenues were $1,844,750. In 1918 the buses carried 17,120,652 passengers. Their gross receipts then were $856,032. In 1917 the buses carried 8,195,591 passengers. Their gross receipts then were $409,774. In the very severe weather of January this year the buses carried 3,263,484 passengers and their gross earnings were $163,174. The city of Newark has received from the buses the following amounts in taxes: Seven months of 1916, $5,555; twelve months of 1917, $17,333; twelve months of 1918, $36,151 and twelve months of 1919, $74,636.

Snow Costs High in Jersey. — The blizzard which swept over the North Atlantic States on Feb. 4 and 5 cost the Public Service Railway of New Jersey close to $300,000 in addition to normal operating expenses. Thomas N. McCarter, president of the company, recently announced that the storm was the most costly in the road's history. The expenses of clearing snow from the tracks and streets was at least $200,000, while the cost of repairs to equipment will be between $75,000 and $100,000. On Thursday, Feb. 5, while the storm was still raging, the company carried 810,000 passengers. On the following day, in spite of the blocking of the tracks by snow and ice, 897,000 persons were transported, and on Feb. 7 the number of riders was in the neighborhood of 1,200,000.

May Build Bridge Across Hudson.—As a part of the extensive program for the improvement of terminal facilities at New York City, steps are being taken to raise more than $100,000,000 to build a bridge across the Hudson River connecting Manhattan Island with New Jersey. Gustav Lindenthal, who designed the New York Connecting Railway and the Queensboro bridges, is working out plans for the project which contemplate a bridge from Fifty-ninth Street to Union Hill, N. J. The bridge would be a double-deck affair, the upper level being used for vehicular traffic, the lower for railroad freight. Under Mr. Lindenthal's plan the surface tracks on Eleventh Avenue would be eliminated, an elevated freight line from the Battery to Dykman Street taking their place.

Lynn Revokes All Jitney Permits.—The City Council of Lynn, Mass., voted on Feb. 19 to revoke all jitney licenses to take effect on April 26, 1920. As the result of this action, the Eastern Massachusetts Street Railway has announced a new schedule of fares which will provide sixteen tickets for $1. Furthermore it is promised by the trustees of the road that if the reduced fare succeeds in maintaining sound economic operation of the lines, a further reduction, probably a 5-cent fare inside the city limits, may be expected. The City Council adopted the "home rule plan" and voted to establish a committee to be appointed by the Mayor, to co-operate with the trustees of the Eastern Massachusetts Street Railway in connection with the working out of numerous problems affecting community service.

Interurban Would Raise Express Rates.—Petitions were filed with the Public Service Commission of Indiana on February 11 by the Terre Haute, Indianapolis & Eastern Traction Company, Union Traction Company of Indiana and Indianapolis & Cincinnati Traction Company, asking that the express freight rates established by an order of the commission in May, 1919, be increased on certain classes of freight, and that the minimum charge of 25 cents be increased to 40 cents on local shipments and to 50 cents on inter-line shipments. Present uniform express tariffs are based on 150 per cent of the first class rate for local traffic with an increase of 25 per cent on traffic covering two or more lines. The companies desire to apply the 150 per cent standard to first and lower classes of freight as at present, but desire to apply the express charge to shipments bearing rates listed higher than first class. Bulky articles, such as furniture and other household goods, are listed higher than first class and would be affected by the increase in express rates.

Smoking Orders in Conflict.—Several conductors of the United Railways, St. Louis, Mo., have been suspended recently because of the controversy between the Public Service Commission of Missouri and the Board of Aldermen of St. Louis in regard to the anti-smoking decision of the Service Commission. The company has decided to abide by the decision of the commission, which prohibits smoking on the cars at all times, and has instructed its conductors to enforce the rule. The conductor will be expected to ask the passenger to stop smoking or leave the car and to call a policeman as a last resort. The Board of Aldermen has passed a bill permitting smoking in the cars on the three rear seats when the weather permits the windows to be open, as has been the rule in past years. H. M. Nelson, president of the local division of the Amalgamated Association, said that conductors had been instructed by the union to request passengers to stop smoking, but to go no further. He said the conductors were embarrassed by the fact that the Board of Aldermen permits smoking while the rules of the company and the decision of the Public Service Commission prohibit it. The union will take up the suspensions with Rolla Wells, the receiver of the United Railways, in the hope of solving the difficulty

New Publications

The Engineering Foundation

A progress report of the United Engineering Societies. Engineering Societies Building, 29 West Thirty-ninth Street, New York.

This publication gives the story of the Engineering Foundation and its founder, Ambrose Swasey. A section describing the work accomplished in co-operation with the National Research Council is of particular interest.

Hendricks' Commercial Publisher

Hendricks' Commercial Register of the United States for Buyers and Sellers Twenty-eighth Annual Edition 1919-1920. 1,813 pages, S. E. Hendricks Company, Inc., New York.

The edition of "Hendricks' Register" for 1920 has just been published, after being delayed for two months by the strike of the printers in New York. The new edition contains several improvements, the most noticeable being a new method of exterior indexing by coloring the front edge red, white and blue to indicate the different main sections of the book. Over 18,000 different products are listed and there are more than 1,200 new headings.

Inductive Interference Between Electric Power and Communication Circuits

1,160 pages, including numerous charts and other diagrams, etc. A limited number of copies have been printed for sale at cost by the Railroad Commission of the State of California.

The Railroad Commission of the State of California has put into convenient reference form in this volume the results of extensive field and laboratory tests and investigations carried on for more than five years by a staff of electrical engineers from all parts of the United States. The costs of the test are stated to have been more than $100,000. Analyses were made of causes of inductive interference, its magnitude and quantitative and qualitative effects under varying conditions, methods of prevention and mitigation of interference and special characteristics of the phenomena. The volume includes thirty of the most important technical reports of the joint committee on inductive interference, selected from the seventy-one which were issued from time to time during the investigation. It also includes the preliminary and final reports of the committee to the commission, and General Order No. 52 of the commission prescribing rules and principles governing the construction and operation of power and communication lines for preventing and mitigating inductive interference. The thanks of the engineering fraternity are due to the commission for putting the results of the famous series of investigations into this comprehensive form. The compilation is of the highest scientific and practical reference value.

Personal Mention

New Post for Mr. Knox

Becomes President of Columbia Railway, Gas & Electric Company—An Executive of Wide Experience

In choosing F. H. Knox of Spartanburg to direct the public utilities of Columbia, S. C., the boards of directors of the Columbia Railway, Gas & Electric Company and the Parr Shoals Power Company have selected one of the most experienced and best-known electric railway operators of the Southern States. Mr. Knox has been elected president of the two companies to succeed E. W. Robertson, who has resigned to devote his attention to the development of plans for the betterment of the working conditions of the companies' employees. His election and Mr. Robertson's retirement were briefly noted in the ELECTRIC RAILWAY JOURNAL for Feb. 14.

For the past eleven years Mr. Knox has had charge of the electric railway, gas and power properties at Spartanburg, serving until his resignation to become connected with the Columbia companies, as vice-president and general manager of the South Carolina Light, Power & Railways Company. In this capacity he has demonstrated his ability to meet the problems of a public utility in a highly efficient manner. Such differences as he has had with his employees have never involved issues between Mr. Knox and his men.

ACTIVE IN COMMUNITY LIFE

He has entered actively into the life of the community, and, both as a utility manager and as a citizen has made for himself an enviable reputation. Mr. Knox's departure from Spartanburg was the occasion of editorials in several of the Spartanburg newspapers, which spoke in high terms of his service to the community. The Spartanburg *Herald* declared that "no head of public utilities in the whole country has established himself more in the confidence of the people his company serves than has Mr. Knox."

Mr. Knox was graduated from the University of Pittsburgh in 1888. After spending a year in the shops and laboratory of the Westinghouse Electric & Manufacturing Company, he served for a time as constructing engineer on electric railways in Pennsylvania. Joining J. G. White & Company, Inc., in 1892, he had charge of the construction of lines in New York and Baltimore until 1894, when he was appointed to an engineering position in connection with the building of the Croton dam on the Croton River for the New York City water-supply system.

Going South in 1897, he had charge of the electrification of the Charleston (S. C.) street railway system. From 1899 to 1903 he served as chief engineer in the construction of the electric railway lines and the gas and electric plants at Spartanburg, acting also as general manager of the company. In 1903 he returned to Pittsburgh, where for two years he acted in a consulting capacity in connection with hydro-electric power developments. He later went to Idaho to take charge of the building of the Swan Falls power plant on the Snake River and of the Boise Valley Traction Company. He returned to Spartanburg in 1909 to take charge of the South Carolina Light, Power & Railways Company.

E. G. Connette Honored

Edward G. Connette, who resigned recently as president of the International Railway, Buffalo, N. Y., has been presented with a testimonial book by his former associates and assistants. The volume is hand-illumined, beautifully tooled and bound in limp leather. One hundred and sixty of Mr. Connette's former associates attached their signatures to the following resolution, hand-tooled on the first page by Roycroft artists:

> Mr. Edward G. Connette, who has for more than six years been the president of the International Railway, has now severed his relations with that company.
>
> These have been years of great stress in street railway undertakings, and the difficulties and problems which he has been called upon to meet and solve have benn unusually severe.
>
> It was the real good fortune of the company during the period to have had in Mr. Connette an executive of marked ability in every department of street railway endeavor and effect, of great force and pertinacity, of untiring energy, and of strong integrity of purpose.
>
> In recognition of his worth, we, his associates and assistants, express in this formal manner our appreciation of his high qualities as an executive, of his uniform courtesy, his unfailing consideration for others, and the human side of his character, which have made service with him a pleasure, and which have endeared him to us all. With our best wishes for his continued usefulness, and for his future prosperity and happiness, we have subscribed this testimonial, this 14th day of January, 1920.

Williston Fish Returns to Chicago

Williston Fish, vice-president of the West Penn Railways, Pittsburgh, Pa., was appointed general manager of the Chicago Surface Lines at the meeting of the Board of Operation on Feb. 24. Mr. Fish was general manager of the Chicago Railways until the time of operating consolidation with the City Railway in 1914, when he became connected with the West Penn system. Mr. Fish thus returns to Chicago thoroughly familiar with the greater part of the Chicago surface lines.

More extended reference will be made next week to the appointment of Mr. Fish and to other changes in the operating organization of the company at Chicago.

Walter N. Walmsley, general manager of the Alabama Power Company, Anniston, Ala., has been elected a vice-president of the company.

F. W. Brownell has been appointed general accountant of the Puget Sound Traction, Light & Power Company, Seattle, Wash.

F. P. Dexter, general accountant of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has been transferred to the Boston office of Stone & Webster, operators of the property.

Thomas W. Martin, vice-president of the Alabama Power Company, Anniston, Ala., has been elected president of the company. Mr. Martin succeeds James Mitchell, who has resigned to become chairman of the board of directors.

N. W. Berkeley, superintendent of the Danville Traction & Power Company, Danville, Va., has resigned. Mr. Berkeley has been connected with the company for more than thirty years. He has been succeeded by Frank G. Higgins.

H. L. H. Smith, an electrical engineer connected with the New England Power Company, Mass., and formerly on the staff of the Brooklyn (N. Y.) Rapid Transit Company, is making a survey of one of the electric lighting systems in the West Indies.

Frank G. Higgins, assistant secretary and treasurer of the Danville Traction & Power Company, Danville, Va., has been promoted to the position of superintendent of the company. Mr. Higgins succeeds N. W. Berkeley, resigned. He joined the company a number of years ago as a clerk, later being appointed cashier. He subsequently became assistant secretary and treasurer. Mr. Higgins is twenty-nine years old.

Walter R. Moynihan, now in the employ of the Boston & Albany Railroad at Boston, Mass., will succeed James W. Samuel as assistant treasurer of the United Railways, St. Louis, Mo. Mr. Moynihan was formerly a lieutenant in the corps of engineers and served under Colonel A. T. Perkins, general manager of the United Railways, when the latter was in command of the Division of Combat Railways of the A.E.F. Mr. Moynihan is twenty-nine years old. He has been in charge of land and tax matters in the legal department of the Boston & Albany Railroad.

James Mitchell, president of the Alabama Power Company, Anniston, Ala., has resigned. Mr. Mitchell has been elected chairman of the board of directors of the company, which operates electric railway lines in Anniston and Huntsville, Ala. He has been president of the company, with the exception of a few months, since its organization in 1912. On account of ill health at the present time he requested that he be permitted to resign. He hopes to be able to resume his duties within the near future. Mr. Mitchell is also president of the Alabama Traction, Light & Power Company, Ltd., which controls the Alabama Power Company.

T. J. Minary Retires

After Forty-Eight Years of Active Service with Louisville Railway He Becomes Chairman of the Board

Thomas J. Minary, sixty-nine years of age, "The Grand Old Man of the Louisville Railway," retired on Feb. 19 as president of the company, accepting the position of chairman of the board of directors, following forty-eight years of active service with the company.

MR. MINARY'S MODEST STATEMENT

The correspondent of the ELECTRIC RAILWAY JOURNAL being unable to catch Mr. Minary at his office on Feb. 20, took the liberty of calling on him at his home that night, requesting the loan of a photograph, and asking for an interview on the next morning. Mr. Minary in his usual courteous way made an appointment for 10 o'clock on Saturday morning, and after some persuasion agreed to furnish the photograph.

On Saturday morning he produced the accompanying portrait, made some years ago, and a short written statement of his connection with the company. This statement follows:

> Entered the service, 1872 (nearly forty-eight years ago) as secretary and treasurer of the Central Passenger Railroad, one of the two competing companies in Louisville at that time. Became general manager of the Central Passenger Railroad in 1876.
>
> The Louisville Railway was incorporated, consolidating the City Railway and the Central Passenger Railroad and I was made general manager in 1890. This consolidation included all the lines in the city.
>
> In 1898 elected president and have filled the position of president and general manager since that time (twenty-two years). Now sixty-nine years of age and have decided to lay aside some of the duties and responsibilities, so have just been elected chairman of the board of directors and it is the intention shortly to select a president and general manager.

These are the bare facts concerning Mr. Minary's activities with the company. It is interesting to note that just prior to his going with the Central Passenger Railroad in 1872, he was employed by a hardware house on Main Street, and his earliest work was in connection with furnishing change to the men who handled the mule cars on that line. Basil Doerhoeffer, later one of Louisville's wealthiest men, drove a car on Main Street at that time. The late Tom Funk, who for several years was superintendent of the company, also drove a car, and Charlie White, now prominent business man and Republican leader, could pick a horse fly from a mule's ear nine times out of ten with a blacksnake whip.

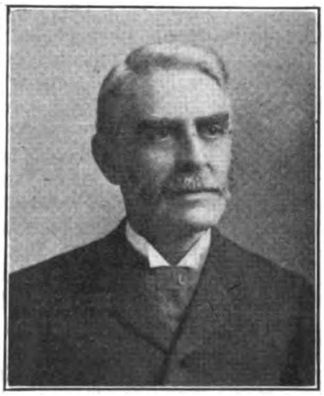
FIGHT FOR CONTROL

When Mr. Minary went with the company there were two competing lines, and a hot fight for supremacy reacted through many years. In this fight the two companies built parallel or competing lines, running east and west and north and south, with the result that there have been always too many competing lines.

At the time Mr. Minary entered the railway business the companies had about 40 miles of track. Today there are 168 miles in the city, and 100 miles of interurban, making 268 miles in all. Connected with the company in the early days was H. H. Littell, in 1882-1883 president of the American Street Railway Association. Mr. Littell is still a stockholder in the Louisville company, but retired recently as a director. The Du Pont family was also largely interested in the early operations. The late Tom Johnson was another man who later loomed large in railway affairs that got his start in Louisville. Judge Humphrey, who has been counsel and director for the company for more than forty years, also retired during the week.

MR. MINARY'S STEWARDSHIP

Mr. Minary has directed and watched the growth of two small competitors into one big company. The company paid dividends regularly until war-time conditions made their suspension imperative. In spite of the handicap imposed during the past four years it is still in excellent shape physically and financially. The company is operating on the 5-cent fare basis, but has been seeking for months to secure an increase, holding that an advance of 20 per cent in gross is essential in order to pay 5 per cent dividends. It wants a 7-cent fare and 1 cent for a transfer, but is handicapped by franchise agreements. Mayor Smith recently said that he would consider the increase, if the company was re-organized along slightly different lines, with a trial period for four months to be followed by close investigation of earnings.



T. J. MINARY

This resulted in several of the old directors resigning, some excellent new blood being taken in, and in the change whereby Mr. Minary became chairman of the board. A new president will be named as soon as a special committee, which is operating the road, decides upon the best man available for the position.

Under adverse conditions Mr. Minary has been doing extremely well in managing the company. He is a small man physically, but is a keen executive, and a natural-born fighter. He comes from the old school of Southern gentlemen, and the old school of transit operators. Although he is sixty-nine years of age, Mr. Minary is still a young man in many ways. When one enters his office and sees him in his "Prince Albert" it is almost impossible to keep from thinking of "Cappy Ricks," the predominating character in the Peter B. Kyne stories in *The Saturday Evening Post*. Mr. Minary is a lovable character, and it is only reasonable to expect that for many years to come he will continue to be a factor in helping to direct the policy of the company.

Very few of the other early heads are left with the company, although there are several men on the cars whose collars are covered with five-year stars and year bars who drove mule cars for one or the other of the early competing companies.

Forty-eight years with one corporation is a significant record of continuous service. No such record can be achieved without conspicuous merit. Merit in one particular only does not make it possible. There must be a combination of rare talents to achieve so long a service. In the case of Thomas A. Minary there are more than enough conspicuous talents to have made the man a success in anything he might have undertaken.

A pioneer in street and electric railway work, Mr. Minary grasped the new and essential things in a rapidly changing industry and continued to be a force when less adaptable men succumbed. His successors in the affairs of the company are fortunate in being able to build on the sound structure reared for them by the former president, for the Louisville Railway is one of the few companies whose fares have not been raised and weathered the stress of war-time conditions without either a receivership or very serious impairment of the company's financial resources.

The history of "Tom" Minary is largely the history of the Louisville Railway. The history of the Louisville Railway is certainly the history of "Tom" Minary. Frank Norris said there were just three cities in the United States that are story cities—New York, New Orleans and San Francisco. And then he promptly disproved this by writing "The Pit," and Theodore Drieser wrote "The Titan." When the business epic of Louisville comes to be written we shall be disappointed unless we find there along with Marse Henry Watterson and others, the counterpart of Mr. Minary, a Southern gentleman of rare attainments with a record of unusual achievements, the only outward and visible sign of which to the multitude has been the work done by him for the railway.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

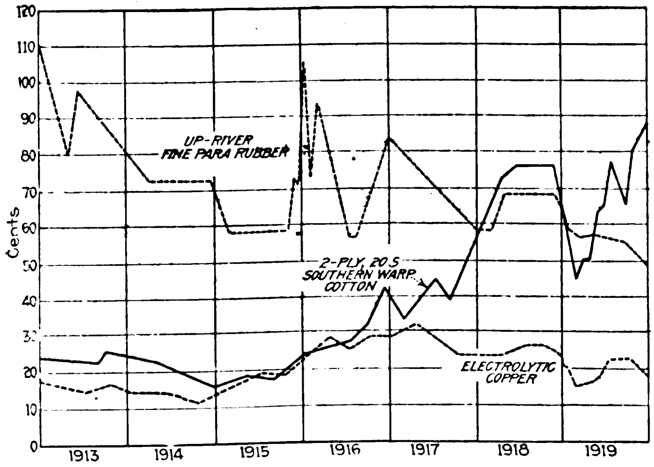
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Difficult to Gage Wire Prices

Fixed Bases Have Little Meaning in Code Wire Quotations

The widely varying prices of the different materials entering into the make-up of insulated copper wire are making it more and more difficult to judge the price of any size of code wire from a given base price for that kind of wire. As a matter of fact, insulated wire bases mean little in themselves today. Rubber-covered wire is now quoted on bases varying from 23 to 30 cents, the average being just under 28 cents. This means little to a wire customer who may be interested in sizes other than No. 14, as manufacturers say No. 14 is the size on which rubber-covered wire is based. Discounts, changing as labor and materials costs change, allow for the difference in price of the various sizes of code wire.

At one time the cost of code wire was largely dependent upon the cost of bare copper wire. Labor, rubber, cotton, compounds, etc., were changing little in value. Consequently a single base could be used advantageously. Since the end of 1915 rubber has been decreasing in value, cotton warp has been increasing and copper has been fluctuating, but within rather small limits. During 1919 up-river fine Para rubber went from a high of 64 cents a pound to a low of 48 cents and is still decreasing, present quotation being 45 cents. In the same period two-ply, 20S Southern warp cotton, starting at 66 cents, went to a low value of 44 cents, then rose to 87 cents, and is still rising. The present quotation is 95 to 98 cents a pound. Electrolytic copper in 1919 varied between the limits of 14.50 cents and 23.50 cents to 24 cents a pound and is now approximately 19 cents. Bare copper wire closely follows fluctuations in the raw copper costs. Consequently in the last year the cost of cotton has been playing a very important part, as well as the steadily increasing cost of labor. Cotton plays a larger part in small sizes of code wire than in large sizes, while copper is of more importance in the larger sizes. Labor plays a more important part in the smaller sizes.



TREND OF PRICES ON UP-RIVER FINE PARA RUBBER, TWO-PLY, 20S, SOUTHERN WARP COTTON AND ELECTROLYTIC COPPER

At least two manufacturers of code wire are basing their quotations on net prices derived from the cost of each size of wire. This method appears to point out a way of arriving more closely at wire prices when the costs of materials other than copper are changing so widely in an article in the various sizes of which these materials enter to such disproportionate amounts.

The attached curves have been made up from curves received from the *Textile World Journal* and from the *India Rubber World*, and give the trend of prices of up-river fine Para rubber and of two-ply, 20S Southern warp cotton, in connection with electrolytic copper. The 20S size of two-ply warp is widely used, along with sizes up to 30S, in rubber-covered wire insulations and has been taken because it is representative. The different sizes of cotton, however, vary in price as demand and supply change.

Many Railways In Market For Large Cars

Inquiries Out on More than 600 Heavy Cars to Cost $11,000,000—Orders Already Placed for 170 Heavy Cars This Year

The rolling stock market is active. Inquiries continue to pile up both on safety and on the heavier cars with the result that car builders are preparing for a heavy season. Although the percentage of safety cars placed to date this year is probably three to four times as much as for the heavier cars, the market for the latter has become extremely active and very important considering that the cost of a heavy car is two and a half to six times as great as that of a safety car, depending on the type ordered.

Considerable interest is being shown this week in the report that the New York Central Railroad is in the market for thirty cars of the multiple-unit control type for its electric division. With the exception of a few modifications, these cars will be similar to the last allotment which were purchased from the Standard Steel Car Company. The cars complete with trucks, motors, control and all accessories are estimated to cost approximately $40,000 each or a total of $1,200,000. Another inquiry of importance is that sent out by the Brooklyn Rapid Transit Company for 200 subway cars. At present prices, it is estimated that these cars will cost from $22,000 to $25,000 or from $2,200,000 to $2,500,000 for 100 of these cars which the company desires to purchase right away. Toronto Civic Railway is in the market for thirteen double-truck cars for which the Board of Control has apportioned $200,000. San Francisco-Oakland Terminal Railways are now completing eight double-truck cars in their shops and will build nine new motor cars and five trailers as soon as shop space is available. They will spend approximately $140,000.

Hudson & Manhattan Railroad is expected to place its order for twenty-six cars shortly. Boston (Mass.) Elevated Railway has authorized the purchase of forty elevated cars and thirty standard center-entrance double-truck surface cars which will no doubt be placed in the near future.

In Cleveland the purchase of fifty motor cars and fifty trailers has been recommended as part of a program of improvements calling for $2,500,000. The cars would cost approximately a little less than one-half of this amount. United Railways of St. Louis are expected to purchase 100 Peter Witt cars. One car of this type has been built in the company's shops and the results of its trial may decide whether or not cars of this type will be ordered.

Philadelphia Rapid Transit Company has been planning for some time to purchase fifty elevated cars and something definite may be expected in the next few months. Pittsburgh, Pa., Railways have also been mentioned as planning to buy cars and further announcement in regard to this will be made later.

Although less than 200 heavy cars have been placed so far this year, including the seventy cars for the Long Island Railroad electric division, 100 trailers for the United Railways & Electric Company, Baltimore and a number of small orders, there are a number of good orders about to be placed and more pending which will greatly increase activity in the railway field.

Foreign Trade Budget Cut 50 Per Cent

Commercial Attaches May Be Released —Commerce Reports Reduced and Co-operative Offices Closed

Estimates for promoting foreign trade were cut from $1,658,000 to $490,000 by a bill reported out by the appropriations committee on Feb. 21. The sum allowed is only one-half of the appropriation now used. According to a statement made by Secretary Alexander of the Department of Commerce, this is the most serious blow ever aimed at our foreign trade. Commenting on the matter, he said, "The bill aims to abolish the commercial attaches entirely. Twelve men trained and experienced in commercial and economic matters who are at present attached to Embassies and Legations in foreign capitals will be withdrawn within three months time. Not all of our trade commissioners in European countries are to be dismissed but their number is to be greatly reduced. At least fifteen will have to be recalled by May 1. Almost all of the districts and co-operative offices in this country will have to be closed. We maintain district offices in New York, Boston, Chicago, St. Louis, New Orleans, San Francisco and Seattle. It means a smaller "Commerce Reports" and delayed trade figures.

Rolling Stock

Chickasha (Okla.) Street Railway Company is in the market for three safety cars.

Rutland Railway, Light & Power Company, Rutland, Vt., is reported to have purchased two cars.

Empire State Railway, Syracuse, N. Y., has placed an order with the Osgood-Bradley Car Company for six cars.

Rockford & Interurban Railway, Rockford, Ill., has ordered twelve double-end safety cars from the National Safety Car & Equipment Company.

London & Port Stanley Railway, London (Ont.), Canada, are inquiring for six passenger cars and for one electric locomotive.

Reading Transit & Light Company, Reading, Pa., has placed an order with the Osgood-Bradley Car Company for twelve cars.

Grand Forks (N. D.) Street Railway has purchased six double-end safety cars from the National Safety Car & Equipment Company.

New Orleans Railway & Light Company, New Orleans, La., are reported to be in the market for fifty safety cars to cost approximately $300,000.

Monongahela Valley Traction Company, Fairmont, W. Va., has placed an order with the National Safety Car & Equipment Company for eight double-end safety cars.

Birmingham Railway, Light & Power Company, Birmingham, Ala., has ordered ten double-end safety cars from the National Safety Car & Equipment Company.

New York Central Railroad, New York, N. Y., is reported in the market for thirty cars of the multiple-unit control type for its electric division. With the exception of a few modifications, these cars will be similar to the last allotment which were purchased from the Standard Steel Car Company. The cars complete with trucks, motors, control and all accessories are estimated to cost approximately $40,000 each or a total of $1,200,000.

San Francisco-Oakland Terminal Railways, Oakland, Cal., has placed an order with the American Car Company for twenty-five Birney safety cars, delivery of which is expected about June 1. The cost of the cars will be approximately $160,000. In addition, this company is now completing eight cars of the double-truck type in its own shop and will build fourteen new double-truck cars as soon as the present order of eight cars is completed. Nine of the new cars will be motor cars and five will be trailers. The total cost for rolling stock for the year will approximate $300,000.

Franchises

Los Angeles, Cal.—The Los Angeles City Council has advertised for sale a franchise to build and operate a double-track electric line in Broadway from Pico Street to Tenth Street.

Track and Roadway

British Columbia Electric Railway, Vancouver, B. C.—This company plans to double-track its line in Hastings Street East and make other improvements.

Los Angeles (Cal.) Railway.—The Northwestern Business Men's & Property Owners' Association of Los Angeles is conducting a campaign for the extension of the Temple Street line of the Los Angeles Railway to Hollywood.

Pacific Electric Railway, Los Angeles, Cal.—The State Supreme Court has handed down an opinion upholding the action of the Superior Court in refusing to prevent the city of Los Angeles from tearing up a spur track of the Pacific Electric Railway in Santa Monaca Avenue, used by the Simmons Brick Company.

Columbus Railway, Light & Power Company, Columbus, Miss.—The Columbus Railway, Light & Power Company is taking up and relaying the track on several of its lines.

Toronto (Ont.) Civic Railway.—Public Works Commissioner R. C. Harris of Toronto has made two suggestions to relieve the congestion of traffic at the intersection of Broadview and Danforth avenues, the first being the construction of a line on park property to the west of Winchester Drive, and the other the extension of the present line north on Broadview Avenue. The first project would cost about $23,000, and the second $46,000.

St. Thomas (Ont.) Municipal Street Railway.—The street railway department of St. Thomas plans to extend the lines of the St. Thomas Municipal Street Railway.

Seattle (Wash.) Municipal Street Railway.—Work has been started on the double-tracking of the Alki Avenue line of the Seattle Municipal Street Railway to Martin Street at a cost of $50,000.

Seattle & Ranier Valley Railway, Seattle, Wash.—The State Public Service Commission has directed the Seattle & Rainier Valley Railway to lay new ties, pile bracing and other safety improvements on its Seattle-Renton line.

Seattle (Wash.) Municipal Railway.—The City Council of Seattle, Wash., at a recent meeting, authorized construction of a railway extension on East Marginal Way to provide improved transportation service to residents of the South Park district, by the passage of an ordinance appropriating $200,000 to finance the work. Although the project was included in the 1919 construction program of the railway department, for which an issue of $790,000 in utility bonds was provided by the Council, commencement of the work has been delayed by failure of the utilties committee of the Council to act on the pending ordinance. The improvement contemplates installation of a double track line on East Marginal Way.

Power Houses, Shops and Buildings

Massachusetts Northeastern Street Railway, Haverhill, Mass.—A car-house belonging to the Massachusetts Northeastern Street Railway in Upper Swampscott collapsed on Feb. 20 causing a loss of $20,000. Five cars were damaged to the extent of $10,000. The collapse was due to the presence of four feet of snow and ice on the roof.

Kansas City (Mo.) Railways.—Wright & Wright, architects, have been instructed to prepare specifications and final working drawings for a ten-story interurban passenger station to be erected at the northeast corner of Tenth and McGee Streets, Kansas City. A conference of various interurban representatives and members of the board of control of the Kansas City Railways was held recently, at which various engineering details connected with the track layout and the method of unloading passengers at the proposed station were discussed.

Pittsburgh (Pa.) Railways. — The United States District Court, through Judge C. P. Orr, handed down an order on Feb. 21 authorizing the receivers of the Pittsburgh Railways to undertake improvements of the car-house of that company in Carrick, a suburb of Pittsburgh. The cost is slightly in excess of $6,800.

Wheeling (W. Va.) Traction Company.—Fire destroyed the carhouse of the Wheeling Traction Company at West Wheeling, causing a loss of about $25,000. The building had not been used for cars for years, but was used as a store house and several thousand dollars' worth of lumber, tools and equipment went up in flames. The building will be rebuilt at once.

Trade Notes

The General Electric Company, Pittsfield, Mass., is arranging for the immediate erection of a new brick addition to its plant in the Morningside district. The structure will be about 100 ft. x 400 ft. and will be used as an extension to the enameling department.

Electrical Engineers Equipment Company, Pittsburgh, Pa., has opened a district sales office at 2611 Union Central Building, Cincinnati, Ohio. This office will be in charge of R. M. Hein, who for a number of years has been connected with the Chicago office of the Electrical Engineers' Equipment Company.

Jarret P. Lake has joined the engineering staff of the Economy Electric Devices Company, Chicago, general sales agent for the Economy railway power saving meter. Mr. Lake's former experience included service with the Pacific Electric Railway and in the power saving department and the Bay State Street Railway for which he was superintendent of the power saving department. In the latter connection, he had charge of the operation of the 1,300 Economy meters with which that road is equipped.

Electric Hoist Manufacturers' Association,, New York, N. Y., announces that at a meeting on Jan. 23 it engaged the services of E. Donald Tolles as executive secretary. The office of the association hereafter will be at 52 Broadway, New York City. C. W. Beaver of the Yale & Towne Manufacturing Company, is the president, and R. H. McCredy, of the Shepard Electric Crane & Hoist Company, is secretary-treasurer. The last meeting of the association was held on Feb. 20, at 9 East Fortieth Street, New York City.

United States Rubber Company, New York, N. Y., through its export division, the United States Rubber Export Company Ltd., 1790 Broadway, is increasing its export facilities of rubber insulated electrical wires and cables, tapes and other products which are manufactured at its Bristol, R. I., plant. Twelve direct branches and numerous distributors are now being operated in important centers of the world. The promotion of export wire and cable sales are being handled at the New York office, H. C. Morehouse in charge.

Standard Steel Bearings, Inc., 347 Madison Avenue, New York, which is owned and operated by the Marlin-Rockwell Corporation, has been organized to consolidate the plants of the Marlin-Rockwell Bearing Company, Philadelphia, Pa., Braeburn Steel Company, Pittsburgh, Pa., Rockwell Drake Bearings Division, Plainville, Conn., Willow Street and Hawden Divisions New Haven, Conn., and the Norwich Division, Norwich, Conn. The new organization was determined solely by considerations of efficiency, in view of the program of expansion necessitated by the growth of demand for the products named, according to a statement from the company. No change is implied either as to policy or executive and operating personnel.

Electro Service Company, Marietta, Georgia, which some time ago acquired all the patent rights covering the Bennett surge arrester invented by C. E. Bennett, electrical engineer, of the Georgia Railway & Power Company is now manufacturing these arresters in several designs in a new plant established at Marietta, Ga. This type of arrester, which relieves surges due to lightning, switching disturbances, arcing grounds and the like, is being made for voltages from 2,300 to 110,000. It is now understood that two other types will soon be ready, one for 140,000 volts and the other for 1,500 volts, direct current railway service. G. N. Lemmon is general manager of the company in charge of production. The following sales representatives have been appointed: Maxwell Engineering & Manufacturing Company, 61 Broadway, New York City, Mill Power Supply Company, Charlotte, N. C., and E. A. Thornwell, 1026 Atlanta Trust Company Building, Atlanta, Ga.

W. McK. White has resigned from Holden & White, Inc., to become Western sales representative of the Columbia Machine Works & Malleable Iron Company. He opened an office in Chicago, Feb. 15, and began active work at once in the selling of the Columbia Machine Works products to the electric railways, steam railways and industrial plants in the Middle West and southwest states. Mr. White began his business career in the automobile industry in which he spent eleven years. He entered the railway field in 1913 as sales manager of the Esterline Comany at Indianapolis, and in this connection he was largely responsible for the widespread installation of incandescent lamps for headlights on electric and steam railways. In February, 1916, with Roy Holden, he organized the now well-known selling organization of Holden & White, Inc. Mr. White's aggressive and dependable sales activities have brought a commendable service to the electric railways, earning for him a place of respect and esteem among railway men.

War Department, Office of the Director of Sales, Washington, D. C., is offering for sale a quantity of special size rail and track materials, bids for which will be received until 4:30 p.m., March 29, 1920, by the Chief of Engineers, Room 2706, Munitions Building, Washington, D. C. Included in the materials offered are: 1,333 gross tons of 67.53-lb Russian rail in standard lengths; 1,091 gross tons of 35-lb. A. S. C. E. rail in 15-ft. lengths, and 1,101 gross tons of 30-lb., A. S. C. E. rail in 26-ft. lengths. Track materials offered include splice bars for 80-lb., A. A. A. type "B" rail, splice bars for Russian rail; splice bars for 50-lb., A. S. C. E. rail; track bolts and nuts for use with 80-lb., A. R. A. type "B" rail; track spikes for 40-lb., A. S. C. E. rail; tie plates for 80-lb., A. R. A. type "B" rail; rail braces for 80-lb., A. R. A. type "B" rail; railroad crossings made of 80-lb., A. R. A. type "B" rail; railroad crossings made of 67.53-lb. Russian rail; and re-railers. Further information relative to the terms of sale or a more detailed description of the materials to be offered for sale, may be obtained from the Chief of Engineers, Room 2706, Munitions Building, Washington, D. C.

New Advertising Literature

N. B. Payne & Company, 25 Church Street, New York, N. Y.: A bulletin on electric cranes manufactured by the Lane Manufacturing Company, Montpelier, Vermont, containing a complete set of specifications.

Brown Instrument Company, Philadelphia, Pa.: A ninety-six page illustrated book, catalog No. 12, describing this company's pyrometers, and other lines of electrical indicating and recording instruments.

Economy Electric Devices Company, Chicago, Ill.: A pamphlet containing a price list of repair parts for the Economy Electric Railway Meter and containing numbered illustrations of all parts of the standard meter.

Manganese Track Society and Manganese Steel Founders' Society: A revised re-issue of book No. 8 of the standards of these societies, making some changes and more closely defining some of the details of the design for rail-bound manganese steel frogs.

The Star Brass Works, Chicago, Ill.: Bulletin No. 6 on its small steam and water jet apparatus, steam and water syphon and ejectors, also small steam jet pumps used as centrifugal pump primers, etc. It is fully illustrated and includes considerable engineering data. Copy sent to interested parties upon request.

Franklin Railway Supply Company, New York, N. Y.: Bulletin giving suggested form for use by railroads in sending in dimensions for orders for driving box lubricator, fire door, automatic adjustable wedge. Contents of bulletin also include account by Mr. Godfrey of the Inspection Dept. of experiences while with the Railroad Division of the A. E. F.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 55 — New York, Saturday, March 6, 1920 — *Number* 10

Harbingers of the Day of Better Appreciation of Electric Railways

DURING the recent storm period the railway in a certain New England city was "stalled" by snow and ice. The situation far more than overtaxed the resources available to the management. Fortunately the citizens realized what transportation means to them, and they turned out *en masse*, armed with pick and shovel, and dug the railway out. They thus had a lot of fun and beneficial exercise, did the railway a good turn and saved themselves in the aggregate much time and money. May their tribe increase! In many localities where the patrons of the railway did not pitch in with pick and shovel they showed appreciation of the way in which the railways cleared a way for their own cars and, incidentally, in many cases, provided a runway for competing jitneys as well! Especially was this appreciation reflected in the newspapers, many of which were converted (at least for a time) from knockers to boosters.

It is only a question of time until good service will be appreciated. A little deprivation stimulates appreciation. To paraphrase an old saying, "You never miss the street cars till the snow banks high."

The Farmers Want to Help

APROPOS of several recent articles in this paper on the development of interurban electric railway freight transportation, our attention has been called to some press reports which indicate that the farmers in certain localities of the Middle West are keenly alive to some of the possibilities of freight transportation *a la* interurban. The inability of the steam railways to furnish cars for livestock transportation has resulted in serious loss to the farmers in those communities where livestock raising is an important industry. The transportation requirements of this industry are: first, transportation should be available when the stock is ready for the market; second, the stock, once loaded on the cars, should spend a minimum of time enroute to the destination market.

That the farmers are beginning to realize that the average interurban can meet these requirements in an admirable manner is evidenced by the efforts now being made by county and state agricultural organizations to secure this kind of transportation service from the electric railways. It is emphasized that where the farmers are able to ship their stock via traction, consignments can be delivered at the large depot stockyards, in the majority of cases two or three hours after they have been loaded. The secretary of the Farmers' Federation in one state is quoted as saying that if the interurbans were allowed to handle car-load shipments of livestock on a large scale, thousands of dollars would be saved each year to the farmers of that state on the weight shrinkage item alone.

It is true, of course, that freight cars, particularly those loaded with livestock, are not permitted on the streets in many cities. It is, however, a hopeful augury when powerful organizations outside of the railway industry begin to take an active interest in transportation matters and to demand rights for the transportation companies which they do not now possess.

The Electric Railway a Decade Hence

PROPHECY is risky unless the would-be prophet has accurate and ample knowledge in the field of his proposed prognostications. At the same time some kind of vision of the future is necessary in any line of endeavor if effort in that line is to be more than mere drudgery. Every wide-awake railway man is looking ahead, some farther than others, and the picture which enlightened imagination paints for him adds zest to his work, or takes the "pep" out of him as the picture is rosy or dun-colored.

A writer in a recent issue of a popular magazine forecasts some of the changes that the next ten years will bring in our habits of living and doing business, an important factor in which is the expected great development of air craft. He is very specific as to details and to insure a checking of his estimates at the proper time he suggests that his article be laid aside and his statements compared with the facts ten years hence. His advice suggests that a similar comparison of the electric railway situation in 1930 with the tendencies pointed out in the columns of this paper by many writers during the current year will be interesting, especially to those who have stayed by the business through the present trying period.

It would be extremely unwise to predict in detail what the traction business will be in 1930, but to the writer it appears certain that the industry will be here and that it will be prosperous. Traction securities will be securities in fact because the fares will be automatically adjusted to the cost of service, although there will be no speculative interest in them because the return will be limited. City cars will be much lighter, due to the use of special materials and to their average smaller size. Rails will still be in use, not only because the rails of 1920 will not have been worn out, but also because the necessity for them will still be realized. Among the convincing reasons for this necessity will have proved to be that electric power is increasingly cheaper with relation to other forms of power; that the series electric motor is the ideal motor equipment on account of its good starting, load-carrying and self-regulating qualities; that the maximum of passenger comfort can be provided with a vehicle operated on a perfectly smooth runway, and that the railway car gives the greatest passenger-carrying capacity per mile of street per hour. While some of these advantages would also be inherent in the trackless trolley, that system will have been found adaptable in only a limited number of cases wherein the traffic would not support a rail line. The auto motor bus will be in large use as auxiliary to the electric railway, on extension of routes beyond zones profitable for the railway, on cross connecting lines and on routes where rails for one reason or another are not feasible.

The interurban business will be more highly developed than now, with lighter cars and more frequent service. A scheme of co-operation with the steam roads will have been worked out so that electric and steam lines will be given complementary rather than competitive service, each doing its share of the total business to which it is inherently best suited. Real progress will also have been made in electrification of steam trackage, following a logical program worked out on a co-operative basis to give the best over-all operating efficiency.

Merchants Know That They Need the Street Railway

THE electric railway manager who, upon looking out of his office window, sees one of his own trainmen driving to the carhouse in an automobile needs a bracer to maintain his optimism in the continued necessity for electric railway service. He will get that bracer the moment he begins to talk to the merchants about the relation of good business to good transportation. He may have supposed that they were quite indifferent to the decline of the service because of the increasing number of automobiles. They will soon make it clear to him with various degrees of forcefulness that they consider frequent electric railway service about 100 times as important as the possession of automobiles by everybody in the city. Mr. Merchant is a shrewd business man and he knows very well that if only five or six machines should park in front of his store—if they are allowed to park at all on a main street—automobile shopping becomes far more troublesome than street car shopping. The fact that the automobilist is more likely to carry off all or part of his purchases is not a sufficient set-off to the larger personal patronage that would come from a 50 cent increase in street railway service.

The anguished cries of downtown merchants which immediately follow the calling of a strike or of an increase in fare afford additional evidence of the worth that they attach to the cheapest and most capacious form of mass transportation. On such occasions they are quick to realize that their downtown corners are worth precious little more than a corner in the suburbs, if there is any material withdrawal of electric railway service or a discouraging increase in the cost thereof to the rider. At the same time, human selfishness is such that most business men do not realize their obligation to the electric railway until it is too late.

One would have to be an extreme optimist indeed to expect merchants to agree to any plan that would make them pay for the benefits that the electric railway brings them. Yet, it is not beyond hoping that they can be induced to *lend* at fair interest such amounts as the local railway needs to give that increased, lower-cost service which restores street railway travel to the volume of pre-automobile days and better. There are many arguments, constitutional and otherwise, against subsidizing a private corporation from public funds, but there are no legal obstacles against soliciting loans from those who would be most benefited by the continuance and improvement of electric railway service.

Pulverized Coal Burning Receives Impetus from Several Directions

THE burning of pulverized coal has for many years appealed to inventors as a possibly fruitful, and a certainly fascinating field for their endeavors. They realized that when coal reaches the furnace in dry, impalpable form it is in ideal condition for combustion, and that with suitable combustion space and careful attention to tube cleaning it can be burned with good furnace efficiency. The practical difficulties in the past have been largely in producing equipment for drying and pulverizing which would not too greatly complicate the fuel supply and too greatly increase equipment and operating costs. That these difficulties are being rapidly conquered is attested by an accumulating weight of evidence, a little of which will be adduced here.

Before we refer to specific cases, however, it may be worth while to point out that there is nothing radically new in the apparatus for preparing pulverized coal. A large part of it consists in conveyors, elevators, crushers, dryers, pulverizers, cyclone separators, exhaust fans, etc., all standard devices. Materials of many kinds have been dried and pulverized in the past, but under space and other limitations more liberal in most cases than are present in most electric power stations. Such an installation, however, is just another application of well-known processes which would have been made earlier if the past prices of good coal and fuel oil had not been so low. Present conditions render highly desirable the ability to burn low-grade coal, which can be done readily with the pulverizing system.

Readers of this paper will recall a description of an experiment made in 1917 by the Puget Sound Traction, Light & Power Company in pulverizing and burning culm. The outcome was the equipping of a number of boilers in one of its plants in Seattle for this purpose. An account of this installation and some facts regarding its operation are given this week. Here is a plant burning successfully what but a few years ago was considered mine waste. Again, within the next few months a large boiler room in one of the Philadelphia Rapid Transit Company's plants will also be outfitted to reclaim waste coal. This will be a peak-load proposition, the flexibility of the powdered coal "stoking" having appealed forcibly to the P. R. T. management.

The test run recently made at Milwaukee of five boilers fired with pulverized coal will give the further study of this method of firing in large power stations a real impetus. The test was personally observed by P. W. Thompson, a responsible engineer from what is generally spoken of as one of the most efficient stoker plants in the country, namely, the Detroit Edison Company. This observer might be considered to be biased, if prejudiced at all, in favor of stokers, yet he reaches the conclusions in his written discussion of the paper by John Anderson appearing elsewhere in this issue, that the boiler-room operation with pulverized coal as compared to stoker firing is much simpler; that from the standpoint of reliability the odds are in favor of pulverized coal, and that the elimination of many variable conditions entering into stoker operation will result in higher efficiency for the pulverized fuel installation. These are certainly significant statements.

Mr. Anderson has substantiated his faith in the economies possible with pulverized coal burning based on two years' experience and experimenting, by announcing that the new Lakeside power plant of the Milwaukee system, the construction of which has been begun, will be originally laid out and equipped for using pulverized coal. The savings which he has demonstrated to be possible at the old remodeled Oneida Street plant, he thinks, can be realized and improved upon in the new plant by virtue of a design primarily for burning pulverized coal. The new plant will contain an initial installation of two 20,000-kw. generating units and eight 1,306-hp. boilers.

Both Mr. Anderson and Mr. Thompson point out that there are many improvements which can be made in the design of a new plant, particularly in the design of the furnaces, the location of drying and coal-pulverizing equipment, the method of coal handling, drying and pulverizing, the method of handling ash, the prevention of slag formation, etc. The working out of these improvements will undoubtedly add to the advantages of the system. There will also be found many weaknesses which will have to be eliminated as experience develops their existence. All these things indicate a vast amount of work yet to be done by designing engineers before the powdered coal system of firing can be pronounced a complete success. But the Milwaukee test will serve to arouse great interest not only in perfecting this system, but also in improving the general overall efficiency of stoker fired boilers. This augurs some good healthy competition, out of which the power plant industry is sure to derive benefit.

It is very fitting that the Engineering Association executive committee should have assigned the subject of burning pulverized fuel to the committee on power generation this year. The experiences of the companies mentioned above would alone be enough to make a good foundation for a report.

Some Valuation and Rate of Return Theories May Be Crystallized

ONE benefit to be derived from a commission decision which is detailed is that, upon appeal, more clear definitions of some theories may be obtained. Apparently our valuation and rate regulation practice is being formulated, a point at a time, by decision and rules as cases are appealed. And now another case, involving many interesting arguments and facts, goes to a court review. We refer to the appeals taken by the various Washington, D. C., railway companies from the decisions of the District Commission. These decisions have been mentioned before in these columns, but we print this week a more complete and analytical review by A. E. Knowlton. We speak of these several cases as one because they are so closely related and because several questions arise on account of the competing companies and the inter-company relations.

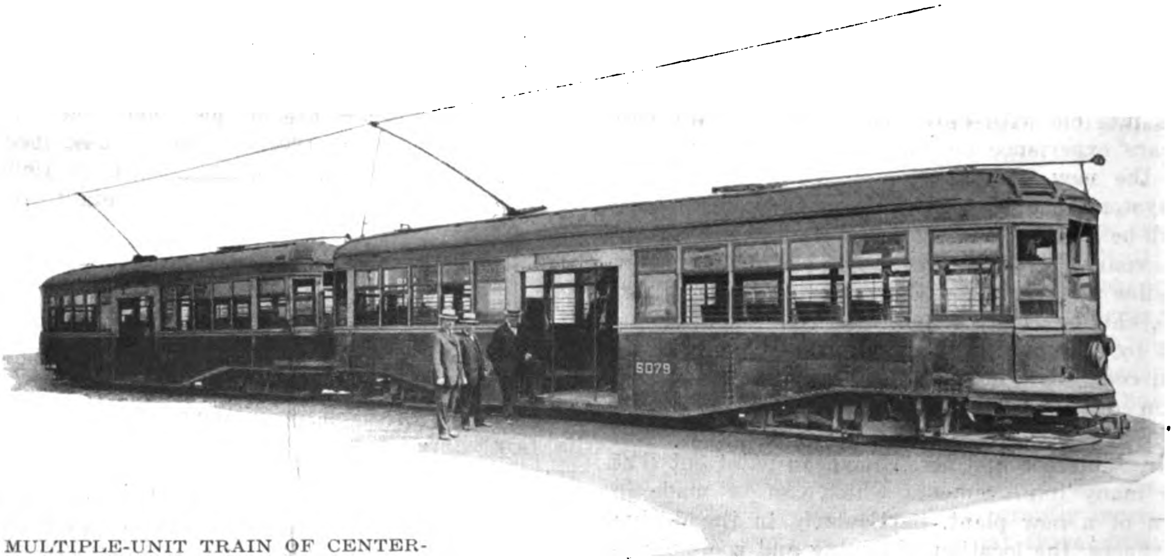
The District Commissioners, in both majority and minority opinions, have given detailed reasons for many of their findings, and it may be possible, from a court analysis of the case, to fix more definitely some of our ideas on valuation and the rate of return of competing companies operating with widely variant costs. Mr. Knowlton has called attention to some of the main features which must be considered on appeal. He has also mentioned what is certainly somewhat novel, namely, a company forced to appeal from a decision on principle, though the decision apparently allows a rate of return of over 14 per cent!

Why Jitneys Aren't Driven Out

THE electric railway manager, who long ceased to ride on his own street cars, is often sorely puzzled and hurt at the tepid reception which he gets from the public when he calls for the removal of the jitney. "Yes," says the public in effect, "We know that the jitney doesn't run on rainy days, that it doesn't pay its fair share of taxes, that it soaks us to the limit when the soaking is good and that our grandfathers gave you the sole right of carrying the common people; but the jitney is giving us some things in the way of speed and service that we are not getting from the electric cars and that is the reason we patronize them." In a specific, though undoubtedly rather an extreme case, which came to attention recently, the railway is permitted to charge a 10-cent fare to an outlying community, while it costs 15 cents by jitney, yet the jitney gets the greater part of the business. If we look for the reason we find that it is because people do not have to wait more than two or three minutes for the six-passenger touring-car (for that's what it is) and they are delivered to destination in fifteen minutes. If they wanted to take a trolley car to the same locality the chances are that they would have to wait ten minutes and the ride would last thirty minutes at least, and in an old car at that. Can the people be blamed for preferring what is practically a taxicab service even if it costs 50 per cent more? What a lesson is there in this to those who believe that the public is really unwilling to pay a reasonable fare to get good service.

Another objection to the operation of jitneys, which their higher speed will not overcome, is the irresponsible character of the average jitney operator. A serious jitney accident will some time awaken a community for a brief interval to the fact that damages for personal injuries cannot be collected from the jitney owner, but the lesson is soon forgotten and the jitneys will be patronized again as freely as before. The average American is careless and is usually willing to take a chance when he can save time. But such a reckless point of view is inexcusable for those in charge of the interests of the community as a whole. If the public wants a system of mass transportation faster than that which can be supplied by the electric cars and auxiliary to it and is willing to pay a higher price for this kind of transportation, the authorities should see that it is supplied by a responsible organization, and surely there is no organization in any community so well trained in traffic methods as that of the local electric railway.

By this statement we do not mean that we are urging railway companies to engage in the bus business. But we do think, first, that modern operating methods and equipment will drive out a large part of the jitneys and, second, that insistence by the authorities on responsible operation and regular schedules will drive out most of those which remain. After all this has been done, if there are any bus routes left, the authorities could well approach the railway company to see if it would conduct their operation.



MULTIPLE-UNIT TRAIN OF CENTER-ENTRANCE MOTOR CARS

Brooklyn Adopts Surface Car Trains

Trains With Three Different Classes of Equipment Are Now in Use and a Total of 100 New Trail Cars and 208 Motor Cars Will Soon Be in Service

THE Brooklyn Rapid Transit and Brooklyn City Railroad Companies have been operating two-car trains on certain of their surface car lines for some time. The service has met with pronounced success and is popular with the traveling public, so that it has gained for itself a permanent place in street railway operation in Brooklyn.

Brooklyn's rush-hour service lends itself admirably to surface-train operation. It consists essentially of carrying large groups of people to and from New York across the Williamsburg and Brooklyn bridges, and picking up and distributing passengers through the business sections of Brooklyn. These business sections are located at the Brooklyn end of the bridges and extend back a distance of from a mile to 2 miles. These bridges and business sections form the necks of bottles through which it is necessary to operate as many cars as possible. The real problem in rush-hour transportation is then, how to increase the carrying capacity of the lines through these sections, and it appears that train operation affords the greatest prospect for success.

At present the loops which form the terminals at the New York end of the bridges are not adapted to receive trains, so that train operation has been confined to runs in Brooklyn which enter and pass through the business sections and no train service is operated across the bridges. This train service has proved of greatest value in relieving the congestion caused by carrying large numbers of people to the business districts.

CHARACTER OF SERVICE FURNISHED

The Flatbush Avenue line was the first one on which train operation was attempted. The train service on this line runs from the Flatbush Ave. depot to Borough Hall, Brooklyn, a distance of 6¼ miles. The morning rush-hour service consists of picking up passengers in a district 1½ miles in length, which is suburban in character and stops average five or six per mile. These stops are of comparatively short duration, due to the small number of persons that board and alight at each point.

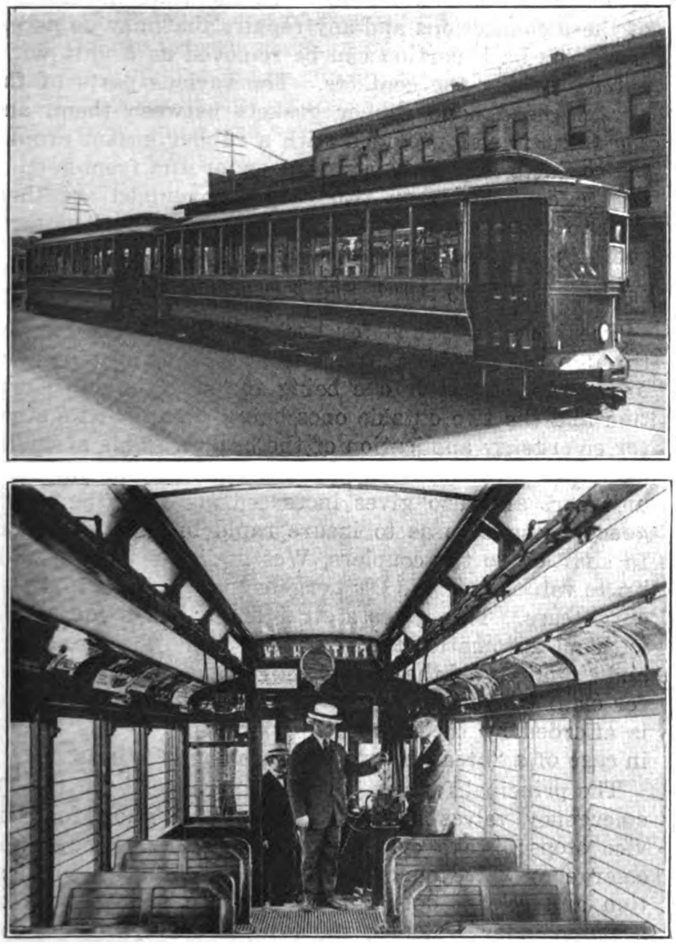
The second class of service is through a more closely populated residence section for a distance of about 3 miles. The stops in this section average from seven to nine per mile, and there are some transfer points with a correspondingly longer time for stops.

The remaining class of operation is through a business section of Brooklyn where the stops average from twelve to sixteen per mile and where headway between cars is so short, due to the operation of several lines over the same track, that there is very little operation beyond the series position of the controller. Frequent slowdowns for traffic also add somewhat to the congestion. The length of this business district is about 2 miles.

At present in Brooklyn the entire rush-hour service on any one particular line is not taken care of by trains alone, but single cars are intermingled with the trains. Train service is provided during the rush-hour period only. On the Flatbush Ave. line twenty-one trains are operated a total of eight hours per day and, in addition to this, forty single-car units are operated to make up the service. The shortest interval for this line is forty seconds, so a fair idea can be gained as to the density of the traffic. In starting either cars or trains, the interval is adjusted so as to give a definite number of cars in a given time interval regardless of whether single cars or trains are operated. Thus, where trains are operated on a three-minute interval, and it is necessary to replace a train by single units, two cars would be operated on a two-minute interval.

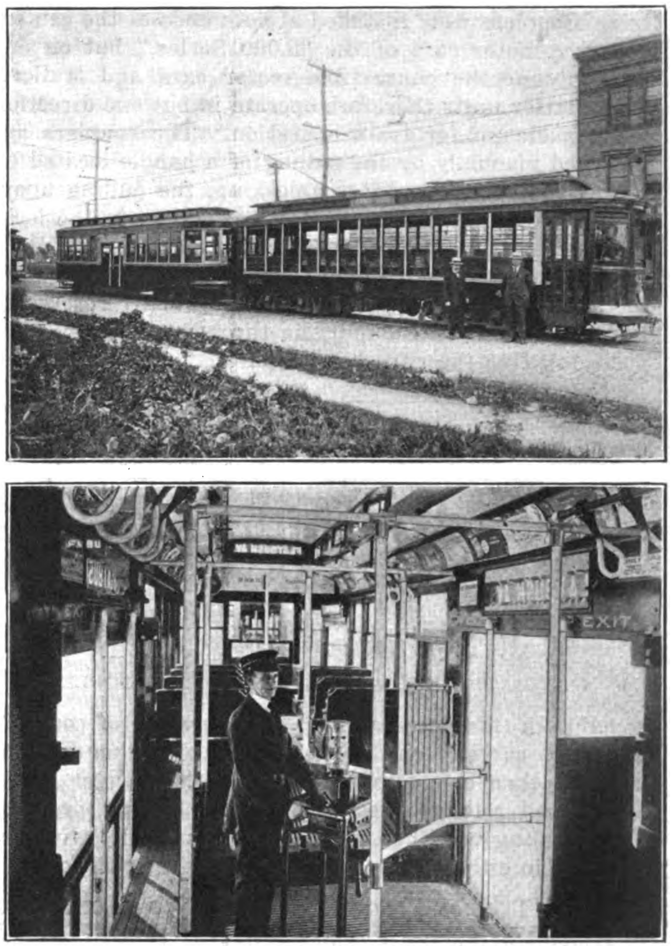
During the heavy traffic hours, the schedule speed for a two-car train is slightly slower than that for a single car. This is due mainly to two conditions. First, trains made up of either two center-entrance motor cars or of a motor and a trailer have either center entrance doors or folding steps and doors, so that it is impossible for passengers to board or alight while the train is in motion. The single cars are not provided with folding steps and doors and are of the end-platform type so that many passengers board and alight before the car comes to a complete stop. This reduces the length of the stop and helps to speed up the service somewhat. The second fact referred to is the greater number of stops made by a two-car train as compared with a single car.

The advantages of train operation for certain classes of the Brooklyn service was recognized at the time when center-entrance cars were purchased in 1913. Accordingly, the multiple-unit equipments of these cars was arranged so that they could be adapted for train operation by adding automatic air and electric couplers and without relocating or reconnecting the equipment. The surface companies have 101 cars of this type, and additions necessary to permit of their use for train operation are now being carried out as rapidly as possible. Each car is 45 ft. 8 in. long and weighs 38,350 lb. A seating capacity of fifty-eight persons per car and a total capacity of 123 persons brings the carrying capacity for rush-hour service of a two-car train up to 246 passengers. Additional details of the equipment and construction of these cars were given in the ELECTRIC RAILWAY JOURNAL for March 30, 1912, June 22, 1912, and April 19, 1913.



TOP VIEW, MULTIPLE-UNIT TRAIN WITH PAY-AS-YOU-ENTER CARS. AT BOTTOM, INTERIOR OF CONVERTIBLE MOTOR CAR

There are two different "make-ups" used for the Brooklyn train service. The first consists of the two center-entrance motor cars just referred to and the second a motor car with trailer. The motor cars used to haul the trailers are of the convertible type. They were purchased in 1905 and were described in the ELECTRIC RAILWAY JOURNAL of March 11, 1905. These cars weigh 25½ tons, seat forty-eight passengers and have four 40-hp. motors each. At the time they were purchased it was considered the best practice to buy large heavy cars with an excess of motor capacity. These cars have been in almost constant use since their purchase, in the most severe of Brooklyn's service often being operated twenty-four hours a day for long periods. The maintenance costs have been very low and from the operating man's point of view they have been most satisfactory.



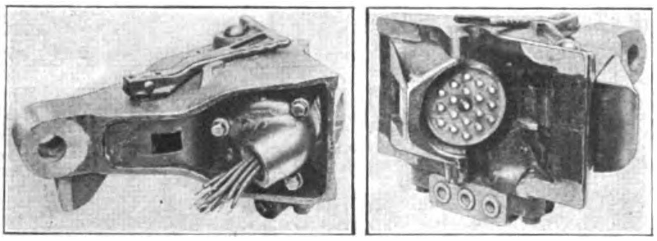
TOP VIEW, MOTOR AND TRAILER TRAIN. AT BOTTOM, VIEW OF INTERIOR OF NEW TRAIL CAR

When train operation was decided on for Brooklyn it was realized that the reserve capacity of these cars could be used to very good advantage in hauling trailers. An extended test was made to insure against overloading of the motors. One of the convertible motor cars was equipped for this test and a center-entrance motor car was stripped of its operating equipment to serve as a trailer during the test. Both cars were loaded to give a weight equal to that with standing load. This train was operated over various lines under conditions approximating as nearly as possible those of actual service. Results indicated that the motor equipment of these convertible cars was of capacity sufficient for the service and accordingly 100 trailer cars were ordered.

The trailer cars are of a low-floor center-entrance type. They are 45 ft. 6 in. long, 8 ft. 6 in. wide, 11 ft. 3 in. high from rail to roof and have 22-in. wheels. They are similar in appearance to the center-entrance motor cars used for train operation but have a monitor roof instead of the "turtle back" roof of the motor cars. They have a seating capacity of sixty-one and weigh 14 tons. Further information regarding their equipment was given in the ELECTRIC RAILWAY JOURNAL for June 8, 1918, page 1121.

ALL EQUIPMENT IS INTERCHANGEABLE

The equipment which it was necessary to add to the motor cars to permit of train operation was made uniform as far as possible. The couplers for all cars are Westinghouse type K-1-A automatic car, air and electric. Couplers were installed at both ends of the center-entrance motor cars of the "5,000 Series," but on one end only of the convertible motor cars and trailers. These latter units therefore operate in but one direction when made up for train operation. The couplers are unlocked manually by the pulling of a handle located on top of the coupler. After unlocking, the pulling apart of the cars returns the coupler mechanism to the locking position automatically. This is accomplished by a trigger with a projection to engage the coupler when in the unlocked position. The pulling apart resets the trigger. Should the handle be thrown to the unlocked position after the cars have separated, the mechanism remains in this position until the operation of coupling is again carried out. The sliding together of the couplers then acts automatically on the trigger mechanism and returns the parts to the locking position. The coupling will then be made automatically with the couplers in either the locking or unlocking position.


Side View End View

AUTOMATIC CAR, AIR AND ELECTRIC COUPLER

NEW TYPE OF ELECTRIC COUPLER WAS ADOPTED

Accompanying illustrations show the type of coupler used. The electric portion is located in the central part of the coupler and has nineteen contacts with fourteen active circuits. There are fewer circuits than contacts because some of the contacts are connected in parallel to take care of large current values and to provide for reversal of ends of the multiple-unit cars without affecting operation. For the motor-trailer operation the circuits carried through the couplers are for lights, heaters, door operation, register operation, automatic signal circuits, bell and buzzer connections. For multiple-unit train operation, each car has its own power supply but connections are carried through the couplers for the control operation. A very ingenious arrangement of connections was worked out by the engineers of the railway so that no harm can result from coupling together of dissimilar equipments. Thus a convertible motor car which in regular service is operated with a trailer could be coupled to a multiple-unit motor car without complication. This arrangement is highly desirable for emergency conditions as it might be necessary to couple up to a crippled car or train in order to prevent a tie-up. Both ends of all cars are also arranged for coupling with a link or bar-type coupling, so that trains may be coupled mechanically to any car of the system.

The contacts in the electric portion of the couplers are arranged for butt contact at both back and front. A coil spring between the stationary and movable portions provides the necessary pressure. The back part of the movable contacts has a spiral thread and this gives a turning action to the contacts as they are compressed and insures good electrical contact. The wires are brought into the back ends of the electric portion through flexible conduit and are soldered into terminals attached to stationary studs. To facilitate the making of these connections and any repairs that may be necessary, this back portion can be removed as a unit without disturbing the contacts. The various parts of the electric head have rubber gaskets between them, and the front is also provided with a rubber gasket around the contacts to prevent water, snow or dirt from getting to the contacts when two cars are coupled together. A hardwood cover fitting tightly over the contacts protects them when they are not in use.

TWO AIR LINES ARE PROVIDED

The air connections for brake operation are carried through the coupler at the bottom. Three openings are provided; the center one being for straight air operation and the two outside ones being connected together for emergency application of the brakes. This arrangement provides for reversing the ends of the multiple-unit cars and also gives increased area for the emergency passage so as to insure rapid brake application. In addition to the couplers, Westinghouse type M-18-B brake valves and type D emergency valves were installed on all cars. This gives a straight air-brake equipment with an automatic emergency feature. The flexibility and simplicity of the straight air brake is thus retained for ordinary service operation and additional protection is afforded by the automatic application of the brakes in case of a "break-in-two" or bursting of a hose.

The principal features of this equipment with type D emergency valves are: straight-air operation for service stops; brake cylinder release locally through the emergency valve on each car; prompt service application and release operation; automatic maintenance of brake-cylinder leakage; uniform brake cylinder pressure independent of variations in piston travel or leakage; practically uniform compressor labor insured without the necessity of governor synchronizing system; automatic application of the brakes in case of ruptured piping, burst hose or parting of train; retarded release after an emergency application, as a penalty to discourage unnecessary use of this feature; need for but one size of emergency valve for any size of brake cylinder, and arrangement so the conductor can set the brakes in emergency by means of the conductor's valve.

The "H-B" life guards used on the center-entrance motor cars and those of the "4,100 series" and "4,300 series" interfered with the installation of the couplers, so that it was necessary to cut out the back of the life guards to provide clearance and also to do away with the apron for tripping. A new type of tripping mechanism was designed and installed. This extends out to the front end of the car and the front portion is constructed of ¾-in. wrought iron pipe. On the "4,100" and "4,300" motors and trailers, where but one coupler is applied per car, no changes were made in the life guards at the other end of the car. On the center-entrance motor cars of the "5,000 Series" the previous type of coupler also interfered with the installation of the new type. This was removed and a slot was cut through the buffer immediately above the coupler to accommodate the coupler bar for use in case it is necessary to couple up to a car of another type which may be disabled. The installation of the couplers adds somewhat to the overall length of the cars, and in order that this additional length may not reduce the number of cars which can be stored in the space available in the different car houses, provision is made for swinging the coupler to one side and hooking it in position so that the cars can be laid up end to end. The couplers are the same for all types of car so that cars can be coupled up for use if necessary, but the present make-up of train service provides for the center-entrance motor cars to be made up together to make up a two-car train, both cars being motor cars, while the trailers are connected to motor cars of the "4,100" or "4,300 Series."

The electrical connections are carried from the couplers to a junction box located just back of the coupler through flexible conduit and the three air connections which are necessary in the coupler are made with flexible hose.

CHANGES MADE IN ELECTRICAL EQUIPMENT

In order to provide for train operation of cars of the "4,100" and "4,300 Series" a Westinghouse No. 806-C line switch has been installed and the tripping mechanism has been removed from the circuit breakers located on the front platforms of the cars so that these act only as switches to open the circuit by hand. The line switches take care of overload conditions. Provision for operating the line switches is made at the bottom of the K-28-B controllers, which are used on these cars. The main circuit as rearranged is from the trolley through the fuses and then to the line switch. From this, connections are made to the two circuit breakers on the front of each platform, and from these to the controllers.

The signal system used consists of a motorman's light which indicates when all doors of both the operating car and the trailer are closed. For passing signals from conductor to conductor and from car to car and to the motorman a buzzer system is installed.

Advantage is taken of the fact that these cars must be put through the shops for the addition of this new equipment to make other changes and submit them to a general overhauling, and painting. On the "4,100" and "4,300 Series" cars the inside bulkhead has been removed at both ends, and new doors and folding steps have been installed for entrance and exit. In this reconstruction, provision is made for the use of the electrically operated cash register, and push buttons are installed for the use of the conductor in operating the registers.

A second class of multiple-unit train is also in operation on the Brooklyn lines. There is but one of these units at present and it consists of two cars of the "3,300 Series," with end platforms, which have been altered by the addition of new safety doors and folding steps. Multiple-unit operation of the control has been accomplished by the addition of a Westinghouse PK head to one controller of each car. These cars are slightly over 37 ft. in length, seat thirty-five passengers and each have two 60-hp. motors.

Daylight Saving Again Discussed by A. I. E. E.

Lighting Expert, on Basis of Investigation, Concludes That Daylight Saving on the Whole Costs More Than It Saves—Others Disagree on This Point

PRESTON S. MILLER, general manager Electrical Testing Laboratories, New York City, presented a paper on daylight saving at the recent midwinter convention of the American Institute of Electrical Engineers, stating that the paper was the result of an impartial investigation by himself of the various factors relating to daylight saving. He found that the total output of certain central stations of one gas company was reduced by about 3 per cent during the seven summer months. For lighting alone the reduction was 8 per cent. If these fragmentary data were applied to the whole country, the estimated annual saving is $19,250,000 in expenditure for artificial light and nearly 500,000 tons per annum in coal consumption.

He named the several advantages of daylight saving as outdoor recreation, saving in expenditure for artificial light and saving of fuel. The disadvantages are experienced principally by farmers, dairymen, truck gardeners and miners. He concluded that economic losses probably far outweigh the gains.

In analyzing the present allocation of hours for work, sleep and play, Mr. Miller argued that these have been evolved through long experience and are the result not of the periods of darkness and light but the combined results of the natural distribution of darkness and light and of temperature, throughout the twenty-four hours of the day. He claimed that our sleeping habits are a compromise between the natural desire to sleep in the dark and the natural desire to sleep during the cooler part of the day, and that any arbitrary disarrangement of this schedule is wrong physiologically. He presented a chart upon which were plotted the distribution of light and temperature throughout typical days in June, September and December.

Mr. Miller contended that the advancement of clocks had served the interests of only one part of the population and had proved very disadvantageous to another part, which appears to be a large part of the total population.

In the subsequent discussion, R. S. Hale, of Boston, suggested a more accurate method of comparing central-station output during daylight saving and during normal times, stating that the output should be compared on sun-time basis and not on clock-time basis. Others, in discussing the paper, brought out the point that the only farmers seriously affected were those near large centers. The effect on central stations along the New Jersey Coast supplying summer resorts was said to be much more aggravated than the average of the country, as in some instances a 20 per cent reduction was noticed. This is particularly disadvantageous because these companies operate chiefly in summer and a 20 per cent reduction for a few months means practically a 20 per cent reduction for the entire yearly output of the power station.

Although Mr. Miller brought into the discussion of daylight saving some new elements, the members of the meeting were not entirely convinced that the repeal of the daylight-saving law will, in general, prove to be beneficial to the country.

Comparison of Steam Power-Plant Performance

At A. I. E. E. Meeting Engineer of Interborough Rapid Transit Company Pleads for Uniformity in Statistics to Permit More Accurate Analysis

AT THE recent New York convention of the American Institute of Electrical Engineers, W. S. Gorsuch, engineer of economics Interborough Rapid Transit Company, New York City, presented a plan which he claims will make possible more accurate comparison of steam power-plant performance. This is discussed largely on the basis of attempts to compare operating statistics of steam power plants as published today by various state and governmental bodies. Complaint is made that there is no present uniformity in reporting the output of a power plant, the gross output being used in some cases and the net output in others. Load-factor figures as given are often misleading because they are computed upon different bases.

It is not proposed to make an analysis of the thermal characteristics or cost of generation in power plants, but rather to adopt as a criterion for comparing power plants the commercial efficiency, that is, the total cost per kilowatt-hour sent out from the alternating-current power station bus, which is the ultimate test of design and operation. To render such a comparison accurate would require a uniform system of accounting and many other impracticable uniform practices. For that reason Mr. Gorsuch has evolved a means of comparison which is limited to the cost of coal, the largest single item in the cost of generation in coal fuel power stations.

DATA NEEDED TO PERMIT ACCURATE COMPARISON OF POWER PLANT PERFORMANCE

		Plant A	Plant B
I. *Coal Characteristics of the Plant*			
1. Average B.t.u. supplied to plant per kw-hr. net output		22,400	25,600
2. Thermal efficiency of plant in per cent		15.24	13.34
3. Average B.t.u. per dollar, coal as received (moist basis)		5,226,666	5,734,400
4. Coal factor, or pounds of coal per kw-hr. net output (moist basis)		1.60	2.00
5. Average B.t.u. per pound coal, as received (moist basis)		14,000	12,800
6. Cost of coal per ton (2,240 lb.) delivered alongside plant		6.00	5.00
7. Kind of coal		Bituminous	Bituminous
8. Cost of coal in cents per kw-hr. net output		0.428	0.446
II. *Load Characteristics of the Plant*			
9. Average daily factor of load.	Interval of maximum load one hour	50	54
10. Maximum load for one year.		90,000	80,000
11. Yearly load factor of load.		40	38
12. Kw-hr. net output for the year—(kw.hr. sent out from the a-c. bus)		315,460,000	217,248,000
13. Installed rated capacity, that is, the aggregate maximum continuous rating of the generators in kw		125,000	100,000
14. Average kw-hr. net output per kw. installed rated capacity		2.525	2,173

The fourteen items given in Table I are those desired by Mr. Gorsuch in order to get a reasonably accurate comparison between two power plants. Figures are given for two power plants to show the application of the system to specific cases. In this comparison chief dependence is based upon an accurate knowledge of the quality of the coal used and a uniform method of analyzing the load characteristics of the plant.

With the present method of recording power-plant statistics, item 4 in the table would be given, but items 1, 2, 3 and 5 would not. In this case it would be impossible to tell whether or not any part of the difference in the coal factor was due to the quality of coal. If the relative merits of the two plants were judged from the coal factors alone, a comparison would be misleading for the reason that while the coal factor for plant B is 25 per cent higher than for plant A, the B.t.u. supplied per kilowatt-hour net output is only 14 per cent higher.

In the subsequent discussion, R. S. Hale of Boston suggested that load factor be taken for eight hours per day or ten hours per day instead of twenty-four. In case a monthly load factor of 80 per cent is given, does the plant run day and night or does it run in day time only? This is an important factor to include in the data.

Philip Torchio, of New York, chairman of the power station committee of the Institute, in contributing to the discussion by letter, stated that the object in gathering statistics of this sort is for state and government reports and it is hoped that government agencies will standardize questionnaires. A comparison of gross thermal efficiency of steam plants is not contemplated, in fact it cannot be undertaken by the government, but much useful information could be obtained if state and governmental bodies would adopt a uniform plan for a questionnaire upon some such basis as suggested.

Edward J. Cheney, engineering division Public Service Commission, New York, rose to say how difficult it is to fit various requirements in the questionnaires sent out by governmental bodies. This particular suggestion of Mr. Gorsuch might be satisfactory for power men, but how about the meter men who would want statistics on cost of reading, setting, etc., and the outside distribution man on his costs, etc.?

In answer to this, it was argued that if the governmental bodies will merely shape their questionnaires so that the information is useful for comparison that is all that is required. No great increase of data obtained is wanted.

Rail Failure Statistics

A REPORT on rail failure statistics for 1918 has recently been published by the American Railway Engineering Association. This report covers rail failures on steam railroads throughout the United States and Canada.

As a comparison between open-hearth and bessemer steel rails, failures per 100 track-miles are recorded. For rails rolled during the years 1913, 1914, 1915 and 1916, giving respectively five, four, three and two years of service, the report shows that bessemer rails had respectively 19, 134, 86 and 49 per cent more failures. As bessemer rails were in general in less severe service than open-hearth rails, the actual difference in the same service would undoubtedly have been greater.

The average failures per 100 track-miles of the rollings for the years from 1908 to 1918 inclusive covering both bessemer and open-hearth rails are tabulated. The 1908 to 1913 rollings show successively decreased numbers of failures compared on a basis of five years of service, and the 1914 rolling shows a further decrease when compared on a basis of four years of service. The more recent rollings, according to the report, are not starting out so well.

According to a statement in the *Engineer*, London, electrification work in Switzerland is advancing steadily. It is hoped that the Gothard line between, approximately, Erstfeld and Faido, may be in electrical operation about July 1, 1920. The work on this line has been delayed through difficulty in installing the electrical equipment. Insulators have been particularly difficult to obtain.

Washington, D. C., Valuations Reviewed

Orders of the District Commission Show Thorough Arguments on Practically All Points Considered — Some New Stands Taken by the Commission

BY A. E. KNOWLTON
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THE District of Columbia Public Utilities Commission issued, last fall, two orders with reference to the two railway systems in the District. These were referred to by the ELECTRIC RAILWAY JOURNAL in the issue of Sept. 13, 1919, showing the valuations fixed, and again in the issue of Oct. 11, 1919, showing the increased rates of fare authorized. An appeal for a higher fare was filed by one company, as mentioned in the issue of Jan. 10, 1920, and all valuation figures were appealed by both companies as mentioned in the issue of Jan. 17, 1920. The orders in these cases are now available for analysis in Public Utility Reports, 1919F.

These decisions are notable in that, considered together, they present most of the questions that arise in connection with current rate cases, and one is especially significant because of a practically unprecedented action with reference to competing traction companies. Both present majority and minority opinions with unusually good expositions of the diametrically opposed conclusions.

One case was that in which the Washington Railway & Electric Company petitioned for an increase of fare for itself and its subsidiaries. A previous ruling of the commission authorizing a charge for inter-company transfers at once involved the other principal system, the Capital Traction Company, and this reason, as well as that a broad discussion of the desirability of some form of measured service might be had, led the commission to make the Capital Traction Company a party to the proceeding. The initial fare asked for was 7 cents, and other items were the abolition of transfers between constituent companies and the abandonment of certain through routes. The chief point in favor of a zone system, in the opinion of the commission, was that it would serve to reduce the great disparity in net operating revenues of these two principal systems. Congress had, however, established and observed a certain civic practice relative to the development of the numerous suburban districts of Washington, and the commission deemed it inadvisable to upset this practice. As will be seen shortly, this feature leads to a decision of considerable moment and one practically unprecedented —that the fares of competing systems should be equal regardless of the resulting net rates of return to the two companies.

The commission discarded the suggestion that the Washington Railway & Electric Company derive its needed increase in revenue by increasing its existing rates for electric light and power, with the remark that such a procedure was "not only inequitable and unjust, but illegal." Commissioner Gardiner, in his dissenting opinion, supplies the items numbered 5 to 12 inclusive, in the accompanying table, and argues from these that the approving order is as susceptible to injunction as an order raising the light and power rates of the Washington Railway & Electric Company rather than its traction rates in order to provide a fair return on traction capital. Congress had in 1900 permitted the Washington Railway & Electric Company to acquire the stock of the Potomac Electric Power Company as well as of its present railway subsidiaries, and Commissioner Gardiner construes the intention of Congress to have been that "the system as a whole, operated as one, would be a benefit to the riding public as a whole." In his opinion, this act and intention of Congress as readily justifies a raise in power rates to provide a fair return on traction capital as it does the application of the instant order which in effect raises fares on the now profitable city lines to compensate for losses on suburban lines.

Part of the disparity in net incomes of the two companies is attributed to the long-standing tax of 4 per cent on gross income and the commission announces its intention of advocating before Congress the substitution of a sliding scale tax on net income.

	Washington Railway and Electric Company System	Capital Traction Company System
1. Trackage in Dist. of Columbia (miles)	135	64
2. Cars per day..........................	350	250
3. Passengers per day....................	230,000	230,000
4. Suburban lines (miles)	10	2
5. Fair value as of June 30, 1919...........	$16,106,368.14	$14,270,495.51
6. 6 per cent return should be...............	$978,514.88	$856,229.73
7. Taxes (4 per cent tax on gross income) 1918	$138,000.00	....
8. Net return should be..................	$1,116,514.88	....
9. Actual net earnings (7 mos. 1918).........	$65,000.00	$780,000.00
10. Difference from 6 per cent return (7 mos. 1918)........................	—$586,000.30	+$280,532.64
11. Existing rate of return, per cent......	0.588	9.36
12. Estimated rate on approved fares, per cent	6±	14.22
13. Wages to car crews (7 mos. 1918)........	$750,000.00	$600,000.00
14. Other operating expenses and taxes......	$1,815,000.00	$1,110,000.00
15. Cost per car mile....................	$0.3625	$0.3185
16. Cost per passenger carried..............	$0.052346	$0.035146

There is tabulated below a list of comparative physical and financial items, some of the latter reflecting the marked difference in physical character of the two systems and the areas they serve and also the effect of the commission's equal raise in rates for the two systems.

Many important questions arose in connection with the other case, that of the Capital Traction Company, and it is of interest to examine the manner in which these questions were disposed of. The company's experts and the commission's accounting expert followed two widely different methods of determining "historical cost" and "both, in the opinion of the commission, have merit and must be very carefully considered in the determination of" the total valuation. The company claimed values based on the actual cost of the property to the present owner. With reference to this method, the commission says:

"Much of the investment may be represented by expenditures of an abnormal nature or which relate to other than physical property; such as increased book value resulting from the transfer of property, discount on stocks and bonds, cost of financing, promoters' fees, and additions to capital account by reason of the revaluation of the property. Probably the greatest of these consists of increasing the investment account 'upon the transfer of property, in order to bury in plant account the bonus, which is paid generally in securities, to acquire operating control." The commission outlines the procedure of its accounting experts in arriving at a total "historical cost" as follows:

"Under the second method, i.e., the ascertainment of the actual cost of the existing units of a property used and useful for the public at the date of valuation, an entirely different course of procedure from that followed in the first method becomes necessary. A thorough and detailed analysis of the plant account must now be made in order to ascertain just what items are included in the investment account. The various units of property must then be classified or grouped and their cost and date of installation determined . . . the more serious and exacting duty of the investigator" is then "to determine the amount of property that has gone out of existence, but is still included in the plant account. This disappearance of property is due to various causes, such as losses by fire, abandonment, sale, changes in the art, experimentation, and obsolescence, such losses not being properly adjusted in the books."

The commission excluded from the total amount stated to be the historical cost of the property early losses incurred by one of the constituent companies for the reason "that such losses are not a part of the amount of money expended" but "constitute an intangible element to be considered in finding fair value." An item of $8,000 for cable patents was disallowed, the patents having expired. "Such items as patents under any circumstances should be taken care of by earnings, and should not be allowed to remain in the plant account." On the other hand, the cost of right of way for a line later abandoned and the land dedicated to the District of Columbia for park purposes was allowed as a development loss. Profits received from the sale of various parcels of land were, however, applied to reduce the total of development loss allowances. Another allowance in connection with development losses was one of about $84,000 to cover the value of "cars abandoned as the result of an order of the Interstate Commerce Commission forbidding the use of single-truck cars." Perhaps the most interesting development loss allowance, though, is one of about $450,000, representing the loss incurred by reason of the fire that destroyed the old cable power station, not fully covered by insurance. The company had either to rebuild for cable or construct for electricity, then under contemplation, and the latter plan was adopted. The commission made the allowance on the company's contention that, even if the fire had not occurred, underground electric motive power would have been adopted soon and the abandonment of the cable plant would have followed with probably greater loss.

The company also asked to have included as development loss one item of $50,000 as estimated loss in connection with rebuilding a car barn and office building and another of $13,421.79, the difference between original cost and amount received from sale of an engine-generator set. These "items . . . . cannot, in the opinion of the commission, be considered in the light of development losses. Upon any accounting theory losses brought about by the reconstruction of buildings or sale of superseded equipment in the usual course of business should be taken care of by charges to depreciation."

Taking up the details of the appraisal, one finds a very instructive tabulation (according to Interstate Commerce Commission classifications) of reproduction cost, residual value, depreciable value, annual depreciation per cent, etc. That they may be available for purposes of comparison, certain of the percentage items are tabulated below, Chief Engineer Pillsbury defining "per cent remaining" as the ratio of the "remaining life" to the sum of "age" and "remaining life."

The commission made an allowance of $108,000 as working capital, this amount being arrived at by taking one-twelfth of the annual operating expenses and real property taxes. In approaching the matter of "established business" as an element of fair value, the commission ruled that the appraised value of some $5,000,000 for a part of the company's property for which it paid over $10,000,000 called for treating the $5,000,000 difference, not as associated with cost of reproduction, but rather "with that other element of fair value," namely, actual or historical cost. In claiming that the commission must allow as part of the fair value of the entire purchase price of this property, the company cites the U. S. Supreme Court decision in Willcox vs. Consoidated Gas Company, 212 U. S. 19,- and further contends that the "purchase was specifically authorized by Congress; that it had been acquiesced in by the public for many years; that the stock issued in pursuance thereof had been largely traded on, on the faith of this transaction; and that the condition created at that time was a fixed condition not to be changed or made the subject of any sort of disturbing analysis." But the commission finds little parallel between the Capital Traction and Consolidated Gas cases, analyzes the financial history of the purchased road, and, without specifying any amounts, says:

Inventory Division	Per cent Remaining	Annual Desreciation Per cent	Ratio of Reproduction Cost Less Depreciation to Reproduction Cost
A. Land	100.00	0	100.00
A1. Removal of obstructions	100.00	0	100.00
B. Way (track and roadway)	76.71	3.41	77.42
C. Structures (buildings)	84.93	1.54	86.18
D. Power plant and substation equipment	77.18	4.17	78.84
E. Transmission and distribution system	70.51	3.23	78.52
F. Rolling stock	74.84	4.22	76.08
G. General equipment: office, shop, store, stable, garage etc	69.52	8.87	72.12
H. General costs: legal, organization, engineering, superintendence, insurance, taxes, etc	90.12	1.45	90.07
Materials and supplies	100.00	0	100.00
Working capital	100.00	0	100.00
On total physical property devoted to railway service in the District of Columbia	81.82	*2.67	82.51

* This applies to depreciable cost, not to total cost of reproduction.

"This transaction has neither been ignored as an evidence of value by the Commission, nor has the amount been completely disallowed, the fullest consideration having been given to the intangible elements of value represented in this amount."

It is thus seen that in this case, which presents an unusually varied group of problems, the regulatory body has found grounds for deviating from precedents established in cases which are to some extent parallels and it is certain to be a matter of much interest to see the attitude the District Supreme Court will take as to these points when the appeal is ruled upon. In passing, it is not often the case that a utility, whose rates have in effect been advanced to a resultant 14 per cent return, finds that the circumstances necessitate or even warrant an appeal from the decision.

Sidelights on Some Fare Situations

On Recent Visits to Toledo, Cleveland, Buffalo, Rochester, Syracuse and Utica a Number of Significant Items Were Noted

BY "SPECTATOR"

IN THE COURSE of his regular duties, the "Spectator" happened recently to drop in on electric railway friends at a number of cities along the line of the New York Central Railroad, in which, as a group, the fare situation presents itself in several different aspects. In fact, if they had been selected for the purpose, no better choice of cities could have been made to illustrate the difficulties against which railway operators are now contending. While the situations in all of these cities have been depicted from week to week in the news columns of this paper, a few sidelights such as would be noted by a sympathetic visitor may be of interest.

ALL QUIET ON THE SURFACE AT TOLEDO

After reading of the sensational street railway "stunts" which had been "pulled off" in Toledo, Ohio, within recent months, the "Spectator" was agreeably surprised to find the car service normal and popular. In spite of the obstacles in the way of working out a satisfactory franchise, there was evidence of friendly good feeling all around on the personal side, due no doubt to the individual popularity of Frank R. Coates, president of the Toledo Railways & Light Company, and his associates, A. C. Van Driesen, J. M. Enright, A. Swartz, and others. It was evident also that the public appreciates the fact that Henry L. Doherty ardently desires to give the city good service. The deadlock which had developed regarding the financial and operating conditions of the hoped-for franchise seems almost inexplicable to a casual observer.

One thing stands out very clearly in Toledo, namely, that the city is becoming very much ashamed of the reputation which it is getting throughout the country, although locally it is thought that this reputation is not deserved. A movement is now on foot to stimulate "boosting" of the city to offset the popular practice of "knocking" which patriotic citizens say has infected the city itself. Good friends of Toledo feel, however, that by hampering its electric railway development, the city has set itself back many years in its growth, and the pity of it all is that if given a reasonable opportunity the management of the railway would take pride in giving as nearly ideal service as is enjoyed anywhere.

As for the company itself a wonderfully fine spirit pervades all departments. Mr. Doherty's strong and helpful personality pervades the whole institution, and the spirit of solidarity is conspicuous. The fact that the company supplies a quadrilateral service—transportation, light and power, heat and gas—makes it very broad in its interests. A few months ago the administration offices were consolidated in an attractive building, especially fitted to their needs, and an auditorium seating 500 or more for the use of the joint company sections of the four national societies representing the four departments of the company was provided. The effect of this move is already evident in the greater spirit of company unity and loyalty. At Toledo the welfare work of the company is handled by the company section, which has a much broader function and greater responsibility than most organizations of its class. The section has nearly 1,500 members and it is the expectation of the local officers that shortly it will also include the few hundred employees still outside the fold. A man of proved ability in promoting friendly relations with employees has been engaged to give his entire time to the personal side of the company section work, and another man, with suitable clerical assistants, will look after the office routine. The "Spectator" will be greatly surprised if within the current year "Rail-Light," as the company is locally known, does not make a notable improvement in its already remarkably successful work for employees.

FAIR PLAY FOR THE INVESTOR AT CLEVELAND

As the home of the Tayler franchise, Cleveland is of all cities the one most frequently referred to in connection with fare cases, although Philadelphia is coming to be a close second. In spite of the publicity forced upon it, the Cleveland Railway is much misunderstood because the name Cleveland and the 3-cent fare are indissolubly associated in the public mind. By "pinching" the investors, it has been possible to make ends meet on the present 5-cent fare in Cleveland, because traffic conditions have been unusually favorable lately due to the prosperity of the city. Men in responsible circles now appear to favor an increase in the return to investors above the original 6 per cent prescribed. The people must now decide the matter, and it is to be hoped that they will realize the importance to themselves of maintaining the attractiveness of the property as an investment.

As has been the case for many years a fine democratic spirit permeates the organization, typified by the unconventionality and friendliness of President John J. Stanley. Colonel J. H. Alexander is back "on the job," full of vigor and enthusiasm from his war experience, already making his influence felt strongly in co-operating with Mr. Stanley, General Manager George L. Radcliffe, and their associates, in solving some very pressing problems. Among these problems the "Spectator" found that one of the most serious is the reduction of accident costs. For many years Cleveland has been a great place for automobilists, who have seriously hampered rail transportation. Of course, this is a worrisome proposition in all cities, but somehow Cleveland seems to have been particularly hard hit of late. Colonel Alexander has organized his department in such a way as to co-operate with the traffic, engineering and other departments through especially qualified assistants, and is planning to get better control of the accident situation. The "Spectator" predicts that the results of this arrangement will be good.

The impression of the Cleveland situation which one carries away is one of hope that the citizens of the city will blaze a trail by acquiescing cheerfully to an increase in the rate of return to the stockholders. If by so doing they show appreciation of their fine local transportation system, they will encourage the management to carry out desired and needed improvements. They will also help in getting justice for investors elsewhere.

MUTATIONS IN PROGRESS AT BUFFALO

The fare situation in Buffalo is unique in that, while the company has permission to charge a 7-cent fare or to sell four tickets for a quarter, the fare is still held at the old 5-cent level. In taking over the control of the property, the bondholders apparently feel that the time is not propitious for taking advantage of permission to raise the fare.

After long and somewhat bitter controversy between the railway company and the city, the jurisdiction of the Public Service Commission over the local fare situation was clearly established, but undoubtedly this has left a considerable resentment in the city among those who lack confidence in the justice of the awards of the State court. While the present management has not yet fully stated its policy in regard to the matter of fares, one can easily surmise that the policy of conciliation with respect to the fare increase is to be adopted. The "Spectator" has noted elsewhere that when there is a change of management, the public is inclined to give the newcomers a chance to show what they can do, and presumably this rule will hold in Buffalo. This spirit of toleration would obviously be intensified if the new management said in effect that it desired to go into all possible details of operating economies to see if any less than the permitted maximum increase would meet its needs. In any event, the Buffalo situation will prove very interesting from the railway news standpoint for some time to come.

ROCHESTER IS STOLID ON THE FARE QUESTION

From the standpoint of reasonable fare, Rochester is one of the most discouraging cities in the country. The unfortunate "Quinby" decision of the Supreme Court of New York State hit Rochester especially hard. When the "Spectator" called, he found that Vice-President J. F. Hamilton and most of the heads of departments were in New York City improvising an operating organization for the Fourth Avenue-Madison Avenue line, which was taken over Feb. 1 by the financial interests behind the New York State Railways. However, it was possible to size up the local situation about as follows: In many ways public sentiment in Rochester favors a reasonable return to its transportation utility investors, and the company has the backing of the leading business interests. On the other hand, the city council is unwilling to risk popular disapproval of a decision to permit a fare increase. Mr. Hamilton and his associates apparently have the confidence of the people, but somehow this confidence does not take the desired concrete form as yet. The company has under way an advertising campaign which ought to bear fruit. Numerous small "cards" averaging, say, a single column wide and 2 in. high, have been carried in the local papers, each impressing one or more facts regarding the fare situation. These are signed by Mr. Hamilton, and are very frank in stressing the deplorable financial condition of the property.

In Syracuse the situation is much more favorable than that just described as obtaining in nearby Rochester. The people in Syracuse are reasonable, and acquiesced with good grace in the 6-cent fare proposition. However, this fare is far from meeting the needs of the company and the situation in the city is really deplorable. Money is not available for necessary maintenance, to say nothing of service improvement. The city lines are blessed with excellent shops, however, so that it is possible to maintain the cars with reasonable expenditure.

The conviction is growing in Syracuse that the city and the local lines operated by the New York State Railways must get together on some kind of a service-at-cost proposition. It is the hope of the management that when the city has really become convinced that, even with its reasonable attitude toward the company, some radically different means must be provided if good service is to be maintained, results will follow promptly.

A number of very fine interurban lines center at Syracuse, and in their case the outlook is better. The interurban mileage rate in the vicinity is as high as competition with the steam railroads will permit. All kinds of operating economies have been introduced, and one of the important companies is now contemplating a complete equipment of automatic substations along its main line. This company is also installing meters on its cars to induce energy saving. Another finds that by the use of reasonably light cars of large capacity a profitable business can be carried on.

As Utica is operated under the same managership as Syracuse, and as the fare situation in the two cities is the same, what has been said with regard to Syracuse may be said to apply here. The city is much smaller than Syracuse, but as the two cities show the same spirit in connection with the fare increase, presumably they would follow the same course if a service-at-cost franchise could be worked out.

Syracuse and Utica are connected by the electrified West Shore line, or Oneida line, on which is the Manlius Center automatic substation, mentioned several times in this paper. This station has given a very good account of itself, and while it has come in for criticism occasionally, in some cases this criticism was not properly directed against the automatic equipment. The station shows an actual saving in labor cost greater than estimated, and is having a marked effect in holding the operating cost of the distribution departments in spite of the large increases in labor and material prices.

In conclusion, the "Spectator" wishes to emphasize the fact that the observations made above are not designed to be comprehensive, but as stated earlier merely throw sidelights on a few salient features on the several properties mentioned.

New Cars for Metropolitan Railway, London

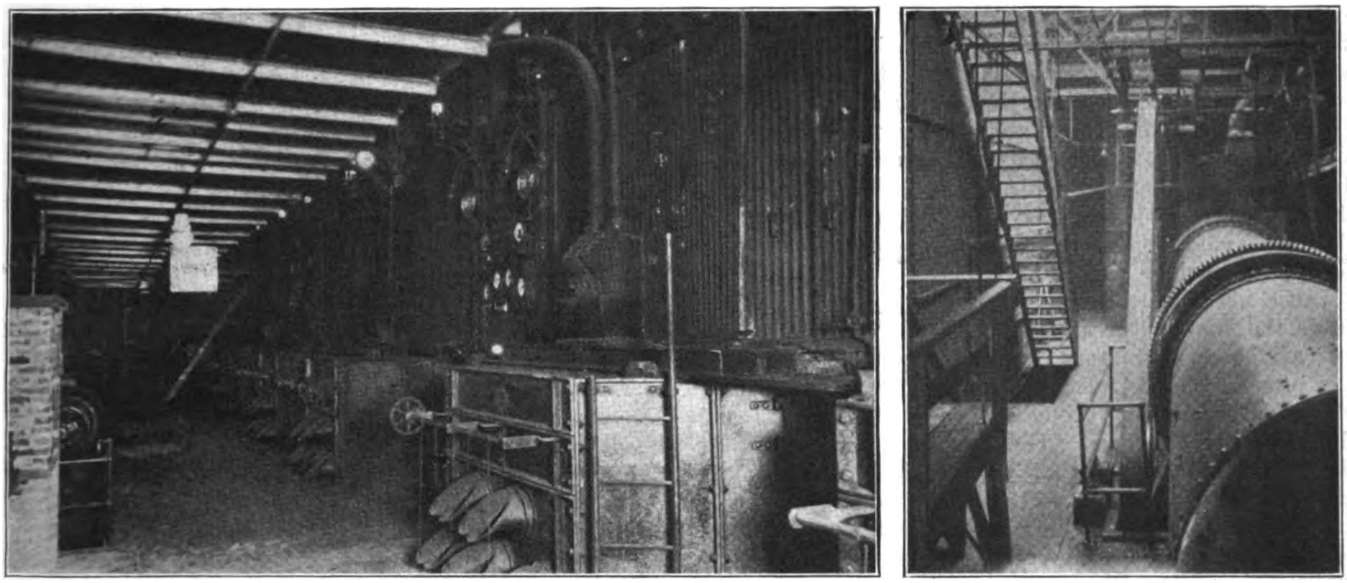
The first train of an improved type of cars has been commissioned by the Metropolitan Railway, London. This contains six cars, the first installment of an order for 100 cars. Pictures and diagrams of the cars were given in a recent issue of the *Electric Railway and Tramway Journal*, which states that the feature of the new train is the provision of five swing doors on each side of each car in place of the two or three sliding doors hitherto prevailing. The underframes and trucks of the cars are identical with earlier ones, but the seating has been rearranged to give a total of 292 seats as compared with 268 seats previously furnished. No straps are provided for the use of "standees," but in their place "steadying" rails are provided on seat backs and doors.

Pulverized Coal for Fuel Makes Good Saving in Milwaukee*

Ease With Which Fuel Feed and Draft Are Controlled, Ability to Take and Drop Heavy Overloads Quickly Without Waste, Thorough Combustion and Uniformly High Efficiency Are Chief Advantages of Pulverized Coal

By JOHN ANDERSON
Chief Engineer of Power Plants, The Milwaukee Electric Railway & Light Company

THE cost of installing and operating the plant necessary for pulverizing and drying will always determine the advisability of adopting powdered coal for steam generation in any one location. This plant comprises equipment for separating tramp iron from the coal, for crushing the coal to a size suitable for drying and feeding to the pulverizer, for removing the moisture, and finally grinding it to the desired fineness. In recent times the extra investment required for the burning of pulverized coal has become less an obstacle than formerly. The soaring price of coal has prompted thorough investigation of any process which holds promise of greater efficiency.



AT LEFT—FRONT VIEW OF PULVERIZED COAL FURNACE IN ONEIDA STREET POWER PLANT, MILWAUKEE. AT RIGHT—THE REVOLVING COAL-DRYING CYLINDER

These considerations led the Milwaukee company to begin two years ago the installation of pulverized fuel-burning furnaces and the necessary equipment on first one and later four additional 468-hp. boilers in the old Oneida Street power plant. This station contains ten boilers, the other five being equipped with Riley stokers. After much development work and many changes in design, these five boilers, burning pulverized coal, were put on comparative test with the five stoker-fired boilers in the same plant. The summary of this test is given later in this paper. The general experience gained from the use of the pulverized coal plant and furnaces is summarized in what follows:

As the coal is received at the plant in the form in which it leaves the mines, it is necessary to pass it over a magnetic separator which removes all tramp iron, such as bolts, nuts, pick-points, etc., as a safeguard against damage to the pulverizing and conveying machinery. A crusher must be used to reduce the green coal to a size suitable for proper drying and pulverizing, unless coal can be procured in sizes smaller than ¼ in. screenings without sacrificing heat value.

The fuel is next dried. The object is to bring it to a condition in which it can be most easily pulverized and most uniformly controlled by feeders into furnaces. In a pulverized-coal-fired furnace, most uniform temperature conditions are obtained with dry coal. Moisture in varying or large quantities in pulverized fuel definitely prevents a regular controllable flow of mixed fuel and air to the burners. For the removal of moisture, a mechanical dryer which reduces the water content of the fuel to about 1 or 2 per cent, is installed. This dryer usually consists of a double rotating cylinder, so arranged that hot gases from a small furnace are passed through the coal as it travels by gravity through the shell of the dryer and is delivered to the pulverizers.

The dried coal is next fed into the pulverizers. The fuel is ground to an impalpable powder, varying in fineness to pass from 80 per cent to 85 per cent through a 200-mesh screen. This process completes the preparation cycle and the coal in this form, after being conveyed to storage bunkers adjacent to the furnaces, is ready for firing.

Dust collecting and reclaiming equipment, although only auxiliary to the drying and pulverizing machinery, is of great importance in securing the most economical. as well as the cleanest operation of a preparation plant.

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*Abstract of paper presented at Feb. 19 meeting of the technical section of the Employees' Mutual Benefit Association, The Milwaukee Electric Railway & Light Company.

The cost per ton of preparing coal depends upon the size of the plant and the quantity of fuel handled, but ordinarily will vary between the limits of 25 and 50 cents. It would seem that a great deal of work toward reducing this cost remains to be done, especially along lines of utilizing waste gases for drying, in plants not provided with economizers. Development of a furnace design which will permit of burning a large percentage of finely divided coal, but capable of taking care of a smaller amount of larger sized particles, presents further study along this line. This is possible in view of the fact that the pulverizers consume about 86 per cent of the total electric energy required for all moving parts of the coal preparation equipment. Both of the items mentioned above, if capable of being reduced as suggested, will also cause a reduction in the cost of the pulverizing department labor.

Continuous and uniform operation of the pulverizing division of a plant is dependent largely upon the ability of the operators to recognize and meet the varying properties of the coal as it arrives. Dryer operation especially must be changed frequently so as to handle varying sizes of coal (from high percentages of dust to high percentages of small nut) and varying amounts of moisture, both inherent and surface, and yet supply continuously a coal of uniformly low moisture. Irregularities in the drying process usually manifest themselves throughout the entire coal cycle, and very often with the result that the fuel feeding system becomes plugged at points most readily affected by wet coal.

Little need be said concerning the equipment which feeds the fuel to the furnaces. Feeder screws driven by variable-speed motors carry the fuel from the storage bins to the air mixing chambers from which it is blown as a mixture through pipes to the burners and then into the furnaces. The feeder motor controls at the Oneida Street plant are all provided with cutouts and if at any time the air blast to the mixing chambers and burners is lost due to a blower shut down all coal feeders are automatically stopped, thereby preventing serious plugging with attendant interruption to operation of boilers for what could easily be a considerable period. Air in addition to that used for carrying the fuel into the furnace is taken through auxiliary inlets located in the furnace front, and this can be varied in amount by manipulation of the stack damper which serves to change the gas velocities through the boiler and thus the volume taken into the furnace. With coal and air supplies easily adjustable, perfect fire control is assured and it becomes at once obvious why coal is burned so efficiently in pulverized form.

MORE EFFICIENT COMBUSTION CAN BE SECURED

In further explanation of this it is well to consider briefly the indications of efficient combustion applied to the steam boiler. Chief among these is the percentage of carbon dioxide, CO_2, the product of complete combustion, which is found in flue gases. Next in importance is the percentage of monoxide, CO, a product of incomplete combustion, which may be found at the same time.

The condition desirable is that with the percentage of CO_2 as high as practical there should be no CO—a condition obtainable to a greater degree in a pulverized feed furnace than in any other type. Complete combustion with the least amount of excess air requires the best distribution of that air and the problem of furnace efficiency therefore resolves itself mainly into one of air supply, not to the furnace alone but to each particle of coal. With a fuel finely pulverized, air can be made at once available to each particle since the surface exposed to air is increased to many times that of a lump and combustion is rapid, complete and efficient. With fuel in lump form, air must be supplied through a bed, the outer surface of the lumps must be burned off, the process of combustion eating into the lumps slowly. As a result combustion is often gradual and unequal. Where the fire is thin too much air is passed; where it is heavy there is too little air. To insure complete combustion in any furnace some excess air must therefore be provided. The use of pulverized fuel reduces this excess to a minimum, gives a higher and more uniform percentage of CO_2 and therefore a higher and more uniform efficiency.

The percentage of CO_2 to be maintained in pulverized fuel practice is determined to a great degree by furnace limitations rather than combustion consideration. From 16 to 17 per cent CO_2 in the flue gases is easily obtainable but it cannot be maintained in actual operation due to the exceedingly high flame temperatures that result and the consequent destruction of the brick work. The temperature of the furnace therefore must be regulated by varying the volume of excess air. The temperature of the flame should not be above 3,000 deg. F. and that of the brick work in the flame zone not more than 2,400 deg. or 2,500 deg. F. Higher temperatures than these usually result in fusion of the ash particles and formation of a molten slag which is very destructive to the brick work with which it comes in contact.

In attempting to carry combustion conditions of a furnace so as to obtain exceedingly high percentages of CO_2 usually too little attention is given to the losses resulting from the formation of carbon monoxide, CO. Carbon monoxide, a highly combustible gas, is formed when the excess air admitted to the furnace is insufficient properly to surround and completely oxidize all the coal particles. Heat losses occurring when CO is present in the gases of combustion, outweigh any gains that may be effected by an exceedingly high CO_2 percentage.

ADAPTABILITY TO VARIOUS GRADES OF COAL

In the discussion of furnace efficiencies consideration should be given to the adaptability of a pulverized fuel fired furnace to the use of widely varying grades of coal without resultant losses in economy. Further, boiler capacity, even under heavy overloads, is in no way effected when an inferior quality of coal is burned. It is known that the combined efficiency of a boiler and furnace does not decrease when the fuel is poor, which condition does not hold true for the stoker. In the case of the stoker, the dropping off in efficiency is at a more rapid rate than the B.t.u. value of the fuel would indicate as normal, and so much so, that the point is rapidly reached when proper combustion cannot be maintained.

Operation of a pulverized fuel fired boiler, equipped with proper instruments, can be varied to take big fluctuations in load over very brief periods of time. A heavy overload can be quickly taken on or dropped off by adjustment of the coal and air feeds, and without any waste of fuel as always occurs under like conditions in stoker practice. No losses occur due to clinkering of coal or cleaning of fires, this condition of operation being entirely eliminated. Irregularities caused by change in quality and variation in size of coal, such as the fireman cannot successfully cope with on stokers, are also eliminated. Furnace conditions necessary to most economical combustion are more perfectly obtained and hence a horizontal combined efficiency curve is possible of approximate attainment.

Due to its easily regulated coal and air supply and its perfectly controlled rate of combustion, the pulverized fuel furnace practically eliminates losses of combustible in ash. Ordinarily this loss is relatively large and varies according to the nature of the coal, type of stoker and the boiler load carried. In pulverized fuel practice the loss is very small and these variations do not occur.

An additional economy is effected during banked boiler hours. Banking conditions when operating with pulverized fuel are somewhat different from those obtained in stoker practice. By stopping the fuel supply and closing up all dampers and auxiliary air inlets, a boiler fitted for use of pulverized fuel can be held up to pressure for several hours. The furnace brick work having been heated to incandescence during operation, gives off a radiant heat which is almost all absorbed by the boiler rather than escaping up the stack intermixed with an excess of cooling air. Radiation losses only occur as against radiation plus stack and grate losses with the stoker.

MAINTENANCE FEATURES GOOD NOW BUT CAN BE IMPROVED

Commenting for a moment on the maintenance features of such a plant as has been described it is the writer's belief, based on two years operating experience, that the furnace brick work in a pulverized fuel furnace will stand up equally as well as a stoker installation, with a very great advantage in favor of the former due to the elimination of all iron work in the furnace or anywhere near the high temperature zones of the boiler furnace. Regarding the maintenance of the pulverizing plant equipment it has not been found that any great amount of maintenance is likely to be necessary, as all the equipment is of the slow moving type and many opportunities are afforded for applying the same concentration of effort that has been typical of the stationary engineer's work in improving equipment when defects or fast wearing parts are discovered. The pulverizing machinery manufacturers have done a great deal along this line, but there are still matters that can be improved upon by the engineer looking for the least troublesome as well as most economical plant from a maintenance standpoint.

Powdered fuel installations are not feasible in every location. The one limitation is the size of boiler plant to be served. A plant of less than 2,500 developed b.h.p. on a 24-hour operating basis should not consider using powdered fuel. The amount of coal pulverized per day, the cost of installation, and the labor for operating the preparation plant, when properly studied, will bring before those interested the reasons therefor.

In general, we have found the powdered fuel method applied to our furnaces a distinctly advantageous one. Our firemen prefer to operate such equipment rather than the stokers when it becomes a matter of choice. It has proved more economical as evidenced by the monthly coal bill. It seems to form less scale than in stoker fired boilers. There is absolutely no trouble from smoke, consequently no reduction in the ability of the boiler to absorb heat due to soot on the tubes.

The use of high sulphur coal which is so destructive to boiler tubes, breechings, smoke stack, and all other steel equipment found in a boiler plant is much less unsatisfactory when in pulverized form, since the low moisture content of the prepared coal reduces the opportunity for attack from sulphuric acid.

Although frequently cautioned against explosions, we have had no evidence that such caution is necessary. The reason for our freedom from such unpleasant occurrences is due almost entirely to a proper care in preventing coal from being dried too much and pulverized to a fineness beyond that necessary. Matters of this kind are in the hands of the operating engineers and do not benefit by highbrow application of theories. The engineer who is careful of his every-day equipment and keeps his plant free from accidents of every nature, can operate a pulverized fuel plant successfully without other assistance than his own experience.

COMPARISON OF COSTS AND NET EFFICIENCIES

ELECTRIC ENERGY AND FUEL CONSUMPTION PER TON OF COAL BURNED

	Pulverized Fuel System		Modern Stoker
Energy consumed by conveyors, crusher, elevators, dryers, fans and feeders, kw.-hr.	5.73	Stokers and Blowers, kw.-hr.	10.94
Energy consumed by pulverizer, kw.-hr.	16.72		
Total energy, kw.-hr	22.45		10.94
Coal equivalent at 1.5 lb. per kw.-hr. lb.	33.68		16.41
Coal consumed in dryer furnace, lb.	25.66		
Total coal and equivalent, lb.	59.34		16.41
COST OF FUEL PREPARATION, FIRING AND ASH DISPOSAL			
Labor—coal preparation	$0.143		$0.000
Labor—firing	0.112		0.140
Labor—ash removal (in plant)	0.025		0.064
Dryer fuel—coal at $4.00 per ton	0.051		0.000
Electric energy—coal per kw.-hr. at 1.5 lb.	0.068		0.033
MAINTENANCE			
Labor at $0.036—material at $0.020 Manufacturer's estimate (Lubricants at $0.007)	0.063	Labor at $0.046 Material at $0.049 Lubricants at $0.002	0.097
Total cost of fuel preparation, firing, ash disposal and maintenance	0.462		0.334
Price of coal as purchased, per ton	4.000		4.000
Total cost, per ton	4.462		4.334
Cost per ton of coal in p. f. system over modern stoker	0.128		......
EFFICIENCY			
Actual gross efficiency, per cent	80.67		76.80
Net efficiency after all incidental costs have been accounted for, per cent	72.32		70.88
Difference in favor of pulverized fuel system, per cent	1.44		......

PULVERIZED COAL EQUIPMENT AT ONEIDA STREET STATION

In the Oneida Street plant the equipment and the route of the fuel through the drying and pulverizing plant are in outline, about as follows: The coal is delivered to the station by barge and run over an automatic scale, discharged onto a short belt conveyor equipped with magnetic separator pulley for removal of tramp iron, and then into a Peck carrier, which takes it to the green coal storage bunkers, the starting point of the plant proper. From there it is conveyed and elevated to a Jeffrey disintegrator where it is prepared for drying by being crushed, and then discharged into a small storage bin and fed to the dryer. The dryer is of a double shell type and is so arranged that the gases exhausted from it are discharged through a cyclone separator where coal dust, carried from the shell, is reclaimed and conveyed to the pulverizers. The gases discharged from the separator are vented into the smoke stack. The dried coal is carried from the dryer discharge by a bucket elevator to the dry coal storage bins, to which are connected the pulverizer feeders. The pulverizers are of the five-roll Raymond type. Pulverized coal from the mill outlets is conveyed by screw conveyors to the pulverized fuel storage bins. Screw feeders take the fuel to the air mixing chamber from where it is blown to the furnace.

COMPARATIVE TESTS OF FIRING SYSTEMS

In order to learn the relative operating costs and net efficiencies of pulverized coal and modern stoker firing, a test of 99 hours' duration, 495 boiler hours, was run on Nov. 11 to 15. Complete data were taken on the five stoker-fired Edge Moor water tube boilers and this compared with corresponding data on the stoker-fired boilers taken at another time, but with the boilers maintained at 120 per cent full load in each case to secure similar conditions. The summary comparison is given in the table on page 475.

Discussion of Mr. Anderson's Paper

BY PAUL W. THOMPSON
Technical Engineer of Power Plants, Detroit Edison Company

There is at the present time a considerable difference in opinion among engineers as to the feasibility of burning pulverized coal in central generating stations, and as to whether, taking all facts into consideration, the use of pulverized fuel will result in a net saving over the results obtained with modern stoker installations. It is to be presumed that a general comparison of any two plants, one equipped with stokers and one equipped for the preparation and burning of pulverized fuel, would probably not give results which could be readily comparable in determining the ultimate relative value of one method of burning fuel over the other because of the probable different conditions of operation and the difference in design, kind and cost of fuel, cost of labor, etc.

It is unnecessary to go into the details of the Milwaukee test. It is sufficient to say that the test was properly conducted and particular care exercised in obtaining an accurate record of all quantities involved. The water and coal were weighed and the scales checked for accuracy at frequent intervals. All blow-off piping was disconnected from the boilers to preclude any possibility of error due to leakage. The boilers were subjected to regular normal operation except the rating was held at practically a constant figure, and no special effort was made to obtain an efficiency which would not be obtained under normal plant operation.

During the test the writer availed himself of the opportunity of watching carefully the boiler room operation and also the operation of the pulverizing, drying, and coal handling equipment and was very favorably impressed with the installation from an operating viewpoint.

The boiler room operation was indeed much simpler than is obtained with a stoker installation. The rate of steaming of the boiler is controlled by varying the speed of the feeder motor and adjusting the damper to take care of the different quantity of flue gas. It is unnecessary to look into the furnace at any frequent interval as is the case when firing with stokers and where holes in the fire or heavy spots must be corrected. In fact when once the feeder speed is set to give a certain rate of steaming of the boiler there seems to be no reason why this rating could not be maintained continuously, as far as the furnace is concerned, without it being necessary to make any changes whatever. Variations in the kind and quality of fuel burned seemed to have no effect on the operation except that when fed at a constant quantity, the rating of the boiler varied with the heating value of the coal. At one time during the test Youghiogheny was used, which coal had a higher heating value, higher volatile content, less ash and less sulphur than the mixture of Youghiogheny and Kentucky coal which was used throughout the remainder of the test.

Losses which are inherent in stoker practice such as, breakdowns in the stoker itself, breaking up clinkers, loosening clinkers, continually watching the fire to maintain correct and uniform thickness, watching the gas passes of the boiler to see that there are no large sparks which indicate a carrying away of combustible, dumping and the many other operations that are necessary in stoker operation, are eliminated. In other words, efficient combustion is obtained at all times without continual supervision by an experienced operator and from the standpoint of reliability of operation the odds are in favor of the pulverized fuel. This is an item for serious consideration in plants designed with 4.5 kw. capacity or more per installed boiler horse power, where the losing of a boiler due to stoker trouble at the time of maximum load on the station may seriously overload the remaining boilers or make it necessary to drop a portion of the load on the plant.

The handling of the ash resulting from combustion of the pulverized fuel is a very simple matter due to the very small quantity which is deposited in the furnace. It is in the form of a very fine impalpable powder which during the test was removed twice each 24 hr. On several occasions during the first and second day of the test, slagging occurred in a furnace due to not admitting a sufficient quantity of air. The direct cause of this was the over-anxiousness on the part of the men conducting the test, to obtain a higher per cent of CO_2 in the flue gas, and the reduction in the excess air permitted the furnace temperature to rise to a point where slagging occurred. The removing of this slag from the bottom or floor of the furnace presented more difficulty than is usually experienced in removing the refuse from the ash hopper of a stoker fired boiler. This slag had to be broken up and pulled out before it fused to the brick lining of the furnace.

It appeared to the writer that this formation of slag could have been almost entirely eliminated by a more frequent inspection of the floor of the furnace and the admitting of more air through the openings in the front of the furnace if it was found that slag was beginning to form. Even at times of removing this slag it was possible to maintain the rating on the boiler by increasing the coal feed, which, however, resulted in a decreased efficiency during this time amounting to about 45 min. in 24 hr. for each boiler. A large portion of the ash resulting from combustion is carried on through the passes of the boiler and out of the stack. Owing to the fineness of this ash it is apparently carried a considerable distance even in a moderate wind before being precipitated. Throughout the test there was a moderate wind blowing probably between 4 and 8 m.p.h. and the writer was unable to find any noticeable deposit in the streets. Even at the time of blowing the deposit of ash from the boiler tubes, which was done three times a day, requiring about 20 min. per boiler for each blow, no noticeable precipitation of ash could be found in the streets. At no time during the test was there any tendency for slag to form on the tubes of the boiler.

Strictly speaking there is no such thing as a banked boiler when using pulverized fuel, since all that is necessary when it is desired to cut out a boiler is to shut off the coal feed and close all the dampers and auxiliary air inlets to the furnace. In this way the Milwaukee company found by test that it is possible to hold the boiler up to pressure for about 10 hr. by the radiant heat stored up in the furnace and boiler setting which is gradually absorbed by the boiler.

The loss which occurs and which can be compared to the banking loss in a stoker fired boiler is the heat which is radiated from the boiler and setting and equivalent in amount to that required to heat up the boiler and setting again to the temperature attained when steaming. In a plant where the ratio of boiler hours to boiler steaming hours averages 43 per cent or greater, which corresponds to an average daily plant load factor of 67 per cent, the saving resulting from the use of pulverized fuel is worth considering. Assuming 0.2 lb. coal consumed per boiler-horsepower banking hour in a plant equipped with underfeed stokers, this loss amounts to about 1.5 per cent, which, in a pulverized fuel burning plant, should easily be reduced to one-half this figure, resulting in a net saving of 0.7 per cent on this one item of the banking alone.

OPERATING CONDITIONS DURING THE TEST

The conveying and preparation of pulverized fuel presents a somewhat more complex problem, although the present equipment in the Oneida Street Station is operating satisfactorily, and during the test operated without any serious interruptions. Moisture in the pulverized fuel caused by sweating on the inside of the pulverized fuel bins resulted in some feeder troubles but this was only a temporary condition and was overcome by closing the windows just above the bins, stopping the cold air from blowing directly on them. One of the feeder pipes between the bin and the furnace became partially plugged up due to a paper composition gasket becoming lodged in the pipe just above the burner. The boiler on which this occurred was operated for at least 24 hr. at the desired rating by increasing the feeder speed on the other burner until the trouble was located and removed. During this period the efficiency of combustion was undoubtedly below the average as the coal which did come through the plugged feeder was not fed in with the correct quantity of air due to the obstruction in the feeder pipe. No trouble was experienced with the dryer or pulverizing mills at any time during the test.

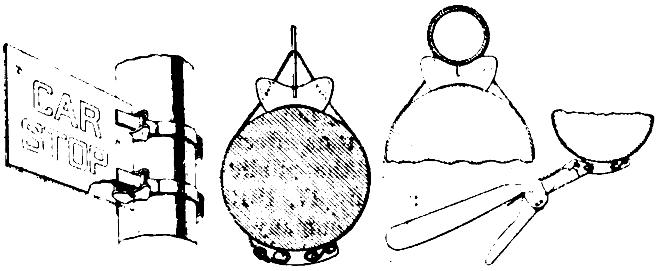
The writer does not believe that under *test* conditions over a period of constant boiler rating the efficiency obtained with the use of pulverized fuel will exceed that which has been obtained from the best stoker practice under similar operating conditions. However, under normal operation it is believed that the elimination of the many variable conditions entering into stoker operation will result in higher efficiency for the pulverized fuel installation. Overall efficiencies of boiler, furnace, and grate as high as 82 or 83 per cent, have been obtained on test with stoker fired boilers but normal operation day in and day out seldom exceeds 76 per cent in the very best practice where highly skilled help is employed in supervising the boiler room operation. The gross overall efficiency of boiler and furnace of 70.6 per cent as obtained from the results of this test would unquestionably have been higher had the boiler been cleaned prior to the test. As a matter of fact each boiler had been in operation prior to the test approximately 600 hr. since being entirely cleaned, including approximately 300 hr. on three of the boilers since cleaning the first four rows.

Inasmuch as the boiler feed water consisted of approximately 90 per cent untreated water, the scale formation in the tubes would tend to give a lower efficiency than would have been obtained with clean boilers. At the time of writing this paper it has not been possible to open up the boilers and ascertain the exact amount of scale on the tubes.

Certainly the results obtained in the pulverized fuel burning plant as a whole, where the equipment was installed and made to fit into an old plant originally equipped with Jones stokers, are encouraging enough to warrant serious consideration of the use of this kind of fuel in stations to be built in the future. There are many improvements which can be made in the design of a new plant, especially in the design of furnace, location of drying and coal pulverizing equipment, method of coal handling, drying and pulverizing, method of ash handling, slag prevention, possibility of using waste gases for the drying of fuel—all of which will have an effect on the efficiency which may ultimately be obtained. The application of pulverized fuel to central generating stations has been in use to a very limited extent for several years, but there still remains much experimental work to be done before we can hope to exhaust all the possibilities for increased efficiency, and bring it to as high a state of development as is the stoker at the present time.

New Fastening for Pole Attachments

A NEW fastening for car stop signs, conduits or other fittings which require attaching to tubular steel or concrete poles has been placed on the market by the Bush Electric Company, Cleveland, Ohio. Accompanying illustrations show how the fastening is applied. It consists of a band placed around the pole, drawn through a seating clip and clamped in such a manner as to hold the sign or conduit firmly against the pole. This tightening is made of a cinching tool which may be set at any point on the loose end of the band to give the desired tension. After the cinching tool has been brought around against the pole, the loose end of the band is fastened by bending over the fastening lugs.



CAR STOP SIGN APPLIED TO POLE, AND METHOD OF FASTENING

The principal advantage claimed for this fastening is that it will fit any pole, regardless of size, including tubular steel poles which are built in sections, the diameter decreasing towards the top, and concrete poles which are tapered from the ground up. The same equipment may be used on all sizes and shapes of poles and the bands can be carried in rolls and cut off to any desired length. All parts are weatherproofed to prevent rusting.

Revised Schedules Bring Gain

The International Railway of Buffalo Is Giving Better Service with Fewer Car-Miles—The Methods of Determining the Number of Cars Required and of Drafting the Time-tables Are Described

THE tables in the accompanying panel show what was done by the International Railway in one year by adjusting service to traffic. During the war the heavy demands on the system for the transportation of war-workers, added to the severe cold and storms experienced during the winter 1916-17, affected the operation adversely, and there was considerable criticism of the schedules in consequence. This led the company to make an extended review of the entire subject of the make-up of its time-tables.

Statement of Operations, International Railway

	For Calendar Year 1919	1918
Passenger revenue	$8,970,689	$7,167,371
Car-hours	2,442,434	2,284,352
Receipts per car-hour	$3.67	$3.13
Car-miles	22,355,365	20,655,019
Receipts per car-mile	$0.401	$0.347
Speed in miles per hour	9.1	9.1

	For Nine Months Ended September 30 1919	1918
Passenger revenue	$6,694,808	$5,689,744
Car-hours	1,833,314	1,833,315
Receipts per car-hour	$3.65	$3.10
Car-miles	16,739,825	16,582,453
Receipts per car-mile	$0.400	$0.343
Speed in miles per hour	9.1	9.0

In this study a special effort was made to adjust the service to the actual traffic demands. As will be explained later, certain notable savings in car miles and car hours were made principally in turnbacks, although few or no changes were made in the downtown district except in some cases to add cars. There was also some re-routing. By these changes, during the first nine months of 1919, under the new schedule, the passenger revenue was increased more than a million dollars, while by a coincidence the car hours were just one less. The figures for the twelve months are of a like nature.

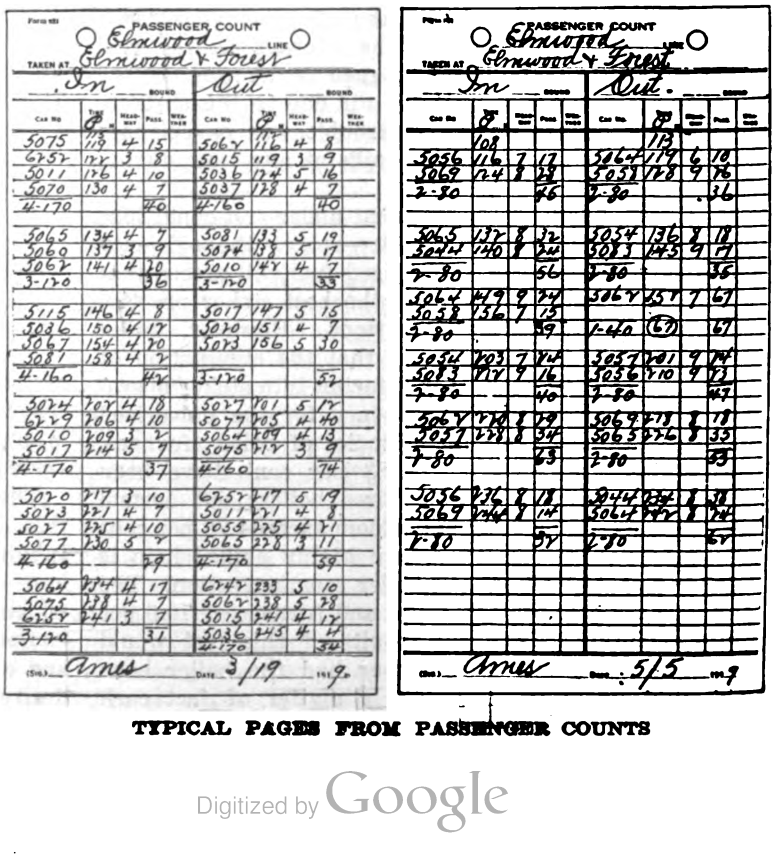
In explanation of these changes in schedules it should be said that the company exerted every effort to keep the cars on time, the theory being that a 5-minute schedule well maintained is more satisfactory to the public than a 4-minute schedule not kept up. The improvement in service thus effected was generally acknowledged in the public press, and the mayor as late as July 17, 1919, expressed the opinion that the company was giving "super service." It should be added that the figures given are those of the company as a whole and that the same fare was charged on the city lines during both periods. On the interurban lines, by order of the Public Service Commission, an increased fare was collected, beginning May 1, 1919. The total additional revenue thus collected was $206,379, but this amount of money is not included in the passenger revenue totals for the year, as given in the tables on this page.

It is the purpose of this article to describe the way in which the investigation was conducted, and how the time-tables were prepared. The work was undertaken by John O. Weigel, general superintendent of transportation. Mr. Weigel came to the International Railway from the Brooklyn Rapid Transit Company, where he had had charge of the construction of time-tables.

The first step was to take a traffic count at certain strategic points on each line. These counts were taken by checkers, of whom only a small number was required, because they would go from line to line and would check only at the times when a preliminary investigation by a higher transportation official indicated that a check was necessary. The blanks used gave the car number, time, headway, number of passengers passing the point, and weather. As a rule, the points selected for such counts were half or two-thirds of the way out from the center of the city, where there were cross-overs, so that cars could be turned back. Most of the changes in the time-tables were made in the non-rush hours.

A typical record passenger count is shown in the forms below. From the conclusions indicated by these counts the time-table was made up.

Several fundamental principles were recognized in the time tables thus drafted. The first of these was that if possible at least every other car would be run through



PASSENGER COUNT

Elmwood LINE

TAKEN AT Elmwood & Forest

In BOUND | Out BOUND

Car No	Time P.M.	Headway	Pass.	Weather	Car No	Time P.M.	Headway	Pass.	Weather
	115					112			
5075	119	4	15		5062	116	4	8	
6252	122	3	8		5015	119	3	9	
5011	126	4	10		5036	124	5	16	
5070	130	4	7		5037	128	4	7	
4-170			40		4-160			40	
5065	134	4	7		5081	133	5	19	
5060	137	3	9		5074	138	5	17	
5062	141	4	20		5010	142	4	7	
3-120			36		3-120			33	
5115	146	4	8		5017	147	5	15	
5036	150	4	17		5020	151	4	7	
5067	154	4	20		5023	156	5	30	
5081	158	4	2						
4-160			42		3-120			52	
5024	202	4	18		5027	201	5	12	
6229	206	4	10		5077	205	4	40	
5010	209	3	2		5064	209	4	13	
5017	214	5	7		5075	212	3	9	
4-170			37		4-160			74	
5020	217	3	10		6252	217	5	19	
5023	221	4	7		5011	221	4	8	
5027	225	4	10		5055	225	4	21	
5077	230	5	2		5065	228	3	11	
4-160			29		4-170			59	
5064	234	4	17		6242	233	5	10	
5075	238	4	7		5062	238	5	28	
6252	241	3	7		5015	241	4	12	
3-120			31		5036	245	4	4	
					4-170			34	

(Sig.) Ames DATE 3/19 1919.

PASSENGER COUNT

Elmwood LINE

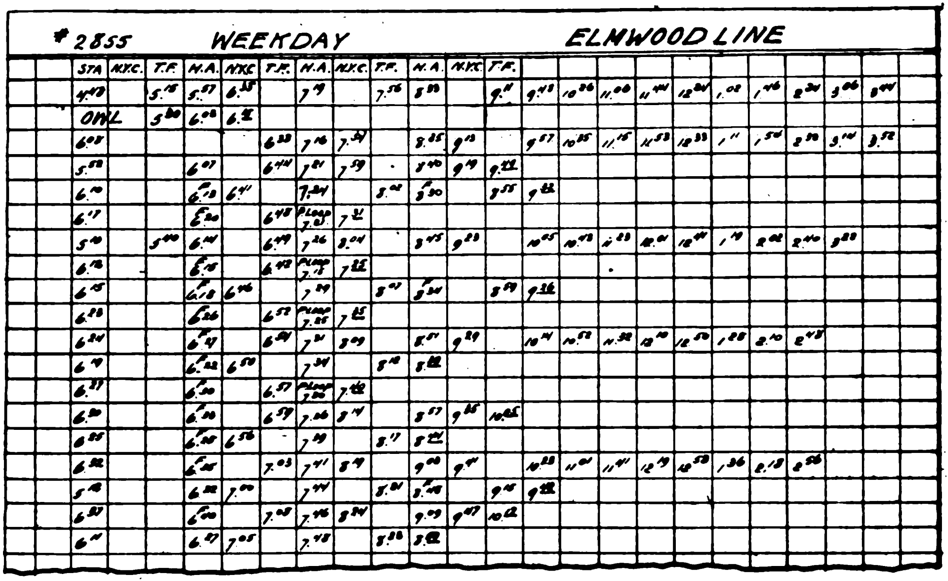
TAKEN AT Elmwood & Forest

In BOUND | Out. BOUND

Car No.	Time P.M.	Headway	Pass.	Weather	Car No.	Time P.M.	Headway	Pass.	Weather
	108					113			
5056	116	7	17		5064	119	6	10	
5069	124	8	29		5058	128	9	26	
2-80			46		2-80			36	
5065	132	8	32		5054	136	8	18	
5044	140	8	24		5083	145	9	17	
2-80			56		2-80			35	
5064	149	9	24		5062	151	7	67	
5058	156	7	15						
2-80			39		1-40	(67)		67	
5054	203	7	24		5057	201	9	24	
5083	212	9	16		5056	210	9	23	
2-80			40		2-80			47	
5062	220	8	29		5069	218	8	18	
5057	228	8	34		5065	226	8	35	
2-80			63		2-80			53	
5056	236	8	18		5044	234	8	38	
5069	244	8	14		5064	242	8	24	
2-80			32		2-80			62	

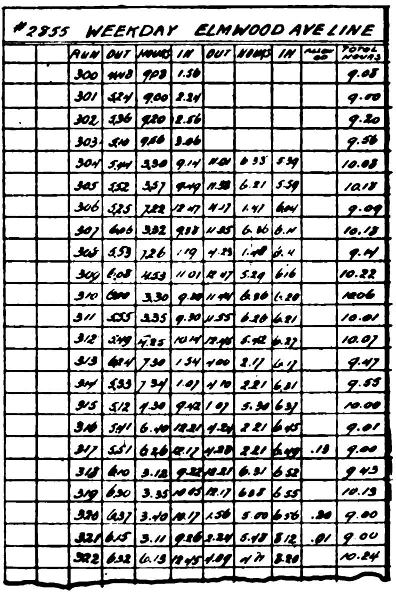
(Sig.) Ames Date 5/5 1919

TYPICAL PAGES FROM PASSENGER COUNTS



#2855 WEEKDAY ELMWOOD LINE

		STA	N.Y.C.	T.F.	H.A.	N.Y.C.	T.F.	H.A.	N.Y.C.	T.F.	H.A.	N.Y.C.	T.F.											
		4.48		5.15	5.57	6.35		7.19		7.56	8.38		9.11	9.43	10.26	11.00	11.44	12.24	1.08	1.46	2.24	3.06	3.44	
		OWL		5.30	6.08	6.45																		
		6.08					6.33	7.16	7.54		8.35	9.13		9.57	10.35	11.15	11.53	12.33	1.11	1.54	2.30	3.14	3.52	
		5.52			6.07		6.44	7.21	7.59		8.40	9.19	9.42											
		6.10			F 6.13	6.41		7.24		8.02	F 8.30		8.55	9.32										
		6.17			F 6.20		6.48	P.Loop 7.03	7.21															
		5.40		5.40	6.14		6.49	7.26	8.04		8.45	9.23		10.05	10.43	11.23	12.01	12.41	1.19	2.02	2.40	3.20		
		6.13			F 6.15		6.48	P.Loop 7.13	7.32															
		6.15			F 6.18	6.46		7.29		8.07	F 8.34		8.59	9.36										
		6.28			F 6.26		6.52	P.Loop 7.26	7.45															
		6.24			F 6.27		6.54	7.31	8.09		8.51	9.29		10.14	10.52	11.32	12.10	12.50	1.28	2.10	2.48			
		6.19			F 6.22	6.50		7.34		8.12	8.42													
		6.37			F 6.30		6.57	P.Loop 7.30	7.48															
		6.30			F 6.30		6.59	7.36	8.14		8.57	9.35	10.25											
		6.35			F 6.35	6.56		7.39		8.17	8.44													
		6.32			F 6.35		7.03	7.41	8.19		9.00	9.41		10.23	11.01	11.41	12.19	12.58	1.36	2.18	2.56			
		5.48			6.32	7.00		7.44		8.21	F 8.48		9.15	9.52										
		6.37			F 6.40		7.05	7.46	8.24		9.09	9.47	10.2											
		6.41			6.47	7.05		7.48		8.28	8.52													



#2855 WEEKDAY ELMWOOD AVE LINE

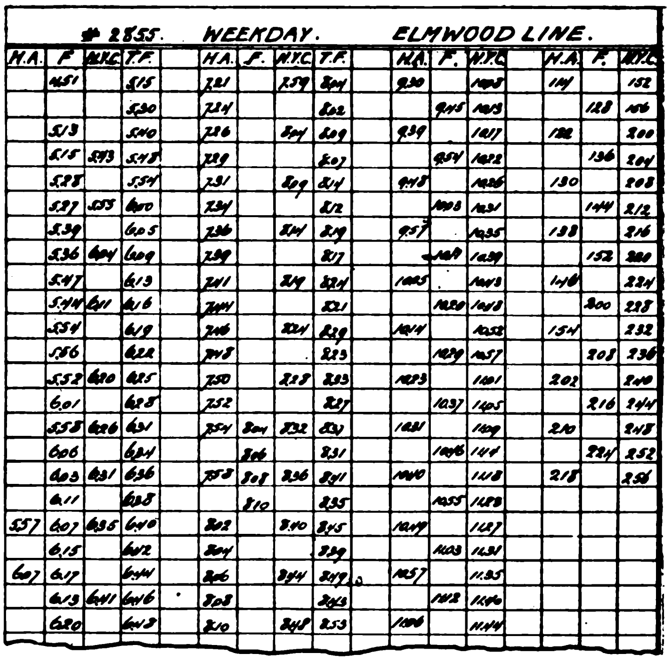
		RUN	OUT	HOURS	IN	OUT	HOURS	IN	ALLOWED	TOTAL HOURS
		300	4.48	9.02	1.50					9.02
		301	5.24	9.00	2.24					9.00
		302	5.36	9.20	2.56					9.20
		303	5.10	9.56	3.06					9.56
		304	5.44	3.30	9.14	11.01	6.33	5.34		10.03
		305	5.52	3.57	9.49	11.38	6.21	5.59		10.18
		306	5.25	7.22	12.47	4.17	1.47	6.04		9.09
		307	6.06	3.32	9.38	11.35	6.46	6.21		10.18
		308	5.53	7.26	1.19	4.28	1.48	6.16		9.14
		309	6.08	4.53	11.01	12.47	5.29	6.16		10.22
		310	6.00	3.30	9.30	11.44	6.36	6.20		10.06
		311	5.55	3.35	9.30	11.55	6.26	6.21		10.01
		312	5.49	4.25	10.14	12.45	5.42	6.27		10.07
		313	6.24	7.30	1.54	4.00	2.17	6.17		9.47
		314	5.33	7.34	1.07	4.10	2.21	6.31		9.55
		315	5.12	4.30	9.42	1.07	5.30	6.37		10.00
		316	5.41	6.40	12.21	4.24	2.21	6.45		9.01
		317	5.51	6.26	12.17	4.28	2.21	6.49	.13	9.00
		318	6.10	3.12	9.22	12.21	6.31	6.52		9.43
		319	6.30	3.35	10.05	12.17	6.38	6.55		10.13
		320	6.37	3.40	10.17	1.56	5.00	6.56	.20	9.00
		321	6.15	3.11	9.26	2.24	5.48	8.12	.01	9.00
		322	6.32	6.13	12.45	4.09	4.11	8.20		10.24

UPPER PORTIONS OF CAR-RUN SHEET AND CREW-RUN SHEET, ELMWOOD AVENUE LINE

to the end of the line. A second principle was that every effort should be made to keep the headway regular. A third was to run at least as many cars, if not more, during the rush hour and in the downtown district.

The second step in the preparation of the time was the drafting of the "headway layout sheet." The upper part of such a sheet, for the Elmwood Avenue line, is given in an accompanying form, in which the time points from north to south are Hinman Ave., Forest, Terrace and Franklin and New York Central. As will be seen, cars are started south from the carhouse at Forest Ave. on this schedule as early as 4:51 a. m., but do not begin running from Hinman Ave., the north end of the line until 5:57 a. m. From 6.32 to 8:10 practically every car going south starts from the outer end of the line at Hinman Ave., but after that time only every other car starts from the outer end of the line. In the same way, during the non-rush hours, only every other car goes as far south as New York Central.

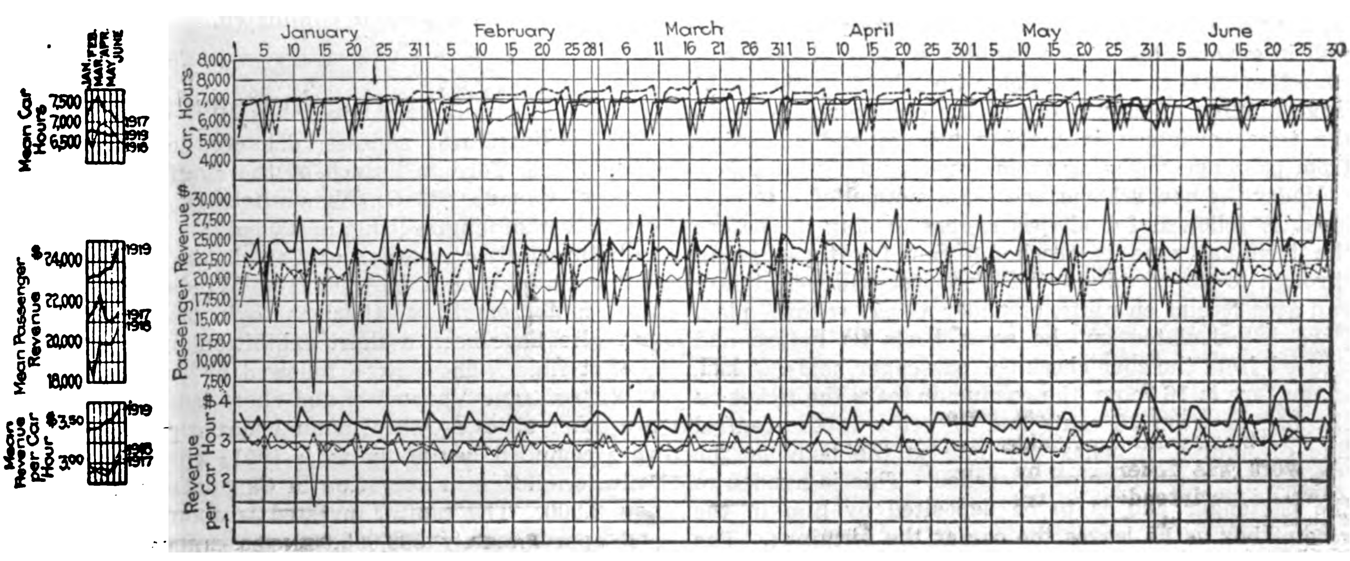
From this layout sheet, the car runs are compiled, as shown in the upper part of the car-run sheet for the same line, and from the car-run sheet the crew-run sheet is compiled. In the crew-run sheet shown all of the runs are either one-piece or two-piece runs.



# 2855. WEEKDAY. ELMWOOD LINE.

H.A.	F	N.Y.C.	T.F.		H.A.	F.	N.Y.C.	T.F.		H.A.	F.	N.Y.C.		H.A.	F.	N.Y.C.
	4.51		5.15		7.21		7.59	8.04		9.30		10.05		1.14		1.52
			5.30		7.24			8.02			9.45	10.13			1.28	1.56
	5.13		5.40		7.26		8.04	8.09		9.39		10.17		1.22		2.00
	5.15	5.43	5.48		7.29			8.07			9.54	10.22			1.36	2.04
	5.28		5.54		7.31		8.09	8.14		9.48		10.26		1.30		2.08
	5.27	5.55	6.00		7.34			8.12			10.03	10.31			1.44	2.12
	5.39		6.05		7.36		8.14	8.19		9.57		10.35		1.38		2.16
	5.36	6.04	6.09		7.39			8.17			10.09	10.39			1.52	2.20
	5.47		6.13		7.41		8.19	8.24		10.05		10.43		1.46		2.24
	5.44	6.11	6.16		7.44			8.21			10.20	10.48			2.00	2.28
	5.54		6.19		7.46		8.24	8.29		10.14		10.52		1.54		2.32
	5.56		6.22		7.48			8.23			10.29	10.57			2.08	2.36
	5.52	6.20	6.25		7.50		8.28	8.33		10.23		11.01		2.02		2.40
	6.01		6.28		7.52			8.27			10.37	11.05			2.16	2.44
	5.58	6.26	6.31		7.54	8.04	8.32	8.37		10.31		11.09		2.10		2.48
	6.06		6.34			8.06		8.31			10.46	11.14			2.24	2.52
	6.03	6.31	6.36		7.58	8.08	8.36	8.41		10.40		11.18		2.18		2.56
	6.11		6.38			8.10		8.35			10.55	11.23				
5.57	6.07	6.35	6.40		8.02		8.40	8.45		10.49		11.27				
	6.15		6.42		8.04			8.39			11.03	11.31				
6.07	6.17		6.44		8.06		8.44	8.49		10.57		11.35				
	6.13	6.41	6.46		8.08			8.43			11.12	11.40				
	6.20		6.48		8.10		8.48	8.53		11.06		11.44				

PORTION OF HEADWAY LAYOUT SHEET, ELMWOOD AVENUE LINE



THIS CHART SHOWS THE BETTER RECORDS PER CAR-HOUR DURING 1919 AND ATTRIBUTABLE, IN THE OPINION OF THE MANAGEMENT, LARGELY TO MORE CAREFUL SCHEDULE MAKING

Contrary to the conditions on some properties, Sunday is a day of light traffic. This fact is emphasized in the chart of car miles, car hours and receipts for the first two quarters of the last three years, in which the weekly peaks represent Saturdays and the weekly valleys represent Sundays.

While much was done in the way of schedule adjustment to secure the results shown in this chart some rerouting was also done on the downtown lines. This relieved the congestion during the rush periods on Main Street and also made quite a material saving in car hours per mile.

The number of cars required to operate the schedule in force during January, 1920, was:

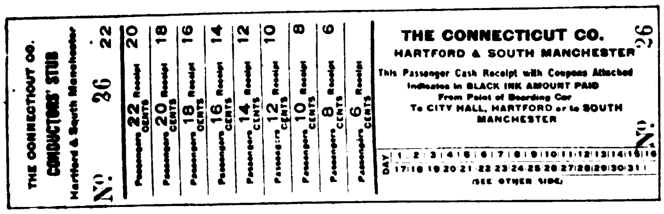
During the morning rush period	584
During mid-day	303
During the afternoon rush period	692

New Ticket for Zone System

Connecticut Company Adopts New Method to Facilitate Unloading at Termini of Heavy Interurban Runs

In order to facilitate unloading at the end of heavy interurban runs, the Connecticut Company is inaugurating on Sunday, March 7, a new method of zone fare collections for all passengers who go through to the terminus. This is being applied to two lines at first—the Hartford-South Manchester and the New Haven-Waterbury. One of the tickets used under the new method is shown in the accompanying cut.

As previously described in these columns, under the present zone system of the Connecticut Company each passenger is given a "zone check" by the motorman as the former boards the car; the fare deposited in the fare box is then calculated by the passenger and conductor from this zone check. This system has worked well in general, but at the termini of heavy interurban runs there has been some delay in unloading the usual large number of passengers at the one point, owing to the time consumed in making change and collecting from passengers coming from so many different zones.



THE CONNECTICUT CO.
CONDUCTORS' STUB
Hartford & South Manchester
No. 26
22 20 18 16 14 12 10 8 6
Passenger Receipt 22 CENTS
Passenger Receipt 20 CENTS
Passenger Receipt 18 CENTS
Passenger Receipt 16 CENTS
Passenger Receipt 14 CENTS
Passenger Receipt 12 CENTS
Passenger Receipt 10 CENTS
Passenger Receipt 8 CENTS
Passenger Receipt 6 CENTS

THE CONNECTICUT CO.
HARTFORD & SOUTH MANCHESTER
This Passenger Cash Receipt with Coupons Attached
Indicates in BLACK INK AMOUNT PAID
From Point of Boarding Car
To CITY HALL, HARTFORD or to SOUTH
MANCHESTER
No. 26
DAY 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
(SEE OTHER SIDE)

NEW TICKET FOR ZONE FARE COLLECTION ON INTERURBAN LINES

Under the new scheme, the same method of fare payment is followed for all passengers getting off before the terminal zone is reached. But for those going through to the terminus, the conductor will collect fare and give receipt en route, or under a "pay within" plan. Fare is calculated on the same basis as before and figured from the zone check the passenger holds. Then, if the fare is 16 cents, the conductor tears the ticket on the line between 16 cents and 18 cents in the central line of figures, punches the date in the body of the "Passenger Cash Receipt" attached. This is handed to the passenger and is to be deposited by him in the receipt box as he leaves the car at the terminus. The other portion of the receipt is turned in by the conductor with his other daily records and shows, in red, at the lowest right hand figure the fare he has collected on each ticket.

As seen, this method does not preclude the payment of zone fares according to present practice in case the conductor has not collected from all passengers, but is merely a means to facilitate the unloading of cars at the termini.

Closed System of Turbo-Alternator Ventilation

In an article in the current issue of the *General Electric Review*, George Monson gives valuable information on turbo-generator cooling. He points out the importance of sending clean air through the ventilating ducts because the volume required is so great that even a small amount of dust in a unit of volume may seriously clog up the spaces. For example, some conception of the magnitude of the quantities involved may be had from the fact that a 30,000-kw. machine requires approximately 6,000,000 lb. (81,000,000 cu.ft.) of ventilating air in a 20-hr. run.

The closed air circuit system of ventilation offers certain advantages in insuring cool clean air. It operates in the following manner: The air enters the rectifier cooling chamber directly after leaving the generator. This chamber contains the water sprays which produce the cooling action. It then flows to the speed-reducing chamber where the water particles are segregated from the air flow, then through an eliminator chamber where the last vestige of water is removed from the air before it re-enters the generator. This system uses the same air continuously, and can be made to occupy a relatively small and compact space as compared with the present system.

The foundation directly under the generator is usually provided with a space which is occupied by the inlet and outlet airduct pipes. This space can be utilized to advantage for mounting the air rectifier. The cumbersome station ventilating ducts, including the room occupied by the air washing apparatus, will be eliminated, thereby simplifying the station construction considerably and saving space.

The air washer is used for cleaning and cooling the incoming air. By using the same air continually, and without any possible way for it to mix with impurities, the problem of cleaning is eliminated.

Engineering in Canada

In his inaugural address, delivered on taking the chair of the Toronto branch of the Engineering Institute of Canada, R. O. Wynne-Roberts discussed "A generation of engineering in Canada." In connection with the electric railways of Canada, he said that the first ones were built in 1890 from Windsor to Walkerville, and from St. Catherines to Thorold, but there may also have been a short exhibition line in Toronto at that time. These were followed by four miles each at Victoria and Vancouver and short lengths in one or two other cities. Official annual statistics in this field were compiled beginning with 1901, when the electric railway mileage in operation in Canada was 674. It is now 2,300. The capital invested is about $170,000,000 and approximately 500,000,000 passengers are carried annually.

New Power Supply for the St. Paul

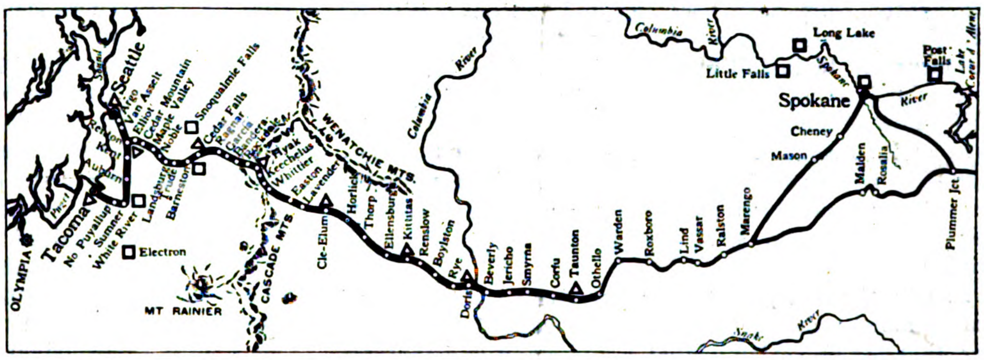
Water Power Plants at Long Lake and Snoqualmie Falls Supply Electrical Energy at 100,000 Volts to Eight Motor-Generator Substations

THE formal inauguration of electric service on the coast division of the Chicago, Milwaukee & St. Paul Railroad was scheduled for March 5, the day on which this issue of the ELECTRIC RAILWAY JOURNAL goes to press. An account of the inauguration will be given in a later issue. Readers of the paper are familiar with the details of the line and the locomotives from the several articles which have appeared in it during the past three years. Two pictures of one of the substations have just come to hand and are reproduced herewith. They were furnished by the General Electric Company. An outline map of the line is reproduced from the January, 1920, issue of the *Electric Journal*, from which a part of the following information is abstracted:

The electrification of the coast division adds 207.4 miles to the 440 previously electrified in Montana on the Rocky Mountain and Missoula divisions, and it extends from Othello in central Washington to the shops in Tacoma at the Puget Sound end. There is still a 212-mile gap between the Montana and Washington sections to be electrified.

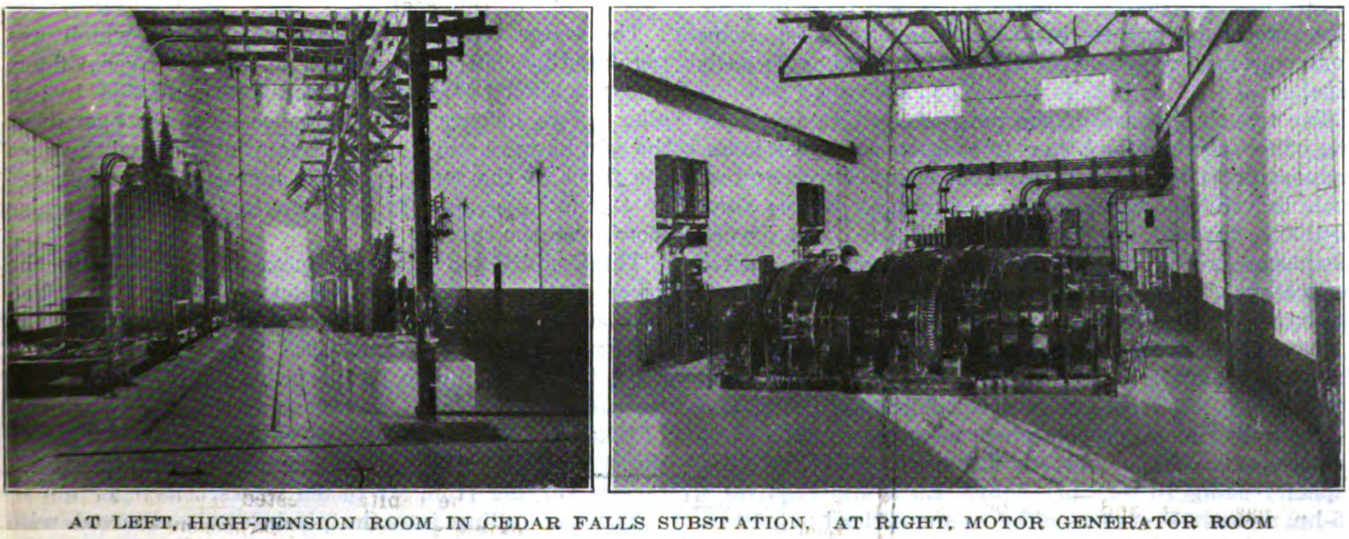
All of the energy used on the new electrification is developed from water power, by the Washington Water Power Company and the Puget Sound Traction, Light & Power Company, through an organization known as the Intermountain Power Company. The Long Lake plant of the Washington Company and the Snoqualmie plant of the Puget Sound Company are the chief sources of power. This is delivered at 100,000 volts along the railroad's right-of-way, to eight substations as indicated by triangles on the map.

The contract between the Intermountain Power Company and the Chicago, Milwaukee & St. Paul Railroad specifies that the total demand of the railway company must not exceed a stated amount when integrated over a period of five minutes, and that the power payment be based upon this amount, with a maximum load factor of 60 per cent. For instance, if the denominated maximum is 10,000 kw., the railway company will pay for 6,000 kw. integrated over the month, whether this amount is used or not, and for amounts in excess of 6,000 kw., will pay at the same rate per kilowatt-hour. This requirement gives the railway company the benefits in cost of power generation that accrue because of high load factor. In order to meet the conditions of the contract it becomes necessary to totalize at every instant the whole load being taken into the railway system at the substations located at Taunton, Cedar Falls, Renton and eventually Tacoma. This load must be totalized in such manner that it can be measured by a maximum demand meter with a five-minute interval, as well as indicated and recorded. Also, in order to prevent the peaks of load usual to railway service from penalizing the road in additional power cost, the voltage generated at the substations is reduced automatically when the total load reaches such proportions that the nominated maximum demand is in danger of being exceeded. The result is a smoothing out of the load curve of the system by slowing down trains during the peak and spreading some of this load over the valleys of the curve.


Seattle
Sound
Puget
Argo
Van Asselt
Elliot
Cedar Mountain
Maple Valley
Noble
Snoqualmie Falls
Cedar Falls
Ragnar
Garcia
Renton
Kent
Auburn
Landsburg
Trude
Barneston
Tacoma
No Puyallup
Sumner
White River
Electron
OLYMPIA
MT RAINIER
CASCADE MTS
WENATCHIE MTS.
Rockdale
Hyak
Keechelus
Whittier
Easton
Lavender
Cle-Elum
Horlick
Thorp
Ellensburg
Kittitas
Renslow
Boylston
Rye
Doris
Beverly
Jericho
Smyrna
Corfu
Taunton
Othello
Warden
Roxboro
Lind
Vassar
Ralston
Marengo
Columbia River
Columbia River
Long Lake
Little Falls
Spokane River
Spokane
Post Falls
Lake Coeur d'Alene
Cheney
Mason
Malden
Rosalia
Plummer Jct.
Snake River

MAP OF PART OF C., M. & ST. P. R.R. SHOWING NEWLY ELECTRIFIED SECTION

Equipment for the substations is being supplied by the Westinghouse Electric & Manufacturing Company and the General Electric Company. Each of these companies has taken special precautions to guard against the occurrence of flash-overs on the direct-current generators at times of short-circuit on the 3,000-volt system. The substations whose equipment is supplied by the General Electric Company are provided with high-



AT LEFT, HIGH-TENSION ROOM IN CEDAR FALLS SUBSTATION. AT RIGHT, MOTOR GENERATOR ROOM speed circuit breakers with a view to opening the circuit before the current has had opportunity to build up. The machines furnished by the Westinghouse Company are protected by the "flash suppressor," a device developed especially for this electrification.

Powdered Coal Plant at Seattle

Following Extensive Experiments the Puget Sound Company Installed 4,100-b.-hp. Plant — Well Arranged Equipment Increases Economy and Efficiency

THE Puget Sound Traction, Light & Power Company, Seattle, Wash., installed in one of its boiler plants, used for steam heating purposes, a complete equipment for burning pulverized coal, following the experiments described in the issue of the ELECTRIC RAILWAY JOURNAL for May 19, 1917. Fuel oil was previously burned in this plant, but the presence of a 225,000-ton culm heap near by, and the possibility of effecting considerable economy by utilizing it, induced the company to install a pulverizing and drying plant. The culm is from Washington lignite coal which has a fuel value of about 9,000 B.t.u. with 18 per cent moisture and 16 per cent ash. The culm itself contains 7,300 B.t.u. with moisture of 25 per cent, volatile matter 28 per cent, fixed carbon 26 per cent and ash 20 per cent. It costs $1.80 per ton f.o.b. the raw-coal bunkers.

Briefly the equipment may be divided into several parts, namely, that for handling raw coal, that for drying, that for pulverizing, that for burning and that for handling the ashes.

There are three wooden raw-coal bunkers, lined with galvanized iron, of a total capacity of 725 tons. The raw coal passes first through a gate and an auxiliary hopper (provided to prevent clogging) to a Mead-Morrison crusher, next by way of a belt conveyor to a bucket elevator, thence to a raw-coal flight conveyor, which distributes it over the bin provided for raw crushed coal. The capacity of the plant to this point is 75 tons per hour.

The 325-ton crushed coal bunker is of reinforced concrete. It branches into two hoppers with 10 in. x 5 ft. discharge openings in the bottom. From these 30-in. apron feeders convey the coal to dryers through 10-in. pipes, so arranged that either or both of the two dryers can be used. In these pipes are lines of paddles, motor-driven, to insure continuous flow. One horsepower is required for the set of paddles in each pipe.

The two dryers are of the indirect-fired rotary type, one of 7 tons and the other 10 tons capacity per hour. Induced draft for these is provided by two Sirocco fans, each driven by a Terry steam turbine. These fans discharge through cyclone separator heads. The dryers discharge into a dry-coal elevator, through magnetic separators which take out iron scrap. Thence the coal is distributed by means of a 12-in. screw conveyor over a dry coal bin through eight steel extension spouts. The dry-coal bunker is of reinforced concrete, with a total capacity of 160 tons. It is divided into four hoppers.

The pulverizing mill equipment comprises four Fuller-Lehigh 42-in. mills and one Raymond mill, the total capacity being 16 tons per hour. Each mill requires a 75-hp. motor. From the mills the spouts lead to a 12-in. screw conveyor and the powdered coal passes over an elevator to another 12-in. screw conveyor, leading to the bins above the boilers.

No cyclone separators or dust collectors are used with the Fuller mills, but the excess air is removed by a small induced draft fan, and is fed directly to the furnace. From the Raymond mill a large exhaust fan, driven by a 30-hp. motor, drives the air through a cyclone separator, from which the discharge leads to the above mentioned screw conveyor. There is also a small pressure relief fan connected to the separator to prevent accumulation of pressure.

As previously mentioned, a screw conveyor leads to the bins over the boilers, and across this are four 12-in. conveyors, each driven by a 5-hp. motor, feeding a bin of 16 tons capacity. Connecting with the bins are twenty-two screw-conveyor feeders. After experiments with several types of feeder, it was found that for the local conditions the Santmyer feeder was best and this is now used throughout.

Air for the feeders comes from two 50,000-cu.ft. Sirocco fans and two 3,000-cu.ft. Sturtevant fans, the latter being used for individual feeders. The feeders are driven by 1½-hp. Crocker-Wheeler motors.

The burners are especially designed elbows with three openings, one for the fuel, a smaller one for the air feed and a third for the discharge.

In adapting the boilers for the new fuel supply, Dutch ovens were added so as to give ample combustion chamber space. Ash crushers were installed also and a drag-chain conveyor was provided to transfer the ashes to an elevator which raises them to the ash bin.

The culm is loaded at the mines directly into coal cars by means of a Bagley scraper. It is delivered to the storage bunkers at night, two additional men being furnished to help the train crew in unloading the cars. One man takes care of the raw coal equipment, coal being transferred from the storage bunkers to the crushed coal bunkers sufficient for the twenty-four-hour run during an eight-hour shift. One man looks after the feeders supplying the dryers which, owing to the higher temperatures of the discharge, tend to clog up. Another man operates the dryers and mills. He has an assistant to look after the distribution of the dry coal and pulverized coal in the bunkers above.

Both mills and dryers are operated continuously. Pulverized coal is used as a fuel for drying, approximately one ton of pulverized coal being burned to dry twenty tons of raw coal.

The water tender takes care of feeders, which are regulated by controllers located on the boiler room floor. The machinery is kept in operating condition by an oiler. Two helpers keep the tubes clean by operating the soot blowers and a special steam jet inserted through the front of the setting. This operation is performed at 4-hour intervals. In addition to this the men also blow down the tubes.

Three additional helpers remove the ashes from the dryer settings, clean the combustion chambers when necessary and remove the ash deposits back of the bridge wall at regular intervals. This deposit is wetted down in the setting to facilitate handling and to avoid spreading of the dust. One cleaning a week is sufficient to take care of this deposit. The slag accumulating on the sides of the combustion chamber is removed at intervals varying from six to ten weeks.

The ash falling into the pit below is removed with long rakes. The ashmen look after this work, while the third operates the drag chain and ash elevator and feeds the ash crusher. The ash in the pit consists of slag and powdered dust. The slag is pulled out near the door and cooled off with a stream of water. When sufficiently cool, it is pulled out under the runway in front of the ash pit where it is again drenched to speed up the cooling, after which it is fed to the crusher.

The above information is taken from an article in the Stone & Webster *Journal*, where additional details can be found.

Association News

Mr. Henry to Head Washington Office

W. V. HILL has resigned as manager of the Washington office to resume his duties as manager of the California Electric Railway Association, and Charles L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., and chairman of the committee on national relations will take over the active supervision of the affairs of that office. The office will be open continuously and all communications pertaining to matters of federal legislation, the Interstate Commerce Commission, or other federal departments or bureaus, addressed to Charles L. Henry, chairman committee on national relations, American Electric Railway Association, 950 Munsey Building, Washington, D. C., will receive prompt attention.

The Washington office is equipped to act as agent before the Interstate Commerce Commission for companies requiring this service and such companies as are not so represented or who desire to make a change in their present arrangement should communicate with Mr. Henry at Washington for the necessary authorization blanks. There will be no charge for the performance of this service other than a documentary tax of 25 cents required by the government and cost of telegrams or other unusual service involved.

Executives and others connected with member companies having business in Washington are urged by Secretary Burritt to make the Association's rooms their headquarters.

Information Bureau Activities

DURING February the following very considerable group of special reports and compilations was prepared by the association information bureau under the direction of its special engineer, J. W. Welsh:

Typical Exhibits of Electric Railways Used in Settlements of Wages and Working Conditions: This is an outline of a typical wage arbitration case, showing the essential elements, a brief statement of arguments and a number of actual exhibits used by member companies recently in the presentation of such cases.

Confidential Information Concerning Wages of Trainmen: Supplement No. 1 to bulletin No. 122, dated March 1, 1920. This supplement follows the plan of the original bulletin, showing the name of the company, miles of track, wage rates for each period of service and the dates of establishment and expiration of the scale.

Practice of Electric Railway Companies in Adjusting With Shipper Shrinkage in Coal Received by Boat or Rail: In response to a request by a member company, a questionnaire was sent to a limited number of companies to determine their practice in allowing for shrinkage in the weight of coal as shown by bill of lading and as actually measured on receipt.

Elements Entering Into the Determination of Fair Value of Public Utilities, Dated February 10, 1920: This is an appendix to a former compilation on "Official Valuation of Electric Railway Properties" and is based on extracts from decisions of courts and public service commissions.

Recent Decisions of Public Utility Commissions, Regarding One-Man Car Operation, Dated February 19, 1920: This is a compilation of abstracts of decisions and orders of public utility commissions regarding the operation of one-man cars.

Rentals Paid by Electric Railway Companies for High Tension Lines and Cables Over Bridges, Dated February 17, 1920: This report was prepared in response to a request by a member company and is based on replies received to a circular letter sent out by the association to a limited number of companies.

Effect of Increased Rates of Fares in Cities Having a Population Under 100,000, Dated February 16, 1920: This compilation is supplemental to the one reported last month which covered companies operating in cities having a population over 100,000. It shows the results for 57 companies.

Effect of Increased Fares for Companies Operating in Interurban Service, Dated February 16, 1920: This report covers a total of 28 companies.

Summary of Cities of Over 25,000 Population in Which the Fares Have Not as Yet Been Increased, Dated February 19, 1920: This shows the population, the operating company, present rate of fare and details as to pending applications.

Bibliography on Motor Bus Design and Motor Bus and Jitney Costs, Dated February 19, 1920.

Copies of the above will be sent to member companies upon request.

Some Safety Precautions in Winding Armatures

IN A RECENT issue of the *Safety Bulletin*, issued by the Bureau of Safety, Chicago, some precautions are enumerated which can be advantageously employed by armature winders. Among these precautions are the following:

Never allow water to drop into hot solder or babbitt metal.

Never stand directly in front of a banding lathe, where a banding wire is apt to strike you if it breaks.

Goggles should be worn when banding armatures and when slotting or turning commutators. A neat guard with an adjustable glass screen can sometimes be added to a slotting machine to prevent copper chips from striking the eyes.

Do not allow insulating paints that are mixed with alcohol, naphtha or other inflammable liquids to be poured from cans while near furnaces or torches. A 5-gal. can with about one quart of shellac in it exploded while a young man was shaking it within a few feet of a furnace. The explosion caused severe burns on his face and arms, and had it not been for the shopmen present, these might have proved more serious, if not fatal.

Make sure that the tailstock of the lathe is secure before starting to turn a commutator. Watch carefully the condition of slings, hooks or chain tackles and make certain that armatures are properly balanced so that they cannot slip.

Gears on turning lathes or field winders should be properly guarded.

Remember that fooling, horseplay or practical joking has no place in the armature room. Neglect of this will lead to accidents, poor standards of work and general demoralization of an otherwise efficient force.

Recent Happenings in Great Britain

Railway Wages Arranged — London Wants Four-Track Lines — Practically All Municipal Roads Have Raised Fares

From Our Regular Correspondent

The railway trouble is over. On Jan. 15 the negotiating committee of the National Union of Railwaymen accepted the terms as to standardized wages offered by the Government substantially in the same form as that in which they had originally refused them. The leaders of the men succeeded in persuading the latter to accept the Government proposal, but the course was adopted by only a very narrow majority.

SLIDING WAGE SCALE

The standard wage in each grade is to be the average of the pre-war rate of grade plus 33s. war bonus plus 5s. A sliding scale is adopted by which wages move up or down by 1s. a week after September next as the cost of living goes up or down five points from 125 per cent above the pre-war rate. Should the cost of living fall to the pre-war rate, wages will never fall below double the pre-war rate. This settlement, along with the scheme of the Wages Board's, which I explained in my last article, should go far to prevent trouble in the future. Before the war the railway wages bill amounted to £47,000,000 a year. It will now come to £110,000,000.

A remarkable suggestion was made on Jan. 16 by Lord Ashfield (before his elevation to the Peerage, Sir Albert Stanley), chairman of the London underground railways. Speaking at a gathering of the London American Luncheon Club on the problems of traffic congestion in the metropolis, he threw out the proposal that not only should additional underground electric railways be constructed, but also that underground roads should be made, to be devoted exclusively to the use of fast automobile traffic, and connected in the outer districts with boulevards.

In dealing with the need of greater facilities for transportation, Lord Ashfield pointed out that a population of about 8,000,000 has to be dealt with over an area having a radius from the center of London of 20 to 25 miles. Not only is London the most populous, but it is the greatest riding city in the world. In 1914 the number of journeys per head of population was 303, while now it is 393 per annum. In reference to his proposal for more underground railways, he thought they should be brought up more to the standard of those in New York where there were local and express services.

UNIONS SUPPORT FARE BILL

The executive of the National Union of Railwaymen, contrary to the latitude of other trade unions, decided early in February to support the Parliamentary Bill of the London underground railway companies for an increase of fares. The N. U. R. sees that without the increase the underground companies will not be able to pay the higher wages under the recent agreement.

Some figures submitted by C. Owen Silvers, general manager of the Wolverhampton Corporation Tramways, to the Town Council in regard to fares indicate pretty clearly what has been done generally in England. A proposal was brought before the Council to reinstate the 1d. fare for short-distance journeys, but acting on the advice of the manager it was decided to adhere to the increased minimum of 1½d. Mr. Silvers stated that the running costs of the Wolverhampton cars were 6.651d. per car mile in 1913-14, but in 1918-19 they amounted to 12.366d. People, he said, seemed to have realized that in everything except tramway fares 2d. was now required where 1d. was enough in pre-war times. He found from returns he had received that fares had been raised on practically all the municipal tramway undertakings in the kingdom, and that the 1½d. minimum was now the usual practice.

EXTENSION OF PARCEL SERVICE

A good many of the British tramway undertakings have for several years carried on a parcel service successfully. In Leeds a new arrangement has now been adopted for the carrying of market produce on the cars. Suburban retailers make their purchases in a central market early in the morning, and they have hitherto taken their parcels with them on the ordinary cars, paying for them at the time they paid their own fares. Under the new arrangement the traders have to take their packages to a weighing machine in the market, where a tramway employee is in attendance to weigh and stamp the packages. The car conductors do not accept the parcels unless they have been stamped.

On the occasion of the amalgamation of the Metropolitan Carriage Wagon & Finance Company, with Dickers, Ltd., Mr. F. Dudley Docker, chairman of the former company, was presented by the shareholders with an illuminated address and a sum of money for the creation of scholarships at Birmingham University bearing Mr. Docker's name, to be competed for by employees of the Metropolitan Company, in subjects selected by him. The subscribers numbered about 1,100. Mrs. Docker received miniature portraits of herself and her husband mounted in gold. Mr. Docker occupies one of the most prominent positions in the British manufacturing world. He is a leader of the British Industries Federation.

The lorry omnibuses which had begun service in June last year were finally withdrawn from the streets of London in the end of January. Owing to the large number of omnibuses which had been sent to France for the purposes of the war and owing to the impossibility at the time of obtaining new ones, the London omnibus traffic became very congested. The War Office placed at the disposal of the London General Omnibus Company a number of military motor lorries. These were fitted for 'bus purposes by providing cross seats, an overhead canopy, and a door and steps at the rear. These vehicles reached a maximum number in service of 176 last November. They were never popular, though they eased the situation, because their springs were made to carry three tons, while the weight of the twenty-six passengers each could carry was only about a ton and a half. The company found that the working expenses exceeded the revenue by no less than 5d. per mile run, partly owing to low receipts and partly to high petrol consumption. Regarding the latter, the best result that could be got was 5½ miles to the gallon, compared with 7 miles in the case of the ordinary omnibus, which carries 50 per cent more passengers. The company has got so many buses back from France it can now dispense with the use of the lorries.

The interesting statement was made at a meeting of the London County Council in the end of January that the average speed of the Council's cars is higher than that of the cars in any other city in the kingdom. In view of the great congestion of general traffic on many of the routes, this achievement is highly creditable.

EDINBURGH BUSES SATISFACTORY

Not long ago the Edinburgh Town Council as an experiment began running a service of five motor omnibuses as supplementary to the tramways. The plan has proved so satisfactory that it is now proposed to purchase thirty additional omnibuses at an estimated cost of £55,000. The tramways, which are still worked by cable traction, are congested owing to increase in the number of passengers.

Disaster fell on the English Electricity (supply) bill during December. So much opposition developed to it in the House of Lords that the Government dropped the part opposed till next year, when there will be more time, and proceeded only with the part on which there was general agreement. There has thus been cut out of the bill all the compulsory powers for the establishment of district electricity boards and for the acquisition of generating stations and main transmission lines.

The financial provisions have also been deleted, except one for an expenditure up to £20,000,000 for the erection of power stations and transmission lines. The part of the bill remaining provides for the establishment of a body called electricity commissioners, and the exercise through them of present powers and duties of the Board of Trade under the Electric Lighting Acts, with power to the commissioners to conduct experiments, and power to set up advisory committees.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Sliding Scale for Toledo

New Service-at-Cost Measure Provides for Added Return to Company for Efficient Operation

The service-at-cost ordinance drafted by a commission appointed by Federal Judge John M. Killits for settlement of the railway problem at Todelo, Ohio, will be submitted to the City Council for preliminary action on the evening of March 8. Council hopes to have the proposed ordinance ready for a referendum in connection with the presidential primaries on April 27. A month's notice must be given before the election.

SOME SLIGHT MODIFICATIONS

The commissioners met during the week ended March 6 for the first time since the measure was submitted to Henry L. Doherty two weeks ago. Mr. Doherty has sent no reply yet. The commissioners heard the written reports of six lawyers who scanned the measure for technical errors and have since adopted a few new principles to go into the franchise ordinance.

Those who drew up the franchise have decided that it should contain a provision for a premium in the form of increased rate of return for economical operation of the system by the company, which will take over the traction business when the ordinance is adopted by the people. This premium is to consist of a one-quarter of 1 per cent increased return on the capital value for each half cent the rate of fare is lowered. Figured on an estimated capitalization of $10,000,000 and 60,000,000 riders annually, this would mean that the car riders would be saved $300,000 for each $25,000 the company receives in the way of increased return.

Chairman W. L. Milner, of the commission, declared such a provision would make the securities of the company more saleable and in that way help the financing of the railway. It was agreed that the increased return should accrue to the stockholders. With low fare and consequent high rate of return the stock would sell above par, the commissioners believe.

MAXIMUM FARE PROVISION RETAINED

The maximum fare provision will be kept in the ordinance to win the popular support necessary for the adoption of the measure. Some commissioners believed it would be possible to eliminate the maximum fare provision with the premium on economical operation incorporated in the ordinance.

Mr. Doherty has never yielded on the maximum fare objection which he registered with the commissioners some time ago. This and the valuation question are the only major issues not definitely decided.

The commissioners also considered the cost of current which will be bought from the Water Street power station and the Acme Power Company, both Doherty properties. It is understood that the Acme plant does not come under the authority of the Public Utilities Commission as it sells power only to the Water Street station and other commercial users in Toledo. The commissioners will probably make the Acme Power Company a party to the contract in the ordinance and in that way secure the rate-fixing restrictions imposed by the Public Utilities Commission.

The ordinance must be passed by Council not later than March 22 if it is to be submitted at the presidential primary election.

The decision of the Supreme Court on the municipal ownership test case is expected soon. If it is favorable to public ownership and is received in time another ordinance providing for the bonding of the general tax duplicate for the purchase of the traction system will be submitted to the voters.

Franchise Extension Refused

The application of the Hudson & Manhattan Railroad, New York, N. Y., for another extension of time in which to begin building its line from Thirty-third Street and Broadway, its present terminus, to the Grand Central Terminal, was denied on Feb. 28 by Acting Transit Commissioner Daniel L. Ryan.

It was the seventeenth time the company had asked for an extension, and it will be the last, for the reason that its franchise expired on Feb. 29 and its options of real estate has lapsed. It cannot proceed with the work now without obtaining from the Board of Estimate another franchise. It was said that this would probably be denied by the board, for the reason that it would be deemed unwise to advance any project that would compete with city-owned transit lines.

The plan of the Hudson & Manhattan Company was to reach the Grand Central Terminal by extending its line to a point at or near Sixth Avenue and Fortieth Street, then running under Bryant Park to a point near Fifth Avenue and Forty-second Street, to a terminal under the latter street between Madison and Lexington Avenues.

Fear that the proposed extension would restrict the development of the city-owned lines was one of the reasons why property owners in the borough of Manhattan opposed the proposed extension.

Denver Arbitration Closed

Decision Expected Soon by Board Which Has Been Considering Wage Question

Indications pointed on Feb. 24 to a decision being reached very soon, by the board which has been considering the question of pay for the employees of the Denver (Col.) Tramway. Commencing on Jan. 19 public meetings were held by the arbitration board in the Council Chamber. Final argument was made on Feb. 10. Since then the arbitration board has held numerous conferences for the consideration of the data and the evidence submitted.

The demands of the men were made on Nov. 19, 1919, to a local board of arbitration under the agreement of Sept. 4, 1919, between the company and the union. The trainmen want an increase from the National War Labor Board award of 43 cents the first three months, 46 cents the next nine months and 48 cents thereafter, to 60 cents the first three months, 65 cents the next nine months and 70 cents thereafter with corresponding increases for the employees in the other departments, also time and a half for overtime, and changes in working conditions. The board of arbitration consists of two members, one appointed by the company and one by the union. The company's appointee was William G. Evans, former president of the Denver Tramway, while William C. Thornton, general agent of the Continental Life Insurance Company and also identified with local labor circles, was selected by the union.

The failure of the two members of this board to come to an agreement regarding the questions at issue and also regarding the selection of a third arbitrator led to intervention by the State Industrial Commission, which assumed jurisdiction on Dec. 29 in the effort to avert the possibility of a cessation of service.

Through the efforts of the Industrial Commission Hamilton Armstrong, chief of police of the city of Denver, was agreed upon as the third member of the Arbitration Board, the appointment being accepted by him and the Board completed on Jan. 13.

The railway is now collecting the 6-cent fare authorized by the municipal authorities during November, 1919. This ordinance, which contains no time limit, was passed by the municipal authorities following the defeat at a special election held on Oct. 22, 1919, of the tramway measures which were on the ballot and the subsequent expiration on Oct. 29, 1919, of the second 6-cent fare ordinance which had been granted. This last measure was limited to ninety days.

Detroit's Battle on in Earnest

Opposing Forces Line Up in Fight on Piece-Meal Railway Construction by City

As the date set for voting on the $15,000,000 bond issue for financing Mayor Couzens' proposed municipal railway system in Detroit, Mich., approaches, both parties to the controversy, the Mayor and his followers in favor of the plan and the Detroit United Railway officials who oppose it are taking advantage of all possible opportunities to express their views to the taxpayers.

CAMPAIGNING BEGUN

Either the Mayor or his adherents in the matter are appearing daily before different organizations to discuss the issue and clear up points of doubt in the minds of the car riders who will decide the question on April 5.

The Detroit United Railway officials are endeavoring to. justify the company's conduct in the matter of providing extensions by reviewing conditions as they have existed in the past years. The company's views are being expressed through its official weekly publication and by paid advertisements in the local papers.

The greatest organized opposition to the municipal ownership plan was expressed at a meeting of the street railway men's union, Division No. 26 of the Amalgamated Association, when a resolution was adopted denouncing the Mayor's plan as a piece-meal experiment sure to result in a useless duplication of equipment, shops and machinery, and "in confusion and inconvenience to the car riders rather than improvement and relief." The declaration was made by the railway men that the service-at-cost plan will solve the problem if properly put into operation.

The proposed bond issue for piece-meal construction is opposed as a waste of time and funds and the entire membership of the organization will be called upon to oppose the Mayor's proposition and to work for its defeat until the date set for voting upon the question.

The Detroit United Railway maintains that it has built in the city of Detroit every foot of railway tracks that the city authorities would allow it to build and when restrained from building in the city, went outside the city and by outside authority built many miles of railways later included in the city and one-fare zone when the city limits were extended.

COMPANY RETURNS TO THE ATTACK

Admitting that the city is short on railway service and reviewing past circumstances including the World War, instructions from city authorities to avoid construction in Detroit pending the popular vote on municipal ownership in 1915, and similar conditions in 1919 when another like vote was taken, the company maintains that it is unfair for those who have prevented it from extending service to now make inadequate service the sole basis of attack.

In discussing the bond issue the company's publicity department points out that Detroit's municipal pot is shy in many ways, including schools, watermains, municipal lighting plant, police department, and even jails.

The cost of construction of the proposed piece-meal system, if approved by the city, will not come out of the taxes, as all construction costs will be met by the sale of bonds issued against the faith and credit of the city itself. The city charter provides that "the faith, credit and property of the city of Detroit shall remain pledged for final payment of all bonds issued and of all moneys borrowed by authority of, and in accordance with this charter or any act of the legislature of this state."

If, however, by any chance or under any circumstances enough money does not come in from railway operation, resulting in deficits, even though the fares were boosted again and again, the bonds will be paid because they are bonds upon the entire city and taxpayers' money is used to pay bonds.

Commenting favorably upon the Mayor's plan, and branding the claims of the railway as false, the supporters of the plan advanced no argument with the man constitutionally opposed to municipal ownership as long as his opposition is based upon facts. The four-to-one vote in favor of the municipal ownership charter proves these opponents are a small minority.

WHY PREVIOUS PLANS FAILED

One objection to previous settlement plans was that more service was not provided. The present plan is supremely a service-at-cost plan providing 100 miles of new tracks and 550 new cars at once.

The Mayor's plan involves no contracts with the Detroit United Railway, thus eliminating objections of those who feared the expense and trouble which would come from entering into contracts with the private company. As it is intended to take advantage of the right the Supreme Court gave the city to oust the railway from Fort and other streets where franchises have expired, another objection to previous settlement plans has been met.

The fourth objection was to the purchase of the Detroit United Railway's equipment at a price either too high or not definitely determined. This objection is met by the present plan inasmuch as the purchase of new cars and equipment will make the purchase of the company's cars unnecessary.

Meeting the objection that municipal ownership is not efficient, that it does not give service, city officials state that in the last ten years municipal authorities have increased sewerage systems 50 per cent, increased mileage of paved streets by 80 per cent, increased mileage of watermains by 90 per cent, all at the cost of construction while in these ten years when the population of the city has increased more than 100 per cent the Detroit United Railway has increased its service a meager 25 per cent.

It is also maintained that the city can borrow money to build and equip 155 miles of new trackage at 4½ per cent or 5 per cent where the Detroit United Railway would have to pay 10½ per cent to get the money to build similar lines, thus providing a saving annually of $900,000 in interest charges alone.

Mayor Couzens has sounded the warning that if the proposed plan does not go through it will be years before the much needed car line extensions, some 200 miles in extent, can be built and that they may never be built. A private company cannot build the needed extensions without a vote of the people. Either a vote is required or the lines must be built on a day-to-day agreement and the company says it cannot finance a day-to-day agreement.

MAYOR SOUNDS WARNING

Detroit can expand only if it gives proper transportation to its workmen. Something must be done to remedy present traffic conditions and the Mayor's claim is that Detroit will not get anywhere by relying on private capital while his proposed plan means development and progress for the city. He has also sounded the warning that only four out of every ten voters need vote against the plan to kill it.

Seeks to Reduce Paving Cost

An agreement has been reached by the San Diego (Cal.) Electric Railway, the City Council of San Diego and the California Railroad Commission to permit the railway to try out a crushed rock paving on streets where traffic is not as heavy as in the business district of the city.

According to specifications submitted by the railway company's engineers, the new paving is to consist of a layer of coarse crushed rock, with a surface of finely crushed rock, but no cement is to be used with it as a binder. Concrete curbs will be laid to hold the paving in place.

Reed Dilworth, general counsel for the railway company, stated at the conference that it was impossible for the company to put down the regular asphalt pavement because of financial conditions at this time.

Engineer Sachse of the Railroad Commission stated that a pavement similar to that proposed to be used in San Diego was put down between the tracks of the "Key Route" between Oakland and Richmond.

Engineer A. Ervast of the San Diego Electric Railway refused to give out for publication any figures as to the relative cost of the proposed paving, saying that such figures would be available only after an experimental section had been put down.

Commissioner Paints a Drab Picture

Legislature Hears That More Than One-Third New York City Mileage Is in Hands of Receiver

Lewis Nixon, Public Service Commissioner for the First District, of New York on March 2 submitted a special report to the Legislature upon the traction situation in New York City in response to a concurrent resolution passed in January. The report is in a pamphlet of seventy-seven pages, which are summarized in certain general conclusions.

SUBWAY ALONE PROFITABLE

Mr. Nixon holds that the Interborough subway if operated alone can very probably survive under the present rate of fare, but that the Interborough system, including the Manhattan Elevated line, can avoid a receivership only by a subordination of the investment interest charges or through securing additional revenue.

Mr. Nixon also holds that it is doubtful if the New York Consolidated Railroad which operates certain city subways in connection with the Brooklyn Elevated road, can continue at the present rate of fare under existing contracts and pay interest on municipal and company bonds. As to the surface lines, both those in Manhatttan and other boroughs, he expresses the view that they must either have more revenue or that their deterioration, disintegration and further suspension of service may be expected to continue.

The commissioner suggests a plan of reorganization of all the companies into one company for the entire city, or, if that is not possible, one large company with a single management in the area now served by the Interborough Rapid Transit Company, and one for the area served by the Brooklyn Rapid Transit Company. He says a simple increase of fare without corresponding concessions from the companies should not be considered under any circumstances. Perpetual franchises for surface lines should be abolished and a proper form of indeterminate franchise substituted. The securities should be refunded and based in amounts upon a fair appraisal of the properties and amortization should be provided to vest title in the city after a certain term of years. A flexible cost-of-service fare should be established, controlled by a surplus fund and consideration should be given to the remission of taxes and paving charges, because all expenditures are reflected in the fares charged.

SUGGESTS EXPERIMENT WITH FARES AT COST

The commissioner suggests the tentative establishment for six months of such a cost-of-service fare, the receipts from which should be used only for cost of operation and maintenance, and not one cent for dividends of any nature. Accounts should be kept of receipts and expenditures for the first four months and these subjected to an analysis to be completed within the six months, after which time the fare for the next six months could be determined.

Mr. Nixon says the reorganization plan should include the modification of the dual subway contracts. The provisions for preferential payments to the companies under these contracts should be opened and a fair adjustment made after full investigation. The revenues from a cost-of-service fare on rapid transit lines should be sufficient to meet the contract requirements for the payment of interest and sinking fund on the city's rapid transit bonds, or at least on a substantial portion of them, so that they may be relieved from the operation of the debt limit.

After explaining the different methods of ownership of the various lines, the report reads:

> As the result of corporate extravagance in the past and municipal inaction, the city of New York is now reaping a whirlwind in transportation shortage, bankruptcy of companies, disintegration of long-established and efficient systems into less effective units, double and in some cases triple fares resulting therefrom, the absolute stoppage of several important lines, and the ever-present threat of further demoralization and bankruptcy.
>
> The consequences of this policy of inaction may be seen today in the deplorable conditions existing, of which the following is a summary:
>
> Street railroad trackage abandoned and service discontinued, 77.82 miles.
>
> Street railroad trackage cut off from parent systems and now operated separately under additional fare, 266.22 miles.
>
> Nine operating companies in the hands of receivers, representing a total of nearly 700 miles of track—more than one-third of the total trackage in the city. (Two of these receiverships, namely, the Second Avenue and the Manhattan and Queens companies, with 44 miles of track, antedate 1918.)
>
> Combined deficits of street railroad companies for the fiscal year ended June 30, 1919, $8,083,820, which shows the companies worse off by $13,350,346 than the year before.
>
> Deferred maintenance already amounting to $6,000,000, and consequently growing, which will have to be made up if the property is to be kept in condition.
>
> About 1,575 free transfer points abolished, 1,500 in Brooklyn and 75 in Manhattan.
>
> Tremendous shrinkage in values of street railroad securities, entailing heavy losses to investors.
>
> The companies' distress is the city's opportunity. They will, they must make concessions to the city in return for permission to raise rates, and if the municipal authorities would enter into negotiations to that end I feel confident that the situation can be saved with satisfaction to the carriers and with profit to the city.

The report says that if the Manhattan Elevated Railway still serves to drag the Interborough down the latter may fall into the hands of a receiver in June.

P. R. T. Accomplishments Reviewed

Relations Between Philadelphia Rapid Transit Company and Its Employees Described in Year Book

The record of accomplishment of half a decade of co-operative management is summed up in the 1919 Year Book of the Co-operative Welfare Association of the Philadelphia (Pa.) Rapid Transit Company. The book, which was published recently, is a profusely illustrated pamphlet, and in its forty-odd pages one catches a glimpse of the "Philadelphia plan" in action.

FEATURES OF PLAN WELL KNOWN

The essential features of this "Philadelphia Plan" are too-well known to make their repetition necessary beyond a bare outline. The scheme was worked out by Thomas E. Mitten shortly after he became president of the Philadelphia Rapid Transit Company. Briefly, it provides for settlement of wage and other disputes between company and men through an employees' organization, the Co-operative Welfare Association. Wages are regulated by the average pay for the same kind of work prevailing in four other cities.

The 1919 Year Book contains the minutes of the association's annual mid-winter meeting and the speeches made at the president's dinner on Sept. 4 last and at the association's picnic and "get-together" meeting, held on Sept. 3 and 4. At the mid-winter meeting, held on Dec. 27, 1919, the officers of the association and the committee chairmen submitted their reports. George W. Jackel, president of the association, announced that the membership included more than 99 per cent of the company's employees.

The beneficial results which the organization has accomplished in the direction of stimulating good will between the company and the public, are well brought out in the talks of prominent Pennsylvanians who addressed the meeting. W. D. B. Ainey, chairman of the State Public Service Commission, said, speaking of service-at-cost:

> But there is one fundamental weakness in all these plans, which leads me to say to you, that you have gone a step further than any other plan that I have heard of, or seen, in the solving of street railway problems, and that is, you have, by your plan of co-operation, solved all the points of difference that sometimes come up between management and labor.
>
> Coming down on the train this morning from Harrisburg, discussing street railway problems casually with a gentleman with whom I was sitting, we adverted to your Philadelphian Plan. I am going to tell you that I made this remark, that the focal point which has lifted the P. R. T. system above many others of the country, is the work that you gentlemen of these committees have done in your co-operative efforts to make the management a success.
>
> So I, as a member of the Public Service Commission, interested in the success of all the utilities, am very proud of your efforts, because you are enabling this company to serve this locality and be the kind of a carrier and public service body that the Commission at Harrisburg is anxious to see engaged in all lines.

Hon. Samuel M. Clement, Jr., Commissioner, Public Service Commission of Pennsylvania, said in part:

> I want to say to this audience that Governor Sproul, Mayor Moore, City Solicitor Smyth, and every other prominent man in this room today—real, full-blooded Philadelphians—all are mighty proud that there is one organization in the United States where labor and capital can get together and work for the welfare of humanity as you men are doing. You are doing a wonderful work, and there is not a Bolshevist in the audience—not one. If you keep up the work that you have done,

> Philadelphia will have something to be proud of. I do not care so much about the rate of fare—I care more about the contentment and the happiness of the people of Philadelphia that you represent.

Mayor-elect J. Hampton Moore of Philadelphia, said:

> I have witnessed here today in the few brief moments that I have been in this hall a picture which I shall not forget. It is so different from some of the pictures I have seen in days gone by in the City of Philadelphia. How many of you recall the early strike troubles, way back in 1888 and 1889, when the men, finding they could not exist decently upon the wages paid, when they were receiving less than 20 cents an hour, finally determined upon the force of the strike to obtain what they claimed at that time was justice? I remember those days, the cars tied up, men out all over the city, and finally, under the benign influence of the compromise and the conference, going back with better pay. We can decently contrast that condition, less than 20 cents an hour, with the rather remarkable statement made by Mr. Mitten today, that the maximum rate is 58 cents an hour, a percentage of increase that is a great credit to the officers and management of this company. That explains why, instead of having Bolsheviks, anarchists and rioters in the City of Philadelphia, we have now a peaceful co-operation, between the traction company and its 10,000 employees, that is a model for the rest of the country.

Governor William C. Sproul of Pennsylvania was also among the speakers. He paid a tribute to the association's work in these words:

> I am glad to have an opportunity of testifying to the appreciation we have of the good effect that this plan is having on the rest of the State.
>
> I know a great many of the men who work on the cars here in Philadelphia, went to school with a good many of them and see them every once in a while. Let me say that they are better qualified, better appearing, better looking generally, and more courteous and attentive, than any people that I know of anywhere in service in the other cities of the country.

Arbitration Agreement in Atlanta

An agreement for 1920 has been reached between the Georgia Railway & Power Company, Atlanta, Ga., and a committee representing the railway union. Every point at issue is covered in the agreement except the question of hourly wages. This question will be submitted to arbitration. Luther Rosser will represent the company and Madison Bell the union. A third member of the board of arbitration will be chosen by these two.

Preston S. Arkwright, president of the company, would not give out the details of the contract. He stated, however, that the "closed shop" is not included in the new agreement. All matters referring to the relations of the members of the union to the company and the operation of the company's cars in Fulton, DeKalb and Cobb counties were fully agreed upon by both parties, with the exception of the straight hourly wage.

On Feb. 26 Mr. Bell submitted the name of Mayor James L. Key as the third member of the board of arbitration to act as umpire, but Mr. Rosser declined to accept him. This resulted in the employees calling a mass meeting on the night of Feb. 27 which was attended by more than 1,000 union men, most of them railway employees. At 3:00 a.m. on Feb. 28 a motion to strike was presented at the meeting, but the appeals of the executive committeemen had the desired effect and the men finally agreed to let the matter rest until an umpire is named and board of arbitration can meet to settle the wage matters.

Mr. Rosser refused to accept Mayor Key as umpire because the Mayor has been more or less hostile to the company in the past.

City Threatens to Seize Railway

Corporation Counsel Burr of New York announced on March 4 that unless the Interborough Rapid Transit Company improved its service greatly on the subway lines within ninety days steps would be taken for the seizure and operation of the property by the city. The announcement followed instructions to Mr. Burr by the Board of Estimate on March 3 to take action to deprive the New York Railways of its franchises for failing to furnish adequate service.

In reference to the subway lines, Mr. Burr said he would call upon the Public Service Commission and insist that the terms of the Interborough Company's contract with the city be lived up to. He explained that a clause in the dual subway contract provides that the Interborough Company shall furnish adequate service, and that if it fails to do so, and the warning of the city is disregarded for ninety days, the city could take over the lines and either operate them itself or turn them over to an operating agency.

On March 1 Public Service Commissioner Lewis Nixon issued an order directing the Interborough Company to add 600 more cars to its subway service not later than March 10. The order practically provides for a service equal to the present rush-hour periods during the entire day. Mr. Burr, in his statement, referred to this order by Mr. Nixon as follows:

> There is ample proof of the inadequacy of the present service and unless the 600 additional cars are provided the present serious congestion will continue. At present there appears to be no doubt that the contract with the city has been violated. Recent hearings have proved this beyond a doubt.

Thirty Lines Still Tied Up

Surface railway lines in three boroughs of Greater New York were still out of commission on March 3 through the blizzard responsible for their break-down begun four weeks ago. The following lines, thirty in number, are still idle:

NEW YORK RAILWAYS—Eighty-sixth Street and Spring Street.

THIRD AVENUE—West Side belt: Avenue B, from Fourteenth, to Fifty-ninth Streets.

SECOND AVENUE — Second Avenue, Canal to Worth Streets; First Avenue shuttle.

EIGHTH AND NINTH AVENUE — Ninth Avenue; Eighth Avenue, from 116th to 125th Streets.

B. R. T. AND BROOKLYN CITY — Montague Street; Metropolitan Avenue, from Dry Harbor road to Jamaica Avenue; Wykoff Avenue; Avenue C, one track; Bergen Beach, one track; Flatbush Avenue shuttle; Holy Cross shuttle; Nostrand Avenue shuttle, one track; Ocean Avenue, one track; Utica Avenue shuttle; Ralph Avenue shuttle; Canarsie shuttle, Avenue K to Canarsie; Grand Street, Metropolitan Avenue to Fresh Pond Road and Jackson Avenue to North Beach.

NEW YORK & QUEENS COUNTY — Calvary Cemetary, Lutheran Cemetary to point one-fourth mile west; Steinway, Riker Avenue to North Beach; Corona. Fisk Avenue, Woodside, to Leona Avenue, Corona; Flushing Avenue, Second Avenue to North Beach; Vernon Avenue, one track; Fourteenth Street to Broadway; Dutch Kills, entire line.

LONG ISLAND ELECTRIC—Hollis to Belmont Park.

NEW YORK & LONG ISLAND—Hempstead to Jamaica and Mineola to Jamaica.

Bank Comments on Electrification Prospects

Fuel saving and increased track capacity would be two of the important results from the electrification of the railroads of the country, it is stated by the National Bank of Commerce in New York in the March issue of its magazine, *Commerce Monthly*.. However, chiefly because of the great expense involved in the transition from steam to electrically operated railroads, it is unlikely that any general move toward electrification will be made in the near future. The bank says:

> It would not be without precedent if the next decade witnessed England and the continent outstripping this country in the exploitation of another industry which, while possibly not conceived here, has certainly been more fully developed in America than elsewhere.
>
> It is plain that we must take a long-sighted view of the future of our railroads. They must be given such freedom to develop and to improve their facilities that they will not be required to enlarge their facilities merely on the basis of the immediate pinch, but will be able to introduce improvements from the standpoint of return a decade or two decades hence. Electrification thus has its greatest argument in the future, for with the rapidly increasing cost of fuel and rate of traffic, the ultimate return on any amount now invested in electrification will be more than generous compared with the return on the accumulated amount which might be spent year by year over a long period in patching up our steam railway system.
>
> Traffic on our railroads normally doubles every twelve years. Practically all improvements have been postponed for a long period. When the process of rehabilitation begins, it will be well to consider devoting to electrification part of the tremendous sum which will have to be spent

The magazine points out that it is estimated that $2,500,000,000 must be spent in the next three years to meet the accumulated and the current annual need for improvements. It then cites the fact that plans for future electrification are more extensive abroad than at home. It says:

> Conditions in the United States are not favorable for putting into effect any extensive scheme for electrification. The political and economic situation of the American railroads is at best uncertain. Without going into the effect of governmental regulation on the railroads during the past few years, it is fairly evident that capital is not seeking railroad investment. Also, the fuel situation in the United States is so much more favorable than is that of most other nations that the problem of conservation and efficient utilization of our coal supply has not become so accute as in Europe.

Mr. Beeler in Chicago

John A. Beeler has been employed by Henry A. Blair to study the routes, schedules and equipment of the Chicago Surface Lines and to make such recommendations for improvements as he finds advantageous.

News Notes

Two-Cent Wage Advance at Covington.—The Cincinnati, Newport & Covington Railway, Covington, Ky., has granted its carmen an increase in wages of 2 cents an hour. Under the new scale the maximum rates are raised to 45 cents and 50 cents an hour.

Appeal for Wage Increase.—The employees of the Joplin & Pittsburg Railway, Pittsburg, Kan., have filed a complaint with the Kansas Industrial Court asking for increased wages and better working hours and conditions on that line. The employees were awarded a raise in wages by the War Labor Board, but it is said that the increase was never placed in effect.

Jury Inquiry in Richmond.—The Richmond County Grand Jury has been instructed to investigate all the circumstances attending the suspension of service by the Staten Island Midland Railway, which ceased operation after its failure to make the city officials of New York realize the need of the company for increased fares. Residents of Staten Island, deprived of car service, have indicated their willingness to pay a 10-cent fare if necessary.

Governor Vetoes Fare Bill.—Governor James M. Cox, of Ohio denied to the State Public Utilities Commission the right to interfere with the Toledo railway situation by fixing of rates for two years, when he vetoed the bill presented by Representative Evans of Lucas County, after it had passed both houses of the Assembly with little or no general debate. The bill gave to the commission the power of rate determination of city tractions such as it has in the case of other utilities and interurbans at the present time.

An Echo of the Past.—Municipal ownership, once so strongly advocated by the Mayor of Atlanta, Ga., has never received the smallest encouragement from the taxpayers. Since the State Legislature of Georgia a year ago turned down a proposition looking toward municipal ownership, little if anything has been heard on the subject. It is not regarded as probable that a municipal ownership program, which has been discussed in some sections of the State, will find any favor with the law makers at the June session of the Legislature.

Explains Service-at-Cost. — Harry Reid, president of the Kentucky Utilities Company, the Louisville & Southern Indiana Traction Company, the Louisville & Northern Railway and the road between Louisville and Indianapolis, explained the service-at-cost plan of operation in an interview in one of the Louisville papers recently. Mr. Reid is a resident of that city. He said that he did not care to be placed in the attitude of giving advice either to the city authorities or to the new administrative body of the Louisville Railway, but merely was pointing out at the request of the paper how the system had worked out satisfactorily in other cities.

Suggestions Welcome. — Believing that the men on the job, who are in very close touch with conditions, can offer suggestions to the officials of the Monongahela Valley Traction Company, Fairmont, W. Va., that will improve service and better conditions in general, George M. Alexander, president of that corporation, is going to make an effort to avail himself of these suggestions. Compensation of an adequate nature will be offered for those that are accepted. All suggestions will receive the earnest consideration which is due them. A committee has been appointed to devise means and a system of compensation for such suggestions.

Municipal Railway an Election Issue.—It is expected that the election in Seattle, Wash., on March 5 will bring about a change of administration in city affairs, as both Hugh M. Caldwell, former corporation counsel, and James A. Duncan, the labor candidate, defeated the present Mayor at the primaries. Mr. Caldwell, who will very probably be elected, has expressed himself as bitterly opposed to the municipal railway management, and in fact the entire project. He has even intimated that he will, if elected, take steps to revoke the $15,000,000 deal whereby the city took over the railway lines of the Puget Sound Traction, Light & Power Company.

City Commission Against One-Man Cars.—The City Commission of Nashville, Tenn., has passed on third and final reading an ordinance abolishing one-man cars in that city. The Mayor and Commissioner Tompkins voted against the proposal. The measure becomes effective in ninety days. The Nashville Railway & Light Company has invested $150,000 in one-man cars. It protested the passage of the measure abolishing the cars. Representatives of local schools and colleges and of local manufacturing companies appeared in opposition to the bill. For the company, Walter Jackson explained the operation of the cars and reviewed their history and development. He called particular attention to the fact that one-man cars originated in and enjoyed the greatest popularity in the South.

Snow Affects Connecticut Trolleys.—While other electric railways in New England temporarily abandoned large portions of their systems during the recent series of severe snowstorms, the Connecticut Company at no time failed to provide some sort of service on all parts of its system and kept schedules even during the most trying days of the period on 85 per cent of its lines. On March 1 the company was able to announce 100 per cent service on all lines. The Hartford & Springfield Street Railway, which operates on both banks of the Connecticut River between the two cities, had its first through service in more than a week on the east side on March 1, and hoped to get back to normal on the west side during the week. The Shore Line Electric Railway has had intermittent service on its lines during the storms.

To Close North Hampton Branch.—The New Hampshire Public Service Commission on Feb. 24 gave the Portsmouth Electric Railway authority to suspend traffic on its North Hampton branch, connecting the town of North Hampton with Hampton Beach, unless an agreement between town and company is reached before May 1. Authority to close for the time being the North Beach branch was refused, as rail communication between Portsmouth and Hampton Beach would thereby be severed. The company will not be required this winter, however, to clear out about 200 yards of ice-filled tracks, so that transfer of passengers will temporarily be necessary at that point.

Program of Meeting

Central Electric Railway Association

The program of papers has been announced for the annual meeting of the Central Electric Railway Association at the Seelbach Hotel, Louisville, Ky., on March 10 and 11. Sessions will be held at 2 p.m. on March 10 and 9 a.m. on March 11. The dinner for association members, their families and invited guests will be at 7 p.m., on March 10, The executive committee will meet at 9 a.m., on March 10. The Interstate Public Service Company has arranged to furnish a special car to be operated between Indianapolis, Ind., and Louisville, Ky., on March 9.

The session on March 10 will be opened with the annual address by J. F. Collins, president of the association. This will be followed by the business session and the reading of reports of committees. Ralph H. Rice, principal assistant engineer, Board of Supervising Engineers, Chicago Traction, will then read a paper "Rail Bonding." The discussion will be participated in by M. B. Lambert, assistant manager of the railway department of the Westinghouse Electric & Manufacturing Company; Ralph W. Palmer, engineer with the General Electric Company; E. W. Rowland, bond engineer with the Ohio Brass Company; R. J. Custer, engineer of ways and structures of the Interstate Public Service Company.

Following the business session on March 11 there will be a paper by D. D. Ewing, professor of electric railway engineering at Purdue University, "Economical Use of Electricity for Car Purposes." The discussion of this paper will be led by L. E. Gould, president of the Economy Electric Devices Company, and by L. M. Clark of the Railway Improvement Company.

The regular session will close with the presentation of the annual report of the secretary and treasurer and the election and installation of officers for the ensuing year.

Financial and Corporate

Increase in Revenue for November

Fare Increases, One-Man Cars and Absence of Epidemic Lead to More Favorable Conditions

A comparison of returns for the month of November, 1919, with those for the same month in 1918 of those companies reporting their operating statistics to the information bureau of the American Electric Railway Association, shows results quite favorable to 1919. This is probably due, in part at least, to the effect of the influenza epidemic, which although it had passed its climax at the end of October, 1918, in the East and South still lingered with enough force to make itself felt in those sections of the country throughout the month of November.

November Worst in West

In the West, the disease did not reach its full malevolence until after it had been gotten well under control in the other sections of the country. November was probably the worst month in the West, and this is very clearly reflected in the attached tables in which the West makes the most favorable showing in the comparison of 1919 with 1918.

The South seems to be enjoying an unusual degree of prosperity which has shown up consistently in its operating statistics for the last few months. Several factors are contributing to this prosperity, or at any rate are contributing to the favorable showing made in the latter months of 1919 when compared with the corresponding months of 1918. First there are the lingering effects of the influenza mentioned above. Second, there are the numerous oil booms occurring there, bringing in their train large additions to the population and building up the traffic of the local street railways. Third, there is the introduction of one-man cars during 1919 on a large proportion of the mileage represented in the accompanying tables, with the consequent reduction of expenses and tendency to secure the maximum amount of traffic possible.

Tables Analyzed

In Tables III and IV an analysis of the operating expenses is given, Table III showing the actual amount spent by the different departments and Table IV showing the same amounts on a per car-mile basis.

A study of these tables shows that the heaviest increases have occurred in the way department, with the transportation department second. For the country as a whole the cost of maintaining way and structures rose from 2.7 cents per car-mile in November, 1918, to 4.24 cents per car-mile in November, 1919, an increase of 57.03 per cent. The heaviest increase in this department occurred in the West, where it jumped from 1.81 cents per car-mile in 1918 to 5.11 cents per car-mile in 1919, or 182.32 per cent.

The cost of conducting transportation for the country as a whole increased 25.54 per cent per car-mile, rising from 11.08 cents per car-mile in 1918 to 13.91 cents in 1919. The West showed the heaviest increase in this department also, the increase being 33.23 per cent per car-mile.

The only item of expense showing an actual decrease in any part of the country was that for power. In the East the cost of power dropped from 6.2 cents per car-mile in 1918 to 5.83 cents in 1919, a decrease of 5.97 per cent per car-mile. The South also showed a slight decrease in power expense, amounting to 0.71 per cent per car-mile, but as some of the Southern companies include their power expenses in their expenses for conducting transportation, the figures for these items are probably not strictly accurate.

Usual Territorial Arrangement Followed

As in the past the returns from both city and interurban companies have been classified according to the following geographic grouping: Eastern district—east of the Mississippi River and north of the Ohio River; Southern district—south of the Ohio River and east of the Mississippi River; Western district—west of the Mississippi River.

Boston Has Fairly Good January

The financial statement of the month of January as given out by the Boston (Mass.) Elevated Railway shows a net gain of $99,727 as compare dwith $343,333 for the proceeding month. The difference is due mainly to the fact that the month of January was a particularly stormy one. The total receipts for the month were $2,868,841. The total cost of service was $2,769,118. The total operating expenses were $2,071,950, of which $1,373,223, was for wages. During the month there were 28,467,646 revenue passengers and the cost of service per passenger was 9.727 cents. The receipts per revenue passenger amounted to 10.078 cents. Due to the particularly favorable balance now resulting from the 10-cent fare, it is very likely that the end of the year 1920 will find the Boston Elevated Railway able to continue its programme without the necessity of resorting to special assessments upon the cities and towns served.

Connecticut Loss $177,110

Increased Revenues Under Zone Plan Offset by Mounting Expenses—Figures for Three Months

The Connecticut Company went $177,110 behind in the first three months of operation under the zone system, despite greatly increased gross revenues. This was learned at the final hearing on the zone system before the Public Utilities Commission in the State capitol at Hartford, Conn.

Greatly increased costs of operation were responsible for this condition, according to President Lucius S. Storrs, who said that a statement on the situation would be issued by the company shortly. He and Walter J. Flickinger, his assistant, expressed the belief that under the 6-cent system, in force up to Nov. 2 of last year, the loss would have been much greater. In the year ended October 31, 1919, the company had a deficit of little more than $10,000.

In each month since the establishment of the zone system the company's gross revenue has shown an increase over that of the corresponding month in the preceding year. February was a banner month so far as gross receipts were concerned, but the great expense of keeping the lines open during the series of storms that has swept Connecticut has eaten into this increased revenue and sometimes more than nullified it.

During November, the first month of the zone system, the deficit of the company after taking out the amount required for fixed charges was $82,999. In December the deficit was only $110 because of the great volume of holiday season riding. The January deficit was $94,000. During February, with a large number of snow storms that kept the jitneys off the streets, the volume of riding was approximatly 25 per cent greater than that in the same period of 1919, but the work of keeping the lines clear was very expensive.

Attorneys for most of the sixteen towns protesting against the zone system were heard in final argument. Joseph F. Berry, attorney for the company, told the commission that under the law he did not believe that body had the power to set rates for passenger service and then grant a lower rate for commuters.

The commission intimated that its decision would be given early in April.

Court Orders Service Discontinued

Judge Mayer in the Federal Court at New York on Feb. 27 authorized Job E. Hedges, receiver of the New York, N. Y., to discontinue the operation of the Seventh Avenue line and of the Fourteenth Street line across the Williamsburg Bridge. The date for the discontinuance was set for March 7. The order was made on the grounds that the company has no franchise for service over the bridge. The franchise is owned by the Fourth and Madison Avenue line, which was recently separated from the rest of the New York Railways.

TABLE I—INCOME STATEMENT OF THIRTY-THREE RAILWAYS FOR NOVEMBER, 1919, COMPARED WITH NOVEMBER, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Railway operating revenues	$6,444,246	$5,385,969	$3,154,686	$2,692,601	$694,614	$601,193	$2,594,946	$2,092,175
Railway operating expenses	4,969,084	4,177,439	2,521,970	2,104,827	472,429	416,510	1,974,685	1,656,102
Net operating revenue	1,475,162	1,208,530	632,716	587,774	222,185	184,683	620,261	436,073
Net revenue: Auxiliary operations	62,071	....	50,369	....	4,272	....	7,430	....
Taxes	374,974	340,839	168,560	173,125	57,537	53,059	148,877	114,655
Operating income	1,162,258	867,691	514,525	414,649	168,919	131,624	478,814	321,418
Non-operating income	141,854	103,325	79,527	50,326	172	6,642	62,155	46,357
Gross income	1,304,112	971,016	594,052	464,975	169,091	138,266	540,969	367,775
Deductions from gross income	1,207,560	1,135,052	554,946	487,358	128,227	128,664	524,387	519,030
Net income	96,552	*164,036*	39,106	*22,383*	40,864	9,602	16,582	*151,255*
Operating ratio (per cent)	77.09	77.58	79.91	78.19	68.01	69.27	76.11	79.17
Car miles operated	16,696,655	16,033,000	7,938,985	7,501,534	2,027,162	1,919,772	6,730,508	6,611,694

TABLE II—INCOME STATEMENT IN CENTS PER CAR-MILE OF THIRTY-THREE RAILWAYS APPEARING IN TABLE I, COMPARING NOVEMBER, 1919, WITH NOVEMBER, 1918

	United States			East			South			West		
	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase
Railway operating revenues	38.60	33.59	11.49	39.74	35.89	10.73	34.26	31.31	9.42	38.55	31.64	21.83
Railway operating expenses	29.76	26.06	11.42	31.76	28.06	13.19	23.30	21.69	7.42	29.34	25.05	17.12
Net operating revenue	8.84	7.53	11.74	7.98	7.83	1.91	10.96	9.62	13.92	9.21	6.59	39.75
Net revenue: Auxiliary operations	0.37	....	.....	0.63	....	.....	0.21	....	.....	0.11	....	....
Taxes	2.25	2.13	5.63	2.12	2.31	*8.23*	2.84	2.76	2.90	2.21	1.73	27.74
Operating income	6.96	5.40	28.88	6.49	5.52	17.57	8.33	6.86	21.42	7.11	4.86	46.29
Non-operating income	0.84	0.64	31.25	1.00	0.67	49.25	....	0.35	......	0.92	0.70	31.43
Gross income	7.80	6.04	29.13	7.49	6.19	21.00	8.33	7.21	15.53	8.03	5.56	44.42
Deductions from gross income	7.23	7.07	2.26	6.99	6.50	7.54	6.32	6.70	*5.68*	7.79	7.85	0.77
Net income	0.57	*1.03*	.....	0.50	*0.31*	.....	2.01	0.51	294.41	0.24	*2.29*	......
Operating ratio (per cent)	77.09	77.58	*0.64*	79.91	78.19	2.19	68.01	69.27	*1.82*	76.11	79.17	*3.87*
Car miles operated	16,696,655	16,033,000	4.14	7,938,985	7,501,534	5.83	2,027,162	1,919,772	5.59	6,730,508	6,611,694	1.79

TABLE III—OPERATING EXPENSES OF THIRTY-SEVEN *RAILWAYS FOR NOVEMBER, 1919, COMPARED WITH NOVEMBER, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Operating expenses	$5,557,217	[1] $4,498,566	$2,744,480	[2] $2,346,890	$640,205	$531,148	$2,122,532	[3] $1,620,528
Way and structures	783,522	476,091	377,238	301,600	62,100	55,088	344,184	119,403
Equipment	610,645	528,287	301,637	286,276	74,338	59,980	234,670	182,031
Power	867,669	814,348	507,470	511,539	42,624	39,425	317,575	263,384
Conducting transportation	2,571,079	1,952,560	1,244,113	943,530	382,107	312,973	944,859	696,057
Traffic	21,703	21,814	10,837	9,585	753	464	10,113	11,765
General and miscellaneous	710,518	544,013	353,185	260,784	78,283	63,218	279,050	220,011
Transportation for Investment—Cr.	*7,919*	*5,123*			....	....	*7,919*	*5,123*
Car-miles operated	18,473,777	17,642,446	8,699,238	8,250,087	3,044,031	2,780,665	6,730,508	6,611,694

* NOTE—This table includes the expenses of the 33 companies shown in Tables I and II, and in addition 4 other companies which are not included in Tables I and II, because of the fact that they do a power and light business and do not separate their railway taxes and fixed charges from the taxes and fixed charges of their other business.

[1] Includes $166,576 undistributed depreciation and express and freight charges.

[2] Includes $33,576 for express and freight charges.

[3] Includes $133,000 undistributed depreciation.

TABLE IV—OPERATING EXPENSES IN CENTS PER CAR-MILE OF THIRTY-SEVEN COMPANIES APPEARING IN TABLE III, FOR NOVEMBER, 1919, COMPARED WITH NOVEMBER, 1918

	United States			East			South			West		
	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase
Operating expenses	30.08	[1]25.50	17.95	32.12	[2]28.45	12.90	21.03	19.10	10.11	31.54	[3]24.51	28.68
Way and structures	4.24	2.70	57.03	4.33	3.66	18.31	2.04	1.98	3.03	5.11	1.81	182.32
Equipment	3.31	2.99	10.70	3.47	3.47	.....	2.45	2.16	13.52	3.49	2.75	26.91
Power	4.70	4.62	1.73	5.83	6.20	*5.97*	1.41	1.42	*0.71*	4.72	3.98	18.59
Conducting transportation	13.91	11.08	25.54	14.31	11.44	12.51	12.56	11.27	11.44	14.03	10.53	33.23
Traffic	0.12	0.12	.....	0.12	0.12	.....	....	....	.....	0.15	0.17	*11.77*
General and miscellaneous	3.85	3.08	25.00	4.06	3.16	28.48	2.57	2.27	13.21	4.15	3.33	24.62
Transportation for investment—Cr.	*0.04*	*0.03*	33.33	....	....	.....	....	....	.....	*0.11*	*0.07*	57.00
Car-miles operated	18,473,777	17,642,446	4.71	8,699,238	8,250,087	5.44	3,044,031	2,780,665	9.47	6,730,508	6,611,694	1.79

[1] Includes 0.94 cents per car-mile undistributed depreciation and express and freight charges.

[2] Includes 0.40 cents per car-mile for express and freight charges.

[3] Includes 2.01 cents per car-mile undistributed depreciation.

TABLE V—COMBINED INCOME STATEMENT OF *EIGHTY-SEVEN RAILWAYS FOR NOVEMBER, 1919

	United States	East	South	West
Railway operating revenues	$16,375,134	$8,769,510	$1,260,016	$6,345,608
Railway operating expenses	12,581,356	6,862,456	879,121	4,839,779
Net operating revenue	3,793,778	1,907,054	380,895	1,505,829
Net revenue: Auxiliary operations	982,027	515,451	260,516	206,060
Taxes	1,002,991	486,347	122,228	394,416
Operating income	3,772,814	1,936,158	519,183	1,317,473
Non-operating income	374,918	139,936	4,098	230,884
Gross income	4,147,732	2,076,094	523,281	1,548,356
Deductions from gross income	3,212,633	1,714,698	310,752	1,187,183
Net income	935,099	361,396	212,529	361,173
Car-miles operated	40,407,387	21,657,136	3,676,591	15,073,657

* Includes the companies shown in Tables 1 to IV to others for which the 1918 figures are not available.

TABLE VI—COMBINED INCOME STATEMENT OF TABLE V, SHOWING THE AMOUNTS IN CENTS PER CAR-MILE

	United States	East	South	West
Railway operating revenues	40.52	40.49	34.27	42.10
Railway operating expenses	31.14	31.69	23.91	32.11
Net operating income	9.38	8.80	10.36	9.99
New revenue: Auxiliary operations	2.43	2.38	7.08	1.37
Taxes	2.48	2.24	3.32	2.62
Operating income	9.33	8.94	14.12	8.74
Non-operating income	0.93	0.65	0.11	1.53
Gross income	10.26	9.59	14.23	10.27
Deductions from gross income	7.95	7.92	8.45	7.88
Net income	2.31	1.67	5.78	2.39
Operating ratio (per cent)	76.85	78.27	69.77	76.27
Car-miles operated	40,407,387	21,657,136	3,676,594	15,073,657

TABLE VII—DETAILED STATEMENT OF THE OPERATING EXPENSES OF *ONE HUNDRED RAILWAYS FOR NOVEMBER, 1919

	United States	East	South	West
Operating expenses	[1]$12,685,330	[2]$7,093,579	$1,009,349	[3]$4,582,402
Way and structures	1,735,457	992,028	119,283	624,146
Equipment	1,420,394	848,307	30,058	542,029
Power	1,836,757	1,113,118	106,179	617,460
Conducting transportation	5,777,648	3,142,754	607,344	2,027,550
Traffic	47,717	25,429	2,466	19,822
General and miscellaneous	1,709,584	966,666	144,019	598,899
Transportation for investment—Cr.	*8,163*	....	....	*8,163*
Car-miles operated	42,782,633	22,693,813	4,743,721	15,345,099

* This table includes the expenses of the 87 companies shown in Tables V and VI and in addition 13 other companies which are not included in Tables V and VI because of the fact that they do a power and light business and do not separate their railway taxes and fixed charges from the taxes and fixed charges of their other business.

[1] Includes $165,936 undistributed depreciation.

[2] Includes $5,277 undistributed depreciation.

[3] Includes $160,659 undistributed depreciation.

TABLE VIII—DETAILED STATEMENT OF OPERATING EXPENSES OF THE ONE HUNDRED COMPANIES APPEARING IN TABLE VII, IN CENTS PER CAR-MILE

	United States	East	South	West
Operating expenses	[1] 29.65	[2] 31.26	21.28	[3] 29.86
Way and structures	4.06	4.37	2.51	4.08
Equipment	3.32	3.74	0.63	3.53
Power	4.29	4.90	2.24	4.02
Conducting transportation	13.50	13.86	12.81	13.22
Traffic	0.11	0.11	0.05	0.12
General and miscellaneous	4.00	4.26	3.04	3.90
Transportation for Investment—Cr.	*0.02*	....	....	*0.05*
Car-miles operated	42,782,633	22,693,813	4,743,721	15,345,099

[1] Includes 0.39 cents per car-mile undistributed depreciation.

[2] Includes 0.02 cents per car-mile undistributed depreciation.

[3] Includes 1.04 cents per car-mile undistributed depreciation.

Twin City Conditions Fair

Company Able to Meet Dividend Payments—Hopes Current Year Will Show Greater Improvement

The annual report for the year 1919 recently issued by the Twin City Rapid Transit Company, Minneapolis, Minn., indicates that the financial condition of the company has slightly improved and as yet the point has not been reached when it is necessary to pass the stock dividends entirely, although it is true that the dividend rate on the common stock has been below normal for the past two years.

INCOME STATEMENT OF THE TWIN CITY RAPID TRANSIT COMPANY

	1919	1918	Per Cent Change + Increase — Decrease
Revenue from transportation	$11,351,739	$9,618,501	+18.02
Revenue from other railway operations	90,705	77,479	+17.11
Total railway operating revenue	$11,442,444	$9,695,980	+18.02
Way and structures	$1,102,567	$1,005,629	+ 9.69
Equipment	1,245,070	823,048	+51.40
Power	1,175,293	1,132,335	+ 3.79
Conducting transportation	3,788,711	3,142,150	+20.58
Traffic	62,450	37,422	+66.80
General and miscellaneous	1,090,669	873,962	+24.82
Transportation for investment Cr	*19,701	*10,572	—86.40
Total railway operating expenses	$8,445,059	$7,003,974	+20.60
Net operating revenue	2,997,385	2,692,006	+11.33
Taxes assignable to railway operating	1,126,338	936,451	+20.25
Operating income	$1,871,047	$1,755,555	+ 6.08
Non-operating income	51,034	15,215	+235.50
Gross income	$1,922,081	$1,770,770	+ 8.05
Rent for leased roads	3,000	3,000	
Interest on funded debt	1,087,446	1,034,428	+ 5.13
Net loss miscellaneous physical property	32,829	27,334	+20.15
Miscellaneous debits	10,454	14,706	—28.92
Total deductions from gross income	$1,133,729	$1,079,468	+ 5.02
Net income transferred to profit and loss	$788,352	$691,302	+14.02

* Deficit.

An analysis of the accompanying table shows that operating expenses increased more than the revenues, due especially to large increases in the equipment, conducting transportation and general and miscellaneous accounts. The increase in these accounts resulted from the substantial increase in wages made to all employees on Aug. 20, 1919. The net income transferred to Profit and Loss for the year was slightly more than in the previous year,—thus making it possible to increase the dividend rate on the common stock by half of 1 per cent.

The increase in the track and equipment maintenance is also attributed to the continued increase in the cost of labor and material and the fact that during 1918 a large amount of maintenance work, especially as regards the equipment, had to be deferred because of the inability to secure sufficient labor to maintain the property in its past high physical condition of excellence.

STATISTICAL INFORMATION OF THE TWIN CITY RAPID TRANSIT COMPANY

	1919	1918	Per Cent Change + Increase — Decrease
Mileage—First track	243.07	243.03	
Second track	177.40	176.80	+ 0.34
Total mileage—All tracks	452.65	451.50	+ 0.26
Average total miles operated	451.70		
Revenue passengers	222,186,823	188,930,268	+17.60
Transfer passengers	73,458,262	67,985,059	+ 8.06
Total passengers	295,645,085	256,915,327	+15.05
Gross passenger revenue	$11,179,535		
Total per mile of line	46,000		
Total per mile of single track	24,750		
Average fare:			
Per revenue passenger (cents)	5.04		
Per total passenger (cents)	3.73		
Operating ratio (per cent)	73.7	72.2	
Taxes (per cent of gross revenue)	9.80	9.65	
Dividends paid:			
7 per cent on preferred stock	210,000	210,000	
On common stock	2.5% 550,000	2% 440,000	

Because the city claimed that the franchises of the company in Minneapolis expired in 1923, no track extensions or new rolling stock were added during the year. On Dec. 9, 1919, the voters in referendum refused to ratify an agreement resulting from four years' continuous and painstaking effort on the part of the company and Minneapolis city officials, providing for a service-at-cost franchise.

The company, although defeated for the time being in obtaining sufficient revenue to meet the ever increasing cost of service rendered, believes that an ultimate solution of the transportation problem in the Twin Cities will be worked out as the public more and more understands and appreciates that much of the prosperity of the community depends upon good transportation. The situation is rapidly adjusting itself to a point where the people are willing to pay a sufficient fare to insure adequate service and provide a reasonable return on the fair value of the property. Already the officials of the city of St. Paul are considering submitting to the voters of that city an amendment to the franchise ordinance under which service is now rendered, which will permit raising the fare from 5 cents to 7 cents. The company, however, in consideration of receiving this increase in unit rate of fare must furnish adequate equipment and service. Pending the outcome of this referendum, operation will continue and the best possible service rendered under the existing conditions.

To facilitate the handling of traffic and further economies of operation the company is planning to use a part of the renewal reserve fund for improvements in the equipment and the construction of certain extensions which it is hoped will somewhat reduce the congestion and thereby expedite traffic.

During the year an agreement was made with the Northwestern Terminal Company whereby that company financed an extension into a new industrial district. The notes covering the loan do not mature until the line is self-supporting and produces a return on the investment. The terminal company also guarantees the railway against operating losses.

Abrogation of Lease Postponed

The Shore Line Electric Railway, which had planned to turn back to the Connecticut Company, New Haven, Conn., the New London and other lines operated under lease, will continue to run the lines indefinitely. This is in accordance with the wishes of the Connecticut Company. This permission was granted by Judge John P. Kellogg in the Superior Court in New London who passed an order approving of the extension of the agreement made by Robert W. Perkins, receiver of the Shore Line Electric Railway, with the Connecticut Company regarding the annulment of its lease of the local lines.

On Dec. 19 Mr. Perkins applied to the Superior Court for permission to annul the ninety-nine year lease of the New London lines with the Connecticut Company and the court passed an order terminating the lease and authorizing the delivery of the property to the Connecticut Company.

The application of Mr. Perkins stated that on account of the exigencies connected with the operation of its railway, the Connecticut Company finds it difficult and practically impossible to take over the operation of the leased lines and requested Mr. Perkins to continue the operation until one week after the Connecticut Company notifies the receiver that it is ready to take over the lines or until one week after the receiver notified the Connecticut Company of his unwillingness to continue further operation. Mr. Perkins states that it is for the best interest of the receivership estate and the public that the Shore Line continue the operation of the New London lines.

Spokane Sale Confirmed

The Federal Court at Tacoma, Wash., has approved the sale under foreclosure of the properties of the Spokane & Inland Empire Railroad, referred to previously in the ELECTRIC RAILWAY JOURNAL.

The Spokane & Eastern Railway & Power Company has accordingly taken over the former properties and holdings of the old company known as the Nine Mile power plant, and all transmission lines, all the city lines of the Spokane Traction Company, the interurban line extending east into the Spokane valley to Coeur d'Alene and Hayden Lake, the terminal properties in the city of Spokane, both passenger and freight, and the line extending into the Spokane valley known as the Vera line.

The other company, known as the Inland Empire Railroad, has taken over the property from a junction on Sprague Avenue in Spokane, extending south to Moscow and Colfax. Both companies will be officered and operated by the same individuals, who are as follows:

George H. Taylor, Chicago, president.

F. E. Connors, vice-president and general manager.

Waldo G. Paine, vice-president and traffic manager.

Elmo Edwards, secretary.

The directorate is composed of George H. Taylor, Albert W. Harris, Chester Corey, Chester A. Cook and Holmes Forsyth, all of Chicago, and E. D. Adler and John C. Partridge of Milwaukee and F. E. Connors and Waldo G. Paine of Spokane.

According to the tabulated report submitted to Mayor Fleming by Mr. Connors, the local lines carried 72,306 more passengers in January, 1920, than in January, 1919, and collected an increase in cash fares of $9,680 in the same period. In the last month the company's cars carried 823,425 passengers, as against 751,119 in January, 1919, and 940,031 in 1918.

New Haven Wants Its Trolleys Back

The New York, New Haven & Hartford Railroad would like to get back the lines of the Connecticut Company, which operates more than 90 per cent of the electric railway mileage in that State, and which is run by federal trustees under a federal court order that it be divorced from the steam road system.

Edward G. Buckland, president of the New Haven road during the period of federal control, told the correspondent of the ELECTRIC RAILWAY JOURNAL of the desire of his road on Feb. 28 as he finished his work as head of the road. Mr. Buckland said:

> I think that a unified system of transportation by steam road, trolley and steamboat is most desirable for southern New England For this reason the New Haven would like to operate the electric railways in Connecticut, under the provisions of the railroad law which gives the Interstate Commerce Commission great regulatory powers The Rhode Island electric railway properties are in receivership, and the Massachusetts and New York properties do not lend themselves to consolidation with the steam railroad.

It is likely that the New Haven will petition the Interstate Commerce Commission within the next year for a recommendation to the United States Courts asking that the steam road be allowed to take back the Connecticut Company's lines.

Financial News Notes

Average Fare Reported Incorrectly.—In the second paragraph from the last in the article on the Toronto (Ont.) Railway in the ELECTRIC RAILWAY JOURNAL for Feb. 14, page 352, the average fare during 1919 was quoted at 8.9 cents per revenue passenger. This should have read 3.9 cents.

Town Votes to Take Over Road.—The town of Turner, Me., has voted to take over the electric railway between Turner and Auburn, the operation of which was not resumed by the Androscoggin & Kennebec Railway, the successor under foreclosure to the Lewiston, Augusta & Waterville Street Railway.

Wants Service Decision Hurried.—A petition carrying the names of 600 citizens of Racine, Wis., has been presented to the Wisconsin Railroad Commission urging that body to speed its decision in the investigation of railway service in Racine as furnished by the Milwaukee Electric Railway & Light Company there.

Plan to Study Service-at-Cost.—The managing committee of directors now in active charge of the officers of the Louisville (Ky.) Railway pending the election of a successor to T. J. Minary as president, plans a tour to study at first hand the workings of service-at-cost grants where such ordinances have been in operation sufficiently long to establish authentic data.

Atlanta Bond Issues Authorized.—The Georgia Railroad Commission has authorized the Georgia Railway & Power Company, Atlanta, Ga., to issue additional bonds in the amount of $601,000, and the Georgia Railway & Electric Company to issue bonds in the amount of $189,000. Both issues are under the original mortgage to cover improvements for the six months ended Dec. 31, 1919.

Spokane Officers Re-elected.—At the annual meeting of the Washington Water Power Company, Spokane, Wash. recently, the officers and trustees were re-elected. J. D. Porter takes the place of Dr. N. Fred Essig, deceased. During the year 18,478,611 passengers were carried on the Water Power lines. This total was greater than in any year since 1913, but still 6,000,000 short of the maximum number in 1910.

Equipment Trust Securities Asked.—The New York & Stamford Railway has applied to the Public Service Commission for the Second District of New York for authority to issue at par $30,000 in 7 per cent equipment trust notes to be used for purchasing seven steel one-man safety cars. The road operates between New Rochelle, N. Y., and Stamford, Conn. The cars have a seating capacity of thirty-two.

Agree to Bond Extension.—F. H. Dewey, president of the Worcester (Mass.) Consolidated Street Railway, is quoted as authority for the statement that holders of the $700,000 of 4½ per cent debenture bonds due on Mar. 1, 1920, will be offered the right to extend the bonds to Mar. 1, 1925 at 7 per cent. Holders of $500,000 have agreed to extend.

Recommends Short-Term Financing.—State Treasurer Burrill of Massachusetts has recommended to the Governor a change in act providing for purchase of Cambridge subway, deciding to finance purchase with short term notes rather than with fifty-year bonds as provided in the act. He expresses the opinion that the money market will fall a full point during next year, and, if such proves to be the case, the Commonwealth, he says, will save at least $500,000 by deferring the issuance of bonds.

Boston Elevated to Issue Bonds.—The Public Utilities Department of Massachusetts has authorized the Boston Elevated Railway to issue notes or negotiable bonds to an amount not exceeding at par value $1,500,000, said notes or bonds to be payable in a period not exceeding thirty years from the date of issue and to bear interest at a rate not to exceed 7 per cent per annum. These notes or bonds are to be used for paying and refunding bonds to the amount of $1,500,000 due on March 1, 1920.

Court Will Pass on Service Discontinuance.—Three judges of the Supreme Court of Nevada sat *en banc* recently to hear the proceedings on the injunction which was brought by citizens of Reno, Nev., to prevent the Reno Traction Company from discontinuing local service. The case was concluded and the judges now have the matter under advisement. Decision may be rendered in from two days to two weeks. Meantime, the local system has been stopped entirely, but the interurban service between Reno and Sparks is continued.

Suggests Valuation at Akron.—The Northern Ohio Traction & Light Company, Akron, Ohio, has requested that the railway lines of the company in that city be valued by a board of arbitration as a step in the direction of affording relief to the company from the burdensome conditions under which it is now operating. A. C. Blinn, general manager of the company, has suggested a board of three, one member to be appointed to the company, one by the city and the third by the two so chosen. The Council has taken the matter under advisement.

Traffic and Transportation

Temporary Increase Urged

Public Service Commissioner Recommends Fare Agreement in Rochester as Solution of Service Problem

A temporary agreement between the New York State Railways and the city of Rochester, N. Y., under which the company would be permitted to increase its fares on its Rochester lines for a period of three months, was proposed by Public Service Commissioner John A. Barhite of the Second District at a hearing in Rochester on Feb. 28. Commissioner Barhite made his suggestion for a temporary suspension of the 5-cent fare provision of the company's franchise as offering the best hope of a solution of the city's transit difficulties, which the company contends cannot be reached without an increase in revenue.

Commissioner Barhite urged the company and the city to "get together" and agree on the points at issue to improve the service in Rochester, admitted by company officials to be inadequate. The Public Service Commission had ordered the company to show cause why it should not improve the service. In all, three hearings were held, at which Commissioner Barhite examined witnesses for the company and the city. The hearings are now concluded. It is believed that under existing conditions the commission will refuse to order the company to improve the service.

COMPANY WELCOMES AGREEMENT

Under the temporary agreement the company would be granted a fare of 6 or 7 cents for a limited period, during which its books would be open to public inspection. The company has already expressed its willingness to accept such an agreement. Daniel M. Beach, its counsel, said in this connection:

> We are not asking that the contract with the city by which we are required to furnish a 5-cent fare be abrogated. We are simply asking for its suspension and the right to charge a just fare while operating costs are too much to permit of good service at that rate. When the time comes that a 5-cent fare is sufficient the suspension could and should be lifted.

The company's books showed a balance of $300,000 for the year 1919, according to testimony at the hearing by representatives of the city. The attorneys for the company, declared, however, that this sum did not allow for deferred maintenance, the cost of trackage, equipment need renewals and replacements which they said aggregated several hundred thousand dollars. The attorneys stated that the increase in service demanded by the city authorities would cost the company $500,000 additional, and together with the future raises in employees' salaries would total $553,000. It was contended that in order to give better service the company would have to abolish the present 5-cent fare and charge 7, 8 or even 9 cents.

General Auditor Joseph M. Joel of the company, while under cross-examination, testified as to the value of the company's property within the city of Rochester. Asked as to the allocation of the salary of President James F. Hamilton and the expenses of administering the offices of the New York State Railways, Mr. Joel said that slightly more than a third is paid by the Rochester lines.

Corporation Counsel Charles L. Pierce asked representatives of the company for a statement of its expenditures for renewals and replacements for the years from 1909 to 1917 inclusive. It was said that it would take six weeks of searching through vouchers to give the information. On the Charlotte line, which is an appendage to the Rochester lines, a 6-cent fare has been charged and for the past three years subject to a decision by the Public Service Commission as to whether or not that rate is more than should be asked, rebate slips have been issued to patrons on this line. It was said on March 1 that the slips issued to date amount to approximately $223,443.

New Jersey Fixes Fare Rights

The New Jersey Supreme Court at Trenton has affirmed with costs the findings of the Second District Court in the matter involving Mayor Charles P. Gillen, of Newark, and the Public Service Railway. The decision holds that the railroad companies possess the legal right to raise rates of fares at will, subject, of course, to suspension later by the Board of Public Utility Commissioners. Mayor Gillen, a passenger on a Public Service Railway car, refused to pay a 7-cent fare after the Utility Board had set a rate of 6 cents for the company. The matter was threshed out in the Newark District court, and the verdict rendered was favorable to the railway. Mayor Gillen took an appeal..

The court says that the legal question is whether the railway could lawfully raise its fares without an order of the commission and a delay of twenty days before proceeding under the order. The court said:

> This question was definitely settled in the case of O'Brien against the Public Utility board, and where it was held that the railway possessed such a right, and that case is controlling here. It was made clear in the case referred to that the raising of the rates was, as a matter of course, subject to intervention by the Public Utility Board, who may suspend the fares. The proposition is self-demonstrating that if the defendant company had the right to raise the fare, it needed no order and no twenty days' delay before putting the order into effect. The judgment of the District Court is affirmed with costs.

Sees Hope for I. R. T.

Can Continue to Operate Temporarily at Present Fare, Says President Hedley at Traction Inquiry

Frank Hedley, president of the Interborough Rapid Transit Company, admitted under questioning at the resumption of the hearings before the New York City Board of Estimate on March 3 that the company could continue to operate, for the present, at least, on a 5-cent fare. While urging the necessity of an increase in the company's revenue, Mr. Hedley stated that the lines would not go out of business on July 5 next unless an 8-cent fare were obtained before that date, when, it had previously been predicted, the system would be driven into bankruptcy.

Mr. Hedley stated it as his personal conviction that the company would be able to continue beyond July 5 next and still pay its debts. Comptroller Craig thereupon asked why the company could not put up with a 5-cent fare until July 5, 1921. The witness replied that "the company has certain obligations to meet." He further declared that it was not he who had named July 5 next as the day of fate for the Interborough. Asked concerning the quality of the service furnished by the company, Mr. Hedley said:

> With the revenue as it is at present, I consider the state of the subway highly efficient. We are carrying more passengers than any other road in the world, and we are doing it with a higher degree of safety.

The Comptroller then asked if Mr. Hedley considered it fair for the Interborough to fall down on its part of the contract, and for the people to continue to pay the fare. "Supposing the people regarded the fare as too high and refused to pay?" he asked.

Mr. Hedley said that he was willing at any time to sit down with the board and devise any practical means of solving the problem. He added that it was absolutely essential that the people eventually should pay an adequate fare, something between 8 and 10 cents. At present, he said, the Interborough has not funds enough to meet the returns on its investments, and capital under these circumstances cannot be attracted.

The Comptroller then inquired whether the Interborough was willing to permit the city to buy the security holders out, and cancel all contracts. After this, he said, the city could arrange the rate of fare to its own satisfaction. Mr. Hedley said that he would consider any proposition offered, and that in the case the city was able the raise sufficient funds, which he much doubted, he would recommend to the board of directors that they sell out. The price, he said, would be in the neighborhood of $400,000,000.

Mr. Hedley maintained, in answer to questions by Corporation Counsel Burr, that the railroad was giving comfortable and adequate rapid transit to the best of its ability. Asked what prevented the railroad from giving complete accommodation to the traveling public, the witness replied the construction work under the contracts had not been finished.

Safety Cars Did It

Terre Haute's Rejuvenated Traction System Bears Witness To Their Accomplishments

"Safety Cars." These two words sum up very largely the history of the Terre Haute Traction & Light Company, Terre Haute, Ind., for the past year as far as public relations are concerned. They even do more than that. They stand for a revolution in the habits of a community of more than 60,000 persons. Two years ago Terre Haute's railway equipment was worn out. The company had no funds for replacements. Everybody was disgruntled.

Then something happened. Through strenuous efforts the company secured a loan for the purchase of thirty one-man safety cars. Even the local investors subscribed. The first batch of new cars arrived at Terre Haute in November, 1918. Everyone wondered how they would work. They had not long to wait. From the time the cars arrived a change for the better was apparent. With their advent the whole traction system began to speed up. The improvement continued. Today there are fifty-six one-man cars operating in Terre Haute. The people who ride in the cars now say that their city has the best railway service in the country. They are the ones who know. The safety cars are admitted to have been the chief factor in bringing about the change.

Not only are the people of Terre Haute proud of their revamped trolley system. They like to talk about it. In fact, they take delight in putting it through its paces. When ex-Secretaries of State, movie queens or other visiting dignitaries arrive in town the residents do not take the illustrious strangers on a tour of the public library or the scene of the latest divorce scandal. Oh, no! They are too good salesmen for that. They want their guests to see Terre Haute at her best. So they take them for a ride on the "safeties."

Even the local newspapers "boost" the trolley. Most editors are more afraid of praising railway managers than a husband of two weeks is of being five minutes late for dinner. Not so the Terre Haute scribes. They believe in being different. Or perhaps it is merely that they appreciate getting to the office on time. Anyway, they laud the trolley management. The accompanying article, which recently appeared in the Terre Haute *Star*, is concrete evidence of their attitude. Through it runs an unmistakable note of pride in the local system. A portrait of E. M. Walker, general manager of the company, accompanied it. Here is the article:

With an announcement by General Manager E. M. Walker yesterday that more people were carried on Terre Haute street cars this month than any other January in the history of the city, attention was directed to the metamorphosis that the local street-car system has experienced in a little over a year.

From a small number of old style cars, many of them out of repair, because no one of them could be spared from service long enough for an overhauling, to a fleet of more than sixty, fifty-six of which are brand new and of the latest design—from one of the poorest street-car services in the country to one of the very best, has been the experience of this system, much to the satisfaction of the citizens of Terre Haute.

There were short periods in the year 1918 when less than twenty cars were in operation at one time on the streets of the city. Rejuvenation of the system began in November, 1918, with the delivery of the first five or six of the thirty safety cars that had been ordered some months previously. These cars were put into service as fast as they arrived here, the South Seventh Street line being equipped first.

MORE CARS ORDERED

No sooner had the thirty cars embraced in the first order been delivered than plans were set in motion to obtain almost as many more, and with the aid of some local bankers, money was obtained to buy twenty-six more cars. The last of these were installed more than two months ago, with the result that every line in the city is operated with safety cars, with the exception of Wabash Avenue.

The new cars enabled the company to give much more frequent service, three and four minute schedules being maintained on nearly all lines during the rush hours of mornings and evenings, while six, seven and eight minute service is maintained at other hours.

"Of course we have to do more business to make this better service pay," said General Manager Walker, "but with improvement in the service, there has been a corresponding increase in the number of passengers carried. This increase has been going on right along as our service improved, and in point of gross receipts, that is, of passengers carried, this January is the best January we ever had. I think I am safe in saying that as a result of the public's response to our efforts to give the best street-car service in the United States, there is no indication that we will anyways soon have to ask for an increased fare. In other words, while other cities are asking and receiving a fare of from 6 to 10 cents, we are getting along very comfortably on a 5-cent fare and our business is showing a healthy increase over the same period a year ago."

SAFETY CAR PROVES A SUCCESS

This situation is said to be due to the flexibility and economy of the safety car, which other cities are rapidly adopting. The success of these cars here has been so great that there has hardly been a week during the last six or eight months that delegations have not come from other cities to inspect our street-car system with a view of modeling theirs after it. Just a few months ago a delegation was here from Brooklyn, N. Y., and as a result of what they saw more than 200 safety cars were ordered for that city.

One of the noteworthy things about this improvement in service and the thing that indicates the greatest confidence in the city of Terre Haute, is the fact that money to make these improvements could be obtained at a time when street-car systems in other places were barely able to pay their running expenses. All of the money for the Terre Haute improvements was borrowed in Indiana, and not in considerable part of it came from Terre Haute.

MORE IMPROVEMENTS PLANNED

Mr. Walker states that the program of improvements is not completed by any means and that these will be carried on as fast as money can be obtained for them. It is not improbable that more safety cars will be ordered before the year is much older, and it is probable also that the Water Street power station, which is already one of the finest in Indiana, will be enlarged by the addition of boilers and machinery of the latest and most improved type.

Fare Increase Anti-Parking Alternative

The Los Angeles (Cal.) Railway will be compelled to raise its fare if the plan worked out by the State Railroad Commission for the relief of congestion in Los Angeles is defeated through rejection of the "no parking" ordinance recently passed by the City Council. Warnings to this effect have been issued by Assistant City Attorney Stephens, who points out that the "no parking" ordinance is part of a comprehensive plan worked out by the city and by engineers of the State commission for general relief of congestion. Petitions for a referendum election to pass on the ordinance are being circulated. Mr. Stephens urged all persons not to sign these.

Representatives of the Railroad Commission repeatedly warned the councilmen during a hearing on the new ordinance that failure on the part of the city to enact such legislation would block the plan outlined for rerouting cars. The car rerouting plan was worked out by the State officials as the only means for preventing increases in car fares in Los Angeles. Commissioners Edgerton and Brundidge of the commission pointedly informed city officials that the present traffic congestion in the downtown streets was such that the street cars could not be operated on schedule. The ordinance has been published and will become effective April 10, at which time the rerouting plan will be put into effect, unless halted by the referendum.

Appeals for Public's Co-operation

The "home rule" committee recently appointed to manage the Quincy (Mass.) division of the Eastern Massachusetts Street Railway, has appealed to the people of Quincy for their support. The committee asks the public's co-operation in giving the city the best street railway in the State. The appeal, which was placed in all Quincy cars in the form of display posters, follows:

FOR QUINCY'S SAKE

The Quincy Street Railway is now operated by a Home Rule Citizens' Committee composed of Quincy business men.

Fares, service and other problems are to be settled by this purely local committee.

Everyone's help is needed.

More cars, better cars, quicker service and the lowest possible fares are our aims.

Praise or criticism of the road and its employees is desired.

Let's get together for Quincy's sake and give the city the best street railway in the State. It can be done if you'll help.

Therefore send in your suggestions or criticisms either by letter or personally to any member of the committee:

Forest I. Neal, chairman; Henry L. Kincaide, S. W. Wakeman, Charles L. Gilliatt, Walter E. Barry, Herbert S. Barker and C. L. Young.

Staggered Hours Tried in Richmond

The Lorillard Tobacco Company, Richmond, Va., has voluntarily adopted as a permanent plan the staggered-hour system of assembling and dismissing employees. The employees are divided into groups who come to work at 7, 7:15, 7:30, 7:45 and 8:00 a.m., and leave at intervals from 4:30 to 5:30 p.m. The plan was first put in on trial and it worked out so well that it has been adopted permanently. This scattering of the load throughout an hour, both morning and evening, practically removes the peak for the railway company in connection with this particular plant. The idea is gaining in favor with other Richmond employers. In a letter to the Virginia Railway & Power Company, in regard to this matter, J.

N. Dart, general manager of the tobacco company, wrote as follows:

> As you know, we have at all times tried to co-operate with the Virginia Railway & Power Company, as we realized that it is to our interest as much as to theirs to get our people to work at such times as will enable them to avoid the rush, both coming to work and going home.
>
> It might further interest you to know about the plan which we have recently put into effect, whereby we sell our employees street-car tickets in the building. This enables them always to have a ticket when they get on the car and so they do not have to wait for change. This scheme works very nicely, and our employees are taking advantage of it, having bought $250 worth of tickets within the past ten days.

Transportation News Notes

Increase on New York Interurban.—Increased rates have been authorized for the Utica and Oneida lines of the New York State Railways, Syracuse, N. Y., the schedule of increase affecting all lines between Utica, Little Falls, Frankfort, Ilion, Mohawk and Herkimer.

Asks Seven Cents in Oneonta.—The Southern New York Power & Railway Corporation, Cooperstown, N. Y., has applied to the Public Service Commission for the Second District for authority to charge a 7-cent fare on its lines in Oneonta. The present fare is 5 cents.

Lower Fare for Revere.—The public trustees of the Eastern Massachusetts Street Railway have reduced the fare in Revere, Mass., from 10 cents straight to sixteen tickets for $1. The reduction was made in accordance with the company's policy of reducing fares wherever conditions warrant such a course.

Fare Reduced in Montpelier. — The City Council of Montpelier, Vt., has authorized Mayor Shurtleff to sign an agreement with the Montpelier & Barre Traction Company by which the fare in Montpelier will be 5 cents instead of 6 cents, as heretofore. The Council has permitted the company to increase its rate beween Barre and Montpelier from 15 cents to 18 cents.

"Complaint Cards" in Detroit.—The cars of the Detroit (Mich.) United Railway have been equipped with "complaint card boxes," placed at the exit end of the car together with a supply of complaint cards so that violation of traffic ordinances observed by passengers may be reported easily and quickly. The cards are collected each night at the carhouses and sent to the complaint bureau.

Fare Briefs Filed.—The city's brief in the hearing of the Portland Railway, Light & Power Company, Portland, Ore., before the Public Service Commission asking for an increase in revenue, has been filed with the commission by City Attorney Stanley Myers. The company's brief has also been filed. and the Public Service Commission hopes to arrive at some decision in the matter within thirty days.

Seven-Cent Fare Urged.—In applying for a 7-cent fare in the District of Columbia, William F. Ham, president of the Washington Railway & Electric Company, declared that at the present rate of income his company is earning only 3½ per cent on its investment. Mr. Ham expressed the opinion that the Public Utilities Commission should allow a 7-cent fare with 2 cents for transfers for the period beginning May 1.

Staggered Hours Helpful. — Very satisfactory results are reported by the railways in Washington as a result of staggered hours in the Government departments. The congestion on cars has been measurably relieved, both in the rush hours of the morning and in the afternoon by spreading the hour for reporting for duty between 8:45 and 9:15 o'clock, instead of all reporting at 9 o'clock as formerly was the custom.

Safety Campaign in Toledo.—"Safety" posters are a feature of a campaign which the Toledo Railways & Light Company, Toledo, Ohio, is conducting for the reduction of the number of accidents on its lines. The company has placed the posters in its cars and in other public places. Accidents involving the company's cars numbered 169 in January, 1920, as compared with seventy-four for the same month of 1919.

Suspends Seven-Cent Rate.—Owing to protests from the city authorities of Phillipsburg, N. J., the Phillipsburg Transit Company did not raise its fare to 7 cents on March 1 as it had proposed doing. The municipality has applied to the Interstate Commerce Commission for a hearing on the company's petition for a rate increase. The company operates in Phillipsburg and neighboring New Jersey and Pennsylvania towns.

Will Grant Six-Cent Fare.—The City Council of Little Rock, Ark., has directed the city attorney to prepare an ordinance granting the Little Rock Railway & Electric Company a 6-cent fare for a period of three years. This action was taken after the approval by the Council of the report of the public utilities committee, which urged financial relief for the company through a higher fare. The company's petition for an increase has been under advisement for several months. The present fare is 5 cents.

Jitneys Under Ban in Lowell.—Operation of jitneys in Lowell, Mass., ceased on March 1 by order of the City Council. The Council had previously passed an ordinance barring the jitneys from all streets served by the Eastern Massachusetts Street Railway. This action was taken at the instance of the "home rule" committee recently appointed to manage the Lowell division of the company. Company officials estimated that the annual loss in revenue due to jitney competition in the Lowell district amounted to $50,000.

Would Carry Fare Plea to Courts.—The New York, Westchester & Boston Railway, New York, N. Y., has applied to Supreme Court Justice Platzek for a writ of certiorari to compel Lewis Nixon, Public Service Commissioner for the First District, to produce in court all documents relating to the hearings on the company's application for a higher fare. The company seeks to raise the rate for passengers riding within the corporate limits of New York City from 5 cents to 7 cents. Commissioner Nixon has refused to grant the increase.

Fare Case Still Pending.—The matter of fares on the Memphis (Tenn.) Street Railway is still up for discussion at Nashville before the State Utility Commission. The railway is seeking to raise its fare from 6 cents to 7 cents with a charge for transfers. This is bitterly opposed by the Memphis city government, Mayor Rowlett Paine having appeared in person before the commission. It is intimated that a fight in the courts will ensue if the rate is raised above 6 cents. There is also considerable talk in Memphis of rerouting many of the lines.

Theatres Advertise Subway Advantages.—The Shuberts, New York theatrical producers, have distributed among their patrons a leaflet containing directions for reaching their theatres via the Broadway subway, operated by the New York Consolidated Railroad. The location of the twenty Shubert theatres along the "Rialto," or Broadway theatre district, is shown on a map, on which the route of the Broadway line is also marked. The leaflet also contains information concerning important buildings and other points of interest along the line.

Freight Rates Up Twenty Per Cent.—The Aurora, Elgin & Chicago Railroad, Aurora, Ill., has filed tariffs with the Illinois Public Utilities Commission providing increases of approximately 20 per cent in its freight rates. The company seeks to abandon its collection and delivery service to the Interurban Motor Despatch Company, a freight and express company operating over its lines. The new tariffs raise the rate from 30 to 40 cents on shipments between Elgin and St. Charles and Geneva. Corresponding increases are made between other points. The new rates are now in effect pending approval by the commission.

Eight Cents on Hudson Tubes.—The Hudson & Manhattan Railroad, operating the tubes under the Hudson River connecting New York City with New Jersey points, has posted a new local passenger tariff schedule effective April 4, under which it proposes to raise the fare bewteen the Hudson Terminal, Manhattan, and Jersey City and Hoboken from 5 cents to 8 cents. The fare between stations in New Jersey and stations in New York City other than the Hudson Terminal, now 7 cents, is also to be raised to 8 cents. The only 5-cent fare left is for a ride between the Jersey City and Hoboken stations and between stations in Manhattan.

Lower Ticket Rate Ordered — The Indiana Public Service Commission has ordered the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., to cancel all commutation fares calculated on the basis of 2 cents a mile and to establish in lieu thereof fares on the basis of $.01875 a mile, the rate charged by the Chicago, Lake Shore & South Bend Railway, which operates in the same territory. Commutation books are to be made up of forty tickets with a minimum charge of $4 a book and 10 cents a ride. The Chicago, Lake Shore & South Bend Railway has been authorized to establish a minimum commutation fare of $4 for forty rides, or ten cents a ride.

City Backs Five-Cent Fare Suit.—Justice Clark, of the Appelate Term of the Supreme Court in Brooklyn, has given permission to Corporation Counsel Burr of New York City to intervene in the suit instituted by Julius Merksamer, to recover 5 cents charged him by the Brooklyn Rapid Transit Company. It is claimed that the extra 5 cents was charged for a ride to Coney Island, on the Sea Beach line, and that not more than 5 cents should have been charged. The suit was tried in the Municipal Court in Brooklyn, and resulted in a victory for the company. If the appeal is successful, the fare to Coney Island on the Rapid Transit lines will be only 5 cents thereafter.

Revocation of Jitney Licenses Upheld.—The repeal of jitney licenses in the city of Brockton, Mass., by the City Council after the Eastern Massachusetts Street Railway had threatened to discontinue service unless jitneys were eliminated as competitors was upheld by the Supreme Court of Massachusetts in a recent decision handed down by Chief Justice Rugg. The opinion of the court says that the Aldermen acted in good faith and in the exercise of a reasonable discretion in the interest of public safety and convenience as they believed, to the end that the mode of transportation which they thought best calculated to serve the best interest of the entire population of the city might be preserved and maintained.

Less Traffic in Kansas City. — The Kansas City (Mo.) Railways reports that it now has in service during the evening rush hours 641 cars and twelve trailers, and in the morning rush hours 555 cars and twelve trailers. This is almost exactly the same service that was supplied in July, 1917, but the average daily number of passengers now is 310,000 as against 370,000 in 1917. This decrease is attributed largely to the jitneys and the growing habit of auto owners in picking up passengers on the street and carrying them downtown. The increase in population of Kansas City is estimated at 50,000 within the last three years. The increase in the number of automobile owners is about 13,000 in the same period.

Asks Riders' Support to Prevent Breakdown.—James F. Hamilton, president of the New York State Railways, has addressed to the people of Rochester an open letter asking their support in the company's effort to obtain financial relief for the Rochester lines through an increase in fare. Mr. Hamilton points out that the Rochester lines carry 275,000 passengers daily, although the population of the city is less than 300,000. He calls attention to the fact that the company needs $1,000,000 to put its tracks and equipment in good condition. Mr. Hamilton suggests that car riders use their influence with the city authorities to prevent a total breakdown in the city's transportation system which threatens because of lack of funds.

Appeals for "Safety First."—H. O. Allen, safety engineer of the Beaver Valley Traction Company, New Brighton, Pa., believes in carrying the message of "safety first" into the homes of the company's men. He recently drew up and sent to each employee a series of talks in letter form, dealing with the problem of eliminating accidents on the company's lines. Mr. Allen discussed among other topics, proper braking of cars, the operation of door devices, and the regulation of car speed. He called the men's attention to the fact that, if they had any questions to ask regarding proper car operation, they should come to him for their answers, and that, while it was his business to show them the correct methods, they should not feel that he would report them for mistakes.

Six Cents in Charleston.—The Charleston (W. Va.) Interurban Railway has received permission from the State Public Service Commission to raise its fare within the Charleston city limits and its interurban rates. The commission has authorized a 6-cent city fare. The company had applied for a 7-cent fare. The increase in interurban rates asked by the company was granted without objection. The books of the company showed gross earnings of $261,000 with operating expenses of $244,500 and net earnings of $17,000. George R. C. Wiles, chairman of the commission, stated that the company was entitled to earn 11 per cent upon its investment to include depreciation and risk. It is estimated that the increase in fares will raise the net earnings to $22,000.

Referendum on Columbus Fares.—The 6-cent fare ordinance recently passed by the City Council of Columbus, Ohio, will be submitted to the voters of that city at a referendum election on April 27. The ordinance as passed by the Council grants the Columbus Railway, Power & Light Company a 6-cent cash fare for a six-year period. During the first two years the company is to sell five tickets for 25 cents and during the remaning four years six tickets for 25 cents. The company is permitted to charge 10-cent "owl car" fare. Free transfers are retained. Under the terms of the ordinance the company binds itself to improve service, pay its share of necessary street paving, and make not more than six miles of extensions within the six-year period at a cost of not more than $3,000,000.

Further Transfer Curtailment. — The Public Service Commission for the First District of New York has issued an order permitting the Belt Line Railway Corporation to file a new schedule on short notice, showing the elimination of transfers between the Fifty-ninth Street Crosstown line and the Madison Avenue line. The Fifty-ninth Street Line is owned by the Belt Line Railway Corporation, a part of the Third Avenue system, while the Madison Avenue line is being operated by the New York & Harlem Railroad, the owner of the property, to which company it was returned by an order of the court a few weeks ago. The New York & Harlem Railroad recently notified the Belt Line Corporation that, beginning March 1, it would discontinue giving transfers to, or accepting them from, the Fifty-ninth Street line.

Unprecedented Traffic Increase in Brooklyn.—Directions have been given by the Public Service Commission for the First District of New York to the operating officials of the Brooklyn Rapid Transit elevated and subway lines, the effect of which is to call for improvement in the serivec on those lines. Owing to the recent storm, which greatly delayed surface railroad operation, an enormous amount of traffic was diverted to the subway and elevated lines, so that for the month of February the total increase of traffic upon these lines aggregated 40 per cent. This great growth has had the effect of overloading the company's facilities. Investigations made by the commission have recently shown that at times there was as high as 20 per cent of the rolling stock of the elevated and subway lines in the shops awaiting repairs. This fact has also helped to make the present congestion a serious one.

Plans Fight on One-Man Cars. — The city of Richmond, Va., will shortly begin legal proceedings to bar the use of one-man cars by the Virginia Railway & Power Company, according to an announcement on Feb. 24 by Commonwealth's Attorney George E. Wise. Mr. Wise stated that he was preparing a petition for a writ of quo warranto against the company. Action against the one-man cars was first taken by John Hirschberg, candidate for mayor, who filed injunction proceedings in the Law and Equity Court, declaring that the operation of the cars was contrary to the charter of the city and a direct violation of the franchise of the company. He further claimed in the proceedings that the cars were unsafe. Judge Beverly T. Crump decided that he was without jurisdiction unless action was filed by legal representatives of the city, and Mr. Hirschberg then asked the Commonwealth's attorney to act. It is charged that the cars violate flagging regulations at grade crossings.

Personal Mention

Mr. Fish Again in Chicago

Leaves West Penn Railways to Become General Manager of Chicago Surface Lines—Other Changes

The Board of Operation of the Chicago (Ill.) Surface Lines at its meeting on Feb. 24 appointed Williston Fish, vice-president of the West Penn Railways, Pittsburgh, Pa., to the position of general manager of the system. Mr. Fish's appointment was briefly noted in the ELECTRIC RAILWAY JOURNAL for Feb. 28. Mr. Fish was general manager of the Chicago Railways until the time of the operating consolidation with the Chicago City Railway in 1914, when he became connected with the West Penn System. He therefore returns to Chicago thoroughly familiar with operating conditions in that city and well equipped to cope with the problems confronting the surface lines.

OTHER CHANGES ANNOUNCED

At the meeting on Feb. 24 the Board of Operation also made the following appointments:

Frank L. Hupp, formerly assistant secretary, was advanced to secretary. Mr. Hupp is also secretary of the Chicago Railways.

F. D. Hoffmann, formerly secretary and assistant treasurer, was appointed assistant secretary and assistant treasurer. Mr. Hoffmann is also secretary and treasurer of the Chicago City Railway.

M. B. Orde was made treasurer of the Chicago Surface Lines. He is also treasurer of the Chicago Railways.

John J. Duck was reappointed general auditor. Mr. Duck is auditor of the Chicago City Railway.

W. W. Gurley was reappointed general counsel.

No changes in the department heads, further than those already published in the JOURNAL, have been announced by President Blair, and the former heads are being continued until further notice.

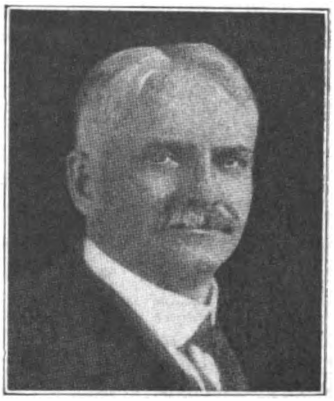
CAREER OF MR. FISH

Mr. Fish was born at Berlin Heights, Ohio, in 1858. He entered Oberlin College in 1876 and in the following year was appointed to West Point. Graduating from the military academy in 1881 with high standing in mathematics, engineering, law and languages, he was appointed a second lieutenant of the Fourth U. S. Artillery. He served with that regiment for several years at San Francisco, New London, Conn., and Fort Snelling, Minn., meanwhile continuing the study of law.

Resigning from the army in 1887, he entered the employ of the Crane Elevator Company, of Chicago, as a salesman. He remained with the company for a little more than a year. He meanwhile resumed the study of law in the school of Judge Thomas Moran, and was admitted to the bar in 1897.

Mr. Fish's connection with the street railway industry began in 1890, when he joined the South Chicago City Railway. For the next nine years he served as right-of-way and claim agent and assistant counsel of the company. During this period he acquired most of the right-of-way for the company and drew up all the contracts.

In 1899 Mr. Fish was appointed assistant to Jesse Spaulding, president of the Chicago Union Traction Company, continuing in the same capacity under John M. Roach, Mr. Spaulding's successor. As aide to Mr. Roach he had an important part in the valuation of the property of the Chicago Union Traction Company and in the negotiations for the settlement ordinance of 1907. When Mr. Roach became president of the newly-organized Chicago Railways, Mr. Fish remained with him as his assistant. In February, 1912, he was elected vice-president and general manager of the company.



WILLISTON FISH

Upon the operating consolidation of the Chicago Railways and the Chicago City Railway to form the Chicago Surface Lines in 1914, Mr. Fish was made vice-president of the system, resigning, however, in the same year. About the same time he was chosen vice-president of the West Penn Traction & Water Power Company and the West Penn Railways.

In addition to his duties with the West Penn Railways, Mr. Fish has served as president of the Wheeling (W. Va.) Traction Company and as an official of several other companies controlled by the West Penn Railways. He has taken an active interest in the work of the American Electric Railway Association, presenting a paper on the subject of depreciation before the recent mid-year meeting of the Association at Cleveland.

Col. R. A. Mitchell of Gadsden has been elected a vice-president of the Alabama Power Company, Anniston, Ala.

George R. Hart has been appointed assistant general manager of the Sacramento Northern Railroad, Sacramento, Cal.

R. E. Luellen has been appointed safety engineer of the Union Traction Company of Indiana, Anderson, Ind. Mr. Luellen is the editor of *Safety*, the company's magazine.

J. W. McNeely, superintendent of transportation of the Paducah (Ky.) Traction & Light Company, has been appointed superintendent of the Paducah Railway, which recently took over the property of the former company.

Archibald Page, general manager of the Glasgow Corporation Tramways Department, Glasgow, Scotland, has resigned. Mr. Page has been appointed a member of the Commission under the Ministry of Transport for the control of the electrical supply of Scotland.

H. M. Aldrich, formerly superintendent of the Northampton Street Railway, has been appointed by the Massachusetts Department of Public Utilities to be inspector of street railways and street railway equipment for the western district of the State.

John M. Johnson, traffic superintendent of the Trenton & Mercer County Traction Corporation, Trenton, N. J. has resigned. Mr. Johnson joined the company in the fall of 1919. He was formerly superintendent of the Ithaca (N. Y.) Traction Company.

Leslie W. Spraggon has resigned his position with the Connecticut Company where he has been inspector of rolling stock for the past two years, to take effect March 1. He goes to the Boston office of the Westinghouse Electric & Manufacturing Company as travelling salesman.

James T. Hutchings has resigned as president of the Rochester Gas & Electric Corporation, Rochester, N. Y., to become assistant general manager of the United Gas Improvement Company, Philadelphia, Pa. Mr. Hutchings was president of the Rochester Railway & Light Company from 1904 to 1909.

T. K. Glenn has been elected president of the Georgia Railway & Electric Company, Atlanta, Ga., to succeed the late Frank E. Block. Mr. Glenn is vice-president of the Georgia Railway & Power Company, which operates the lines of the Georgia Railway & Electric Company.

G. M. Rozelle has been appointed division superintendent of the Union Traction Company of Indiana, Anderson, Ind., with headquarters at Muncie. Mr. Rozelle succeeds A. G. Snell, resigned. Prior to his appointment as superintendent he was an inspector for the company.

Maurice Dooley, superintendent of the Barre & Montpelier Traction & Power Company, Montpelier, Vt., has tendered his resignation to take effect on March 22. Mr. Dooley has been superintendent of the company for several years. He was formerly assistant superintendent.

J. C. Hallman has been elected vice-president of the Georgia Railway & Electric Company, Atlanta, Ga., the lines of which are operated under lease by the Georgia Railway & Power Company. Mr. Hallman succeeds T. K. Glenn, who has been chosen president of the company.

John J. Dempsey, who resigned some months ago as vice-president and general manager of the Brooklyn (N. Y.) Rapid Transit Company to become vice-president of the Seamans Oil Company, has been transferred by the company from New York to Oklahoma City, Okla., where he will hereafter live and make his headquarters.

W. E. Herring, for the last seven years industrial agent of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has been transferred to the Boston offices of Stone & Webster. He is to be connected with the engineering department of the division of engineering and construction. Mr. Herring went to the company at Seattle from the position of chief engineer of the U. S. Forestry Service.

A. C. Colby, who has been master mechanic in the Bridgeport shops of the Connecticut Company, New Haven, Conn., for the past two years, has been transferred to the New Haven general offices with the title of mechanical engineer. He will take over the duties of Leslie W. Spraggon in connection with the company's reclamation shop. Before joining the Connecticut Company Mr. Colby was master mechanic with companies at Pittsfield, Mass., and Birmingham, Ala. He was appointed master mechanic of the Connecticut Company's Bridgeport shops in October, 1918, succeeding William F. McCoy.

G. J. Smith, superintendent of rolling stock and shops of the Kansas City (Mo.) Railways, resigned from that position on Jan. 31 and will engage in the automobile business. Mr. Smith has been actively engaged in electric railway work for the past thirty years, having organized the South Covington & Cincinnati Street Railway in 1890. In 1899 he resigned as master mechanic of that company to become master mechanic of the St. Louis & Suburban Railway, where he remained for two years. At the end of that time he joined the St. Louis Car Company as superintendent, in which position he accomplished important work in connection with truck design and methods of truck manufacture. He was one of the first to advocate an association of electric railway master mechanics. In 1904 Mr. Smith joined the Metropolitan Street Railways, now the Kansas City Railways, as superintendent of rolling stock and shops, which position he has held for the past sixteen years.

O. B. Coldwell Promoted

Now Vice-President Portland Railway, Light & Power Company in Charge of Light and Power Department

Under a reorganization of the operating personnel of the Portland Railway, Light & Power Company, Portland, Ore., Orin B. Coldwell, who for some time has acted as general superintendent, has been chosen second vice-president and has been placed in charge of the light and power departments. F. I. Fuller, first vice-president, has assumed charge of all railroad matters, which have heretofore been attended to by Mr. Coldwell. For operating purposes the railway department and the light and power department are again segregated.

Mr. Coldwell, the new vice-president, is one of the best-known operating men in the Northwest. He was born at Salem, Ore., in 1875. In 1892, while yet a student at the Portland High School, he entered the employ of the Willamette Falls Electric Company, a pioneer in the field of electric power transmission. During the next five years he was engaged in one capacity or another in practically every department of the Willamette Falls company.

O. B. COLDWELL

WIDE EXPERIENCE AS ENGINEER

Not content with a merely practical knowledge of electricity, Mr. Coldwell entered Leland Stanford University in 1897 as a special student in electrical engineering. Here he put in three years, spending his summer vacations in the employ of the Portland General Electric Company. In the fall of 1900 he entered Cornell University as a student in the electrical engineering course of Sibley College, and was graduated with the class of 1902. Returning to the West, he again joined the Portland General Electric Company, this time as assistant superintendent. He has since filled successively a number of positions with the company and its successor, the Portland Railway, Light & Power Company.

Mr. Coldwell has taken an active part in building up electrical engineering societies on the Pacific Coast. He was one of the organizers of the Northwest Electric Light & Power Association, of which he served as president in 1914. He was also instrumental in bringing about its affiliation with the National Electric Light Association. He is a member of both organizations and, in addition, a fellow of the American Institute of Electrical Engineers.

A. G. Snell, superintendent of the Muncie division of the Union Traction Company of Indiana, Anderson, Ind., has resigned. Mr. Snell has accepted the position of cashier of the Farmers' State Bank of Muncie. He has been connected with the Union Traction Company for more than fifteen years. He was appointed superintendent of the Muncie division in 1917.

Obituary

Frank E. Block, president of the Georgia Railway & Electric Company, Atlanta, Ga., whose lines are leased by the Georgia Railway & Power Company, is dead.

D. S. Robertson, purchasing agent of the Montreal (Que.) Tramways, died in Montreal from pneumonia on Feb. 27. Mr. Robertson was born in Glasgow, Scotland, sixty-nine years ago.

Andrew B. Bullock, superintendent of carhouses of the Kansas City (Mo.) Railways, died on Feb. 15. Mr. Bullock had been connected with the company for thirty-one years, beginning as a conductor.

R. L. Morley, electrical engineer of the Muskegon Traction & Lighting Company, Muskegon, Mich., died recently in Muskegon at the age of thirty-six years. Mr. Morley had been connected with the company for several years. He was graduated from the engineering department of Purdue University in 1909, and for three years thereafter served as electrical engineer of the Maine Short Line.

Henry B. Endicott, head of the Endicott-Johnson Company, and chairman of the Massachusetts Committee on Public Safety during the war, died in Boston on Feb. 12. During the war Mr. Endicott was called on to assist in the settlement of labor problems and in one year helped settle labor disputes involving 100,000 workers. He was not directly engaged in electric railway work, but filled offices in the Holyoke, Springfield and Boston Elevated railway settlements that drew the attention of the industry to him. He was a man of unusually broad sympathy and of fine understanding. He put public service above his own interests. The removal of the influence for good that he wielded in connection with labor matters makes his passing a distinct loss to Massachusetts and the nation at large.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Heavy Coupler Orders Placed

Deferred Maintenance and Buying of New Equipment Responsible for Large Volume of Business

Considerable activity is now being shown in the buying of couplers. The market is flooded with inquiries because of the large number of double-truck car orders pending. Deferred maintenance, however, also is responsible for a large volume of orders that are being placed.

Prices are firm, no advances having been made since Dec. 1, 1919, when a small increase, approximately 5 per cent, was announced. Owing to present market tendencies, another increase about April 1 would not be a great surprise.

In addition to the couplers ordered for new cars that are being built, many railways are in the market for maintenance needs. Among the large orders for this purpose noted is one by the Brooklyn Rapid Transit Company for enough coupler heads of the pin and link type to equip 475 cars. These included 400 type 1,250 couplers, 200 type 1,275, 250 type 18 and 100 type 4-A, all of which will be furnished by the Van Dorn Coupler Company. Also the Long Island R.R. electric division, has placed an order for a large number of couplers from a well known coupler manufacturer. In addition orders from some of the railways in the larger cities are now pending and may be closed at any time. The outlook is very good for a large volume of business within the next three months.

President Names New Fuel Commission

Railroads' Coal Confiscation Claimed to Be Illegal By National Coal Association

President Wilson has issued executive orders effective until April 30 next, providing for continuation of the power of the Fuel Administration, but dividing them between the Director General of Railroads and a commission of four, composed of A. W. Howe, Rembrandt Peale, F. M. Whittaker and J. F. Fisher. It will function through the Tidewater Coal Exchange, which had been suspended before the resignation of Dr. Garfield as Fuel Administrator. Director-General Hines will retain jurisdiction over domestic distribution, while the commission will handle bunker and export coal matters. The order said the action was taken "because of the present emergency and in order to insure an adequate supply and equitable distribution, and to facilitate the movement, and to prevent, locally or generally, scarcity of coal."

It directs specifically that the order issued by the U. S. Fuel Administration Nov. 6, 1917, relative to tidewater transshipment of coal at Hampton Roads, Baltimore, Philadelphia and New York, and for the employment of and co-operation with the Tidewater Coal Exchange, as a common agency to facilitate transshipment and to reduce delays in the use of coal cars and coal-carrying vessels," suspended by Dr. Garfield on Feb. 20, 1919, be reinstated.

Rush C. Butler, the general counsel of the National Coal Association, declares that all confiscations and diversions of coal by the Railroad Administration made subsequent to Dec. 13, 1919, the date of Dr. Garfield's resignation as Fuel Administrator, are invalid and unlawful, subjecting not only the Administration itself but the individuals to liability for any damage attendant on such action.

Line Hardware Active

Spring Buying of Line Materials Opening Up Well—Railways Commence on Linework Within Six Weeks

To all appearances railways utilities are quite active in their preparations for line work this spring as orders for line hardware have been coming in in large amounts. Here and there, however, spots are found in the ordering where there is little or no work in course of preparation at this time. Throughout the South, West, and Middle West the buying has been more marked than in the East, although there has been considerable movement there too.

Shipments are of varying length of time, according to the class of material required. In the East flats may be ordered from stocks acquired before the embargoes shut down shipments from the steel regions, and deliveries are being made in two to three weeks. Many brackets are coming through in three to four weeks, while some cannot be shipped for four to six weeks.

It seems that the rolling mills are devoting much of their effort on heavy sections, and this is given as a reason for a rather limited quantity of the light sections such as angles, channels, ovals and flats.

The latter part of last week some manufacturers advanced their prices of line hardware 10 per cent, and it is expected that those who have not already done so will follow suit any day. The tendency of steel products is upward, and mills are booked to the limit for months to come. One of the main causes for the shortage is given as the insufficient number of cars to carry coal to be coked, to carry raw materials to the mills and to remove finished products from the mill warehouses. Then, too, there is a shortage of labor not only in the steel mills but also at the coke ovens, so that it is improbable just now that a considerably greater amount of coal could be coked were there sufficient cars available to bring the coal in.

Changes in Westinghouse Railway Department

Myles B. Lambert Becomes Manager and W. S. Rugg and Charles Robbins, Assistants to Vice-President

Announcement has been made by the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., of the appointment of W. S. Rugg, formerly manager of the railway and of the marine departments, and Charles Robbins, assistant sales manager, as assistants to vice-president. Myles B. Lambert, for many years actively connected with the work of the company, now becomes manager of the railway department.

Mr. Rugg comes from Michigan and is a Cornell graduate. Soon after his connection with the company, he was transferred from Pittsburgh to Chicago and, in 1901, was transferred to New York as special engineer. Eight years later he was made the manager of the office. In 1917, he was recalled to East Pittsburgh to take charge of the railway department where, in 1918, he was also made manager of the newly created marine department.

Mr. Robbins began his connection with the company in 1899 at its New York office. He was transferred in 1906 to the main offices at East Pittsburgh to become assistant to the manager and later manager of the industrial and power departments. In August, 1915, he was made assistant sales manager of the company.

Mr. Lambert joined the Westinghouse forces in 1901 and since that time he has occupied several positions in the railway department. The last one, previous to his promotion, was that of assistant to the manager. The larger part of Mr. Lambert's early life was spent in practical railway work. This has given him a thorough understanding of the class of work handled by his department. His earlier experiences were with the Long Island Railroad, then a steam operated road. Subsequently he entered the employ of the Kings-County Elevated Railroad of Brooklyn, where later he became division superintendent. Mr. Lambert's latest promotion will be gladly received by those of his wide acquaintance among electric railway men. He has been particularly active in behalf of the American Electric Railway Association, serving on several of its committees.

Sheet Products Advance

Headlights, Heaters With Pressed Covers and Devices Contained in Sheet Boxes Included

Owing to an increase in the price of sheets, similar increases in the price of headlights, heaters, covering boxes for electrical devices, etc., have been announced during the past few weeks. These increases range from 5 to 7½ per cent.

Manufacturers in the railway field are experiencing great difficulty in obtaining any sheet at all. Prices are high with large premiums the rule. Orders placed with the mills mean very little as the delivery situation is indefinite and hence manufacturers do not know what they will be able to produce. Some of the more fortunate ones who have a considerable amount of stock on hand will be enabled to quote good prices on a large amount of new business that is now being offered.

Sheet mills are operating at from 70 to 80 per cent of normal. This, however, has had little effect in relieving the sheet shortage among manufacturers in the railway field as manufacturers from every field are in the market for sheets and the demand is many times greater than the supply. The car shortage, also, is proving to be a heavy drawback and even when sheets are finished, it is almost impossible to get them moved. At the present time heavy stocks of finished sheets are piled up in the sheet mills or warehouses of mills waiting for cars.

Although quotations for box annealed one-pass block sheets in from No. 17 to No. 30 gage range from $4.20 to $5.15 per 100 lb., manufacturers in the railway field have been forced to pay 8 cents to 9 cents per pound in order to continue production made necessary by the recent heavy ordering of equipment.

Chicago Plans to Buy 300 Cars

The Chicago Surface Lines is contemplating the purchase of 300 new cars during the present year. The purchase of at least 200 additional cars is practically certain, since the Public Utilities Commission has asked that more cars be put in service.

Rolling Stock

Lincoln (Neb.) Traction Company, has placed an order with the American Car Company for fifteen Birney safety cars.

Cumberland County Power & Light Company, Portland, Maine, lost two cars and a snowplow in a fire which destroyed its carhouse.

Indianapolis (Ind.) Street Railway, will be in the market shortly for from forty to fifty double-truck cars probably of the pay-as-you-enter type.

People's Gas & Electric Company, Burlington, Iowa, has ordered six safety cars from the National Safety Car & Equipment company.

New York & Stamford Railway, Port Chester, N. Y., is in the market for from five to seven safety cars.

Omaha & Council Bluffs Street Railway, Omaha, Neb., has ordered five Birney safety cars for use on four of its outlying lines.

Grand Rapids (Mich.) Railway has placed an order for nineteen safety cars. The purchase has been approved by the special street car committee of the city commission.

Interstate Public Service Company, Indianapolis Ind., has purchased an electric locomotive for use on its line between Indianapolis and Louisville.

Franchises

Hudson & Manhattan Railroad, New York, N. Y.—The application of the Hudson & Manhattan Railroad for another extension of time in which to begin building its line from Thirty-third Street and Broadway, its present terminus, to the Grand Central Terminal was denied on Feb. 28 by Acting Transit Construction Commissioner Ryan.

Track and Roadway

Calgary (Alta.) Municipal Railway.—The Calgary City Commission is considering the purchase of 100 tons of steel for proposed improvements to the line of the Calgary Municipal Railway in Tuxedo Park.

British Columbia Electric Railway, Vancouver, B. C.—The British Columbia Electric Railway proposes to extend its Mount Tolmieline, Victoria, B. C., to Bay Road.

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway has announced that it will pay the entire cost

NEW YORK METAL MARKET PRICES

	Feb. 4, 1920	March 3, 1920
Copper, ingots, cents per lb	19.00	18.37
Copper wire base, cents per lb	22.25	22.25
Lead, cents per lb	8.75	9.00
Nickel, cents per lb	45.00	45.00
Spelter, cents per lb	8.70	9.10
Tin, cents per lb	58.00	61.50
Aluminum, 98 to 99 per cent, cents per lb	32.50	33.00

OLD METAL PRICES—NEW YORK

Heavy copper, cents per lb	17.75 to 18.00	17.00 to 17.50
Light copper, cents per lb	15.50 to 16.00	14.75 to 15.25
Heavy brass, cents per lb	10.00 to 10.50	9.50 to 10.25
Zinc, cents per lb	5.00 to 5.25	5.00 to 5.25
Yellow brass, cents per lb	8.50 to 9.00	9.00 to 9.25
Lead, heavy, cents per lb	6.75 to 7.00	7.50 to 7.75
Steel car axles, Chicago, per net ton	$33.00 to $35.00	$31.00 to $32.00
Old carwheels, Chicago, per gross ton	$35.00 to $36.00	$41.00 to $42.00
Steel rails (scrap), Chicago, per gross ton	$29.00 to $30.00	$30.50 to $31.00
Steel rails (relaying), Chicago, gross ton	$34.00 to $35.00	$34.00 to $35.00
Machine shop turnings, Chicago, net ton	$14.50 to $15.00	$17.50 to $18.00

ELECTRIC RAILWAY MATERIAL PRICES

Rubber-covered wire base, New York, cents per lb	30.00	30.00
Waterproofed wire (100 lb. lots), cents per lb., New York	27.50	27.50
Weatherproof wire (100 lb. lots), cents per lb., Chicago	27.00	27.00
T rails (A. S. C. E. standard), per gross ton	$55.00 to $57.00	$55.00 to $57.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	$51.00 to $53.00	$55.00 to $57.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$45.00 to $47.00	$45.00 to $47.00
T rail, high (Shanghai), cents per lb	3.00	3.00
Rails, girder (grooved), cents per lb	3.00	3.00
Wire nails, Pittsburgh, cents per lb	4.50	4.00 to 4.50
Railroad spikes, drive, Pittsburgh base, cents per lb	3.35 to 3.85	3.35 to 3.85
Railroad spikes, screw, Pittsburgh base, cents per lb	7.50 to 9.00	7.50 to 9.00
Tie plates (flat type), cents per lb	3.00	3.00 to 4.00
Tie plates (brace type), cents per lb	3.00	3.00 to 4.00

ELECTRIC RAILWAY MATERIAL PRICES

	Feb. 4, 1920	March 3, 1920
Tie rods, Pittsburgh base, cents per lb	7.00	3.50 to 4.25
Fish plates, cents per lb	3.00	3.50 to 4.25
Angle plates, cents per lb	3.90	2.75 to 4.00
Angle bars, cents per lb	3.90	2.75 to 4.00
Rail bolts and nuts, Pittsburgh base, cents per lb	4.50 to 6.50	4.50 to 6.50
Steel bars, Pittsburgh, cents per lb	3.00 to 4.00	3.00 to 5.00
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.35 to 4.60	4.50 to 7.00
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.75 to 5.95	6.00 to 8.00
Galvanized barbed wire, Pittsburgh, cents per lb	4.10 to 4.45	4.60
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.70 to 3.95	4.20
Car window glass (single strength), first three brackets, A quality, New York, discount †	77%	77%
Car window glass (single strength), first three brackets, B quality, New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York, discount.	79%	79%
Waste, wool (according to grade), cents per lb	20 to 23	29 to 32
Waste, cotton (100 lb. bale), cents per lb	19 to 22	16 to 17
Asphalt, hot (150 tons minimum), per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton	$25.00	$25.00
Asphalt filler, per ton	$30.00	$30.00
Cement (carload lots), New York, per bbl	$2.90	$2.90
Cement (carload lots), Chicago, per bbl	$2.00	$2.00
Cement (carload lots), Seattle, per bbl	$2.68	$2.68
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.93	$1.80
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.95	$1.82
White lead (100 lb. keg), New York, cents per lb	14½	15½
Turpentine (bbl. lots), New York, cents per gal	$1.97	$1.99

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† These prices are f. o. b. works, with boxing charges extra.
* U. S. Steel Corp.

of the relocation of the tracks in the Belgrade Avenue extension. The company had previously contended that the Eastern Massachusetts Street Railway should pay part of the cost of the work.

New York & Queens Traction Corporation, Brooklyn, N. Y.—Action of the New York City Board of Estimate in ordering the Manhattan & Queens Traction Corporation to construct a surface line from Jamaica to the corporate limits of the city of New York has been validated by Judge Henry W. Rogers of the United States Circuit Court of Appeals in an opinion in which he reverses the recent decision of Judge Thomas I. Chatfield of the United States District Court sustaining an injunction against the Board of Estimate.

Chickasha (Okla.) Traction Company.—This company is building 3,000 feet of track.

Toronto (Ont.) Civic Railway. —Plans have been submitted to the Civic Administrative Commission by the Toronto Civic Railway of Toronto for the construction of an incline railway at a cost of $180,000.

Scranton (Pa.) Railway.—The Scranton Railway plans to elevate its tracks at North Main Avenue and 100th Street.

Grand Trunk Railroad, Montreal, Que.—The Grand Trunk Railroad plans to electrify its St. Mary's, Ont., branch. Work will begin shortly.

Milwuakee Electric Railway & Light Company, Milwaukee, Wis.—Plans are being worked out for the construction of a car line from Kinnickinnic Avenue to the city limits.

Power Houses, Shops and Buildings

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway has begun the construction of a $75,000-dollar passenger station in San Pedro.

Tri-City Railway of Illinois, Rock Island, Ill.—The Tri-City Railway of Illinois and the Moline, Rock Island & Eastern Traction Company have filed a joint petition with the Illinois Public Utilties Commission asking for approval of the purchase by the first named company of the tracks and equipment of the latter.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—This company is making plans for dismanteling its power station at Lebanon, Ind. and substituting a high-tension line from another power house. There is also a general study being made looking toward a change from twenty-five to fifty cycles on part and perhaps all of the system, in order to be in better position to sell energy for commercial purposes.

Cumberland County Power & Light Company, Portland, Me.—A carhouse belonging to the Cumberland County Power & Light Company at Yarmouth was destroyed by fire on Feb. 14. Two cars, a snow-plow and a rotary converter were also destroyed. The loss is estimated at $50,000.

Trade Notes

American Steel & Wire Company, Worcester, Mass., has started work on a new Labor Bureau building to cost $75,000.

Charles A. Hirschberg, advertising councillor, specializing in the technical field, announces that he is now located at 426-436 Sun Building, 150 Nassau Street, New York.

Westinghouse Electric International Company, Pittsburgh, Pa., announces that G. L. Washington has left for Cuba to join the sales department of the Havana office of the company.

Roth Brothers & Company, 14 W. Adams Street, Chicago, Ill., motor manufacturers, announce that H. E. Stocker for a number of years production manager of the Fort Wayne Works, General Electric Company, has become general manager of the company.

American Steam Conveyor Corporation, Chicago, Ill., announces that Henry P. Thompson, Cincinnati district representative of the company has added to his sales engineering staff. Albert A. Casey, who will assist in handling American steam jet conveyors in that territory.

Lindsley Brothers Company, Spokane, Wash., with offices in the Hudson Terminal Building, 50 Church Street, New York, N. Y., announces that R. D. Patterson formerly with the Northwestern Electric Equipment Company, New York City, has been appointed eastern representative of this company.

Western Electric Company, New York, N. Y., announces that J. F. Davis who has been a supply salesman at Chicago for a number of years and has been with the company since 1911, has now been made sales manager at the Boston branch, the position recently held by W. F. Abely, who was promoted.

American Institute of Electrical Engineers and the Association of Iron and Steel Electrical Engineers held a joint technical session at the Hotel Chatham, Pittsburgh, Pa., on Saturday, February 21, at which time a paper was presented on the "Manufacture and Use of Graphic Recording Instruments" by Professor J. W. Esterline, of the Esterline Company, Indianapolis.

Graton & Knight Manufacturing Company, Worcester, Mass., manufacturers of leather beltings, has purchased the leather belting plant of E. R. Ladew Inc., Glen Cove, New York. According to reports several millions was involved in the deal. The main factory at Glen Cove, N. Y., has been established since 1903.

Anaconda Copper Mining Company, Chicago, Ill., rolling mills department, announces that Frank H. Freeman has been appointed sales agent of the general office of the rolling mills department, Chicago. He was formerly connected with the Boston office of the American Electrical Works. H. Don Keresey, sales agent rolling mills department, has been transferred from the Chicago office to the New York office as sales agent to handle the company's business in the eastern territory.

New Advertising Literature

De Pere-Burton Company, Milwaukee, Wis.: A thirty-two-page loose-leaf catalog on the Burton semi-sectional and De Pere improved cross-dam water tube boilers.

National Tube Company, Pittsburgh, Pa.: Bulletin 24A; 8½ x 11 in.; illustrated. Statistical data noting comparisons in the production of wrought and steel pipe.

Griscom-Russell Company, 90 West Street, New York, N. Y.: Bulletin No. 311 on Reilly Evaporators of the submerged type and a paper on "High Heat Level Evaporator Plant" for stationary power houses.

Green Engineering Company, East Chicago, Ind.: A thirty-two-page booklet "Securing Better Combustion of Midwest, Western and Southwestern Fuels" which consists of a compilation of articles which have appeared in McGraw-Hill publications during the past year.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.: A 36-page booklet, "Westinghouse Underfeed Stoker," on stoker operation, giving features of design, grate and tuyeres construction and also the arrangement of brackets, gears and fuel deflecting plates.

Carrick Engineering Co., Chicago, Ill.: A twelve-page catalog, letter size, describing the Carrick Combustion Control which automatically synchronizes fuel feed and damper position to correspond with the load, holding the proper relation for efficient results. A copy of the catalog will be sent upon written request.

Coatesville Boiler Works, Coatesville, Pa.: A sixteen-page booklet "Fuel Oil Applied to Power Boilers." It contains some valuable information as to the relative merits of different fuels for use under boilers of all types, as well as on the dimensions and capacity in gallons of horizontal and vertical storage tanks. A copy may be had free upon request.

Baldwin Locomotive Works, Philadelphia, Pa.: Record No. 95 on Internal Combustion Locomotives. A 36-page illustrated booklet describing this company's gasoline locomotives built in accordance with the Ehle patents. The general construction with details of the various parts are described and illustrated. A number of illustrations taken from locomotives in service including those made for the Government are shown. Data sheets for inquiry giving general requirements also are included.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 55 New York, Saturday, March 13, 1920 Number 11

The Electric Railway a "Regular Gold Mine"

ELECTRIC railways have often been likened to gold mines in the popular version, but the defenders of the industry have not appreciated how truthful the analogy was in some respects. One of these is that they have been required by statute to sell their product at a uniform price, for the electric railway at 5 cents per ride, and for the gold mine, $20.67 an ounce. Both the electric railway corporation and the gold mining corporation are faced with greatly increased operating costs, they have not been able to change the price of their product to conform with changes in cost of production.

It has been hard to find another industry suffering from the same malady as the electric railway industry which has usually been pointed out as the lone sufferer. But now we learn from a statement made to Congress by Harold N. Lawrie, economist for the American Mining Congress, that gold mines are being closed down at an alarming rate because of the fixed price of that which they sell and the greatly inflated price of that which they buy—labor, tools, materials, etc. The gold producer finds the actual purchasing power of an ounce of gold is now $9 instead of $20.67. The result of this condition is shown by the figures covering gold production in the United States. It has fallen from $101,000,000 in 1915 to $58,500,000 in 1919, a loss of 42 per cent.

Having found a *camarade en misère*, perhaps the electric railway industry may find some consolation in the fact that, at least, to get an increase in the selling price of its commodity, it does not have to upset the whole monetary system of the nation and possibly cause international complications.

Don't Kill the Safety Car Goose!

JUDGING from a recent occurrence, the Reuben who killed the goose that laid one golden egg per diem in order to get the whole El Dorado at once left some progeny that blundered into the electric railway field! At any rate, this is what happened.

The company had put on a number of cars equipped with safety appliances. Imagine the general manager's astonishment, therefore, when the claims department told him that several severe accidents had occurred in connection with these cars. Incredulous, he asked for a detailed statement of accidents car per car. No sooner had this list been examined than it developed that the very cars that had been responsible for the worst cases were not equipped with the requisite safety appliances at all. It also proved that the transportation superintendent was so carried away by the platform savings of the safety cars that he had sent out quite a number of the regular style of car at irregular intervals with but one man each. Of course, this was a most unwise proceeding, for not only did the accidents obliterate the platform savings, but they also gave a black eye to the cars which had been properly converted.

Another similar practice which is not to be commended is that of regularly mixing in service new safety cars and old one-man cars without any safety appliances whatever. Even if the company is lucky enough to escape accidents, it cannot escape deserved criticism. In one instance, this policy has afforded an unreasonable labor element to agitate against any and every class of car having a single operator. Thus, exceeding haste to achieve the economies which electric railways so sorely need is in danger of defeating its purpose. With the right way, the popular way and the successful way made so clear by the experience of scores and scores of electric railways, there is no worth while excuse for policies of the kinds criticized.

The Railway Power Substation Is Developing Rapidly

PARTLY by coincidence and partly by intention this issue of the ELECTRIC RAILWAY JOURNAL contains an unusual aggregation of articles on substations. Two important associations, the A.I.E.E. and the C.E.R.A., met during the past few days and spent much of their time discussing this topic. The fact simply illustrates the prominence of the substation in the minds of railway people today. No subject of recent years involves more interesting and important technical questions, and the substation plays an important part also in operating economy.

Consider for a moment how vital the substation is to economical distribution. In the good old days of direct current power generation the area over which current could be distributed was limited and the required amount of feeder copper was frightful. Alternating current distribution simply had to be developed, for the people had to have better transportation. Motor-generator sets were naturally used first, but the invention of the rotary converter followed as a matter of course. Then began a marvelous development in both of these pieces of equipment and in the apparatus for controlling them, which continues to this day. The rotary forced for a time the installation of 25-cycle generating machinery, for inherently the synchronous motor is a low-frequency machine. But other forces have been at work to counteract this, especially the necessity for making provision to utilize the same power plants for railway, industrial power and lighting services. Of these all but the first-named demand higher frequency, preferably 60 cycles. Now the tendency is towards 60 cycles for all purposes and the railway substation has been modified to meet the times.

Within the past few years have come all sorts of radical improvements in the substation. Automatic control is possibly the most spectacular, but this is only one of many; some at least were partly made neecssary by the advent of automatic control, others not. For example, there is the use of load-limiting resistance. This is a feature of automatic control, but it is useful almost anywhere. In the same category come the devices for preventing flashing at the converter commutator. And the improvements in starting qualities of converters must not be forgotten either.

But the subject is too large to permit here more than the pointing out of the high spots. The articles scattered through this issue give the details. They are worthy of careful study. They indicate that modern substation progress is something to be proud of.

The St. Paul Locomotives and Standardization

IT IS of exceptional interest to compare the locomotives which have been produced by the two electrical concerns manufacturing electric locomotives in the country, both to fit or satisfy the same general specifications and to meet the requirements of the Chicago, Milwaukee & St. Paul Railroad. How, we inquire, can we even expect standardization of design in heavy electric traction when such different machines will satisfy similar requirements and both be based on good engineering? And well may the question be asked. Here are two products, each of them a wonderful conception and accomplishment in itself. In neither of the locomotives is any really new practice present. The designing engineers state that they have followed proved theories of design in new combinations, to be sure, but not departing much from trails already blazed. Yet, on the surface and actually in many major details, the final products differ widely although each will undoubtedly prove thoroughly satisfactory in the service required. It is not unlikely, however, that time will show some weak points as well as the strong points of each type.

But does the fact that it is possible to build two admirable machines, though different, for the same service militate at all against a study of the desirability of standardization? It may be and probably is too early now to settle upon any standards in this line. We are yet in the development stage. But, if we needed an example of duplicate engineering which could be obviated if standardization were effected, this, it appears, is one. Cannot the electric railway industry study the question with a desire to find out if such standardization, not only in locomotives but in other equipment, is not desirable. Who would have said, years ago, that it would be possible to have a standard telephone transmitter and receiver which would be universally useful for communication between any two points on the earth? And yet that goal is almost reached. From the illumination field, take a leaf and with all the different reflectors and fixtures on the market, who would have thought standardization possible? And yet, the R.L.M. standard has been evolved for one field.

On the other hand, it is quite conceivable that these two locomotives are a step toward a realization of certain fundamentals of electrical locomotive design. The fact that these two companies are both producing equipment for one requirement and railway is of significance. The electric railway must look forward to the time when it has realized its every opportunity in the transportation scheme, and when it has there will be much more nearly universal use of electric locomotives and other electric motive power. There will be much interconnection of electric lines and interchange of electric equipment. Now is no time to revive any so-called "battle of systems," but is rather one of opportunity to work ahead toward the solution of the many problems in the realization of electric traction's greatest opportunities.

Should the Electric Railway Brain Workers Organize?

THE great war has produced as many topsy-turvies in our economic as in our political relations. One of the most impressive and depressive reversals is the way the intellectual worker has failed to keep pace with the cost of living in contrast to the manual worker who in some instances has actually outstripped the rise in cost. However, as generalizing on this subject is not new, it may be well to submit some truly startling figures from the monthly records of a large eastern electric railway.

Beginning with "general administration," we find that all the executive officers themselves averaged less than $14.50 per diem and their assistants less than $3.00 per diem. In the way department, all engineers, draftsmen, office employees, etc., below the rank of chief engineer and sub-division executives averaged $4.59 per diem, which princely stipend was just 3 cents more than that of the lyric, though illiterate tenors, who do their tamping, spiking, etc., in death march rather than jazz time. In the electrical department, the insiders, counting from the chief down, did a little better, but at that they were only 47 cents above the $5.40 a day averaged by the overhead linemen and similar workers. In the equipment department, we find that the men who do the planning, directing, testing and recording are stopped from enriching the alumni funds of their one-time universities because they average but $5.23 a day —just 7 cents more than is paid to the graduates of the Horny Hand Elementary School in the repair shop for their more personal researches in the nature of steel, iron, copper, oil, etc., before and after being railroaded. But our *piece de resistance* is in the transportation and traffic department. Dismissing the handful of superintendents and other higher officials with their lobster-diet pay of $7.84 a day, we note that the remaining supervisory officials, such as inspectors and dispatchers and the clerical staff, are an unlucky 13 cents a day below the $4.97 paid to the motormen and conductors.

The real inequality in the pay of brain versus brawn employees is much greater than the foregoing figures indicate. The brawn-worker is paid for an average of nine to ten hours a day. Overtime means more pay and often at a higher rate and he can't take his work home. The brain-worker's hours may nominally be less, but actually they are more for any man who likes his work, and most brain-workers are afflicted that way. Unpaid overtime whether in the office or in his home is a matter of course.

A further point to consider is that any increase in pay to the brain-workers means far less to the payroll than a like increase to the brawn-workers. On this particular property, the *intelligentia* are but 20 per cent of the total employees, even when all executives and departmental heads are included. The platform men alone constituted 57 per cent of all employees (there is no power house staff) and commandeered 50 per cent of the payroll. Great is the power of organization for a common purpose.

Some may say that the answer to this is organization among the salaried workers. We do not think so, though to the company the spectre of a rapid deterioration and discouragement of the men who can do more to make or break their employer's interests than any other group whatever should be no less dangerous than that of organization. This much, however, is possible where these conditions prevail. For its own protection the company should bring these salaries as nearly as it can to an adequate standard and make the rest of the increase when its finances permit. The employees, on their side, should realize that their pay must not be gaged dollar for dollar with that of the track laborers and such other workers as have practically reached the limit of remuneration possible to them in railway work. The salaried man has a future before him and there is no limitation to the amount which he can earn if he demonstrates ability. The track-pounder is practically at the maximum of his earning capacity. The blame for the present state of affairs rests, of course, largely on the public which has not permitted rates sufficient to permit railway companies adequately to recompense their salaried employees. In many cases, we believe, it would be worth while for these men to bring their plight before the public at large for the reason that public understanding of and co-operation with electric railways will thereby be widened far more than by controversies concerning platform wages alone. It bodes ill for any industry when specialized training, experience and loyalty have to be so poorly rewarded as they are in the electric railway field at this very moment.

A Real Opportunity for Service to the Utilities

AT THE Cleveland meeting of the executive committee of the American Association an interesting presentation of the work of the Illinois Committee on Public Utility Information was made by its director. The executive committee took action which indicated practical interest in this movement which has already spread beyond the confines of Illinois. The Illinois committee is performing a useful function in supplying utility data to newspapers and other agencies for public enlightenment. The aim of the committee is to furnish simply the plain, unvarnished facts. The way in which city editors have used the material sent them, and a city editor is an eclectic individual, shows that the committee is rapidly ensconsing itself in their favor.

One of the latest enterprises is the issuing of a monthly speakers' bulletin, the first number of which is mentioned in our news notes this week. The bulletin is newsy and interesting. It can serve a useful purpose in stimulating good public speaking. If kept free from bias, as we understand is the plan, it will be of great assistance in promoting that condition so greatly desired—good public relations.

The cordiality of the reception of this work of the Illinois committee suggests the desirability of capitalizing the comparatively active public interest that has been awakened during the war and armistice period in the fate of the transportation utility. Good will is a company's best asset. It will pay to cultivate it, first by good service, then by good salesmanship.

Get Closer to Your Customers

A DEPARTMENT store proprietor who has been conspicuously successful in his business was asked recently to what factor he was most indebted for his prosperity. Was it because his prices were lower or his advertising so telling? As to prices, he replied that they were not always lower but that the goods were always exactly as described—a fact which bred confidence. So, too, his advertising had been a big factor in his success, not alone in the direct offering of his wares but also in the opportunities it gave him to talk to the public as a man of civic spirit on topics of general welfare. But there was still another factor, and that was his system of determining what complaints people had to offer against his service. The usual way of others in securing such information was to get it during the heat of the misunderstanding and to settle the argument on the basis of "The customer is always right." Of course the customer was not always right and would realize that fact on sober, second thought but too late to take the initiative in compensating the merchant or doing the right thing for the injured employee.

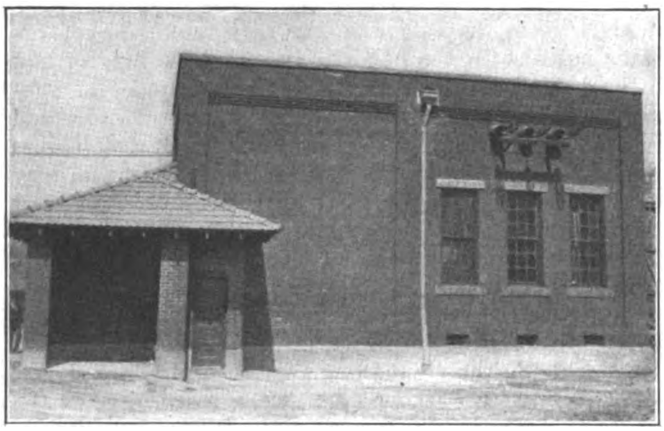
Feeling that the time to get at the truth is when the subject can be seen in perspective, this merchant has evolved a system of letters and personal calls through which past or prospective patrons are requested to suggest improvements in service or standards of quality in merchandise, or to mention incidents that led to their discontinuance of patronage. In this way he secures a large amount of dispassionate and constructive criticism that enables him to adapt his store to the standards set by the kind of customers he desires and to attain a much better relationship between his customers and his employees than would otherwise be possible.

If an electric railway were to follow the same policy, not necessarily in a house-to-house canvass but before groups of different classes of the population, it would be sure to learn much that would be beneficial. For example, it might be astonished to find that some of the business men know very well that the headways haven't been changed in years or the routes altered 1 in. despite the growth of the city. Here, then, is an opportunity to explain to them why it has not been possible to make such changes. Another man will ask why the community can't have faster and more reliable cars. He has had the impression all along that the local management was too fast asleep to know that such cars were to be bought. Here, again, is an opportunity to explain that if you can't pay interest on money borrowed in the past, you can't get anybody to loan you new money now.

In contrast to the numerous occasions where it is possible to show the other fellow that he has been unfair, it is likely enough that the outsider can point to many a fault that rarely if ever comes to the manager's attention by direct complaint. A man who has been passed up by a heedless motorman, may swear and grumble about the matter, but he is not likely to take his pen in hand to write a letter about it if he can get to his destination by walking. The railway is out a profit-bringing rider and there's an end to it. In one case, these heart-to-heart talks brought out the fact that nearly all complaints of this particular character came on the lines where only hand-brake cars were used, thus indicating that the use of the air brake would do more to settle the most frequent source of complaint than any number of admonitions and dismissals.

Noiseless Feature Is Effective in a Simply Constructed Substation

The Cooling Air Is Pulled Down Through the Converter and Muffled on Up-shoot Through the Transformers

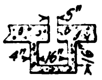


NOISELESS SUBSTATION SHOWING TRANSFORMER ROOM VENTILATION OPENINGS AT FLOOR LINE AND HIGH-TENSION LINE ENTERING AT CEILING

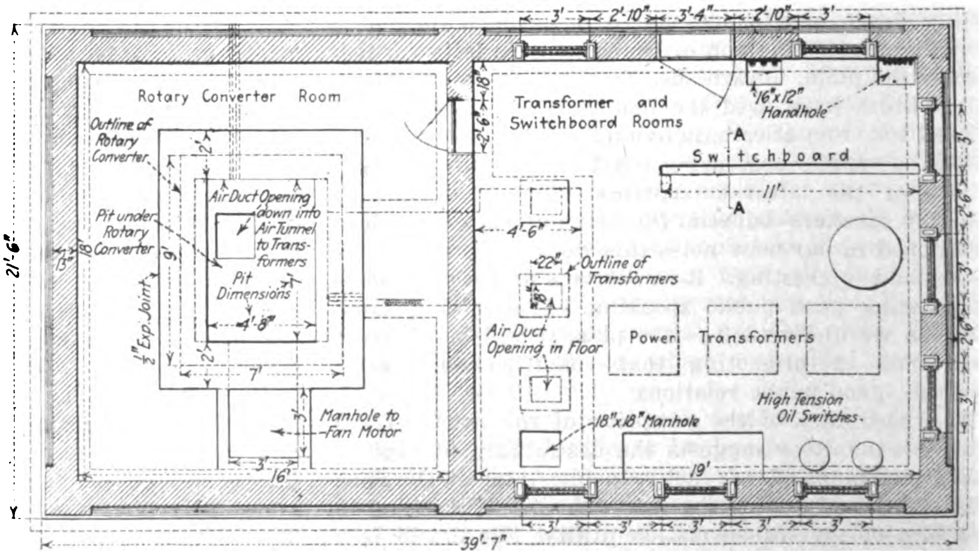
OPPOSITE SIDE OF SUBSTATION SHOWING OUTGOING FEEDER CABLES AND WAITING ROOM CONVERTED INTO CONFECTIONERY STORE

SOME time back the Birmingham Railway, Light & Power Co., found it desirable to install a 500-kw. railway substation at a point within the city where the Gate City, East Lake and Tidewater lines intersect. This intersecting point was very close to the actual load center of the section of the system it was desired to serve. A piece of property at this location was available and the company erected a substation and placed it in operation. This load center was also in a good residential section, and it was not long before the noise of the rotary converter brought such a protest from the surrounding neighbors that it became necessary to move the substation to another point. A point near the end of one of the intersecting lines was selected as the most desirable of the available locations, but this was so far removed from the load center that it made the line losses very heavy and the voltage regulation unsatisfactory. From an economic standpoint it was therefore decided that it was necessary to have a substation located at the load center previously chosen, and so the engineering department, of which L. L. Newman is the chief and H. E. Cox is assistant, set about the task of designing a noiseless substation. The desired result was simply yet most effectively attained in the new Woodlawn substation.

In working out the design it was assumed that the transformer cooling air leaving the building was largely responsible for transmitting the noise of the rotary converter. The substation was therefore built in two rooms, one room for the converter being sealed up tight except for an opening in the roof, and another room for the transformer, switchboard, etc., which has a door and windows, but these are kept closed. The cooling air for the transformers is drawn in through a cupola in the roof of the converter room by a motor-driven fan placed in the pit underneath the converter. The air is thus drawn down through the converter and forced down into a tunnel beneath the floor of the converter pit and thence through this tunnel to three openings in the floor of the other room, up through the three single-phase transformers and out through



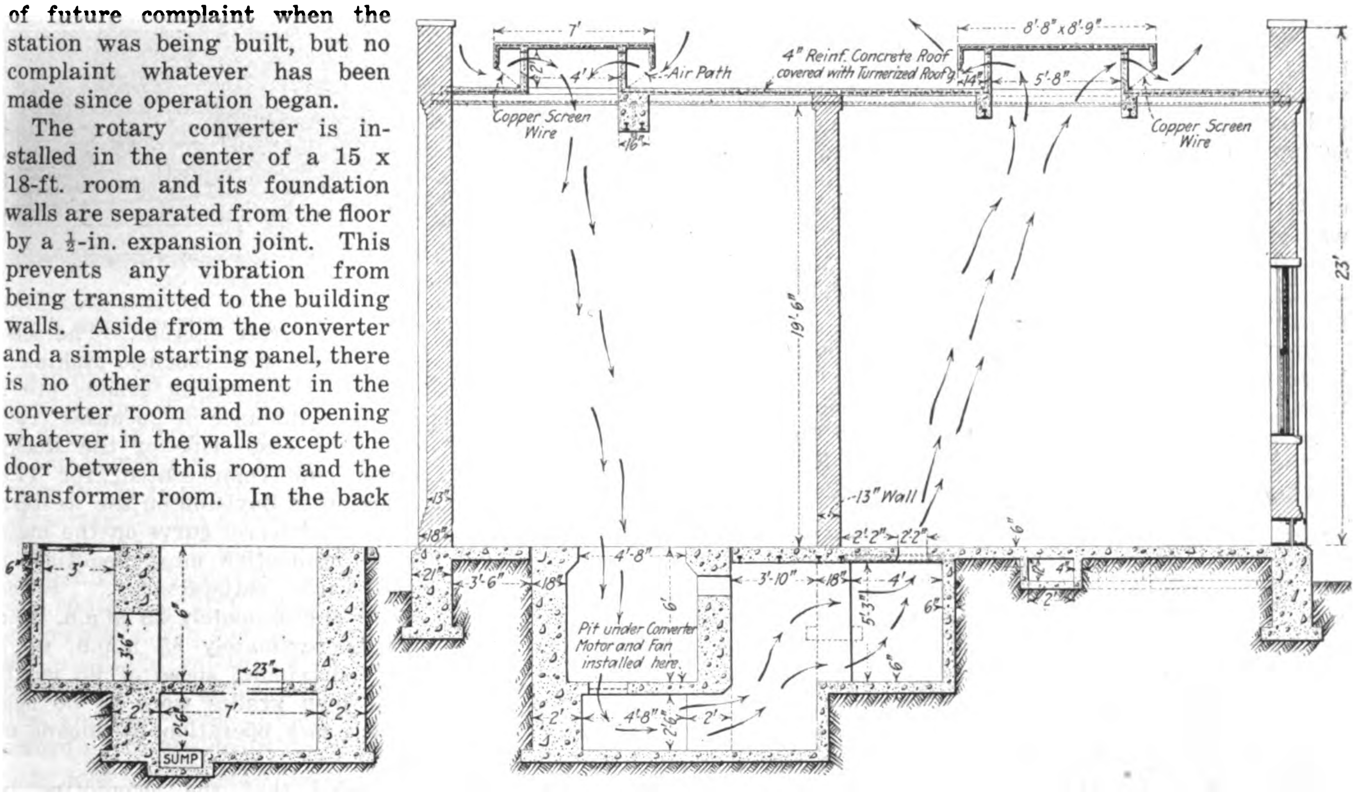
Section A-A of Cable trough behind Switchboard


Rotary Converter Room
Outline of Rotary Converter
Pit under Rotary Converter
Air Duct Opening down into Air Tunnel to Transformers
Pit Dimensions
4'-8"
7'
9'
2'
1'
13"
18"
1/2" Exp. Joint
Manhole to Fan Motor
3'
16'
Transformer and Switchboard Rooms
16"x12" Handhole
A
Switchboard
11'
A
4'-6"
22"
Outline of Transformers
Air Duct Opening in Floor
Power Transformers
High Tension Oil Switches.
18"x18" Manhole
19'
2'-6"
18"
3'
2'-10"
3'-4"
2'-10"
3'
3'
2'-6"
3'
2'-6"
3'
3'
3'
3'
3'
3'
21'-6"
39'-7"

FLOOR PLAN OF THE WOODLAWN SUBSTATION SHOWING THE LOCATION OF THE VARIOUS PIECES OF EQUIPMENT the cupola in the roof of this room. Passing the air through the station in this manner gives the noise of the converter carried with the air stream an opportunity to be diffused or muffled as it passes up through the transformers. And as the air leaving the cupola of the transformer room might still carry some noise, the roof of the cupola is so constructed as to deflect the stream of air down against the roof, and the coping, projecting 18 in. above the top of the roof, then reflects it upward. The transformer coils have apparently made a most effective muffler, or if the noiselessness cannot be attributed to this alone, at least the scheme as a whole has been a complete success.

The 1,000-kw. rotary now installed in the station cannot be heard at all 15 ft. away from the building walls. The people in the neighborhood gave warning of future complaint when the station was being built, but no complaint whatever has been made since operation began.

The rotary converter is installed in the center of a 15 x 18-ft. room and its foundation walls are separated from the floor by a ½-in. expansion joint. This prevents any vibration from being transmitted to the building walls. Aside from the converter and a simple starting panel, there is no other equipment in the converter room and no opening whatever in the walls except the door between this room and the transformer room. In the back wall of the transformer room an opening was arranged for use in case it was necessary to remove the converter. This was done by placing a rail in the wall horizontally as a beam, and bricking in the space below so that the bricks can be readily knocked out.



CROSS-SECTION THROUGH NOISELESS SUBSTATION SHOWING PATH OF COOLING AIR THROUGH THE STATION

The air intake openings in the cupola are covered with fine copper mesh to prevent water and dust from being drawn in. The construction of the pit underneath the converter and the air tunnel can be clearly seen in the accompanying drawing. Entrance to the converter pit for inspection of the fan and motor is made through a manhole at one side of the foundation and through an opening in this wall.

The starting panel for the converter is located in the converter room just inside the door between the two rooms, so that the operator can throw the starting switch over to the full voltage side at the moment he sees that the voltage has come up right as indicated by the voltmeter at the far end of the switchboard in the other room, the converter being started up with open field as an induction motor. There are no meters whatever in the converter room.

The cupola over the transformer room is built and equipped the same as that over the converter room except that it is larger. The transformer and switchboard room is also equipped with eight 12 x 18-in. openings in the walls at the floor level for ventilation purposes, in order that the doors and windows may be kept closed in warm weather to keep down the noise. These were equipped with grating so that the amount of opening could be regulated. They were placed at the floor line on the theory that the heat within the room would cause the air to enter here, rise and exhaust through the ventilators in the roof. However, it has been found that the transformers muffle the noise of the converter so completely that it is even possible to leave the windows and doors in this room open in summer without disturbing the neighbors.

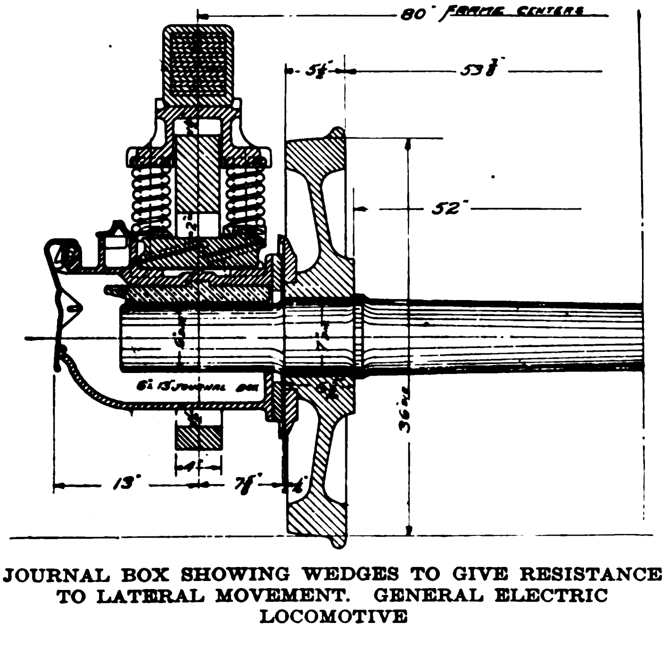
The location of equipment in the transformer and switching room is shown in the accompanying drawing. The transformers were logically placed along the wall between the two rooms in order to make the air tunnel as short as possible. The switchboard was placed near the front of the room so that the bracket-type voltmeter could be seen from the converter room during the starting of the machine. While the high tension oil switch was installed at the rear of this room where the high tension line enters the substation, the switch rod was extended through a 24-in. x 12-in. tunnel underneath the floor so that the operating lever and panel could be placed on the same line as the switchboard. Provision for a second oil switch similiarly installed and three power transformers was also made.

A small waiting room was built at each end of the substation for the convenience of the car riders. One of these rooms has recently been converted into a small confectionery store and the sale of soft drinks and candies, etc., has made the construction of the waiting-room addition to the building a profitable investment.

The Two Designs for the C., M. & St. P. Locomotives*

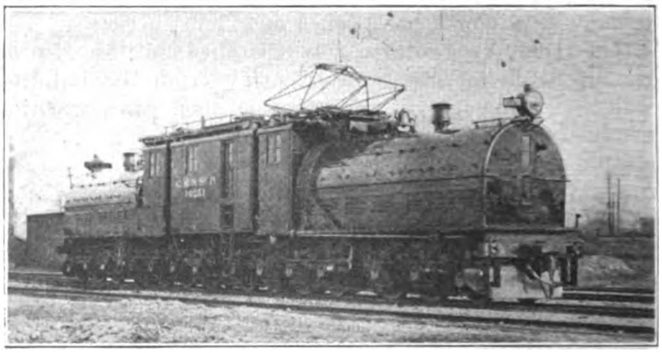
A. F. Batchelder and S. T. Dodd of the General Electric Company and N. W. Storer of the Westinghouse Electric & Manufacturing Company Give Details of the Two Designs to Meet the Chicago, Milwaukee & St. Paul Railroad Specifications—Some New and Individual Characteristics Are Emphasized

THE Chicago, Milwaukee & St. Paul Railroad electrification of the 440 miles of line from Harlowton, Mont., to Avery, Ida., proved sufficiently successful to convince the railway of the economic advantages of electric operation. As a logical consequence, as has been previously noted in these pages, the company decided to equip an additional section over the Cascade Mountains between Othello and Tacoma, Wash., a distance of 212 miles. In the summer of 1917 the railway issued specifications covering the apparatus required on account of this additional electrification and a contract for part of the locomotives was given to the General Electric Company and for the others to the Westinghouse Electric & Manufacturing Company. These locomotives are being delivered and put into service.



JOURNAL BOX SHOWING WEDGES TO GIVE RESISTANCE TO LATERAL MOVEMENT. GENERAL ELECTRIC LOCOMOTIVE

Engineers of the two companies, men who had much to do personally with the development of the locomotives, presented details of the two locomotives with some analysis of the reasons entering into the designs at the Pittsburgh meeting of the A. I. E. E. The ELECTRIC RAILWAY JOURNAL has published† data and other information regarding both of these locomotives from time to time. The publication of the abstracts of the papers presented at Pittsburgh serves to complete the descriptions and at the same time affords an opportunity for a comparison of the two designs.



CHICAGO, MILWAUKEE & ST. PAUL PASSENGER LOCOMOTIVE, GENERAL ELECTRIC CO.

The Chicago, Milwaukee & St. Paul Railroad specifications required that the locomotives be built for a power supply at 3,000 volts direct current. The load specified was a train of twelve steel coaches, making a total weight of 950 tons. The limiting grades are 2 per cent, compensated, for a distance of 20 miles from Piedmont to Donald on the east slope of the Rocky Mountains, and 2.2 per cent, compensated, for 17.8 miles from Beverly Junction to Boylston on the western division. The curvature of sharpest curve on the main line is 10 deg., but the locomotive must negotiate a 16-deg. curve in the yards satisfactorily. Speed requirements were set at approximately 25 m.p.h. up a 2-per cent grade, and approximately 35 m.p.h. up a 1-per cent grade, with a maximum speed of 65 m.p.h. for safety. Trains on down grades were to be held at speeds consistent with safe operation by means of regenerative braking.

It was further provided that the locomotive be equipped with an oil-fired boiler to be supplied by the railway, to furnish steam for heating the train. Storage capacity was required for 30,000 lb. of water and 750 gal. of fuel oil. Apparatus was also required in the locomotive for lighting the train and charging the train storage batteries at a voltage of from 60 to 85.

With these general statements as an introduction, the abstracts will now be given:

The General Electric Locomotive

BY A. F. BATCHELDER AND S. T. DODD

THE locomotive as completed and delivered by the General Electric Company is shown in an accompanying illustration, while another shows an outline drawing of the side elevation, giving some general dimensions. It will be seen that the running gear is composed of four individual trucks, the two end trucks having three axles each and the two center trucks having four axles each. These trucks are connected by special articulation joints. The motor armatures are mounted on the axles and the motor fields are carried on the truck frames.

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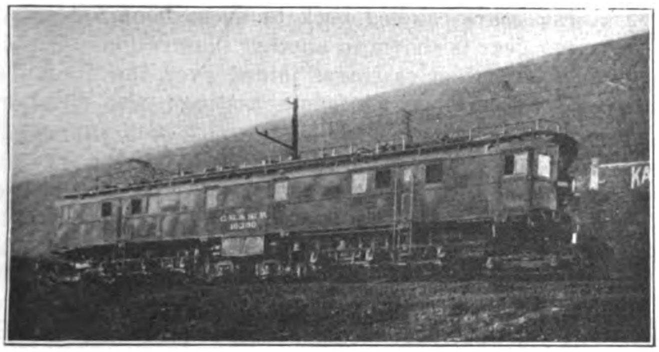
*Abstracts of papers presented before the Pittsburgh Meeting of the American Institute of Electrical Engineers, March 12, 1920.

†See issues for March 23, 1918, pp. 559 and 561; Nov. 1, 1919, p. 827, and Jan. 3, 1920, p. 36.

The superstructure is made in two sections of similar design, with a third section between them. The third or central section contains the train-heating equipment, which consists of an oil-fired steam generator, together with water and oil tanks. This unit is complete in itself and is carried over supports attached to the middle two trucks. It can be readily removed for repairs without interfering with any other part of the locomotive. It is placed between the two operating cabs in order to be easy of access to the engineer's helper or fireman, from either location.



CHICAGO, MILWAUKEE & ST. PAUL PASSENGER LOCOMOTIVE, WESTINGHOUSE ELECTRIC & MANUFACTURING CO.

The end sections are similar in appearance. The operator's cab in either section is on the inner end next to the heater cab above described, having been so placed in order that the operator can be convenient to the heater and to allow a maximum space for apparatus in the apparatus cab or outer end section. Another advantage of this arrangement of cabs is that the operator can have access to any section of the locomotive requiring his presence without passing through a section containing high-tension apparatus. The engineer's or operating cab contains a main or master controller, the air-brake valves and handles and an instrument panel with air gages, ammeters and speed indicator. The engineer uses either of the two operating cabs, according to the direction in which he is running.

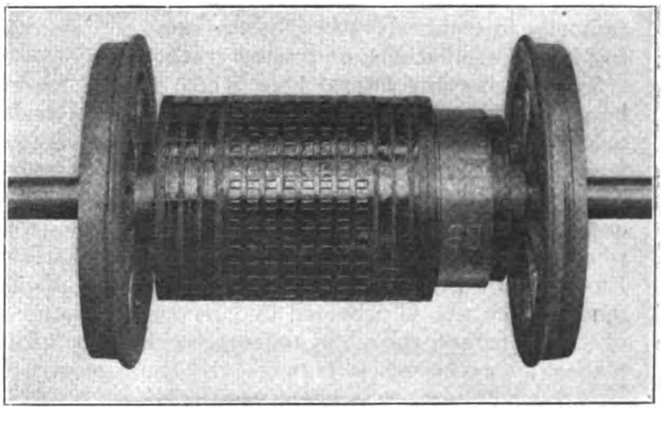
A door gives access from the operating cab to the apparatus section, which extends with a curved top to the extreme end of the locomotive. This construction adapts itself naturally to the protection of the apparatus included and, in addition, allows a clear view for the operator from his normal operating position. Contained in this apparatus section are the resistors and contactors for control of the power circuits of the locomotive. The starting resistors are placed in two rows on each side of the central passage just above the floor of the superstructure. They are covered at the sides by removable covers, which when opened allow the separate resistor boxes to be slid out upon the longitudinal running board outside the apparatus cab. The air compressor for the air brakes, the motor-generator set for the train lighting and the storage battery for marker lights and emergency control stand upon the same level as the resistors and can be removed or replaced in a similar manner. Above the resistors are located the contactors with their arc chutes facing a central aisle 2 ft. wide. This allows ample arcing space and room for inspection of contactors. Above the contactors is the curved roof of the locomotive with trap doors for inspection of the back connections and insulation and for removing the contactors in case replacement is necessary. The whole design and arrangement of this apparatus cab lends itself to economy of cost and material, as well as to convenience of inspection and repair of apparatus.

THE GEARLESS MOTORS ARE OF THE BI-POLAR TYPE

The motors are of the bi-polar gearless design which was adopted for the New York Central Railroad locomotives. To insure light weight per axle, flexibility in control and good truck arrangement for curving as well as for high-speed running, twelve motors were used, each of relatively small capacity. They are especially designed to withstand high temperature, being insulated with mica and asbestos.

The motor armature complete was built directly on the axle with the wheels pressed and keyed in place. The continuous rating of each motor at 1,000 volts and with 120 deg. rise, measured by increase in resistance, is 266 hp., corresponding to 3,500 lb. tractive effort at the rim of the drivers at a speed of 28.4 m.p.h. Forced ventilation is employed for cooling, and the armature core is provided with holes for the passage of ventilating air. Ventilating blowers are located above the motor armature. Air is delivered at the commutator end of the motor where it divides, a part passing through the armature and a part back through and around the field coils where it escapes upward and is afterward used for ventilating the starting resistors.

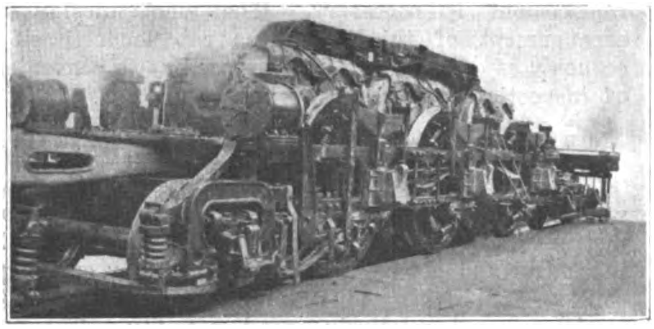
Besides having no journal bearings or gearing, this type of motor has the advantage of simplifying and making compact the locomotive design, as use is made of the frame to furnish the return path for the magnetic flux. With this construction the magnetic flux passes horizontally in series through all twelve motors, having a return path through the locomotive frame. Large surfaces in contact are provided in the articulation joints, thus giving an easy path for the flux. The polepieces are made flat to prevent them from coming in contact with the armature during its movements.



GEARLESS MOTOR ARMATURE AND DRIVING WHEELS, GENERAL ELECTRIC LOCOMOTIVE

In the control equipment electro-magnetic control is used for single independently-operated switches, but electro-pneumatic cam control is used for operating banks of switches.

Four combinations of motors are provided for motoring. The first is with twelve motors in series, the second with six motors in series and two sets in multiple, the third with four motors in series and three sets in multiple, and the fourth with three motors in



ONE-HALF OF RUNNING GEAR, WITH MOTORS MOUNTED. WESTINGHOUSE LOCOMOTIVE

series and four sets in multiple. In each combination there is one tapped-field step in addition to the rheostatic steps, thus giving eight operating speeds exclusive of the thirty-one resistance steps.

For regeneration, some motors are used to excite the fields of the others, which in turn are used as generators to return power to the line.

As a provision against short circuits or extreme overloads, a quick-acting circuit breaker is provided in the apparatus cab which will protect the circuit in less than 1 of a second.

Mechanical Construction Designed to Provide Flexibility

For flexibility in curving the running gear is made up of four trucks, each of a relatively short wheelbase. The middle two trucks have four driving axles each, and the two end trucks, two driving axles and one guiding axle each, making a total of fourteen axles. The trucks are connected together with articulation joints which allow of no relative lateral movement between them, so that each truck positively leads the following truck. This is for the purpose of reducing flange wear on curves and lateral oscillation on tangent track.

It is felt that with a wheelbase which is as long as the present one (67 ft.), the use of articulated trucks allows the locomotive to accommodate itself most satisfactorily to track curvature, at the same time minimizing lateral oscillations on tangent track.

To care for any lateral blow which might, however, be given against the rail head the leading and trailing axles are allowed a movement of ½ in. relative to the truck frame either way from their central position. This movement takes place against a resistance introduced by wedges above the journal boxes. This wedge construction is shown in an accompanying illustration. Further protection of the track from lateral displacement on the ties is provided by carrying the outer end of the superstructure on rollers, bearing on inclined planes upon the truck frames. By this construction the leading and trailing trucks tend to maintain their central position and the weight of the superstructure is best distributed so as to increase the adhesion of an affected rail to its tie.

The Westinghouse Locomotive

By N. W. Storer

Accompanying reproductions of pictures show views of the completed Westinghouse locomotive, and an outline cut-away drawing shows the general arrangement of the interior, as well as the exterior. The running gear consists essentially of two Pacific-type running gears coupled back to back. One half of the running gear is shown in another illustration. The side frames are steel castings, joined over the four-wheel trucks by a heavy A-frame casting; also by heavy cross-ties between the drivers, which also support the motors and carry the center pin and the coupling between the two running gears. Each half running gear has six spring-supported plungers on which the cab rests. There are two supports at each end and two in line with the center pin. By the use of shims, the distribution of weight between the two ends of each running gear may be adjusted as desired. The coupling between halves consists of a long bar of a box section.

The superstructure consists of one long cab built so strong and rigid that it can be lifted at the ends. It is light but stiff. The cab is divided by cross partitions into compartments, one at each end for the engineer and the others for the several parts of the cab equipment.

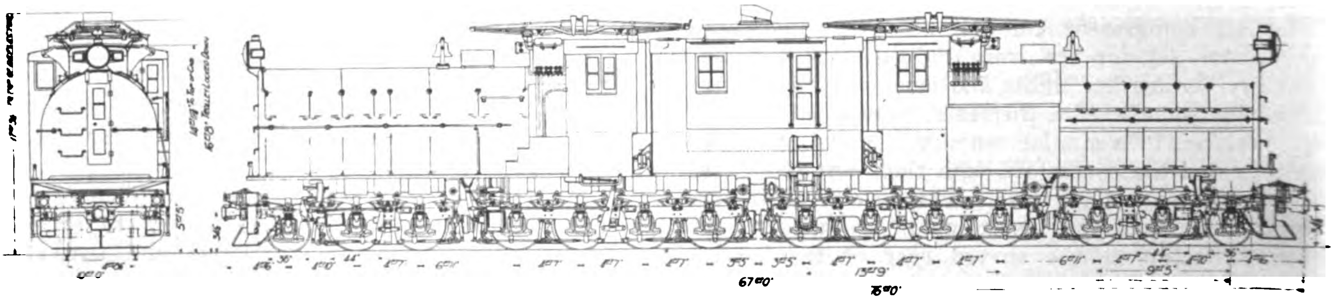
In the middle cab, and occupying relatively a large portion of space, are located the steam boiler and the water storage tanks. The fuel oil tank is located beneath the boiler and the two water tanks are placed just fore and aft of the boiler.

Twin Driving Motors Are Used

The six driving motors are of the twin-armature type, that is both armatures are contained in a single frame arranged to secure the maximum economy of weight. The fields are of the standard four-pole type with four salient poles and four inter-poles for each armature. Each armature is wound for 750 volts, but fields and armatures are connected permanently in series so that the rating of the complete motor is based on 1,500 volts.

The one-hour rating is 700 hp., based on the A. I. E. E. rules, and the continuous rating 567 hp., with forced ventilation and 400 hp. without blowers.

Twin motors were adopted to reduce space used by gears, to reduce locomotive weight, to make the most efficient use of available space and to secure the advan-



OUTLINE DRAWING OF GENERAL ELECTRIC LOCOMOTIVE tage of low-voltage armatures. Motor capacity was fixed by the number of axles, six being selected as the smallest number that could be used under the limitation of weight on the drivers. This led to the adoption of the double Pacific type of running gear with its excellent riding characteristics. An illustration shows the pinion end of the twin motor.

Fans mounted on the motors give them a high continuous rating without the use of forced ventilation, and it is expected that the blowers will not have to be used with normal train load except on heaviest grades.

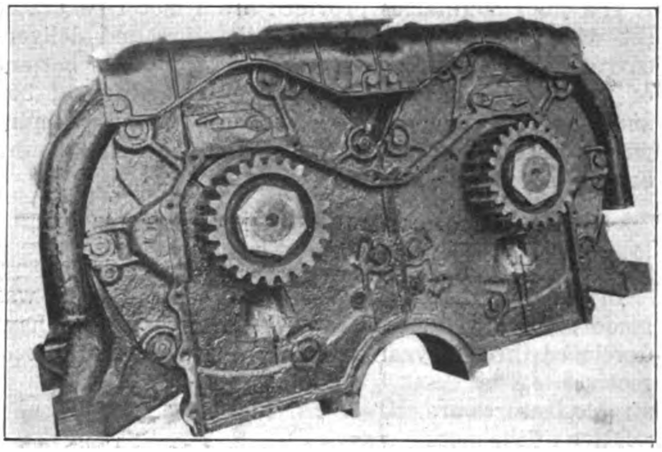
Quill drive, similar to that used on the locomotives of the New York, New Haven & Hartford Railroad was adopted.

Some Facts Regarding the Control System

An accompanying illustration shows a schematic diagram of the main motor circuits and another diagram gives the details of a single motor with its exciter and resistance. Three combinations of motors are possible; first, six motors in series; second, three in series, two sets in parallel, and third, two in series, three sets in parallel. By the use of inductive shunts on the fields of all three of these positions nine running speeds are possible, in addition to the thirty-three resistance steps available. One feature of the resistance arrangement is that the same resistance groups and switches are used for all of the three combinations. All switches are electro-pneumatically operated, some individually and some in cam groups.

Illustrations are given, also, to show the master controller open and the top view with the control levers. An interlock in the controller prevents the line switches from closing when the motor connection is in the second or third position, unless the engineman knowingly pushes a button in the top of the master controller. When applying current with the locomotive at speed this button must be pressed when it is desired to go immediately into the second or third combination.

For regeneration, the motors are separately excited from two axle-driven generators carried on the inside axles of the two four-wheel trucks and geared to them like ordinary interurban railway motors. These generators are separately excited and the field strength of the main motors is controlled by varying the fields of the exciters.

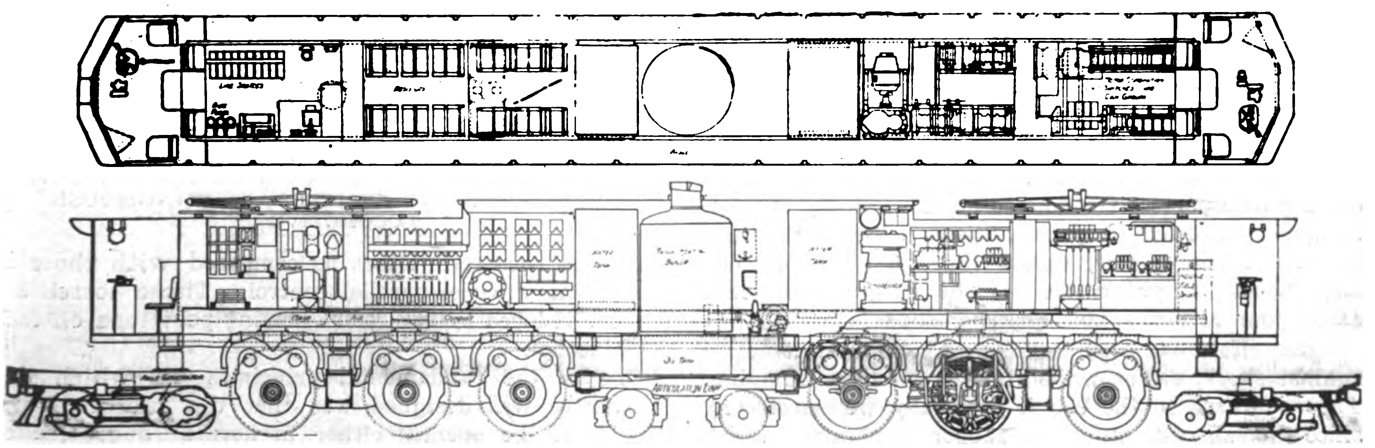


TWIN MOTOR FOR WESTINGHOUSE LOCOMOTIVE

The scheme used for regeneration includes the use of stabilizing resistance, which is connected in series with the exciter armature, with the main motor field circuit and also with the main motor armature circuit, so that the field excitation is dependent, to a certain extent, on the armature current.

One feature was to provide for beginning regeneration at any speed within the normal running range without having a heavy current in either direction that would produce a surge in the train. This was accomplished by providing that the motors should never be connected to the line without the maximum starting resistance in series between motors and the line. This, of course, is provided for in motoring, but is necessary also in regeneration to prevent undesirable surges. With the 17 ohms resistance provided on the first step, the maximum current that could flow from the line would be less than 200 amp. with no voltage generated in the motors. The resulting torque is negligible, particularly if this current is divided among two or three circuits, as would be the case in the second or third combinations.

The stabilizing resistance protects the motors against sudden changes in line voltage, while the axle generators protect against variations in grade, which would otherwise tend to vary the speed. In case of a sudden reduction in line voltage, which would be followed by a heavy increase in the regenerated current, the increased voltage drop in the stabilizing resistance resulting from this immediately cuts down the field current and the voltage generated by the main motor sufficiently to limit the increase in regenerated current to a safe value. Similarly the axle-generator regulation takes care of the passage of a train from a sharp curve to a tangent.

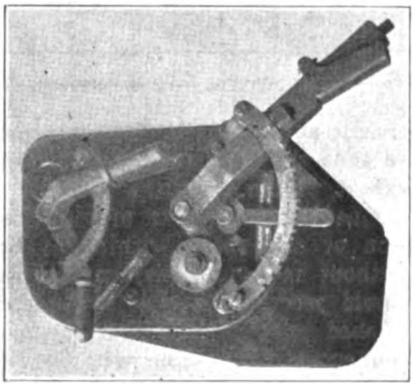


SIMPLIFIED PLAN AND LONGITUDINAL VERTICAL SECTION OF WESTINGHOUSE LOCOMOTIVE

The chief auxiliaries provided are a motor-generator set which draws current from the line and delivers current at a constant voltage of 85; a storage battery of thirty-eight cells with a one-hour capacity of 300 amp., and two axle-driven generators for the primary purpose of furnishing excitation for the main motors during regeneration.

STEAM LOCOMOTIVE EXPERIENCE APPLIED IN MECHANICAL DESIGN

In the design of this locomotive the attempt was made to obtain those mechanical features which have developed through years of experience with steam locomotives. The desirable features are location of the mass as close to the center as possible, high center of gravity of that part of the locomotive carried on the running gear, as long a rigid wheelbase as possible, guiding trucks located well outside the mass of the running gear, equalization to secure stability, minimum permissible restriction of free movement of each axle and portion of the running gear and large driver diameter. In the cab it is very advantageous to concentrate heavy equipment between the center pins. In the running gear the closer the weight is concentrated to the center pins the less tendency there is to nose and the easier the duty on the wheel flanges and track.


TOP VIEW OF WESTINGHOUSE MASTER CONTROLLER

This locomotive embodies all the foregoing features to a remarkable degree. Particular attention was given to weight distribution. The cab has the boiler, water and oil tanks, storage batteries, air-compressor, resistors, motor-generator set and the heavier parts of the control equipment concentrated between the center pins. The driving motors are mounted above the axles on the running gear, thus getting the weight well inside the wheelbase, but placing it relatively high. The height of the center of gravity of the complete locomotive is 68 in., a value that compares well with that of a steam locomotive.

The Pacific type of running gear with its long rigid wheelbase and the guiding trucks is a particularly stable design and is especially good with the weight distribution that obtains on this locomotive. The height of the center of gravity of trucks with motors mounted is 43¾ in.

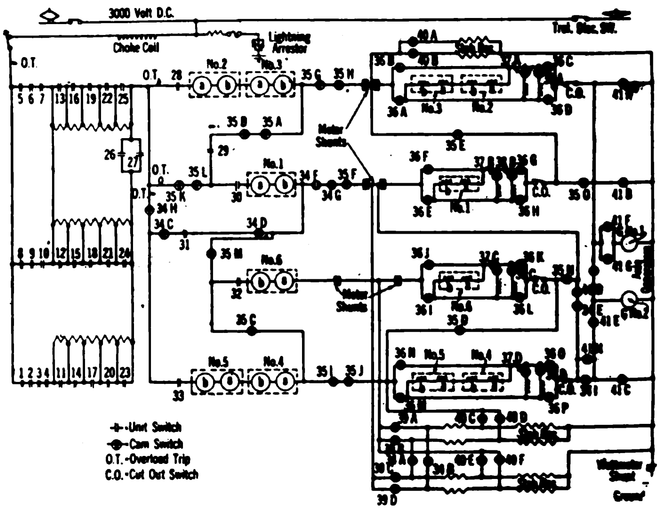
The quill drive, which is a further development of the one used on the New Haven locomotives, gives each driving axle perfect freedom to move vertically the full distance permitted by pedestal jaws without affecting the motors or frames, except through springs. The only "dead" weight carried is the weight of wheels, axles, journal boxes and spring clamps.

Great effort has been made to cushion the locomotive against shock, either while running or from bumping. The apparatus in the cab is especially well protected, since the cab rests on spring-supported plungers which are in series with the main semi-elliptic springs. The cab is protected against bumping strains by floating center pins, which, while held rigidly against lateral motion, are cushioned against longitudinal motion by heavy springs. It has been the practice heretofore with this general type of locomotive to have one center pin rigid in the running-gear frame and to allow the other to move freely in a longitudinal direction. It was considered best in this machine to allow a slight relative motion between the two center pins, but to prevent the bumping shocks by spring cushioning.

NOTES ON THE ELECTRICAL DESIGN

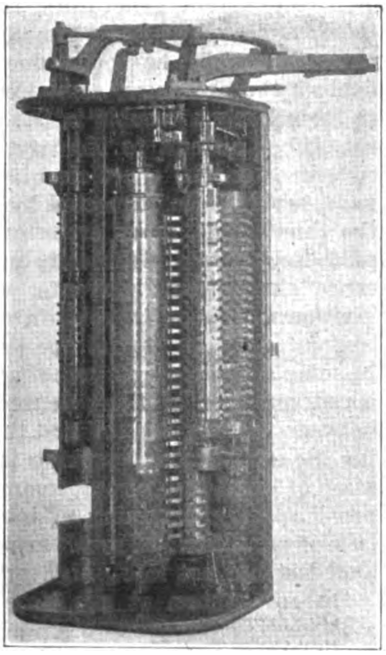
The efficiency of the twin-motor unit with both armatures operating to drive the same gear has been shown by factory tests to be materially higher than that calculated by the A. I. E. E. rules from "no load" losses and the fixed percentage of losses for gears and other load losses. These tests show plainly that those losses assumed for the Institute rules are too high for large motors.

Past practice with direct-current motors has been to use the series-parallel arrangement, or at most, series, series-parallel and parallel, giving one-quarter, one-half and full speed. With six motors and twelve armatures on 3,000 volts the regular series-parallel control could have been obtained in several ways, but the method adopted gives as simple a control as any system for regular series-parallel arrangement and in addition has the great advantage of the three-speed locomotive for handling the service. The one-third and the two-third speed arrangements cover the range so much better than the one-half speed, or than the one-quarter and one-half speeds, that there is scarcely any comparison possible. The one-half speed is too low for a running speed and too high for switching. The one-third speed is an excellent switching speed, and the two-thirds speed is a good running speed, especially good for regenerating on heavy grades. Another advantage lies in the decreased rheostatic losses as compared with those in the ordinary series-parallel control. These losses are further reduced by two field shunting positions on each combination.

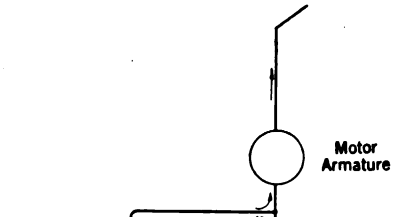


SCHEMATIC DIAGRAM OF MAIN MOTOR CIRCUITS, WITH RESISTANCES AND EXCITERS. WESTINGHOUSE LOCOMOTIVE

One of the fundamental principles on which this locomotive was designed was that the motor circuit should not be opened, either in normal operation or under emergency, until the current had been cut down by the introduction of resistance. This is considered a very valuable, if not an absolutely necessary feature. The effect is not only to divide the arcs among a large number of switches and, therefore, to promote safety, but the generation of high voltages from suddenly rupturing a heavy current is prevented. In order to avoid high-voltage troubles in the auxiliaries it was the policy on this locomotive to limit the high voltage to the minimum possible number of circuits and the minimum amount of apparatus. It was impossible to avoid it altogether on the moving apparatus, due to the fact that the train lighting must be supplied for hours at a time in case of any emergency when the train is held up by a wreck or storms. The motor-generator set, which is designed primarily for this purpose, is the only piece of moving apparatus among the auxiliaries which has the high voltage applied to it. The voltage selected for the auxiliary circuits was primarily determined by the voltage required for train lighting. While 85 volts is lower than would otherwise be selected for the auxiliary motors, it is perfectly safe and is a voltage that is so low that the motors can be forgotten, as far as the questions of insulation and commutation are concerned. The auxiliary motors are, of course, very much smaller than they would be if the high voltage were applied to them. A storage battery, from the standpoint of operation, is, of course, always a desirable thing on a locomotive. The combination of the storage battery and the axle-generators will furnish ample auxiliary power to take a locomotive to the end of a run, if the motor-generator set fails. The same combination will take a train safely down the longest and steepest grade with the air brakes, if power is for any reason cut off the line. If the train is going up a grade and power is cut off the battery will furnish air to hold the train with the brakes for a considerable time, so that it will not be necessary to block the wheels, as is the ordinary practice, unless power is off for a considerable time.



WESTINGHOUSE MASTER CONTROLLER



SCHEMATIC DIAGRAM OF SINGLE MOTOR, EXCITER AND RESISTANCE. WESTINGHOUSE LOCOMOTIVE

In general, wherever possible on the locomotive standard industrial types of motors have been employed for the auxiliaries.

Comparative Characteristics of the Two Locomotives

The following table, which gives a summary of the principal dimensions and characteristics of the two locomotives, is of interest in indicating the manner in which the two manufacturers have met with their individual systems of design the general specifications of the railway for these locomotives:

DATA FOR THE ST. PAUL LOCOMOTIVES

	General Electric	Westinghouse
Total weight	521,200 lb.	550,000 lb.
Total weight on drivers	457,680	336,000
Length over-all	76 ft. 0 in.	88 ft. 7 in.
Height over cabs	14 ft. 11⅜ in.	14 ft. 6 in.
Height over pantograph, locked down	16 ft. 8 in.	16 ft. 7¼ in.
Total wheelbase	67 ft. 0 in.	79 ft. 10 in.
Max. rigid wheelbase	13 ft. 9 in.	16 ft. 9 in.
Diameter of driving wheels	44 in.	68 in.
Diameter of idle wheels	36 in.	36 in.
Heater capacity	4,000 lb. steam per hr.	4,000 lb.
Water capacity	30,000 lb.	25,500 lb.
Oil capacity	6,000 lb.	750 gal.
Compressor capacity	150 cu.ft. per min.	150 cu.ft. per min.
Number of motors	12	12
Type of motor	(Bi-polar) GE-100	(Twin) 4-pole

	General Electric		Westinghouse
Locomotive Rating:	Tapped Field	Full Field	
Total horsepower, 1-hour motor rating	3,480	3,380	4,200
Total tractive effort one-hour motor rating	36,000	46,000	66,000
Speed, miles per hour	36.2	27.5	23.8
Total horsepower continuous	3,200	3,200	3,360

Substation Operation for Street Railway Service*

The Author Gives the Results of Practical Experience with Three Types of Transformation Apparatus

By W. T. Bivins
Chief Engineer of Electrical Equipment United Railroads of San Francisco

SUBSTATION operation for street railway service should be placed in the heavy-duty class. The design of the building and equipment should be made with a view to economy and simplicity of operation, so as to minimize the necessary number of attendants. Due regard, however, should be given to possible future extensions.

For transforming high-voltage alternating current to direct current for railway work, the choice in converting apparatus usually narrows down to synchronous motor-generators, induction motor-generators and rotary converters. On this system all three kinds are used, the largest stations being equipped with motor-generator sets. Where high efficiency, overload capacity, compactness and low initial costs are of greatest importance, the synchronous converter is apparently the most desirable piece of apparatus available, it being understood that the alternating-current feeder-line conditions are favorable and free from severe surges, rapid fluctuations in frequency, excessive ohmic drops, etc.

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*Abstract of paper read at Third Annual Electric Railway Night of Pacific Railway Club.

Where such unfavorable conditions obtain, however, the induction motor-generator is preferable.

On our system we find that there are times when the inherent characteristic of fixed ratio of alternating-current to direct-current voltage is objectionable, due to shifting of load centers. To cite an instance: In the Richmond district we have a small rotary substation supplying the major portion of energy to the Beach, Park and Cliff lines. This station is of ample capacity for all ordinary purposes, but for an occasion like the arrival of the "Fleet" in the harbor, when everybody in San Francisco wanted to go to the beach, this station would be overloaded, thus necessitating relief by some change in the direct-current feeders. If this substation equipment had consisted of motor-generator sets, we should simply have lowered the direct-current voltage and permitted other stations operating in parallel to feed in and help to carry the abnormal load occasioned by the close headway. At the same time a suitable trolley potential for operating the cars would have been maintained. This is a concrete instance where motor-generator sets would be preferable to the synchronous converter.

Voltage control can, of course, be arranged for by the use of extra apparatus for controlling the alternating-current voltage. I believe that the induction regulator is now being used more generally than any other means for voltage control in connection with synchronous converters. However, any such apparatus adds to the initial cost and some of it is dangerous to operate, owing to risk of short circuits.

On our system we have observed that the 60-cycle rotary converter will flash over from positive to negative brush arm, in case of a ground in proximity to the station, much more readily than the motor-generator sets. In fact, we have had considerable trouble from this source with broken trolley wires on the rail, and are now considering the installation of a new type of quick-acting circuit breaker, along with arcing screens.

Our experience has shown that the relation of trolley taps to the source of power is of great importance, for a "close-up" ground will invariably damage the circuit breaker even though the machines do not "buck" over. The line losses due to tap distances are immaterial, when compared with the loss through flashovers, including delays to the service and expense involved in repairing damaged apparatus.

While the rotary converter has somewhat less stability than the synchronous and induction-motor-driven sets, its efficiency, including transformers, is from 6 to 8 per cent better than that of a like motor-generator set without transformers. The motor-generator set, however, has some very desirable features not found in the synchronous converter, such as its possible use by over-excitation for power-factor control. The induction motor is not easily thrown out of phase, and accordingly is very desirable in some classes of work. However, it is at a disadvantage because it has no power-factor control. Comparing all three kinds of converting apparatus, my observations and experience have been that the synchronous motor-generator set is preferable for railway service.

A question which often arises is as to the choice in size of units for a substation. In my opinion, medium-sized units are preferable, space permitting, because better economy can be secured by cutting in and out machines to follow the load. Furthermore, with large units if one becomes incapacitated, a serious overload is usually imposed upon the other machines. With the present high generating cost, it seems even more necessary than ever closely to watch the apparatus to see that no more units are in service than necessary.

In connection with troubles encountered in the upkeep of direct-current generators, the most bothersome are those connected with the commutator. Excessive sparking will usually be found due to some defect in the field or the armature, some external electrical trouble, or more likely a trouble in the commutator, where it is sometimes difficult to identify. Field troubles usually consist of partial short circuit in one coil, unequal air gaps, series fields connected by mistake so as to oppose the shunt fields, or an error in rewinding a coil. Any of these troubles electrically unbalance a machine and cause short-circuit currents with resultant sparking. The more common troubles in an armature causing bad commutation are partial open circuit and short circuit in some portion of the winding. We have also experienced sparking in a less degree due to high resistance between the end of a coil and the commutator riser. As for the commutator, sparking is usually caused by operation of brushes at wrong commutation points, incorrect brush spacing, spanning of too many bars by brushes, lack of parallelism of brush arms with commutator bars, and, last but not least, high mica.

On our system at one time we had a lot of commutator trouble from high mica, particularly in one 9,000-kw. substation, which was heavily overloaded during the Panama-Pacific Exposition. The so-called "skin" or hard finish of the commutators was burned off by overload, after which the commutator bars were soft and the mica hard, occasioning constant stoning to keep the machines operating. Some 1,500-kw. motor-generator sets were stoned two or three times a day. After trying all sorts of brushes we finally decided to undercut the mica, which we did with a tool designed and built in our own shops. This ended our troubles. The machine, which had always given commutator trouble and had been trued up by the manufacturer after installation has, as this paper is written, been running off fifteen months since it was slotted, during which time we have practically disregarded the commutator. Special brushes designed for use with slotted commutator are employed, and these require no oiling and, therefore, seldom need cleaning. These brushes have little or no abrasive characteristics and have worn but little in fifteen months, while the wear of the commutator is practically nil.

Statistics on H. C. of L.

According to reports received by the Bureau of Labor Statistics of the United States Department of Labor from retail dealers in fifty cities, the average family expenditure for food was 2 per cent higher on Jan. 15, 1920, than on Dec. 15, 1919. The cost in December was 2.6 per cent higher than it had been in any previous month. These figures show an increase of 9 per cent since January, 1919, and an increase of 104 per cent since January, 1913. The comparisons are based on the average retail prices of the following articles, weighted according to the consumption of the average family: Sirloin steak, round steak, rib roast, chuck roast, plate beef, pork chops, bacon, ham, lard, hens, flour, corn meal, eggs, butter, milk, bread, potatoes, sugar, cheese, rice, coffee and tea.

Symposium on Railway Substations

Four Papers Read at the Meeting of the American Institute of Electrical Engineers in Pittsburgh Summarize the Status of Converter Protection, Automatic Control and Related Developments

A FEATURE of the 385th meeting at the American Institute of Electrical Engineers, held in Pittsburgh, Pa., on March 12, was a group of papers by substation design experts on subjects which are uppermost in the minds of electrical engineers today. Abstracts of these are given below, and a summary of the discussion following will be printed in a later issue of this paper.

Short-Circuit Protection for Direct Current Substations*

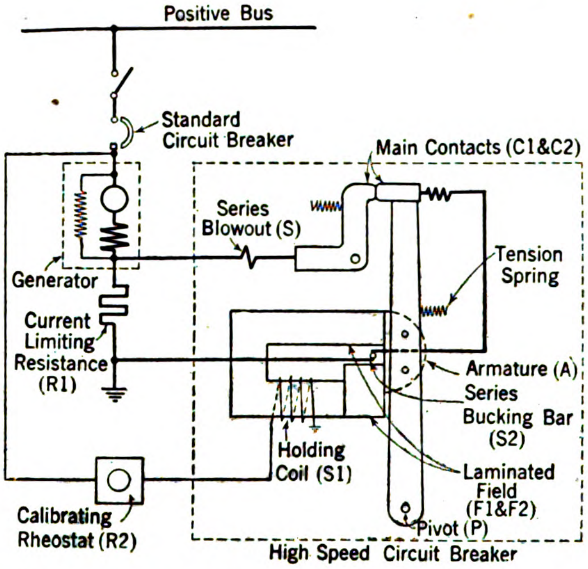
A Résumé of Development of Flash Barriers and High-Speed Circuit Breakers With Special Reference to the St. Paul Electrification

BY J. J. LINEBAUGH
Engineer Railway & Traction Engineering Department, General Electric Company, Schenectady, N. Y.

THE investigation of means to prevent flashing of direct current machinery and the development of suitable equipment have been continued since the presentation of the paper on "Protection from Flashing for Direct-Current Apparatus" by J. L. Burnham and the writer, read at the Atlantic City convention of the Institute in 1918.†

The study covered in that paper indicated that a special form of flash barrier without coolers and a new form of high-speed circuit breaker with current limiting resistance had proved the most promising development, and that tests showed that the two types of protection provided complete protection from a "dead" short circuit caused by short circuiting the terminals of a machine without external resistance. These two types of protection have been further perfected and are now in regular commercial use. They are used either separately or together, and in many instances are considered standard railway practice.

Thirteen of the improved breakers were installed by the Chicago, Milwaukee & St. Paul Railroad, as part of the electrification of its Pacific Coast and Cascade Mountain divisions.



CIRCUIT DIAGRAM FOR CONNECTIONS OF HIGH SPEED CIRCUIT BREAKER

This breaker was used instead of the first type of circuit breaker, which has given successful operation during the past three years in the fourteen substations of the 440-mile original electrification of this road. The new breaker has the advantages of lower cost and

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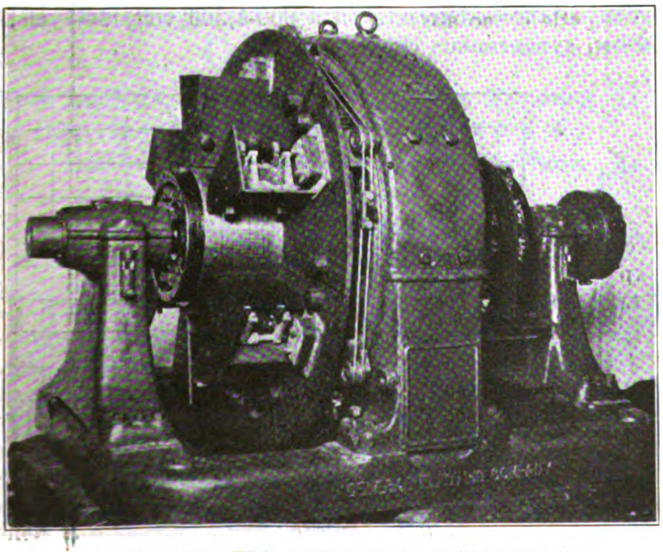
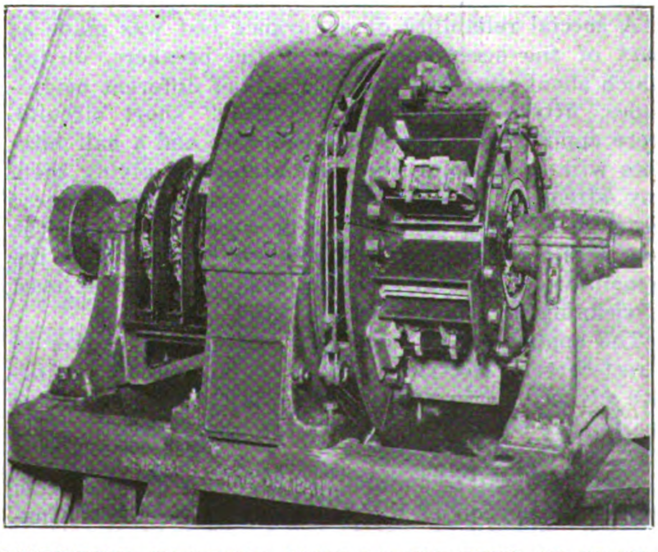
*Abstract of paper read at Pittsburgh meeting of the A.I.E.E., March 12, 1920.

†See issue of ELECTRIC RAILWAY JOURNAL for July 6, 1918, page 9.

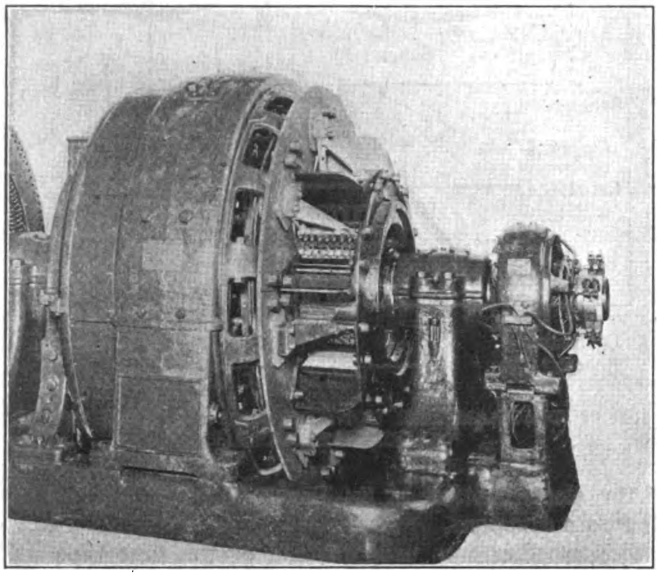


FLASH BARRIERS APPLIED TO SYNCHRONOUS CONVERTER



CONVERTER EQUIPPED WITH LATEST TYPE OF BRUSH HOLDER PROTECTION greater simplicity. One of these breakers is used with each of the 2,000-kw. 3,000-volt synchronous motor-generator sets in the Tacoma, Renton, Cathedral Falls, Hyak, and Cle Elum substations, and the remaining five breakers are placed one each on the new gearless passenger locomotives. On account of the lower cost of these breakers and the advantages of using the "unit" system throughout, each of the sets is protected by its own high-speed breaker instead of one breaker per substation, the arrangement in the original installation. The general connections, location of circuit breakers, etc., are shown in an accompanying diagram.‡ The circuit breakers for the substations and locomotives are exactly alike, with the exception of interlocking and calibration for tripping points.

The circuit breakers were given a very exhaustive test in connection with one of the 2,000-kw. sets before shipment. It was found that the generators could be short-circuited with only sufficient cable in circuit to connect the different meter shunts, short-circuiting contactors and high-speed breaker, without damaging the machine in any way and with practically no flashing at the brushes.



GENERATOR OF ST. PAUL MOTOR GENERATOR SET EQUIPPED WITH FLASH BARRIERS

A special reliability or endurance test was made as part of the acceptance test of the breakers, during which about sixty-five short circuits of different magnitudes, fifteen of which were "dead" short circuits, were applied at intervals of about two and a half minutes without cleaning the commutators or giving them any attention whatever. At the conclusion of these tests, five "dead" short circuits were thrown on the sets within ten minutes. At the end of these tests the commutators were in excellent condition without need of cleaning or attention of any kind.

The application of the high-speed circuit breaker to direct-current electric locomotives is another distinctive advance, as, in addition to protecting the apparatus on the locomotive, it prevents the short circuits from affecting the substations.

An incidental advantage of this type of protection is the elimination of disturbances on the alternating-current side of synchronous converters or motor-generators sets ordinarily caused by direct-current short circuits, due to the fact that the load is decreased so quickly that momentum of the armatures supplies the energy and the load is not increased materially on the alternating-current side. The overload relays are therefore not affected, increasing very greatly the general operating efficiency of the substation, eliminating time required to start up a set from the alternating current side, etc. After the occurrence of a short circuit it is only necessary for the operator to close the high-speed circuit breakers and then the main switchboard breaker which is interlocked with the high-speed breaker, after which the main switch is thrown in following regular switching practice. If the short circuit still persists, the high-speed breaker will again open, but with no flashing or damage to brushes or commutators, and greatly increased duty on the regular breaker.

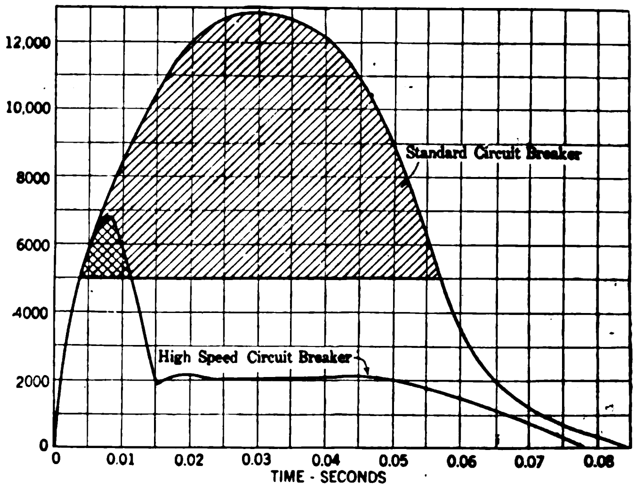


DIAGRAM SHOWING SHORT-CIRCUIT CURRENTS WITH STANDARD AND HIGH-SPEED TYPES OF CIRCUIT BREAKER

The flash barriers described in the original paper have not been changed in any essential details, improvements being along the line of simpler construction, ease of removal for inspection and improvement in appearance. An accompanying photograph shows the barriers as used on the generator of the Milwaukee electrification motor-generator sets, while another illustration shows barriers on a 600-1,200 volt, 60-cycle, 500-kw. synchronous converter.

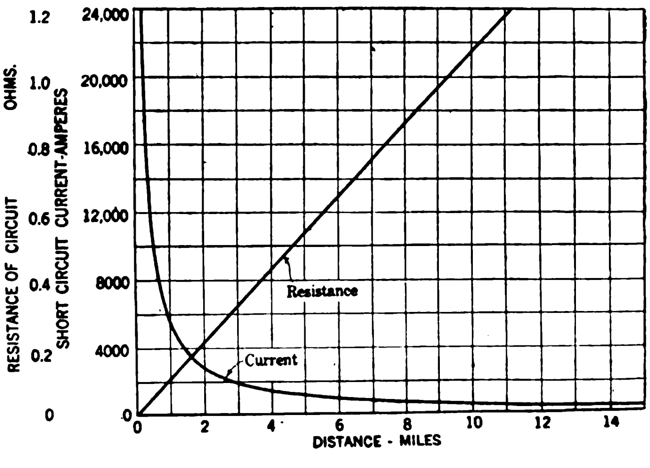


DIAGRAM SHOWING PROTECTION AFFORDED BY REMOTE TAP CONNECTIONS

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‡This circuit breaker was described in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 21, 1920, p. 394.

Another advance in short-circuit protection is the protected type of brush holder in which the brush rigging is protected on all sides where flashing might occur, by asbestos lumber, so that an arc cannot readily hold between brush holders of opposite polarity. This protection is shown in a third photograph. It prevents the formation of iron or copper vapor, which might cause a flash to the frame and damage to the brush rigging or commutator. A removable cover is provided for inspection and removal of brushes. It is made of an iron sheet for convenience, as there is no tendency for the arc to strike this part of the brush rigging during tests or in actual operation. This type of brush rigging has been standardized for all 600-volt, 60-cycle, synchronous converters.

The use of the high-reluctance commutating poles is a very promising improvement which has just been made in 60-cycle, 600-volt synchronous converters, and has been standardized for all 60-cycle machines. This raises the flashing point at least 50 per cent.

In conclusion attention should be called to the great protection afforded by tapping the feeder at some distance from the substation. This is undoubtedly the cheapest type of protection which can be used, but cannot be relied upon to prevent flashing over under extreme short circuits. Under ordinary conditions the distance to the first tap need not be greater than 2,000 ft. A greater distance than this causes an appreciable loss of energy and drop in voltage. An accompanying diagram shows very clearly the great benefit of a small amount of resistance in reducing the maximum possible current on a short circuit.

If complete immunity is desired from short circuits, the high-speed circuit breaker and barriers offer undoubtedly the best known solution. With this protection feeder taps can be connected to the overhead trolley directly at the substation, reducing losses to a minimum. Maintenance of the substation apparatus will also be decreased, as burning from short-circuits undoubtedly causes most of the wear and deterioration on brushes and commutator. Another particular advantage of this type of protection is that it can be applied to old generators or synchronous converters of any voltage without changing the machine itself.

Flashing of 60-Cycle Rotary Converters*

The Author Analyzes the Causes of Flashing, Describes Experiments With a Number of Anti-Flashing Devices and Suggests Some Remedies for This Evil

BY M. W. SMITH
Engineering Department Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

THE protection of the 60-cycle converter from flashing is more difficult than that of commutating machines of any other class due to the inherent limitations of distance between neutral points on the commutator. This distance is fixed by the frequency and by the peripheral speed of the commutator.

The rate of increase of the direct current on short circuit is very rapid as compared with that in direct-current generators. Tests made of the generators of the 2,000-kw. sets for the Chicago, Milwaukee & St. Paul Railroad showed the initial rate of increase in current on short circuit to be approximately 1,100,000 amp. per second. On the 500-kw. converter, however, the average initial rate was approximately 3,300,000 amp. This rapid rate of increase in short-circuit current, together with the limited distance between brush-holder arms, makes the 60-cycle converter particularly susceptible to flashing trouble.

Flashing does not appear to be entirely dependent upon the value at which the current is arrested. When a machine is on short circuit a large percentage of the voltage is consumed internally. The heavier the short circuit, the larger is the percentage of the voltage thus consumed. Then so long as the direct current breaker is closed the voltage between brush arms, and hence the tendency to flash, is a minimum. The voltage between neutral points on extreme overload and short circuit with the direct-current breaker closed, is also dependent somewhat upon the brush pressure. Assuming a reasonable brush pressure and contact drop, it is practically impossible for a machine to "buck over" and hang on between arms on dead short circuit so long as the direct-current breaker is closed, for the voltage on the commutator is practically "killed." It is usually the opening of the direct-current breaker that does the damage.

FLASHING DEPENDS UPON SEVERAL FACTORS

An ideal circuit breaker is not necessarily one which opens the circuit before the machine "bucks over" (for it usually does not "buck over" until the breaker opens) or before the current reaches a certain value, but one which opens the circuit before sufficient gas and volatile matter have been formed over the commutator to cause the machine to "buck over" when the voltage is restored by the opening of the breaker. It may be said that flashing is roughly a function of the voltage, the distance between neutral points and the amount of gas or volatile matter over the commutator.

It is the writer's opinion, in view of results of very extensive tests, that a moderately high-speed breaker is no better than an ordinary slow-speed breaker. A very slow-speed breaker may even be better than a moderately high-speed breaker, due to the fact that the voltage will have time to die down appreciably before the breaker opens, especially if the alternating-current supply is opened in the meantime.

Opening the alternating current breaker is of course undesirable, because the machine has to be synchronized again. However, this procedure minimizes the flashing considerably.

The relative strength of armature and commutating-pole fields has a considerable influence upon the commutation, and hence upon the flashing of a synchronous converter on sudden changes of load and extreme overload or short circuit. Under normal load conditions the alternating-current magnetomotive force opposes that produced by the direct current. In the inter-polar space the resultant armature action is only about 15 per cent of the direct-current armature reaction and is in the same direction. The commutating-pole field ampère-turns under this condition are just sufficient to buck down this resultant magnetomotive force, and in addition to force sufficient flux across the commutating-pole gap to generate the required counter-voltage for commutation. At the instant of short circuit the converter acts largely as a direct-current generator, delivering the first rush of current from its own inertia, with the result that the machine is enormously undercompensated. The larger the proportion of the ampere-turns expended in the commutating-pole air gap, or its equivalent, the less will be the effect of the armature reaction upon the commutating-pole flux and hence upon the commutation and flashing of the machine.

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*Abstract of paper read at Pittsburgh meeting of the A.I.E.E., March 12, 1920.

Sudden changes in the frequency applied to the converter are equivalent to the machine being out of phase and produce similar results from the standpoint of flashing. In one case where flashing occurred with a 1,000-kw., 600-volt, 25-cycle converter, the trouble was eliminated by greatly increasing the strength of the commutating-pole flux.

DIFFICULTIES IN APPLYING THE FLASH SUPPRESSOR TO ROTARIES

The flash suppressor, as applied to converters, is simply a high-speed switch actuated by the short-circuit current, much in the same manner as a circuit breaker, which short-circuits either all or a part of the collector rings.[1] This reduces or "kills" the voltage on the commutator to such an extent that it prevents the machine from flashing over. This device has already been applied to generators of the motor-generator sets in the substations of the Chicago, Milwaukee & St. Paul Railroad.

In connection with the rotary converter the operation of the flash suppressor means practically a short-circuit on the alternating-current system through the converter transformers. In addition the machine has a tendency to fall out of step, requiring it to be resynchronized if it does so. Tests were made with inductance in the local suppressor circuit for the purpose of finding out the maximum value of inductance which could be used to limit the alternating current and still reduce the direct current voltage sufficiently to give protection on the direct-current side. It was found that in order to give such protection the value of this inductance has to be such that upon the opening of the direct-current breakers the direct-current voltage would not rise above the value it had dropped to due to the direct-current short circuit. The test showed that reasonable protection could be had at about eight times full direct current load without drawing over nine times full load alternating current.

With the idea of preventing the machine from dropping out of step, a three-pole oil circuit breaker was put in the local leads of the suppressor circuit in connection with the above test, so as to open this circuit and throw the machine back on the line. It was found that this could be done without any particular disturbance up to the point where the inductance in the suppressor circuit had to be decreased (for protection to the direct-current side) sufficiently to cause the machine to fall out of step. This was approximately ten times full load.

The tests showed clearly that the flash suppressor will give ample protection from flashing to the converter as far as the alternating-current side is concerned. However, there are several problems connected with the application of the device to synchronous converters, such as the increased duty on the collector rings, disturbance to the alternating-current supply system and the falling of the machine out of step, which have not as yet been worked out.

Various forms of flash guards have so far proved to be unsuccessful. These consisted of two continuous end rings, one at the back of the commutator and one at the front with barriers between arms extending down to within approximately $\frac{1}{32}$ in. of the commutator. All tests indicated that these barriers should be of an open construction and as far away from the source of the arc as possible so as to give it sufficient room to expand and dissipate itself without becoming explosive. In other words, the barriers should be next to the parts to be protected (as the pedestal and leading side of brush holders) and as far away from the arc as possible. Best results have been obtained by protecting the pedestal with an arc shield and leaving as much space as possible on the commutator for the arc to expand. This also gives free access to the commutator, the lack of which is one great disadvantage in any form of flash guards.

Automatic Railway Substations*

An Account of Some of the Improvements Made During the Past Five Years and an Outline of the Present Status of Automatic Control

BY FRANK W. PETERS
Railway & Traction Engineering Department, General Electric Company, Schenectady, N. Y.

The use of automatic substations, as shown by several years of use, has resulted in decided economies and improved operating conditions, and as the subject has not been presented before the Institute since the account of the original installation† was prepared, a review of the modern automatic equipment seems desirable.

The individual devices comprising the first equipment were, with but few exceptions, those which had previously been developed by electrical manufacturers for use in other applications. This condition was a decided advantage to the operating companies since development charges were eliminated, rendering the equipment comparatively low in cost. This in addition to the successful operation of the early installations, made possible the rapid growth of automatic application to electric railways.

AUTOMATICS ARE USED IN CONSIDERABLE VARIETY

Shortly after the initial installation on the Elgin & Belvedere Electric Railway, the two remaining substations on that road were made automatic, followed by the Potomac Electric Power Company which made automatic a 500-kw. substation. About that time (1916) the Des Moines City Railway and Inter Urban Railway, two adjacent roads, outlined the now practically completed program involving automatic substations. These roads now have in operation a total of three 300-kw. and nine 500-kw., 600-volt automatic synchronous converter equipments. The confidence inspired in the minds of operating engineers and the rapid adoption of this comparatively new phase of electric railway operation was in no small measure accelerated by the successful performance of this rather broad application.

The range of requirement to which the new scheme could be successfully applied was demonstrated when in 1917 two 300-kw., 600-volt, 60-cycle synchronous converters operated in series on 1,200 volts by the Milwaukee Railway & Light Company were automatically equipped. Two automatic substations each containing one 600-kw., 1,500-volt d-c. induction motor-generator set were also installed in 1919 by the Salt Lake, Garfield & Western Railway. The Rhode Island Company has for some time been operating a station containing two 300-kw., 600-volt converters in parallel, while in other localities portable automatic substations have been functioning successfully. Railway converters now automatically equipped range in size from 200 to 1,500 kw. with motor-generator sets from 300 to 2,000 kw. The total capacity operating in this manner and including those in process of installation is estimated to be 32,000 kw. while the number of automatic equipments involved is approximately seventy-five, fifty of which having been applied to 300 and 500-kw. sizes, and the remainder cover the range of various types and sizes of installations briefly referred to.

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[1] For a description of this device, see ELECTRIC RAILWAY JOURNAL, May 4, 1918, pages 858 and 891.

*Abstract of a paper read at the Pittsburgh meeting of the A.I.E.E., March 12, 1920.

†See ELECTRIC RAILWAY JOURNAL for Sept. 18, 1915, page 583.

Without question a direct reduction in operating expense has been the prime motive for the purchase by railway companies of automatic substations. The saving is effected in several ways, although it is variable and depends upon conditions under which a particular station is operated, as well as the number and capacity of machines in the station. The following are the principal items of saving: Labor, light-load losses, fuel for heating, building construction, saving resulting from improved load factor, feeder costs and reduction of electrolysis losses.

WHAT AUTOMATIC CONTROL ACTUALLY DOES

Under automatic control the functions of starting and connecting the machines to the line upon power demand and finally shutting them down after the demand for power has ceased are all carried on in their proper sequence without any assistance whatsoever from an operator. In present day practice the great majority of these stations are controlled entirely by the automatic equipment, but a few are, for specific reasons, remotely controlled by dispatchers with the aid of a pilot wire. A remote-control station may be considered in the same class with a purely automatic station since the control current merely replaces the automatic devices which determine when the station is to start or stop. The remaining apparatus which performs the actual switching operations is identical in both cases.

Protective devices having the following duties are provided to perform the functions ordinarily left to the discretion of the operator: (1) To limit the overloads. (2) To limit the temperatures. (3) To shut down the machine when a.-c. or continuous d.-c. short circuits occur, upon failure of alternating current, upon failure of any device, in case of excessive speed and upon reversal of direct current. (4) To prevent machine starting during low a.-c. voltage and during single-phase a.-c. supply periods.

In stations containing a motor-generator set, instead of a synchronous converter, certain modifications of the equipment are necessary to accommodate the starting operations, but the scheme of operation with few exceptions is similar to the converter equipments. Oil-immersed starting and running contactors are used because of the higher transformer secondary voltage and a certain amount of overload protection is obtained by inserting one or two steps of resistance in the generator field circuit in addition to two steps of series resistance in the main d.-c. circuit. This arrangement reduces initial cost since the field resistance and its contactors are of small capacity. An energy saving in resistor heat loss is also accomplished. The 250-volt generator on the drum controller becomes unnecessary in the case of a motor-generator automatic equipment.

IMPROVEMENTS THAT HAVE INCREASED RELIABILITY

The recent development in automatic equipments has largely consisted of perfecting and making more reliable the present type of station as well as arranging for and applying the principle in other applications such as lighting, mining and hydraulic generating stations. Among specific instances of improved design may be mentioned the elimination from the equipment of all disk-type interlocks and the substitution of substantial finger-type auxiliary contacts. Relay contacts element have been improved where necessary so as to provide a quick make-and-break action and on direct-current circuits blow-out coils have been added. An improved type of motor-operating mechanism for oil circuit breakers is now in use in which compactness and reliability are the outstanding features. Direct-current contactors having a rupturing capacity sufficient to handle any load conditions have been developed and are performing their function with complete success. Reverse current and under-load relays of substantial construction and capable of accurate calibration at low current values have been designed to accommodate the conditions of automatic substation operation.

The use of automatic control in railway substations has in a comparatively short time expanded to where it is firmly established in city and interurban railway operation. The successful experience of the past has resulted in larger capacity stations serving heavy traffic being made automatic. The adaptation of this type of control to electric trunk line service at 2,400 or 3,000 volts direct current as well as more extended use in the strictly industrial field is not far beyond the horizon.

Automatic Substations for Heavy City Service*

The New Method of Control Simplifies Distribution Problems and, Judicially Used, Saves Money and Improves Operating Conditions

BY R. J. WENSLEY

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IT IS very gratifying to those directly interested in the automatic substation that the larger city street railway systems are eagerly taking up the question of rebuilding their distribution systems by taking advantage of the savings made possible by automatic operation of converting equipment.

The earlier street railway systems made little or no attempt to lay out the distribution lines with economy or efficiency. Any location available was seized on as a power-house site. Cables were run the shortest possible distance to the trolley wire and from that point the trolley wire was usually the only means of carrying current. As service demands increased the voltage

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*Abstract of paper read at Pittsburgh meeting of the A.I.E.E., March 12, 1920.

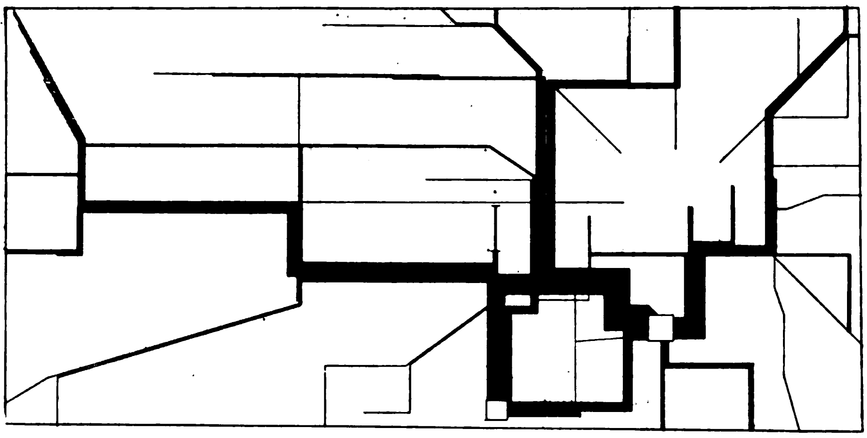

FIG. 1. FEEDER COPPER NOW IN USE IN CITY OF 300,000 POPULATION

drop became too great for satisfactory service, and to remedy this the voltage was increased and feeders were run parallel with the trolley.

As the demands still further increased, the factor of electrolytic destruction of underground pipe necessitated the use of heavy copper feeders in parallel with the rail. The negative booster was also freely used to compensate for the drop in these return feeders.

When first the engine-driven alternator and later the turbo alternator came to the front as the most economical means of power generation, the railway substation soon became popular. In some of the larger cities there were installed one or more central steam plants with a number of large substations located in various parts of the city. Owing to the cost of operating labor, the number of these was kept down to the minimum even at the expense of considerable investment in feeder copper. Not only were large amounts of feeder copper thus involved, but transmission losses were high and schedules were slow.

The development of automatically controlled substation equipment has placed in the hands of the distribution engineer a possible method of reconstruction that is little short of ideal. Substations can now be scattered about without the specter of heavy and ever-rising operating labor expense. The increase in the number of substations enables the holding of good trolley voltage without heavy expense in large feeder capacity. Trouble due to electrolysis is largely minimized and in many cases entirely eliminated by the increase in number of substations.

Care must be used in applying this remedy that it is not overdone. Sizes of machines and stations must be carefully calculated so that the load factor will be high. In deciding on the best sizes for equipment, several factors must be considered. Interchangeability is always desirable and, therefore, there should be as few different sizes of machines as is consistent with economical operation. In most city applications two machines will prove to be best, with space provided for a third to take care of future growth.

Where two machines are selected for a given location each one must be capable of carrying the normal off-peak load without assistance. The combined capacity must be sufficient to take care of the peak load.

TABLE I—DATA USED IN CALCULATIONS

Population of city	300,000
Present direct-current capacity, old plant (lower), kilowatts	8,000
Rotaries in new plant (upper)	3–2,000 kw.
Total area of positive and negative feeders, leaving old plant, circ. mil	25,800,000
Total area of feeders leaving new plant, circ. mil	23,000,000
Total area of tie lines, circ. mil	8,000,000
Total area in positive feeders, circ. mil	40,000,000
Total area in negative feeders, circ. mil	16,800,000
Average length of feeders to center of load, miles	2
Peak load on two plants, amperes	22,000
Average I^2R loss at peak load, kilowatts	2,750
Number of cars operated in heavy traffic	300
Average weight of cars, tons	20
Motor equipment of cars	2–60-hp.
Schedule speed in rush hour, miles per hour	6
Balancing speed of cars, miles per hour	27

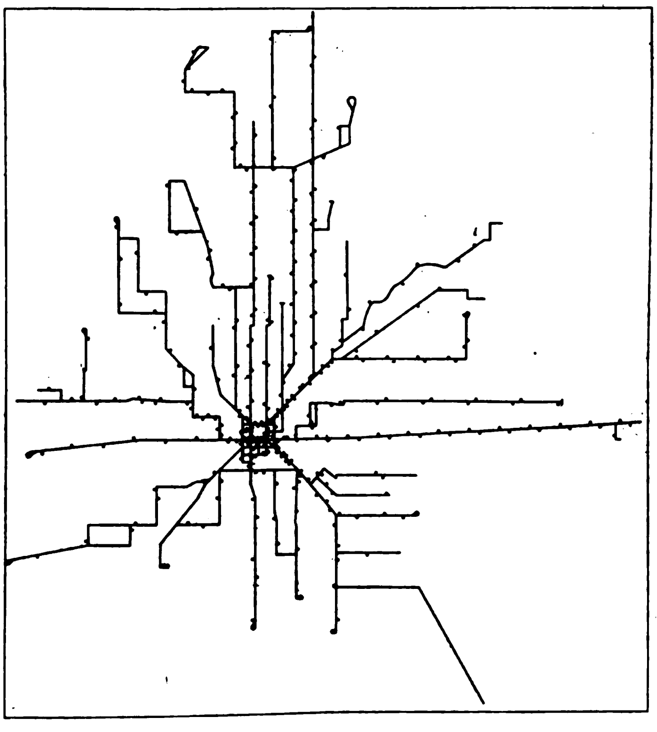

FIG. 2. SPOT MAP SHOWING REQUIREMENTS FOR CARS IN CITY OF 300,000 POPULATION

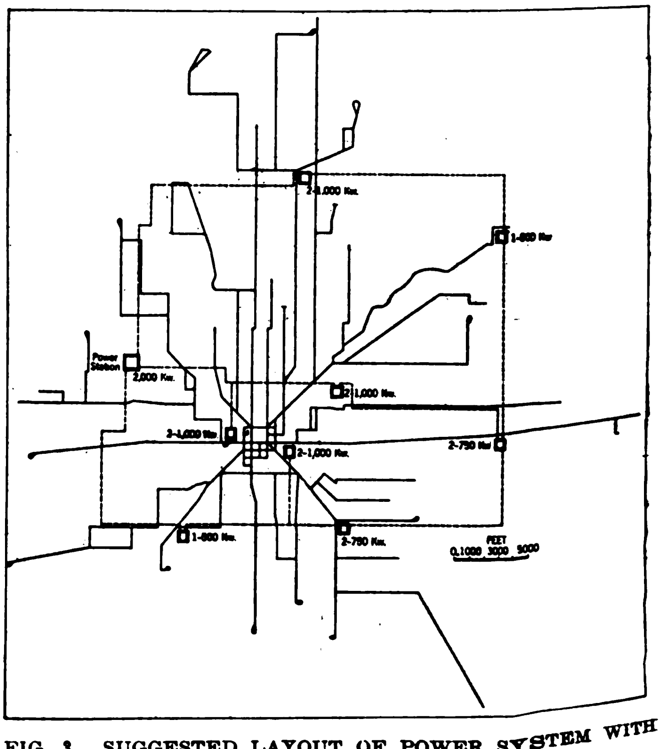

FIG. 3. SUGGESTED LAYOUT OF POWER SYSTEM WITH AUTOMATIC SUBSTATIONS FOR THIS CITY

TABLE II—BALANCE SHEET FOR PROPOSED SYSTEM

Gross cost of the new system:	
11,500 kw. of substations at $40	$460,000
25 miles of line at $5,000	125,000
Reconstruction of feeder system	25,000
Power house equipment, transformers, etc	100,000
Total cost of automatic substations	$710,000
Credit power plant scrap	100,000
Credit copper removed	205,380
Net cost of automatic substations	$404,620
Fixed charges at 15 per cent	$75,693
Annual operating labor	7,000
Gross annual charges against automatics	$82,693
Savings due to the new equipment:	
Annual saving in copper loss	$66,000
Annual saving in platform labor	14,600
Annual saving in labor due to shutting down of old power plant	50,000
	$130,600
Annual cost of substations	$82,693
Net operating credit annually	$47,907

By selecting machines of combined continuous capacity equal to the root-mean-square value of the peak load, a reasonable reserve capacity is allowed since the two-hour rating will probably allow one machine to pull over the peak if the other is out of service. To help in such cases, a limited number of feeders should be run through from one station to another, so that a feeder may be opened in the station in trouble, thus transferring a portion of its load to an adjacent station.

HERE IS HOW THE AUTOMATIC PLAN WORKS OUT

To illustrate the way in which the problem of applying automatic substations to city service should be approached, a city of about 300,000 population has been selected as an example. This represents good practice under the old method of centralized distribution. Fig. 1 shows in a general way the distribution of the feeder copper, details of which are given in table I. The two plants used here are about ¾ mile apart on the same side of the city, and about one mile from the loop district where occurs the section of the greatest load concentration.

The problem is to lay out a new distribution system which will reduce the transmission losses to a minimum, raise the average trolley voltage to a reasonable value, keep the stray earth currents at a minimum and at the same time avoid raising the expense for operating labor to an undue amount. All of this must be accomplished at the lowest possible net cost.

Preliminary to deciding on the size and location of substation equipment, a spot map of the system, based on rush-hour schedule, is desirable. A sample is shown in Fig. 2. A disturbing factor in this case is that there are fourteen interurban lines entering the city, all of which operate fairly heavy cars. In laying out the power supply it has been assumed that two of these cars are at the center of each line which they use for entering the city and that one is equivalent to two city cars. The average current per city car has been taken as 53 amp. After consideration of all of the factors entering into this case, the final location decided upon for the substations was as shown in Fig. 3. Table II shows the balance sheet for this change with the saving which the proposed plan would yield.

In this solution of the problem the entire equipment should be automatic in operation, except the one converter retained in the power plant. One of the converters in one of the loop stations would be set for continuous operation. Many modifications of this layout are possible without materially altering the saving shown.

Is the Use of the Screw Spike Justified?

Baltimore Company Abandons Its Use—Result of Questionnaire Addressed to Prominent Roads Given

BY W. W. WYSOR

Chief Engineer United Railways & Electric Company, Baltimore

IN THESE critical days of the street railway industry, when operating officials are seeking to learn how they may economize in every way possible, it is well not only to point out economies that may be effected, but also extravagances that may be avoided. In caring for the physical properties of the industry, and in building extensions or additions we should consider how the work may be done at the least cost consistent with good construction. It is important that the work be done properly—better one job done right than two jobs done halfway—but there is such a thing as needless refinement and unnecessary expenditure. Our watchword should be "efficiency," and this applies not alone to the men employed in doing the work but to the methods and materials selected for doing it. If a bridge is to be built over which 10-ton cars are to be operated, it is manifestly a waste of money to build a bridge strong enough to carry 300-ton locomotives; if ⅜-in. trolley cord is sufficient, it is obviously foolish to use 1-in. rope merely because it is stronger; if we wish to move an article weighing one hundred pounds from one section of the city to another, we do not employ a five-ton truck. This brings us down to the question, "Why is a screw spike?"

For a number of years past, in the city of Baltimore, screw spikes have been used as standard construction on all girder rail, with the exception of special work, but there does not seem to be any logical reason for having done so nor for continuing this practice. When the question was asked: "Why use screw spikes?" the answer generally was "Because they hold better," or the more indefinite one, "Because it is better practice or in line with more up-to-date methods." There is no doubt that screw spikes, when newly driven, require more force to withdraw them than do nail spikes, but when ties decay or spikes for any reason become loose, the greater holding power of the screw spike is lost. Moreover, if the lifting force exerted on nail spikes is not sufficient to withdraw or loosen them, why go to the expense of providing a spike of greater holding power? The functions of a spike are to hold the rail to gage and prevent overturning, and there is every evidence, so far as the observations of the writer go, that this is performed by the nail spike equally as well as by the screw spike, at least in street railway tracks.

In the last few years we have reconstructed in the city of Baltimore many miles of track which had been down for periods ranging from ten to twenty-five years and which had been laid with nail spikes. In every case where ties were solid, the spikes were found in place as originally driven, and it required as much or more force to withdraw them than it did newly driven spikes. In the case of rotten ties, of course any form of spike is valueless.

About two years ago we started keeping a record of the cost of screw spikes as compared with nail spikes and found that the former cost about $1,500 per mile more than the latter, without any apparent benefit.

In order to determine what the various roads were doing, a questionnaire was prepared and forwarded to forty-eight of the most prominent street railways in the country. Replies were received from thirty-six companies—a list of the questions and a resumé of the answers received being shown in the following statement. It will be noted that a majority of the companies do not use screw spikes and most of the companies that do employ them use them only in particular cases, such as for bridge and subway work. For this kind of work, where traffic is very heavy and where the rails wear out long before it is necessary to renew the ties, the use of screw spikes may be justified, inasmuch as they can be withdrawn and redriven with less damage to the ties; but for ordinary construction in paved streets, not a single valid reason has been given for their use.

When screw spikes were first adopted on this property, tie plates were adopted at the same time, and it seems probable that this was true of other properties, not only of street railways but steam roads, and the better results that have been obtained from this type of construction were, in my opinion, due entirely to the tie plate and not to the screw spike. After a very careful consideration of the matter, this company has abandoned the use of screw spikes but has retained the tie plate. We believe the tie plate to be well worth its cost.

While this article deals with the use of screw spikes in connection with street railways only, it is well to call attention to the report of the committee of the Pennsylvania Railroad, dated April 27, and published in October, 1917, in the Bulletin of the American Railway Engineering Association. This report covers the experimental use of screw spikes ranging over a period of nine years, and the conclusion reached by the committee was that screw spikes have no advantage over nail spikes.

RESULTS OF QUESTIONNAIRE ON SCREW SPIKES

Question No. 1—Do you use screw spikes? Answers: Four companies answered "yes"; ten companies, "to a limited extent only"; twenty-two companies, "no".

Question No. 2—Are they employed as standard construction in (1) city streets? (2) on interurban T-rail track? (3) on special construction such as subways, elevated structures, etc? Answers: (1) Four companies answered "yes"; nine companies, "no". (2) Fourteen companies answered "no". (3) Eleven companies answered "yes" and three "no".

Question No. 3—On what sections of rail are they used? Answers: Eight companies answered "standard T-rail"; six, "high T-rail (Shanghai)"; seven companies, "girder rail."

Question No. 4—Do you use tie plates with screw spikes? If so, are they specially formed so as to give support to the head of the spikes? If not, do you use a clip? Answers: Five companies replied they did not use tie plates; three companies that they used plain plates; three that they used special plates and three that they used combination plates and clips.

Question No. 5—What considerations led you to adopt the screw spike? Answers: Three companies replied "increased holding power"; four, "special construction, such as subways and bridges and where more or less permanent foundation is employed and where rails can be renewed without disturbing the foundation"; two, "experimental only"; one, "best type of fastening"; one, "used with tie plates to prevent cutting of ties"; one, "on account of decreased maintenance of special work"; one, "seemed to be in accordance with best practice".

Question No. 6—Has it met with your expectations and proved satisfactory in service? Answers: Three replied "yes"; one, "no"; three, "experimental only"; seven, "yes for special purposes for which they are applied".

Question No. 7—In comparing the performance of screw spikes as against nail spikes, are tie plates employed in both cases? Answers: Seven companies replied "yes"; seven, "no"; four, "no comparisons made".

Question No. 8—What is the excess cost per mile of single track of screw spike construction over nail spike construction? Answers: Ten replied "no data"; one, "double the cost of hook-headed spikes"; one, "$2,422.00"; one, "$1,000.00".

Question No. 9—Do you consider screw-spike construction of sufficient superiority to justify this excess cost? Answers: Four companies said "yes"; five, "no"; three, "yes as limited to special construction"; one, "in hard wood, no; in soft wood, yes".

Comparison of Automobile and Electric Car Passengers in Schenectady

THE officials of the Schenectady Railway Company, Schenectady, N. Y., have compiled some figures giving a comparison of the trolley and pleasure car traffic in that section during the years 1912 to 1918 inclusive. During this period there has been a constant increase in the number of automobiles used so that the ratio of trolley car passengers to pleasure car passengers has decreased from 20 to 1 to 5 to 1. During the year 1918 there were slightly over 4,000 pleasure cars in that city, or one car for every twenty-six people.

The records of automoblie registration in the office of the Secretary of State for the year 1919 are not yet available, so a comparison for this year is not included. However, the registrations of automobiles were about 30 to 35 per cent greater in 1919 than in 1918, according to a statement made by Secretary of State Hugo during a talk in Schenectady in October, 1919. Just how this increase is distributed in Schenectady and over the State in general would be hard to estimate.

The accompanying tables give detailed figures and comparisons, which will be of interest.

RATIO OF TROLLEY CAR PASSENGERS TO PLEASURE CAR PASSENGERS IN SCHENECTADY

Year	Trolley Passengers	Pleasure Car Passengers
1912	20.0	1
1913	18.8	1
1914	12.8	1
1915	9.4	1
1916	7.7	1
1917	6.2	1
1918	5.08	1

PLEASURE CARS IN SCHENECTADY, 1912-1918

Year	Number Riding Per Day	Total Riding 214 Days	Pleasure Cars in the City	City Population Per Car
1912	4,330	926,620	866	98
1913	5,510	1,179,140	1,102	86
1914	7,425	1,588,950	1,485	65
1915	9,180	1,964,520	1,836	49
1916	12,755	2,729,570	2,551	39
1917	16,920	3,620,880	3,384	32
1918	20,035	4,287,490	4,077	26

Note: Allowing seven months (April - October, inclusive) or 214 days riding period per car, five passengers per car.

DATA REGARDING TROLLEY CAR SERVICE IN SCHENECTADY, 1912-1918

		Passengers Carried (City)					Population	
Year	Revenue	Transfer	Free	Total	Number Cars	Passengers per Car	per Car	Rides Per Capita Per Year
1912	$15,659,267	2,515,148	479,597	18,654,102	151	123,536	562	220
1913	17,446,810	3,025,274	563,903	21,135,987	158	133,765	599	226
1914	16,482,476	2,919,520	578,034	19,980,030	158	126,456	611	206
1915	14,818,223	2,577,047	574,375	17,969,645	158	113,725	569	199
1916	17,266,463	2,924,553	578,485	20,769,501	158	131,452	623	208
1917	18,725,891	3,147,185	580,985	22,454,061	174	129,046	622	207
1918	18,162,463	3,104,355	525,805	21,792,623	172	126,701	623	202

Characteristics of Rail Bonds*

A Summary of Present Practice in This Field With Comment Upon the Merits and Demerits of the Important Types of Bonds Now and Previously in Use

BY RALPH H. RICE
Principal Assistant Engineer Board of Supervising Engineers Chicago Traction

PRACTICALLY all American electric railway systems operate with grounded returns. The track is usually quite intimately in contact with the earth, which is a good conductor; hence we have the condition that the return current from the car is discharged into the conducting rails and earth with its buried pipes or other metallic structures. So long as the rails are in contact with the earth a division of current between them will always occur in accordance with the laws of divided circuits, and while we cannot entirely eliminate the leakage of current from the rails we can minimize it. Our treatment for leakage or stray currents must be either to prevent any passage of current from the rails to the earth by insulating the rails, or by making the rails such good conductors that only a negligible amount of current will leave them. The former method is not practicable and we shall inquire into the latter.

In some cases, particularly in large cities, it is feasible to make the rail practically continuous by welding the splice bars at the rail ends. While such a process is used for mechanical reasons in securing a good joint, it also serves to secure a very low resistance connection between adjacent rails. Several forms of such welds are in use and when properly made they produce an electrical connection which does not exceed in resistance that of an equal length of the rail. The earliest form of such connection was the cast weld produced by pouring molten cast iron into a mold around the rail ends. It was a rather satisfactory mechanical joint but was not of much certain value electrically and has practically been superseded by more efficient forms. A more modern form is the thermit weld. In this the rail ends are actually melted down into a homogeneous mass of great strength and high conductivity. The Clark joint, a special form of this joint, has a weld made between the bases of the rail, thus securing electrical continuity, the ordinary bolted splice bars being used for the mechanical joint.

TABLE I—RESULTS OF TESTS OF ELECTRICALLY WELDED RAIL JOINTS IN CHICAGO

	Joints	Percentage
Total tested	44,263	100.00
100 per cent or more conductance	43,769	98.88
Below 100 per cent—		
No break visible	203	0.46
Broken	291	0.66
Total	494	1.12

In the electric weld heavy bars of steel are spot welded to the web of the rail by a heavy electric current. This process requires special apparatus but produces most excellent results. About 150,000 of these welds have been made on the street railway lines of Chicago and the results of tests made on some of them, covering a period of three years, are as given in Table I.

Arc welded joints are similar to the electric weld except that the electric arc is the source of heat.

Special forms of joints, such as the Clark already mentioned, and the Nichols, are used. The latter is made by pouring molten zinc around the bolted or riveted splice bars. Upon cooling, the zinc expands and, if the rail surfaces are clean, it makes a low resistance joint.

These forms of rail weld take the place of rail joint bonds and should be considered when making a selection of the form of connection to use. They are better adapted to heavy city service than any other service on account of their cost, and of the fact that the rails are protected by the pavement from rapid fluctuations in temperature under which conditions a continuous rail may be maintained better than in the open country.

WHAT IS REQUIRED OF A RAIL BOND?

When the track is not welded, some form of electrical connection between the rail ends is essential, and to meet this need various types of bonds have been developed. Bonds are subject to breakage due to mechanical defect, temperature changes, vibration and flexure. They are also subjected to corrosion at the contact surface with the rail, and to oxidation and consequent increase of contact resistance to an amount which destroys their usefulness. Bonding is largely a mechanical problem of maintaining a low resistance contact against the destructive agencies mentioned above.

In a rail bond we want (1) high conductance from rail to rail, (2) permanent contact with rail, (3) protection of bond from theft or mechanical injury, (4) ability to withstand vibration and mechanical strains incident to operation, (5) provision for ready installation by low-grade labor, (6) provision for ready installation without interruption of traffic, (7) ease of inspection and test, (8) as low a cost as is consistent with the grade of installation desired.

To see what has been done to meet these requirements we may make an analysis of types of bonds, under three headings: (A) construction of bonds, (B) location of bonds, (C) application of bonds.

This analysis is shown in Table II.

TABLE II—ANALYSIS OF BOND CHARACTERISTICS

A—Construction:
1. Terminal—see Application of Bonds.
2. Conductor
    - Solid
    - Stranded
    - Ribbon.

B.—Location:
1. On web of rail
    - Exposed
    - Concealed
2. On head of rail
3. On base of rail

C—Application:
1. Bolted connections
2. Soldered terminals
3. Plastic or amalgamated
4. Pressure terminals
    - Pin terminal
    - Compressed terminal
    - Socket terminal
5. Brazed or welded terminals
    - Arc weld
    - Flame weld
    - Electric weld
    - Copper weld.

ELEMENTS OF BOND CONSTRUCTION

All railway bonds are of copper. Each consists of two parts, the conductor and the terminals for attachment to the rail. The terminals have many forms, which will be considered later. The conductor may be solid, stranded or of flat ribbons, depending upon the length, size and location of the bond. A solid conductor is generally used for long bonds and when not subject to vibration. The ribbon conductor is usually applied with its laminations horizontal and when the bond is subject to vertical motion only, as on third rail construction. The stranded conductor is most commonly used, as it is very flexible in all directions. Special stranding is used and the conductor is divided into two or more cables if necessary. The conductor is usually attached to the terminals by welding, although the terminal is sometimes cast and one type of bond has the copper strands formed into a terminal. The latest type of bond, which is not yet on the market, is one in which a copper terminal is welded to the conductor, and then a facing of steel is brazed to the terminal by the manufacturer. When this bond is applied to the rail a weld is made between the steel face and the rail. This seems to promise excellent results, but is expensive.

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*Abstract of paper read at annual meeting of Central Electric Railway Association, Louisville, Ky., March 10, 1920.

Probably the most frequent application of bonds is to the web of the rail, as being the location which interferes least with the track construction and in which the bond is most protected from ordinary injury. Less frequently bonds are applied to the head of the rail and, sometimes, as on an elevated railway third rail, to the base. When applied to the web the bond may be of the exposed or concealed type. The exposed type is attached to the rail beyond the ends of the splice bars and is unprotected in any way from injury or theft. The concealed type is passed under the splice bar and cannot be removed without removing the bar. In some forms the conductor and terminals are entirely under the bar. Special shapes and divisions of the conductor have to be made to enable the bond to keep clear of the bar and bolts, so that the conductor will be free to move with the movement of the rails.

The greatest variety of bond terminals has been devised with the aim of securing a mode of attachment to the rails which will be easy to install and will result in a permanent and efficient electrical connection. Some of the types mentioned below are now practically obsolete, for the reasons given, and others have merits which will be pointed out.

The ideal to be aimed at in any installation of joint bonds is to make a connection between the rails that will not increase the track resistance above that of the continuous rail. In commercial practice a terminal contact area of perhaps seven to nine times that of the cross-section of the bond conductor is customary, which is approximately two-thirds of the theoretically required area.

Bolted Connections: Bolted connections have not been successful. It is difficult to bring into intimate contact large flat surfaces unless these have been carefully prepared for such purpose. The bulk and cost of such connections, and the practical impossibility of maintaining tight joints has eliminated this type for electrical connection. The old channel pin device by which a bond wire is held in a hole by a wedge driven between the wire and rail, is really a form of mechanical connection similar to a bolted connection, and is subject to the same general limitations. Some recent work has been done on developing forms of bolted connections which are superior to the older types.

Soldered Bonds: Soldered bonds require no rail drilling, but do require a thorough cleaning of the rail, which is sometimes more troublesome than drilling. Such a bond should be applied above ground, as corrosion is sure to impair its value. The soldering fluid used is often the cause of corrosion, and is always a potential source of trouble. The co-efficient of expansion of copper is nearly twice that of steel, so that with temperature variations the film of solder connecting the two different metals is subjected to continual strain and under the vibrations due to traffic will ultimately fail.

With soldered bonds it is difficult to secure complete contact between the rail and the terminal surfaces, no matter how carefully the work is done. The heat capacity of the rail is also so great that it is difficult to get it to a soldering temperature so that frequently the edges of the bond are well attached to the rail but the inner portion is not, and the expected conductivity is materially reduced. On account of the difficulties mentioned soldered bonds have fallen into disfavor.

Plastic Bonds: Plastic or amalgamated terminal bonds have been used to some extent. In this form of bond the rail and terminal surfaces are amalgamated and amalgam is placed in some form of pocket between the rail and bond and permanently held in position by the joint plate. The integrity of the connection is dependent upon the permanence of the clamping device, and experience has shown that such dependence is usually found unjustified by the results. Amalgam may be used with any type of mechanically applied bond as an aid in securing good electrical contact, and tests show that it is effective to some extent in this manner.

Pressure Type of Bond: The pressure type of bond is that in which the copper terminal is placed in a hole drilled in the rail and then in some manner pressure is applied to force the material of the terminal to expand radially and thus come into close contact with the side or wall of the hole. With this form of terminal the continued efficiency of the bond is dependent upon the two metals remaining permanently and intimately in contact. As there is no solder, bolt or other external agency to hold them, the maintenance of the contact seems to depend upon the absence of any cause tending to separate them. It has been claimed that temperature changes due to varying weather conditions will cause the copper terminal to loosen from close contact with the steel, because the copper has a higher temperature co-efficient of expansion than steel. On the other hand, it is claimed, with apparently good reason, that when the copper terminal has been subjected to pressure the distortion of the copper hardens it and it becomes elastic. The elastic properties of the copper and steel will then allow an expansion and contraction action between them sufficient to withstand the stresses caused by ordinary temperature changes.

Pin Terminal Bond: One form of the pressure terminal is the so-called pin terminal or tubular bond in which the terminal has a hole through the center into which a steel pin is driven. These bonds have the advantage of easy application without specially skilled labor. They are quickly applied and require no special tools. In Chicago this type of bond is used on the internal joints of all special work. Over 50,000 40-in. No. 00, ¾-in. terminal bonds have been used.

Compressed Terminal Bond: Another form of the pressure type is the compressed terminal. In this form longitudinal pressure is applied to a solid terminal in such a manner as to produce radial expansion of the terminal. The terminal is placed in a hole the same size as the terminal and then pressed between the jaws of a screw or hydraulic compressor. The application of this form of bond requires a more highly skilled class of labor than does the pin terminal, and is not so dependent upon a properly drilled hole in the rail, but requires proper centering of the compressor. Probably the chief difficulty with the application of this form of bond is to know how much compression to apply.

Socket Terminal Bonds: A third form of pressure terminal, which may be called a socket terminal, is that in which a hole is drilled into but not entirely through the rail, making a pocket into which the copper terminal is forced by hammering or other pressure. Often the hole has an enlargement of some form, such as a groove, made in its sides so that the copper will flow into this enlargement and the terminal will be held more rigidly, as well as having more area of contact with the steel. This form of terminal partakes of the characteristics of both the pin terminal and the compressed terminal. It is more like the former in its ease of application, and more like the latter in that some irregularity in drilling the hole is not so detrimental to a good contact.

Brazed or Welded Terminals: A brazed or welded attachment is made by the application of heat to the rail and terminal in sufficient amount to soften them so that by the application of pressure the two surfaces may be brought into very close contact and a permanent, low-resistance joint is secured. A connection of this kind made between two pieces of the same metal is a weld, but if a third metal, such as brass or solder is used to fill in between the two metals, then we have braze. Most of the commercial bonds of this type are brazed to the rail. According to the manner of applying the heat we have several forms of brazed or welded connections which may be classified as follows: (1) Arc weld—heat furnished by an electric arc. (2) Flame weld—heat furnished by oxy-acetylene flame. (3) Electric weld—heat furnished by current passing through carbon electrodes in contact with the bond terminal. (4) Copper weld—heat furnished by pouring molten copper into a mold surrounding the bond terminal.

All of these forms of welding require some special apparatus. Each form is sponsored by some manufacturer who contracts to do the work or furnishes the equipment required. They require care and skill in their application. The welding temperature is high and burning of the steel or copper must be avoided. These conditions make the cost relatively high.

WHY CROSS BONDING IS NECESSARY

If every joint on a rail was properly bonded and maintained there would be no necessity for cross bonds between the rails of a track. But bonds and joints fail, and by cross bonding the consequent bad results are minimized. In case of a double track road the two tracks should have cross bonding between them for the reason mentioned above and also because the load on the two tracks can be thus equalized. Any type of bond terminal may be used but the conductor is usually solid as it is not subject to as much vibration as the point bond. Cross bonds are spaced from five to twenty per mile of track, the spacing being the closest in large city systems. In Chicago approximately 15,000 60-in., No. 00, ¾-in. pin-terminal bonds are used, and by ordinance they must be spaced not to exceed 330 ft. apart. Between the tracks an auxiliary copper cable of at least 500,000 circ.mil is used on all straight track, and each cross bond is attached to this cable. This results in extremely good equalization of current between the tracks.

Track special work needs replacement more frequently than straight track, and to maintain the integrity of the return circuit while this is being replaced, some form of bonding around the special work is usually adopted. Also on account of the numerous joints in the special work its internal resistance is high as compared with the straight track.

The best form of bonding may be illustrated by the standards adopted by the Board of Supervising Engineers and used in Chicago. There 129-lb. rails having a copper equivalent of 1,500,000 circ.mil are used for all straight track. The four rails, together with the auxiliary cable mentioned under cross bonds, set a requirement of 6,500,000 circ.mil copper equivalent through the special work. This is secured by: (1) Using a 1,000,000-circ.mil cable through the special work for each rail, the ends of each of the four cables being electrically welded to the straight track rail beyond the last bolted joint, a total of 4,000,000 mils. (2) Each internal joint is bonded with a No. 00 pin-terminal bond, a total of 532,400 circ.mil. (3) Copper equivalent of eight 12-bolt joint plates, a total of 2,000,000 circ.mil. Over 25,000 cable welds have been made in Chicago in carrying out this plan.

TESTING OF RAIL BONDS IS A SIMPLE PROPOSITION

The testing of rail bonds is essentially measuring the resistance of the rail joint across which the bond is placed. This is commonly done by measuring the drop across the joint and comparing it with the drop over an equal length of unjointed adjacent rail. This can be done by using two voltmeters read simultaneously, which is not convenient or accurate. Usually a testing outfit is made up by having a frame with three equidistant rail contacts attached to it, these contacts being connected to the terminals of a differential voltmeter. A zero reading then indicates that a certain length of rail, usually three feet, including the joint, has a resistance just equal to the unjointed rail. In some forms of testers the third contact is movable along the rail and may be placed to secure a zero reading, in which case the length of rail having the same resistance as the joint is ascertained. Autographic readings may be made on some testers and there are in use testing cars so arranged that by running over the line the bonds may be tested and recorded automatically. The principle of operation is the same in all cases. Sometimes there is insufficient current flowing in the rail to secure reliable indications. In such an event current must be sent into the rail from an independent source, from points beyond the tester contacts.

A common error is made in assuming that a bond is defective if a test reading is secured greater than the standard. For instance, if the drop is taken over a 3-ft. length of rail, including the joint, and a 5-ft. length of unjointed rail is necessary to balance this drop, then it is often assumed that the bonded joint is defective. This does not follow at all because the test means that the resistance of the 3 ft. of rail containing the bond is greater than 3 ft. of unjointed rail. The bond may be 100 per cent perfect, but if the area of the bond is not sufficient to equal the copper equivalent of the rail such a result will always follow. A test of this kind means very little unless we compare the results of the test with those secured at the time of installation of the bond. Any increase of resistance of the joint may be due to a partial failure of the bond, or it may be due to a lessened conductance through the splice bars. The only way to ascertain what has happened to the bond itself is to test its contact, independently of the rail section.

SUMMARY AND CONCLUSION

All parts of the return circuit should be intimately connected together so that each part may be utilized to the fullest extent for carrying the load. Any high resistance in the return circuit is just as detrimental as one in the positive circuit, and it is bad engineering to neglect the returns because they are usually out of sight. Perhaps on most roads there would not be any financial advantage in bonding merely to save energy, as the loss might readily be less per annum than the fixed charges on the bonding investment. But this should be determined for each road, and it is quite feasible to work out a mathematical relationship which will indicate how much might be spent for bonding for the purpose of saving energy.

A more important reason for good bonding is to secure better voltage conditions. A large line drop will, of course, give low voltage at the motor terminals and cause loss in speed. To develop the same power in the motors increased current will be drawn from the line and this increased current will cause larger power losses in the motors and line. The peak load demand will be raised correspondingly. From no point of view are these results beneficial.

The leakage of current from grounded returns causes electrolysis of underground structures when these are so situated as to be in the leakage path. These leakage currents, of course, follow the fundamental electrical laws, and if our track construction has produced the highest practicable resistance to leakage, then our only recourse to further reduction of leakage is to make the track conductance the highest possible. This opens up a large field, and it is not the intention to discuss electrolysis problems except to point out their existence and cause and to suggest their fundamental relation to rail bonding. Any betterment in the return circuit will directly aid in the reduction of possible electrolytic damage.

Mr. Shoup on Railway Situation

Where Fare Has Been Raised Electric Railways Are Doing Well—Bus Trials Described—Railway Securities Have Large Values Behind Them

IN AN address before the San Francisco Chamber of Commerce on Jan. 12, Paul Shoup, vice-president of the Southern Pacific Railway and president of the Pacific Electric Railway, gave as the fundamental difficulty with the traction lines in the United States "the failure of the public generally, and also of the owners of the lines themselves, to realize that after all the traction line is a private industry, is simply an agent for the public in the furnishing of transportation. As such it should be looked upon as other agents would be who furnish private capital to carry on a public purpose to meet a public need. It should be entitled to protection, just as any other agency would be under like circumstances, and it should not be made the instrumentality of trying to collect other taxes—other than the tax necessary to maintain this industry as a carrier—as a means of transportation." In Mr. Shoup's opinion if the electric lines were freed from their burdens for paving, licenses, etc., it would make a very marked change in their net earnings and therefore in the values of their securities in the market.

Mr. Shoup spoke optimistically of the results on the California roads where the fare had been raised. Referring particularly to his own road, he said that in Stockton and San José the 6-cent fare had given very satisfactory results, the San José property doing better than for twenty-four or twenty-five years. The Fresno Traction Company is also doing as well as to gross and net revenue as at any time in its history, due partly to the increased prosperity of Fresno. The same situation does not prevail on the Pacific Electric Railway, but the State Commission report on how expenses might be reduced through public co-operation on that property offers hope.

Mr. Shoup spoke enthusiastically of the safety car. He said that the companies with which he was associated had had fifty in use for about a year, and were planning to buy 100 more. He also referred to experiments with installing buses as feeders on several of the properties, including Fresno and San José, but they have been failures. "So," Mr. Shoup said, "every one who believes that the jitney would succeed the electric lines may dismiss the subject or doubt from his mind at this time, so far as the present stage of development is concerned, anyway. The great difficulty is that they do not stand up under the wear and tear when you put them into the same kind of service as that which an electric car performs, and ask them to stop at every street corner to take on or let off a passenger or two, or run a hundred yards or two or three hundred yards and stop again, and we can dismiss the jitney as a serious competitor of the electric lines, provided it is subject to the same regulations by the public and made to accept the same obligations by the public that the electric lines have to accept."

Mr. Shoup said that the business of the California electric railways at the present time is very good, so far as gross earnings are concerned; the difficulty is with the net earnings. In spite of this fact, the state has raised its tax from 4 per cent to 5¼ per cent of the revenue. He believes the public sentiment in California is sympathetic with the roads and favorable to private ownership, in spite of the example which has been set by San Francisco.

Speaking of the investment side, Mr. Shoup said there were more than 3,000 miles of electric track in California, against which $155,000,000 in bonds had been issued. He estimated it would take $200,000,000 to replace the capital which had been put into the lines, and $300,000,000 to reproduce them at the present high prices of labor and materials. With these values and in view of the real estate owned by the companies and covered by the mortgages he believes that the securities are selling very cheaply today. In conclusion he said, referring to the electric railways, "There is not a cloud on the horizon which indicates that the industry is going to be wiped out. The public cannot get along without them, and it will have to take care of them."

C. E. R. A. Meets at Louisville

Principal Operating Topics Discussed Were Rail Bonds, Safety and Economy of Electrical Energy on Cars—Organization of Electric Express Company to Serve Central States Proposed—Debate on Place for Summer Meeting

THE annual meeting of the Central Electric Railway Association was held at the Seelbach Hotel, Louisville, Ky., on March 10 and 11. As usual a number of delegates made the trip to Louisville by special through electric cars from different points in the Central Electric Railway territory. The sessions of the association were set to begin at 2 p.m. on Wednesday so as to permit many of the delegates to leave their home cities on the morning of the same day.

The convention was opened by President J. F. Collins, Grand Rapids, Mich., who delivered the annual presidential address. In it, he made a plea for greater standardization of operating practices and equipment, recommended a charge for transfers to minimize their misuse and took a stand for 10-cent city fares and interurban fares equal to steam road rates. He said, in part:

> In cities where the population is 100,000 or less, tracks and special work should be of a specified weight, and in cities of a population of more than 100,000 the tracks and special work should be of a heavier type. Tongue switches should be the same in all cities, large or small. It is costly to the companies to have the present various kinds of rail, tongue switches and other special work and often, if a piece of special work becomes needed, it takes three or four months to obtain new material. In the meantime the railway company is delayed in making the needed repairs. Why not also establish a uniform rail bond for cities and another for interurbans? The block signal system used in cities where single track is installed should also be uniform throughout.
>
> A standard order board on all interurbans should also be established. The rules governing operation should be the same, except for minor changes, to fit local conditions. This should also apply to the telephone system. This would simplify the operation of interurbans where various divisions are operated under one management, as platform men could be transferred from one division to another and could take up employment with another company without difficulty. The uniforms of the platform men should be the same, as well. Trolley wire and trolley special work should also be made standard throughout.
>
> There is no doubt but that the type of cars for medium size cities should be the one-man car. The wheels, flanges and treads, and the trucks should be of one design. There is no good reason why one city should have a different type of truck than another. The manufacturers of cars and trucks would welcome the standard car. In cities of a population of 100,000 or more the type of car should also be standardized, although, on certain lines in large cities, one-man cars would be preferable. Interurban cars, as nearly as possible, should be of one particular design also. It is true that some interurban companies use a larger car than others.
>
> The entrance to the larger type of city car should be exactly the same in all cases. In some of the cities passengers enter from the rear and leave from the front and rear. In other cities, passengers enter and leave from the side of the car, and again in others passengers enter from the front and leave from the side. Why not have one standard so that passengers will always know just where to enter the car? Again, it seems that almost every city has a different system of taking on passengers. Some stop at the far crossing, some at the near crossing, others make special stops where poles are painted a certain color, etc. In my opinion, it would be to the interest of all the city railway companies to stop on the near crossing. In cities where the skip-stop system is used, enamel signs should be hung on the span wires reading: "Cars stop here." Under present conditions, transients when arriving in a city must learn from a policeman or some citizen as to where to board a trolley car.
>
> It seems that most managers of city railway properties pay very little attention as to how transfers are handled. In a great many of the cities in which I have had occasion to examine the transfer system, I have found pads of transfers in such places as the stoves during the summer season and in sand boxes and under the seats in the winter season. I have also found that conductors are allowed to help themselves to transfers in the dispatcher's office. You will often hear railway managers say that transfers have no value when they are not registered. Of course this is not a fact. Transfers have a value. I am a strong advocate of charging passengers for transfers, either 1 cent or 2 cents, as the case may be, thus giving transfers a greater value than at the present time. I also recommend a closer check on the dispatchers and conductors in the matter of handling transfers. There should also be a close supervision of duplex tickets issued.
>
> During the Government's control of the railroads, the interurban lines have been a clearing house in the matter of freight and ticket agents for the steam railroads. Therefore, it has become necessary on a good many interurban divisions to break in many new men and to employ what is known as traveling ticket and freight agents for the purpose of instructing the new agents as to their duties. It was also found necessary to increase the number of traveling auditors to check the stations more frequently. The method of employing traveling freight and ticket agents and having the stations checked more frequently has met with considerable success and I heartily recommend this system as reducing the number of shortages to a minimum.
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> I also heartily indorse the further development of through freight service to all member companies, within the Central Electric Railway Association territory, as well as the establishing of complete express service within the territory of the association.
>
> With the increase in costs of material and labor that the city and interurban lines are compelled to meet, it is going to be necessary that all city lines charge 10 cents per ride, it being a fact that money is worth only one-half of pre-war values. The interurban lines should charge per mile the same as steam roads. I predict in the near future a 4-cent-per-mile rate per passenger, and a 25 per cent increase in freight rates.
>
> There never has been any good reason why interurban lines should not charge the same rate as the steam lines. With their frequent service and delivery of passengers in the down-town districts, they would handle the same volume of business as at present with the lower rate. This has been demonstrated, because, before the war, the steam roads and electric lines both charged 2 cents, and when the steam roads went to a 3-cent fare their business did not suffer.

ASSOCIATION CONSIDERS OPERATING TOPICS

The principal technical topic considered at the Wednesday afternoon session was that of rail bonding, as presented in a well-received paper by Ralph H. Rice, principal assistant engineer Board of Supervising Engineers, Chicago Traction. This paper, which is published in abstract in this issue, was followed by prepared discussions by M. B. Lambert and J. S. Hagan of the Westinghouse Electric & Manufacturing Company, Ralph W. Palmer of the General Electric Company, E. W. Rowland of the Ohio Brass Company, and R. J. Custer, Interstate Public Service Company, Indianapolis. Abstracts of the papers by Messrs. Rowland and Palmer are printed in this issue; those of the others presented will be printed later.

At the end of this discussion, the report of the committee on express service was presented. H. A. Nicholl, Anderson, Ind., chairman of the committee, told of the work it had done in developing the possibilities and considering the advisability of organizing an electric railway express company with some such title as the American Electric Railway Express Company. He said that a majority of the companies of the Central Electric Traffic Association were in favor of such a plan and that it offered a greater opportunity for the electric railways to increase their earnings than any other character of transportation service. The committee is now sending out a questionnaire to member companies to ascertain how much business can be expected from manufacturers and other shippers from the territory served by each road. An effort is also being made to estimate how much capital will be required to establish and handle the business such as that involved in the purchase of motor trucks for pick-up and delivery service, the building of terminals and for additional rolling stock, etc. This report, Mr. Nicholl said, should be considered as constituting simply a progress report. Mr. Nicholl added that the committee hoped to have a complete report ready for the summer meeting.

Harry Reid, Louisville, Ky., then brought up the plan of the National Safety Council for nationalizing and standardizing the accident prevention work of the electric railways and introduced James Harmon, safety engineer Interstate Public Service Company, to speak further on the subject. After a brief address Mr. Harmon offered a resolution that a committee be appointed to work with similar committees from other electric railway associations and the Council in formulating a plan for promoting safety work more consistently and forcefully.

This resolution was adopted and President Collins said he would appoint the committee at the Thursday session.

Next Meeting Place—Election of Officers—Banquet

A lively discussion followed the announcement that the executive committee, at its meeting Wednesday morning, had decided to hold the summer meeting at the Ottawa Beach Hotel, Macatawa Park, Mich., and not to have the popular and customary boat trip. The delegates seemed loath to substitute anything for the Great Lakes boat trip, though someone did make the suggestion that the boat be routed mainly through Canadian waters. Charles L. Henry admonished the members to consider the best interests of the association rather than the pleasure of the outing as the primary purpose of the meeting, but a motion was passed requesting the Executive Committee to reconsider its decision at the March 11 session of the committee.

The nominating committee of which F. D. Carpenter, Lima, Ohio, was chairman, then presented the following recommendations for officers for the ensuing year and the secretary was instructed to cast the unanimous ballot of the association electing them:

President, Robert I. Todd, Indianapolis.

First vice-president, A. C. Blinn, Akron.

Second vice-president, E. J. Burdick, Detroit.

Members of the Executive Committee: F. D. Carpenter, Lima; Charles L. Henry, Indianapolis; H. A. Nicholl, Anderson; S. W. Greenland, Ft. Wayne; G. T. Seely, Youngstown; W. S. Rodger, Detroit; F. W. Coen, Cleveland; J. F. Collins, Grand Rapids; Harry Reid, Louisville; C. B. Kleinhaus, Toledo; L. G. Parker and H. E. Rasmussen.

The annual banquet Wednesday evening was attended by two hundred. President Collins acted as toastmaster and Ex-Judge Arthur Peter, Louisville, made a short address about "Other Days."

Secretary and Treasurer's Report

At the session of the association on Thursday morning Secretary-Treasurer Nereamer presented his annual report. An abstract follows:

The interurban railway membership of the association, as shown in the report for 1918, consisted of 63 lines operating 4,814 miles and two city lines. During the past year there have been several changes in the interurban lines, such as consolidations and separations, which leaves the net result of membership in this association sixty-four lines and 4,364 miles, with two city lines, an increase of one line and 50 miles.

During the year 1919 we had 155 supply members as against 126 in 1918. This is an increase of 29 members.

The receipts and disbursements for the year 1919, both totalling $9,398.97, are as follows:

Receipts:	
Cash on hand, Jan. 1, 1919	$962.12
Interurban lines	4,962.51
City lines	200.00
Supply members	1,550.00
Sale of buttons	20.00
Central Electric Traffic Association	1,084.25
Central Electric Railway Accountants' Association	12.40
Sale military efficiency and defense maps	87.20
Annual dinner	45.95
Returned by Summer Trip Committee	182.38
Fall meeting dinner	12.75
Interest	278.41
Disbursements:	
Pay roll	$4,320.00
Traveling expenses	531.52
Stationery and printing	1,840.16
Boat trip, advertising, etc	361.53
Postage	162.43
Telephone and telegraph	88.04
Central Electric Traffic Association, miscellaneous	50.32
Central Electric Railway Accountants' Association, miscellaneous	15.00
Office fixtures and incidentals	27.00
Freight and express	3.73
Office rent	840.00
Legal expense	35.00
Investments	500.00
Annual dinner	9.30
Taxes and insurance	5.00
Cash on deposit	609.94

It will be noted from this statement that the cost of all material used by the association has greatly increased, while the operating expenses of the association remain the same as the preceding year. There was expended by the committee in charge of the summer meeting $361.53 on account of expenses incidental to the boat trip.

The only investment during the past year was the purchase of $500 of Victory Loan bonds.

A statement of the expenses of the Central Electric Railway Accountants' Association follows:

Total expenses for the year		$196.70
Received from sale of pamphlets	$3.40	
Dues at $5 per annum from two lines not members of the Central Electric Railway Association	10.00	13.40
		$183.30

As an explanation to the item covering Stationery and Printing and the Miscellaneous charge against the Central Electric Traffic Association, a statement is submitted herewith of the receipts and expenses of that association for the year 1919:

Received from sale of tariffs	$1,084.25	
Traveling expenses		97.70
Stationery and printing		913.48
Postage		25.00
Telegraph and telephone		15.49
Freight and express		9.83
Legal expense		35.00
Dues from member companies	82.67	
Surplus		70.42
	$1,166.92	$1,166.92

A statement of the current assets and liabilities of the association for the year just ended follows:

Current Assets:			
Cash on deposit		$609.94	
Investments: Liberty bonds	$2,000.00		
Investments: Railroadmen's Building & Savings Ass'n.	3,046.40	5,046.40	
Due from members		153.80	
Liabilities			$0,000.00
Balance			5,810.14
		$5,810.14	$5,810.14

Your attention is called to the fact that the financial status of this association is the best that it has been since its organization, and this result has only been achieved by carefully watching every cent that has been spent for any purpose whatever. No unnecessary supplies have been purchased through the secretary's office. If the present prices of paper and cost of printing are kept up, the next showing, a year hence, will not be as good as it is now. We have arrived at a place where the continued advance in everything we use will, during the coming year, eat into our surplus unless the income of the association is greatly increased in some manner. The work in the secretary's office has been increasing from time to time, and from present appearances it will probably be necessary to have additional help before another year is ended. This, of course, will call for more income from the members or the use of the permanent investment.

In closing, your secretary and treasurer desires to thank the officers, committees and members for the assistance given him in the discharge of his duties durng the year just past.

A report of the technical sessions on Thursday will appear in a later issue.

Types of Rail Bonds*

By R. W. Palmer

Railway Supply Department General Electric Company, Schenectady, N. Y.

Rail bonds may be divided into two groups: Those for the head of the rail and those for the web or base of the rail.

U-shaped bonds for attachment to the head of the rail were originally soldered. These were followed by different forms of stud terminal bonds mechanically attached to the rail head, but both forms have given way almost entirely to welded or brazed types of bonds, due to the rapid advances made in the art of welding by oxyacetylene and the electric arc.

The facility with which these bonds can be applied is sometimes misleading, as regards actual economy. In other words, there is a tendency to put too much stress on the first cost of short bonds with the idea that it is cheaper to replace them, due to one cause or another, than it is to adopt a longer and more expensive bond in the first place. Unfortunately, the length of bonds for the head of the rail has become fixed, or almost so, by competition between manufacturers, at 7½ in. and smaller, with a capacity usually of No. 0000, although roadway conditions vary to a considerable degree. Therefore, regardless of the manner in which the bonds are attached at their terminals, the same length of bond will have a long or short life, due to rail joint movement, depending upon the conditions found on any particular property. Yet this very important point of length of bond is often completely ignored by the railway man when it comes to comparing one manufacturer's price with another.

Before discussing the merits of welded types of bonds, it will be well to consider briefly the selection of bonds in the second group, or those for other parts of the rail than the head. In this classification we have the well-known "concealed" types of bonds which are installed under the splice bar, also the long bonds installed outside of or around the splice bar. The concealed type of bond is widely used and has about as many advantages as disadvantages. Undoubtedly, the simplest way to apply the concealed bond is by mechanical means, with compressed type or pin type of terminal, in holes drilled in the rail web. Such bonds have been welded only to a very limited extent, and the advisability of welding them to the web is still an open question, for the reason that the spot welding of rail webs in so far as it contributes to rail fractures is a matter which still gives many engineers concern. Moreover, it is difficult to design terminals which are suitable in shape for welding and at the same time will fit beneath the splice bar. The chief consideration, where concealed bonds are used, is the matter of space available. Too often the bond takes up all the space in a new joint, so that when the splice bars wear and are drawn in, the bonds are crushed. The space which dictates the size and forms of bond is that under a worn-out splice bar.

The long bond applied outside of and around the splice bar is easily attached by the various welding methods and is undoubtedly superior to other types where the bonds are not exposed and subject to theft. This form of bond has been used for a number of years both in the solid conductor and the stranded type. With this type of bond, it should be remembered, the cost to the railway is not exactly proportioned to the length of the bond. The principal expense in making this bond is the terminals, so that the cost of a bond installed does not increase in proportion to the length of the bond, and we urge that this point receive careful consideration.

Bonds Must Be Installed Properly

Of equal importance to the selection of bonds is the selection and training of men to install them properly. Many bond failures can be traced to improper installation, the work often being intrusted to track laborers or others who have no conception of the importance of the work they have in hand. This point was brought forcibly to the writer's attention while rebonding an interurban property because of excessive drop in the return circuit. In going over the track we found a number of joints which tested open, indicating that the bond was either broken or missing entirely, but when the angle plate was taken off the bond was seemingly in as perfect condition as when installed, a number of years previous. Further examination, however, showed that the terminals as well as the holes in the rail were badly corroded, indicating that the holes had been drilled too large for the size of the terminals used.

To secure the best results with expanded terminal bonds, the terminals should be accurately milled to size and the holes in the rails reamed at the time of installation to give a snug fit. It is also important that the bond terminals should be properly cleaned, after which the contact surfaces should not be touched with the hands. This precaution is necessary to prevent corrosion. Providing the bond terminals are properly expanded after these precautions are taken a very satisfactory contact can be formed and maintained during the life of the bond. The same degree of care should be exercised in connection with the installation of acetylene or arc welded bonds.

Welded Bonds

The welding of bonds with the electric arc and the oxyacetylene flame is such an improvement over other methods that it is receiving the favorable consideration of railway engineers everywhere. Welded bonds are of three kinds, those for gas or flame welding, for metallic arc welding and for carbon arc welding. Only the flame weld and metallic arc weld types will be discussed here.

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*Abstract of paper presented at annual meeting of Central Electric Railway Association, Louisville, Ky., March 10, 1920.

Flameweld bonds are made with drop forged all copper terminals and with various kinds of steel terminals mechanically attached to copper conductors. The nature of the gas welding process precludes the necessity of having forged copper terminals welded to the conductors at the factory, and this type is very little used now. The steel terminal bonds are considerably cheaper and are equally as good when properly installed, but a little more care is required when they are applied to insure all of the wires being welded together. When flameweld bonds are applied it is not necessary to grind the rail, though the surface of the rail should be coated with flux metal before the bonds are placed in position to weld. This practice insures a thorough union between the rail and the flux metal. At the same time the oxide is removed from the rail surface by the flame.

Pure copper, when used as the attaching metal with the gas flame, does not give good results. Molten copper has a very strong affinity for oxygen, and when used with the gas flame a very porous and brittle metal structure of low mechanical strength and poor conductivity results. The flux wire which we furnish and recommend is a phosphor bronze wire containing a fair percentage of tin. Phosphorus is a deoxidizer and serves as the fluxing agent. The composition is important, as all phosphor bronze wires do not give like results in gas welding.

The resistance of flameweld bonds is about 5 per cent less than that of a perfectly installed double stud or twin terminal bond, and is about equal to that of a brazed bond. Compared with the steel welding, arcweld bond resistance is about 15 per cent less. Therefore, electrically, the flameweld bond is as good, if not better, than the best. Mechanically, it is very strong.

The weld is a simple one to make, and the speed of installation compares favorably with all other types of heat applied bonds. One man and a helper, if expert, will easily install eighty bonds in a ten-hour day. The apparatus is readily portable, and in localities where a supply of gas can be maintained readily, these bonds are worthy of thoughtful consideration.

The steel-faced arcweld bond is the latest development and is meeting with much favor. This type of bond has a steel face welded to a drop forged copper terminal at the factory. This is a forward step in the problem of bonding, for the reason that the old difficulty of attaching copper to steel by some satisfactory means is done at the factory, thus leaving a steel to steel weld to be made in the field. This simplifies the matter, for this kind of welding is common.

To obtain the best results when arcweld bonds are installed, the spot on the rail adjacent to the bond should be carefully cleaned, and all rust, dirt or annealing scale removed. This work can be accomplished with the use of an old file and a steel wire brush. After the rail is prepared the bond should be clamped or held in position and the arc started at the lower edge or bottom angle formed between the terminal and the rail. The operator should carry the arc across the entire length of the terminal if possible without breaking the arc so that the first layer of deposited metal will make a firm union between bond and rail. Before applying the next layer, the operator should use a steel wire brush to remove any surface oxide which may form on top. During the process of welding the operator should hold his electrode at such an angle that for the greater part of his time he will be devoting his efforts toward the rail, inasmuch as the rail being a larger mass of metal than the bond it will require more heat to insure good penetration.

With arcweld bonds, it has been found that the best results can be obtained by using 125 to 130 amp. at a voltage of approximately 20, this being the average voltage required for successful welding with the metallic electrode.

The arcweld bond is now made in two general types: The familiar U-shape for the head of the rail, and a long flexible type for spanning the splice bars. The U-shaped bonds are furnished with round wire strand or with flat wire, and the flexible bonds in two designs of terminal, for attachment either to the rail web or to the rail base.

EQUIPMENT FOR BOND INSTALLATION

So far, the question of electrodes for bonding has not received as close attention as its importance deserves. Naturally, the deposited metal should be as homogeneous as possible, so as to provide the maximum conductivity for the steel. A very pure wire of high conductivity before welding is not necessarily the best after welding, as the composition undergoes a change in the arc. The desired result differs from that of most steel welds where strength is the prime consideration.

The polarity of the electrode is a much mooted subject. Good welds are obtained both ways and with the alternating current arc. It is safe to say, however, that the positive electrode acts differently from the negative electrode, and the welder has to become accustomed to handling the arc with either polarity before good welds can be made.

This brings us to the point of equipments for installing the bonds. The most popular type at present is the resistance welder, commonly called a resistor. In spite of the fact that the power wastage is large with the resistors, they meet with favor because of their inherent reliability and low cost of maintenance. The first cost is low, and they are readily portable, the wire type for 600 volts weighing as little as 80 lb. Aside from the fact that it is necessary for the electrode to be positive with this type apparatus, the high voltage permits a long arc to be held, and it is generally conceded that a long arc is conducive to poor welds. Consequently, due to what might be termed the elasticity of the arc, there is generally a lack of uniformity with the welds made with these machines.

A low-voltage rotary outfit is conceded to be the best for uniformly good welds, but a motor-generator set has the great disadvantage of weight, single operator sets weighing close to 1,000 lb. This is not at all convenient to move from joint to joint. The dynamotor is the lightest type rotary machine for the purpose, and offers the most attractive proposition both from first cost and weight standpoints.

In conclusion, I will point out the chief features of our arcweld bonds: The steel welding face is in plate form, and the copper in the terminal is directly welded to it. In the manufacture, no intermediate metal is used to join the steel and copper together, both metals being directly joined while their surfaces are in a state of fusion. No matter how hot an arc is used on the steel face, the copper will not separate from it. This is very important because it is necessary to raise the bond terminal to a high temperature to insure a weld between the electrode and the steel face.

You may wonder why we go to the expense of applying the steel welding face, instead of using a plain copper terminal. If the problem was simply one of welding two pieces of copper together, we could do that, but when we try to weld steel and copper together, using either a steel or copper electrode, it is not successful because of the different thermal conductivities of the two metals. Unless the copper bond is preheated (and this is not feasible), it is doubtful if any electrode will be developed which will do this.

The cost of installing any particular type of bonds, having terminals welded to the rails, will vary with the cost of labor, current and conditions under which the work is done. Therefore, it is impossible to give any figures which might apply generally.

The only data which we have as to the number of bonds which can be installed in a given time are for some No. 00–26-in. arcweld bonds, applied to the base of 40-lb. rails in coal mines. Here the current for bonding was supplied from a motor-generator set mounted on a small car coupled to a mining locomotive, and a crew of three men was used. One prepared the rail and the other two took turns at welding and operating the locomotive, the other acting as helper. With this outfit an average of twelve bonds per hour were installed, and the man in charge of the work established a record of applying twenty-four bonds in fifty-five minutes. Taking into consideration the time required in moving the equipment from place to place and the difficulties encountered in doing this class of work in the mines, it is believed that the results obtained were very satisfactory.

It might be well to state that the bonding was done after the mines had ceased work for the day, so that no interference was encountered due to operation of hauling locomotives.

Which Type of Bond Is Best?*

By Ernest W. Rowland
Bond Engineer, The Ohio Brass Company, Mansfield, Ohio.

On some properties the rail bonding work falls to the way department, on others the line department is responsible, while on still others each of these departments seems to switch the work off on the other to the detriment of bonding generally.

Basically track bonding is one of the most important phases of railway work. So much depends on it that it seems surprising that more attention is not paid to it. For example, consider a few of the evils that are directly traceable to poor bonding. First there is electrolysis; next in line is loss in power; next loss of voltage; then baked armatures and fields on motors, broken rails due to arcing at the joints and other effects too numerous to mention here.

As to the loss in voltage, there is probably nothing more irritating to a rider than to be compelled to sit in a car late at night with the light varying anywhere from a very dull red to utmost brilliancy. Some of this can be traced to lack of positive feeders, but most of it is due to poor bonding. And baking of armatures is an important item from a financial standpoint alone.

Comparatively speaking it is an inexpensive proposition to bond a line thoroughly. In fact a good bond can be installed for less than a dollar a joint, and when one considers the waste caused by poor bonding this cost fades into insignificance.

Recently an article appeared in one of the railway papers regarding the breaking of rails due to the arcing at the joints where bonds were broken. The author remarked that under normal conditions such joints would break in from six months to two years. His time interval is, I believe, too short, but such action does occur within from three to five years and often less. Which, then, is cheaper; to spend a dollar for a good bond which will last from eight to ten years, or to renew a rail that is burnt out every five years?

Loss in power is another important item, especially when the railway company is buying its power. An instance that came under my observation recently will illustrate this point. A certain railway in the East had one substation which was overloaded about 50 per cent of the time; so badly overloaded that the engineer in charge decided that he would have to put in additional rotaries. But before proceeding to do this he rebonded the track leading past the station and buried some old rail in the street as a supplemental negative feeder. When he had completed this work he found that he had so reduced the load on the station that it was unnecessary to install additional rotary capacity.

The foregoing leads us into a discussion of track bonding generally. For convenience all bonds may be grouped into two classes; those mechanically applied and those heat applied. The mechanically-applied bonds include the pin and compressed-terminal types; also channel pins, about which the less said the better.

As far as the pin and compressed-terminal types are concerned, there are at present no better bonds made, provided they are installed properly, but there, unfortunately, is the rub. It is fairly safe to say that on the average railway property 90 per cent of the men doing the actual work do not do it properly. And yet, if the men have been taught to do the work properly either one of these types cannot be excelled for new work. But they have their limitations. When it comes to renewing them the cost is almost prohibitive. Then, too, few of the workmen install the bonds properly. It is necessary to exercise a few precautions to make the bond effective. Water must be kept away from the bond terminal. Drills should be ground by an expert. It is well also to paint the terminal after installation.

Under existing conditions it is often easier to break a man in to install a welded bond than to train him for installing the pin and compressed-terminal types which are apparently so easy to install that it is not considered necessary to have one man do the work all the time. Hence the normal precautions are not taken. With a welded bond it is necessary to have one man who can do the work. In both the gas and arc welded types a small amount of instruction is generally all that is necessary to enable a man to install the proper type of bond. And it is a very simple matter to check the operator in his welding, because a hammer will test the welds in a perfectly satisfactory manner. On the mechanically-applied bonds the tests are electrical.

As to the relative advantages of gas- and arc-weld bonds, it is necessary for the individual to choose which is the more applicable to his property. Those properties which are distant from service stations have difficulty in getting gas, so that they have been more inclined of late to swing over to the arc weld. The arc weld bond probably requires a little more expertness in its application, but even on the smallest road these difficulties are not insurmountable.

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As to the heat effect of the gas or arc on the rail, while there is a slight hardening effect due to both the processes, I can say, after experience of four years with the gas-weld bond, involving the installation of thousands of bonds of the gas-weld type, I have yet to see an authentic case of breakage due to the welding. Other bonding men report the same experience.

USE OF THE ARC WELDING PROCESS IN ELIMINATING BONDING DIFFICULTIES

Some companies have gone into the arc welding of rail joints within the last few years in order to overcome the difficulties attendant upon bonding. This has apparently worked very satisfactorily, but it might be well to "make haste slowly" here. After all the only test is that of time, and the time interval since the adoption of this type of joint is comparatively short. It would appear that the stress on the small welded surface would be so heavy as eventually to break the weld. This would involve more than the weld, because it would mean the renewing of a rail. This is especially true on an interurban road, where the expansion and contraction of the rails imposes an added hazard.

After all, the cheapest plan in the long run is the ordinary joint, kept tight, with a good bond, either a properly installed mechanically-applied bond or a welded bond. It would appear from conditions generally that of the two the welded bond is the better, and yet it is possible to make a mistake even in this type.

In purchasing a welded bond, either arc or gas, it is well to be sure that at least a 90-deg. scarf is presented. If an acute-angle scarf is formed on the welding surface, vastly more expert work is required in welding than when the operator has at least a right angle to work on. Again, there is a minimum effective limit to the length of a bond. Vibration tests have shown that 7 in. is probably the shortest practicable length. Below this length the breakage due to vibration increases enormously.

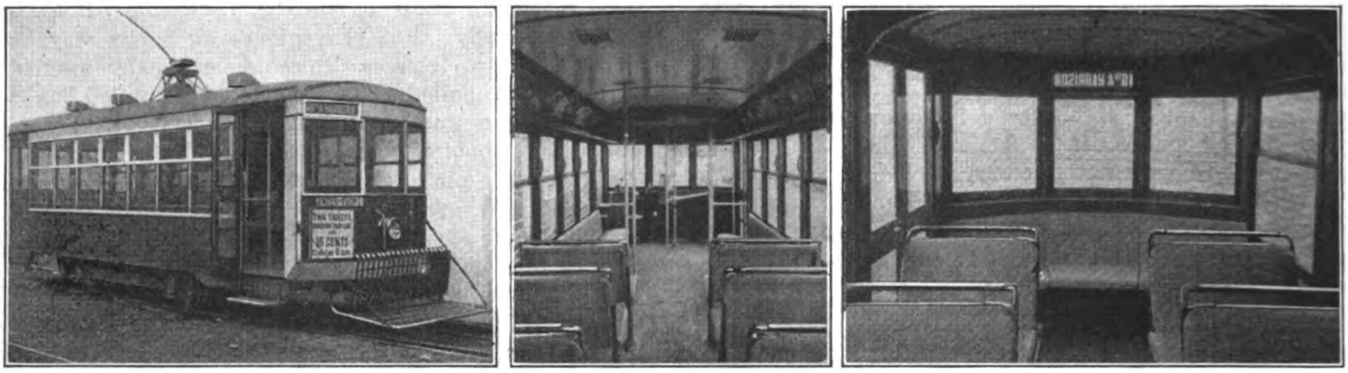
While undoubtedly the shorter the bond the less the resistance, the fact that there is a limit to the mechanical efficiency of the bond compels the manufacturer to forego the advantages of the lower resistance in order that he may produce a bond that is superior mechanically.

There has been a great deal of argument presented as to the relative advantages of the ribbon-type as against the cable-type bond. Tests seem conclusively to demonstrate that, all other things being equal, the cable-type bond has a longer life than one constructed of ribbons.

First of New Safety Cars Arrive in Kansas City

HEREWITH are shown the first pictures of the latest one-man safety cars used by the Kansas City Railways. In them can be seen the results of some of the changes from the "standard" Birney car which P. J. Kealy, president of the Kansas City company, was convinced would add materially to the appearance, comfort and durability of the cars and enhance their popularity with the riding public. These changes have been quite fully described in articles which have appeared in ELECTRIC RAILWAY JOURNAL, one by Mr. Kealy on page 31 of the special report issue dated Oct. 11, 1919, and one on page 998, issue of Dec. 20, 1919. The front-end loading well and stanchions, the headlining and side sheathing, the cushioned seats, and the strengthening of truck and underframe, are among the more important features. The complete car pictured above tipped the scales at the railway company's shop at 14,200 lb. and the weight of the similar double-end safety car is 16,400 lb.

The first cars used were of standard construction and had a seating capacity of thirty-five passengers. Twenty-eight of these were fitted with fourteen of the cross seats, six on two three-passenger longitudinal seats and one on a one-passenger seat in the rear. This seating arrangement provided for a 22-in. aisle space and practically no standing room except in the aisle.



NEW KANSAS CITY SAFETY CAR
At left, exterior; in center, interior, showing space for standing passengers; at right, rear seating arrangement.

The cars of the latest type illustrated have a seat across the rear which accommodates five passengers. There are ten cross seats and two longitudinal seats in front with a total seating capacity of thirty-four. It is thus seen that by sacrificing one passenger seat there has been gained a standing capacity of approximately 8 ft. between the front row of cross seats and the motorman's railing.

In a recent issue the *Railway Review* gives some data for electric operation at the Philadelphia terminal of the Pennsylvania Railroad, where two lines are electrified, one from Philadelphia to Paoli, and the other from Philadelphia to Chestnut Hill. The combined car mileage of the two lines for one month last summer went as high as 252,216, with five detentions totaling 14 min., although the average mileage was somewhat less than this, and the average number and duration of detentions somewhat more. Of the total car-mileage the Chestnut Hill line was credited with about one-quarter early in its operation, but at present it has grown to about one-third.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Coast Division Electrified

Milwaukee Replaces Steam With Electricity on 207-Mile Division Into Seattle and Tacoma

When the Olympian, the overland limited of the Chicago, Milwaukee & St. Paul Railroad, pulled out of Seattle and Tacoma for Chicago on March 5, operation of the coast division of the Milwaukee lines by electricity was started. The electrification of the coast division adds 207.4 miles to the 440 miles previously electrified in Montana on the Rocky Mountain and Missoula divisions, making a total of 647.4 miles of the lines of the Milwaukee now operated electrically.

ONE GAP STILL OPEN

The coast division just opened extends from Othello, in central Washington, to the shops in Tacoma on the Puget Sound end. The Montana electrification extends from Harlowton in the east to Avery, Idaho, on the west. Between Avery and Othello is a stretch of 212 miles yet to be electrified. When that gap is closed the Milwaukee will be operating passenger and freight service with electric motive power over 860 miles of its western lines.

All of the electric current used in the operation of these trains is generated from water power. Substitution of water power for steam, by the generation of hydro-electric energy, on the entire 860 miles means a saving in fuel which, based on the business of 1918, will be approximately 300,000 tons of coal and 40,000,000 gallons of fuel oil annually.

The power for the coast division is taken from the hydro-electric plants of the Puget Sound Traction, Light & Power Company on the west and from the Long Lake plant of the Washington Water Power Company on the Spokane River. The Puget Sound Company has three large generating stations on streams of the west side of the Cascade mountains. White River and Puyallup River are two of the sources of this power. These streams are fed by the glaciers of Mount Rainier. The third plant is on the Snoqualmie, utilizing the picturesque falls of that name, a sheer drop of 268 ft. over a basalt precipice.

TRANSMISSION LINES LINKED

The plant at White River, the plant at Electron on the Puyallup River and the two plants at Snoqualmie Falls are interconnected and are in reality one huge generating machine of 114,533 hp. In addition the Puget Sound Traction, Light & Power Company has an auxiliary steam plant capacity of some 45,000 hp., making a total of approximately 160,000 hp. available at the western end of the Milwaukee system. This system of tied in plants on the west side is in turn interconnected with a similar system of like capacity on the east side of the Cascade mountains. So on the day the switch was closed connecting Snoqualmie and Long Lake there were tied into one system some 1,500 miles of transmission lines serving some 30,000 square miles of territory.

Power furnished to the Milwaukee lines from the Snoqualmie plant at the west end near Seattle, and from the Long Lake plant on the Spokane River is delivered to the railroad's transmission lines at 100,000 volts. There are eight substations between Othello and Tacoma in which the high tension alternating current is stepped down to 3,000 volts direct current for use on the motors of the locomotives. This 3,000 volt current is carried over the rails by overhead trolley wires.

FIRST ELECTRIC OPERATION IN 1915

The first electrification of the Chicago, Milwaukee & St. Paul lines was completed and put into operation in December, 1915. It was the Rocky Mountain division of 226 miles. The locomotives on this section had been burning coal. The following year the Missoula division of 211 miles was placed under electrical operation. This division had been operated with oil burning engines. Oil was used on the newly-electrified coast division.

River Tunnels Ready for Service

John H. Delaney, Transit Construction Commissioner in New York City, has announced that two new tunnels under the East River will probably be opened to traffic in April.

One of these is the tunnel from Whitehall Street, Manhattan, to Montague Street, Brooklyn, and the other extends from Sixtieth Street, Manhattan.

The reconstructed Brighton Beach and Culver lines can be routed through the tube from Montague Street so as to carry passengers from outlying sections of Brooklyn under Broadway, Manhattan, and as far north in that borough as Sixtieth Street.

Practically all of the track work in the Broadway-Fourth Avenue tunnel from Sixtieth Street, Manhattan, to Queensboro Plaza, Long Island City, has been finished and will be ready for train service about April 15.

As soon as the special track work at Queensboro Plaza is completed under-river service can be instituted by the Brooklyn Rapid Transit System.

Out of the East

Manager of Shanghai Tramways, on His Way to London, Studies American Lines

Donald McColl, general manager of the Shanghai (China) Tramway Undertaking, passed through New York last week on his way to London, where he will confer with the English interests that control the line in Shanghai. Mr. McColl has been in Shanghai for eleven years. He took charge soon after the line was opened. Previous to that he had been connected in turn with the Glasgow (Scotland) lines, the Lisbon (Portugal) Tramway and the London Underground.

7,000,000 PASSENGERS A MILE

On taking charge in Shanghai Mr. McColl had to contend with a depreciated Chinese copper currency, but so successfully did he do this that the shares of the company have steadily risen in value from £5 to more than £20. He is a strong advocate of the zone system and low fares for short stages. He says that he handles in Shanghai 7,000,000 passengers per mile of road per annum. He has found trailer operation very successful. He long since saw the value of the light weight car.

Mr. McColl came across the United States from Seattle. On his way he stopped off in a number of cities to study city railway operation. He believes the city of Seattle is making a heroic effort with its municipal railway, but is of the opinion that many things still remain to be done there before the system is fully brought to meet the possibilities which exist there for the development of the riding habit.

Mr. McColl was particularly impressed with the work that T. E. Mitten is doing in Philadelphia. He found the property there in very good physical condition. He said that Mr. Mitten was doing a really big, constructive work by his development of the idea of selling rides as merchandise.

NOT AFFECTED BY WAR

Questioned about his own problems, Mr. McColl said that he was not seriously hampered by the war. At the outbreak of hostilities he quickly ordered material and supplies ahead for about three years. By exercising a little mechanical ingenuity here and there he had been able to keep the road well up to standard.

It is his opinion that excellent opportunities exist elsewhere in China than Shanghai for the installation of electric traction with a comparatively free field to such capital as cares to go a long way from home to seek investment.

Toledo Settlement Delayed

Changes in Proposed Grant Make Settlement Measure Impossible of Adoption, According to Mr. Doherty

In the rush to get the proposed cost-of-service ordinance for a settlement of the railway problem at Toledo, Ohio, before the Council for preliminary action, a mass of hopeless difficulties has entered into the fight which will delay the submission of the plan to the voters till Aug. 10, at least. The negotiations have been further complicated by the injection of the wage dispute and possibility of higher fares into the franchise tangle.

LAST-MINUTE MODIFICATIONS

The commission appointed by Federal Judge John M. Killits to prepare a cost-of-service plan, in its final meetings, added a few more provisions to the ordinance which had previously been made public. In addition to the feature of a premium for economical operation added to the measure last week, the commissioners inserted two more clauses into the ordinance which relate to the purchase of power by the new Toledo Street Railway, created by the ordinance, and the conditions under which the ordinance, if ever made operative, may be forfeited.

The power section provides that the contract for current shall run between the Toledo Street Railway and the Acme Power Company, which now supplies current to the Toledo Railways & Light Company, which then retails to consumers. The idea of this change in the contract form of the ordinance is to limit the Doherty interests to a single profit for electric power.

The forfeiture provision gives Council the power to declare the whole contract void if the courts declare any one of the following five salient points of the measure invalid:

1. The schedule of rates of fare.
2. Valuation of the property of the Toledo Railways & Light Company.
3. City control of service.
4. City's right to inspect the books and accounts of the company at all times.
5. The right of the city to buy the property by direct purchase or condemnation.

In the event one or more of these parts of the ordinance are contested by the company and held by a court to be invalid, then it is provided that Council has the right to declare forfeiture of the entire franchise grant, subject to the charter right of referendum. The company, however, is given no such contesting right.

TRANSPORTATION ENGINEER PROPOSED

In the event the city sinking fund trustees are held by a court as not eligible to hold amortization funds of the company a provision has been added giving Council the right to select some bank or trust company as trustee. And in case it is decided that it is illegal to invest funds in stock of the company there is a provision allowing investment in other standard securities.

If the creation of the office of transportation commissioner is illegal it has been provided that the city can place his duties with other city officials.

With these corrections and with the insertion of the city's valuation figures—$7,111,336—the ordinance was sent to the printer and offered to Judge Killits to be submitted to Council. The judge has consented to give the company additional time to make objections to the new ordinance and he has also asked the commissioners to modify the ordinance in keeping with these suggestions if made in writing before April 3.

The final ordinance will then be handed to Judge Killits, on April 24, after which it will be submitted to Council and later to the voters.

The Council at its meeting March 8 passed a resolution in which it joined with Judge Killits in the extension of time for the purpose of getting written objections and remedies from the company.

MR. DOHERTY OBJECTS

Henry L. Doherty, in a telegram to the commissioners, declared, "What purports to be the final draft contains several provisions which would make it impossible for us to accept the ordinance." This indicates that Mr. Doherty will insist on several changes in the measure as it now stands. Mr. Doherty also referred to the ordinance as "hopeless." He said that legal talent would advise against the purchase of securities as unsafe, that new attorneys couldn't understand the ordinance, that he couldn't accept it in its present form, that the city couldn't afford to do so either, that sections of the draft are in conflict and that it is unworkable. Mr. Doherty suggested submitting the whole matter to a legal specialist as a referee.

The franchise matter was further clouded when Mr. Doherty and Frank R. Coates, president of the Toledo Railways & Light Company, in conference at New York, opened the proposals for wage increases filed by representatives of union labor. The Brotherhood of Electrical Workers demand $1.12½ an hour for foremen of linemen, $1 an hour for linemen, 75 cents an hour for groundmen and emergency track repairers, and 65 cents an hour for chauffeurs and drivers. The Amalgamated Association demands 70 cents an hour for all men having been one year in service and an increase generally of about 40 per cent for all other employees.

Mr. Doherty declared that these demands would mean an increase in railway fares. He said:

> The increased wages demanded by the railway operators alone, aside from the electrical workers employed in the railway department, would amount to more than 1½ cents per pay passenger, and whatever increase of wages is agreed upon will have to be added to the railway fares.

Mayor Cornell Schreiber immediately declared that the city would fight any increase in fares. The fare is now 6 cents with a 2-cent transfer charge. The initial fare under the new franchise is 6 cents with 1-cent transfer charge, and the maximum is 7 cents and a 1-cent transfer charge.

At present, the cars in Toledo are operating under the extension of the ouster ordinance, passed by Council, and an order of the federal court. In case of a wage dispute the case will immediately be thrust into the federal court for settlement.

Advocates of municipal ownership are looking for an early decision from the Ohio Supreme Court in the city's test case to determine whether it has power to issue bonds for the purchase of the railway, pledging the general credit of the tax duplicate of the city.

Electric Railway Case Before New Kansas Court

The Amalgamated Association has filed a complaint with the Kansas Court of Industrial Relations, making the Pittsburgh & Joplin Railway, respondent. The union alleges that the company is now and has been unlawfully failing to pay a fair, living and reasonable wage and has thus endangered the continuous and efficient operation of the utility named. It contends in short as follows:

> That the association has used every diligent effort to make a settlement of the controversy.
>
> That the respondent has failed, neglected and refused to make a settlement or come to a fair agreement.
>
> That failure, neglect or refusal to make such settlement will lead to further dispute and endanger the continuity and efficiency of operation of the utility and will lead to further disputes and produce strife and disorder and endanger the public peace, health and welfare.

The union requests the court to require the company to answer charges; make and establish a reasonable wage pending investigation; make due investigation of the charges contained in the complaint and after hearing to "make and prescribe such orders, rules and regulations for conducting such business as shall be just and reasonable and effect such other relief as to this honorable court may seem just and proper."

This is the first case affecting an electric railway to come before the new court for the settlement of industrial disputes brought into being by the last Legislature at the behest of Governor Allen. The union has filed with the court its former agreement dated Aug. 1, 1917, and purporting to expire on Aug. 1, 1920. No date for a hearing has been set by the court.

On July 31, 1918, the War Labor Board handed down a finding granting the trainmen on this road 38 cents an hour for the first three months of service, 40 cents an hour for the next nine months and 42 cents thereafter. For other employees a minimum of 42 cents an hour was fixed, with an increase by the same percentage that the maximum of the wage scale paid motormen and conductors was increased by the award.

City and Railway Battle It Out

One Side Charges Bad Faith and Other Makes Promises That Would Be Fine If Fulfilled

The officials of the Detroit (Mich.) United Railway and the supporters of Mayor Couzens' municipal railway plan are agreed upon the point that extensions to lines in Detroit are greatly needed. Following the announcements of the routing of the proposed municipal system, Detroit United Railway officials made a statement of the company's attitude in regard to the much needed extensions. Additional extensions which the company believes are needed to meet the immediate surface line requirements of the city are described.

COMPANY SUGGESTS EXTENSIONS

The suggested extensions are based not only on the experience of the transportation men and engineers of the company, but also embody many suggestions that have been made by city officials and former Railway Commissioners to accomplish the development of the city as a whole. They are subject to such alterations or changes as the Common Council might direct, the company maintains.

The company expresses its readiness to construct about 130 miles of extensions and fully to equip them with cars, power houses, yards, carhouses and other facilities. It also agrees to operate them as a unified system, under one rate of fare and liberal transfer arrangements under any reasonable arrangement that may be entered into with the public.

In discussing the municipal ownership plans, officials of the company express the belief that the Mayor's estimated costs of construction are grossly insufficient. The fact is emphasized that since the Mayor's estimates were made, the price of rails has advanced $5 a ton, and that no new promises for delivery can be obtained until after 1921 for city rails. An equally difficult situation covers steel for car building, and costs that enter into the operation of the lines have advanced so that it is believed the Mayor's estimates of operating expenses are entirely too low.

COMPANY HAS DOUBTS

The company asks where the $500,000 will be secured to be laid aside annually for thirty years to pay the $15,000,000 bond issue, since during the first year and perhaps the second and third years during construction, it can not be collected from the car riders for there will not be many on an incompleted system. Any loss for any reason puts the burden on the people and the people's property is liable for the loss since the people's property stands mortgaged until all the bonds are paid.

In referring to the Mayor's alleged statement that the $15,000,000 in bonds for the municipal lines will have back of them $15,000,000 worth of physical property and that besides this the bonds will be backed by a "perpetual franchise from the city," the Detroit United Railway states it has assumed that what the Mayor had in mind was a piece meal railway for, by and of the people of Detroit. If the plan is something else the whole situation will have to be viewed from another and even more startling angle. In this connection it says:

> This looks as if not only the cat but all her kittens got out of the bag. The bonds, when issued, go to the bondholders. Back of the bonds will be a perpetual franchise from the city. The bondholders to have as protection a perpetual franchise behind the bonds they hold. And no rate of fare mentioned in the franchise!

The question is raised as to who are to be these bondholders, with no limit to the rate of fare, when the Mayor refuses to discuss a limited period franchise for the Detroit United Railway at a fixed fare, and even refuses to consider the Tayler plan that fixes fares and service for the operating company.

COUNCIL MEMBER DEFENDS CITY'S PLAN

In speaking in favor of the Mayor's plan, a member of the Council reviewed the long series of dickers whereby the city granted the Detroit United Railway concessions in the hope of getting improved service. This member maintained that the company could have improved service any time in the past and have reduced congestion in the center of the city. He further contended that instead of so doing the Detroit United Railway used the plea of congestion to obtain concessions from the city.

The proposition presented by the Mayor, it is stated, is the first one ever before the people entirely free from some proposal to grant additional rights to the Detroit United Railway. The city takes nothing away from the company. It is claimed that the Detroit United Railway is now offering to build extensions and make other improvements that should have been achieved years ago. The value of these promises, it is stated "are written in an undeniable record of steel and iron," since in the city of Detroit only 9 miles of extensions have been constructed since 1910.

Mayor Couzens' plan has been indorsed by the Detroit Federation of Labor and a copy of the resolution will be sent to every affiliated union with the request for support of the plan. This action is in opposition to that of the local Amalgamated Association.

The question has been raised regarding the adjustment of any differences as to wages of men employed on the proposed municipal lines. It is believed by the city's chief executive that in the event of municipal ownership becoming a reality, the city would have to deal with the federation as representing the men, and that he would have no legal right under the charter to interfere with the organization of the men.

According to Corporation Counsel Wilcox a strike of railway men would mean resignation of their positions. Under the home rule act, civil service would have to be installed in a municipal system as soon as possible and if the men left their positions they would have to be re-examined before being reinstated. The opinion was also expressed that increases in wages could be granted only once a year, when the budget was being considered.

Ex-Governor Raps Union Rule

Former Governor Joseph M. Brown of Georgia has reprinted in pamphlet form his speech "The Supremacy of the Law" made at Atlanta on Oct. 27, 1912. He also issued in pamphlet form "An Appeal for Just Laws and for Their Impartial Enforcement."

In the "Supremacy of the Law" Mr. Brown expresses the opinion that when a State charters a public utility it not only permits but commands the operation of the utility for the benefit of all the people, and that whoever prevents such operation, thereby impeding public travel and paralyzing the public commerce, puts himself in rebellion to the law.

In "An Appeal for Just Laws," which is addressed to the Senators and representatives in Congress, Mr. Brown deals with the history of the Amalgamated Association in Atlanta. It is largely a review of organized labor's misdeeds. Mr. Brown makes it plain that he has no "general complaint" against President Wilson. He says:

> My criticism is restricted to his toleration of acts plainly against the Constitution and laws, and against the cardinal rights of the public, by some of the labor unions, which acts are sternly forbidden to be done by other citizens, or inhabitants, of our country and which, if done by the latter, are punished through the process of law. Therefore, the result of President Wilson's course, as above indicated, is to establish for certain organizations, or combinations of people, preferential privileges over those allowed to all other inhabitants of the United States.

Mr. Brown, who has been characterized as the "most insignificant looking person in the United States," is one of the outstanding public figures of the South. He has been the storm center of the greatest political fights in the South during the last generation. Despite this it is said he has never had the temerity to take the stump and make a public speech. Recluse-like in his habits and nature, "he has fought his battles on paper and fired his shots with a virile pen from a farmhouse that nestles in the mountain shadows of northern Georgia." Mr. Brown is the son of a former Governor. He was graduated from Oglethorpe University in Atlanta and studied law at Harvard. Among his many other activities he has been connected with the Western & Atlantic Railroad and is a former Railroad Commissioner of Georgia.

Paving Suit Lost

Under Franchise Milwaukee Company Must Repave with Asphalt Instead of with Macadam

The United States Supreme Court on March 1, 1920, held that there was a contractural duty for the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to repave, arising from the acceptance of the franchise, and that the language of Section 2 of the franchise was not distinguishable from that involved in earlier cases in which it had held that a duty to keep "in proper repair" without qualification was broad enough to require paving and repairing with the same material with which the street was repaved.

The paving had been ordered on Nov. 8, 1915, by a city ordinance after the city had laid such a pavement on all of the streets except the railway zone. Up to that time the street had been paved from curb to curb with macadam. The company admitted that the railway zone was in need of repaving at that time, but it insisted that under an ordinance of Jan. 2, 1900, which constituted its franchise to lay tracks on Center Street, it was entitled to repave with macadam and could not be compelled to repave with asphalt.

After referring to the history of the case, which had been decided by the State courts in favor of the city, the Supreme Court considered the matter under four heads. Under the first head the court said that the obligation in the franchise for the company to repair "with the same material as the city shall have last used to pave and repair these spaces and the streets" did not excuse the company from paving with asphalt. Otherwise, said the court, "this would put upon the city the burden of paving the whole street in case of any innovation in paving save by agreement of the company with the city. This is not a reasonable construction of the provision." Under the second head the court referred to the claim of the city that the use of macadam by the company on its strip would be injurious to the asphalt paving on the rest of the street because water would seep through the macadam and get under the asphalt. Hence, the court declared it could not say that the city's "requirement that the railway zone be paved like the rest of the street with asphalt upon a concrete foundation was inherently arbitrary or unreasonable."

Under the third head the court considered the claim of the company that the return being earned on its property was less than a reasonable one and that to improve the additional burden of paving, with asphalt would deprive it of its property in violation of the fourteenth amendment. On this point, quoting cases, the court said:

> The Supreme Court of the State answered the contention by saying, "The company can at any time apply to the railroad commission and have the rate made reasonable." The financial condition of a public service corporation is a fact properly to be considered when determining the reasonableness of an order directing an unremunerative extension of facilities or forbidding their abandonment. But there is no warrant in law for the contention that merely because its business fails to earn 6 per cent upon the value of the property used, the company can escape either obligations voluntarily assumed or burdens imposed in the ordinary exercise of the police power.

The fourth defense raised was that the ordinance was void because it denied equal protection of the laws. This contention rested upon the fact that since entry of the judgment the Supreme Court of the State had decided *Superior v. Duluth Street Railway Company*, 166 Wis. 487, which the company alleged was not reconcilable with its decision in this case. On this point the Supreme Court said that it could not see a close similarity between the two cases. Continuing, it said:

> However that may be, the Fourteenth Amendment does not in guaranteeing equal protection of the laws, assure uniformity of judicial decisions, *Backus v. Fort Street Union Depot Company*, 169 U. S. 557, 569, any more than in guaranteeing due process it assures immunity from judicial error. *Central Land Company v. Laidley*, 159 U. S. 103; *Tracey v. Ginsberg*, 205 U. S. 170. Unlike *Gelpcke v. Dubuque*, 1 Wall. 175, and *Muhlker v. New York*, 197 U. S. 544, where protection was afforded to rights acquired on the faith of decisions later overruled, the company seeks here to base rights on a later decision between strangers which, it alleges, is irreconcilable on a matter of law with a decision theretofore rendered against it. The contention is clearly unsound.
>
> As we conclude that there was a contractural duty to repave arising from the acceptance of the franchise, we have no occasion to consider whether there was, as contended, also a statutory duty to do so arising under section 1862 Wisconsin Statute, which provides that street railways shall "be subject to such reasonable rules and regulations * * * as the proper municipal authorities may by ordinance from time to time prescribe."

Justices Pitney and McRenolds filed dissent of the opinion handed down.

Must Meet Franchise Conditions

The United States Circuit Court of Appeals at New York has reversed a decision of Federal Judge Chatfield which enjoined the Board of Estimate from revoking the franchise of the Manhattan & Queens Traction Corporation because of the company's failure to extend its line from Jamaica to the city limit. The opinion was written by Judge Rodgers. It was concurred in by Judges Hough and Manton.

When the board, about a year ago, ordered the company to extend its line the company asked for receivers, and the receivers obtained the injunction freeing them from building the extension. Under the decision of the Circuit Court the city has now the right to take over the road.

The company obtained its franchise in 1912 to operate from Jackson Avenue and the Queensboro Bridge Plaza along various streets to the Nassau County line. It refused to continue construction beyond the Long Island Railroad station in Jamaica. The court says the franchise was an entire franchise and that the line must be built and operated when the city so directs.

Corporation Council Burr of New York City says that the decision means that "every corporation must keep its contracts with the city or suffer forfeiture."

Wage Case Closed

Atlanta Company Concludes Its Testimony Before Arbitration Board—Increase in Fares Necessary

The wages of railway employees in Atlanta, Ga., have been increased in greater ratio than the advance in the cost of living, and if another increase is allowed at this time there must be an increase in fares to meet it. Resting on this contention the Georgia Railway & Power Company on March 5 concluded its case before the board of arbitration that had been appointed to consider the advisability of a salary advance for trainmen. Judge John D. Humphries, umpire of the board, announced that the board would consider the case when the testimony presented had been fully transcribed. A decision will probably not be rendered before April 1.

Preston S. Arkwright, president of the Georgia Railway & Power Company, and H. M. Atkinson, chairman of the board of directors, represented the company. They presented figures to prove that at a 6-cent fare, the present rate, the company could not afford to pay the men any advance in wages. Even at 6 cents, the company executives stated, the corporation is not able to break even on railway operation. Therefore, it was pointed out, that if the board decides in favor of the employees and grants an increase in pay there must necessarily be an increase in fares to meet the added expense.

In presenting the company's side of the case Mr. Atkinson said:

> The company gets absolutely nothing from the last increase in fares to 6 cents. The additional revenue goes to the employees in increased wages.
>
> The railway is being run today literally for the public benefit. We are paying no dividends and stockholders are getting nothing.
>
> The fixing of wages and rates ought to be in the hands of some governing body. In my opinion it would be wise in the State of Georgia, to put the power to fix both these factors in the hands of the State Railroad Commission.
>
> Considering the money spent on wages, material, power, damages, taxes, interest, depreciation and miscellaneous items in 1919, the company paid out $1.03 for every $1 it took in under the 6-cent fare.

These were among the most important points made by Mr. Atkinson during his testimony.

Mr. Arkwright set forth detailed figures showing the system of wages for motormen and conductors, indicating that salaries have been advanced in the past few years in a ratio that more than covers the advanced living costs.

The arbitration board consists of Judge Humphries, of the Fulton County Superior Court, who was chosen as umpire after both the company and the union had refused to accept several other men suggested for that important position. Luther Z. Rosser is arbiter for the company. Madison Bell represents the men.

The only question to be decided by the board is that of wages to be paid during 1920. All other issues arising from the 1920 contract have been settled by previous negotiations to the satisfaction of all concerned. While the exact increase in pay asked by the men has not been made public it is understood on good authority that they ask an increase that will cost the company nearly $600,000 a year, according to figures presented by Mr. Arkwright.

Based on the number of working hours in 1919, Mr. Arkwright pointed out that an increase of only 1 cent an hour would cost the company an additional $30,000. He presented the figures for each additional cent per hour, showing that a 5-cent increase would cost the company almost $150,000 a year; a 10-cent increase almost $300,000; a 15-cent increase almost $450,000; and a 20-cent increase close to $600,000 additional.

It has since been reported from Atlanta by telegraph that the men have gone out.

Present Prices in Valuations

U. S. Supreme Court Holds That Lands and Terminals Can Be Valued at Present Prices

The railroads of the country won an important and far-reaching decision over the I. C. C. in the Supreme Court on March 8, 1920. The court held that in fixing a valuation of a common carrier the commission must follow the provisions of the act of Congress passed March 1, 1913, and consider the present cost of condemnation and damages, or of purchase in excess of original cost or present value of all lands, terminals and rights-of-way owned or used by the railways in their business.

The suit was brought by the Kansas City Southern Railway to compel the commission, which was ascertaining its valuation in accordance with the March 1, 1913, amendment to the Act to Regulate Commerce, to hear proof "that its refusal to investigate and find such present cost of condemnations and damages or of purchase in excess of original cost or present value would result in great wrong and injury to the relator and in the aggregate would result in a finding with respect to said lands at least $5,000,000 less than the value so directed by the Act of Congress."

The commission declined to do this because such a plan seemed to be in conflict with the ruling of the Supreme Court laid down in the Minnesota Rate Case, but the Supreme Court held that this was an erroneous view to take. Continuing, it said:

> It is impossible to conceive how the Minnesota rate ruling could furnish ground for refusing to carry out the commands of Congress, the cogency of which consideration is made particularly manifest when it is borne in mind that the Minnesota rate cases were decided prior to the passage of the act in question.
>
> Finally, even if it be further conceded that the subject matter of the valuations in question which the Act of Congress expressly directed to be made necessarily opened a wide range of proof and called for the exercise of close scrutiny and of scrupulous analysis in its consideration and application, such assumption, we are of opinion, affords no basis for refusing to enforce the Act of Congress. * * *
>
> The judgment of the Court of Appeals is therefore reversed with directions to reverse that of the Supreme Court and direct the Supreme Court to grant a writ of mandamus in conformity with this opinion.

News Notes

Strike in Sioux City.—Employees of the power plant at the Sioux City (Ia.) Service Company walked out on March 4, tying up railway traffic and cutting off light service.

Industrial Relations Court Proposed.—The creation of a state court of industrial relations with broad powers to prevent strikes and lockouts and to insure "efficient and continuous" operation of all industries of public interest and of public utilities and common carriers is provided in a bill introduced by Chairman Knight of Senate labor and industries committee in New Jersey.

Committee Approves Cleveland Subway.—The street railway committee of the City Council of Cleveland, Ohio, has approved the issuance of $15,000,000 of bonds for the construction of a municipal subway. It has also approved the proposition to lease the subway to the Cleveland Railway. The proposals will be submitted to a referendum vote on April 27, if accepted by the City Council.

Home Rule Act in Kentucky.—A home-rule bill has been introduced in the Kentucky House. It has been ordered printed and referred to the committee on rules. The measure provides that "any city or town in the Commonwealth of Kentucky shall have the right by ordinance to regulate the service, and to fix and regulate the rates, tolls, and charges of water, light, gas, electric light, power and heat, telephone and street railway service to users, consumers and customers."

Binghamton Men Strike. — Because the Common Council of Binghamton, N. Y., failed on March 8 to adopt an ordinance permitting an increase in fares to 6 cents the employees of the Binghamton Railway struck on March 9 and the system is completely tied up. The men said their action was not against the railway, which had promised them a raise in pay if they got the increased fare, but against five Aldermen who voted against the ordinance. New compromise ordinances have been introduced.

Preparing New Scale at Wheeling.—To prepare a new annual wage scale to be presented to the electric railway officials of the entire Wheeling district to become effective on May 1, an all-day session of representatives of the various crafts affiliated with the union was held on Feb. 23. The session was attended by thirty-five representatives from all the lines in Wheeling, eastern Ohio and as far up the river as Weirton. It is stated that the new wage scale will be completed and ready for presentation by April 1.

Programs of Meetings

New England Street Railway Club

The twentieth annual banquet of the New England Street Railway Club will be held at the Copley Plaza Hotel, Boston, Mass., on March 25 at 6:30 p.m. The annual meeting for the election of officers will be held at 3 p.m. the same day.

The New England Street Railway Club has always been honored at its annual banquets with speakers of great national prominence. The speakers at the coming meeting will be William C. Sproul, Governor of Pennsylvania; Calvin Coolidge, Governor of Massachusetts; Andrew J. Peters, Mayor of Boston, and Matthew C. Brush, president of the American International Ship Building Corporation.

Second Railroad Conference

The second annual railroad conference of the American Association of Engineers will be held in the Congress Hotel, Chicago, on March 15. Among the speakers and subjects are:

"Plans for A. A. E.'s Future Railroad Work," by G. W. Hand, chief engineer of the Northwestern Railway. Discussion by J. B. Jenkins, valuation engineer of the Baltimore & Ohio and F. E. Morrow, chief engineer of the Chicago & Western Indiana.

"A. A. E. Railroad Salary Schedule," by W. C. Bolin of the association railroad committee. Discussion by R. W. Barnes, principal assistant engineer of the Southern Pacific, C. F. Bower, president of the Burlington Lines East Railroad Section, A. M. Knowles, president of the Erie Railroad Section, O. R. West, president of the Santa Fe Coast Lines Section.

"Railroad Sections: Their Organization and Function." The speaker is not selected.

"Railroad Sections: Their Relation to the Railroad Management," by F. C. Huffman, president of the Chicago & Northwestern Railroad Section.

"Railroad Sections: Their Relation to the Chapters," by Paul Augustinus, past president of the Chicago Chapter.

These subjects will be presented at the afternoon session, of which J. R. Leighty, chief engineer of the Missouri Pacific, will be chairman. The morning session will be in charge of W. W. K. Sparrow, assistant chief engineer of the Milwaukee. It will be devoted to registration, reports, and a résumé of the work of the association during 1919.

At the evening session W. H. Hoyt, chief engineer of the Duluth, Missabe & Northern Railroad, will preside. Dr. F. H. Newell, president of the association, will speak on the "American Association of Engineers—Its Aims and Ideals." Other speakers at the evening session will be Arthur S. Tuttle, chairman, Bion J. Arnold and Oscar C. Merrill.

S. M. Felton, president of the Chicago Great Western Railroad, will also speak at the evening session. His subject will be "Problems of the Railroads Since Their Return to Private Control."

Financial and Corporate

Drastic Reorganization

Stockholders of Another Interurban Wiped Out Entirely in Reorganization

The Kansas City-Western Railway, operating between Kansas City, Mo., and Leavenworth, Kan., and in Leavenworth, was sold at auction on Feb. 16, for $250,000. As noted previously in the ELECTRIC RAILWAY JOURNAL, the property was purchased by Walton H. Holmes, president of the Pioneer Trust Company, Kansas City, Mo., representing a committee of bondholders.

SALE FOLLOWED FORECLOSURE

The sale was the result of a foreclosure suit brought in the Federal Court in Kansas by the Guaranty Trust Company, New York, N. Y., trustee for the holders of $1,600,000, par value, of bonds. The committee which purchased the road included Walton H. Holmes, P. W. Goebel, president of the Commercial National Bank, Kansas City, Kan., and P. T. White, Cleveland, Ohio. The committee headed by Mr. Holmes succeeded in having a large number of claims for damages declared junior to the lien of the bondholders by the Federal Court and also avoided a receivership.

The original plan and agreement for the reorganization of the company was dated April 1, 1919. This was subsequently modified because conditions changed and made the operation of the line more and more difficult. The amended plan is dated Feb. 16. Depositing bondholders who do not desire to approve the amendment have the right to withdraw their bonds and assessments, less their pro rata share of expense incurred to date by the reorganization committee and receive their share of the distributable proceeds from the sale of the property. Such non-depositing bondholders will receive about $110.74 for each $1,000 bond and coupons attached.

REASONS FOR MODIFYING PLAN

It is pointed out that the gross earnings of the property for the calendar year ended Dec. 31, 1919, were $407,804, the largest in the history of the company. The operating expenses, including maintenance, were $396,866, almost the largest in the history of the company. It was feared, however, that if the plan of April 1, 1919, was carried out another reorganization would be necessary in the near future, as the burdens upon the earning capacity of the property would be too severe to provide for the interest of 6 per cent upon the new first mortgage bonds.

The original plan of reorganization provided for the authorization of $1,000,000 of first mortgage 6 per cent bonds, $500,000 of preferred stock and $500,000 of common stock. It was proposed to issue under this plan $958,800 of first mortgage bonds, $479,400 of preferred stock, and 479,400 of common stock. There was previously outstanding $42,000 of Kansas City-Leavenworth Railroad 5 per cent first mortgage gold bonds due Sept. 1, 1919; $1,598,000 of Kansas City-Western Railway first mortgage 5 per cent twenty-year gold bonds; $42,000 of bonds to retire the Kansas City-Leavenworth first mortgage gold bonds and $10,000 of bonds in the treasury of the company, making the total outstanding bonds, $1,650,000. There was also outstanding capital stock to the amount of $2,000,000.

It is explained that the property upon confirmation of the sale by the court will belong to the depositing bondholders represented by $1,558,000 par value of bonds, the assessment paid upon which is intact. If the amended plan is approved the money so deposited will be used to pay the estimated expense of foreclosure and reorganization placed at $116,151. The amendments proposed to the original plan of April 1, 1919, are as follows:

1. Reduce the interest on the new bonds from 6 per cent per annum to 5 per cent per annum.
2. Date new mortgage as of April 1, 1920, or as soon thereafter as the sale is approved by the court.
3. Issue preferred stock at par equal to interest include March 1, 1920, instead of March 1, 1919, on bonds surrendered.
4. Authorize $1,250,000 of bonds, $625,000 of preferred stock, and $625,000 of common stock.

None of the securities in excess of the amounts provided in the plan of April 1, 1919, is to be issued at this time, except the necessary preferred stock to provide for the accrued interest on bonds surrendered.

It is expected that the court will defer confirmation of the sale until a satisfactory plan is determined upon.

Offers Road to City

George A. Stanley, president of the New York & North Shore Traction Company, operating from Flushing to Whitestone, and to Hicksville in Nassau County, Long Island has offered his line to the city of New York as a gift, if the city will operate the road at a 5-cent fare. He made this proffer at a hearing before the Public Service Commission for the First District called to investigate the action of the company in ceasing service over all its lines. He stated that at many points the company's tracks were buried beneath several inches, and in some cases several feet, of ice, and that the company had no money with which to remove the encumbrances. He stated, however, that he was willing to resume service immediately after the snow had melted and the tracks were clear.

Harrisburg Expenses Jump

Passenger Traffic Increases 10 Per Cent —Employees Get 97.7 Per Cent More in Wages Than Before the War

The report for the year 1919 of the Harrisburg (Pa.) Railways states that 3,795,574 car miles were operated, and that the total number of passengers including cash and transfers was 31,572,762. The total number of passengers carried shows an increase over 1918 of 1,640,544.

COSTS JUMP, TOO

With the increase in the number of passengers, the cost of operation likewise increased. During 1918 the cost of operation amounted to $747,396 while in 1919, the cost was $989,267, equivalent to 32.3 per cent increase. This increase was due to higher wages allowed carmen and other employees during the year, and the increased costs of practically everything pertaining to the railway system. Since the beginning of the war, the wages of the employees of the company have been increased 97.7 per cent.

FARES INCREASED

On Oct. 1, 1918, the 6-cent fare went into effect. Since then wage increases have been allowed that amount to 7 cents per hour. This increase represents a raise of approximately 20 per cent during the period. It has eaten up most of the revenue derived from the increase in fare.

Another important item of expense is taxes, for the Harrisburg Company pays, perhaps, more than any other railway operating in any city of the third class in Pennsylvania. During the past year $130,000 was necessary, $39,000 of which went into the coffers of the Harrisburg city treasury under the provisions of the franchise.

IMPROVEMENT PLANS

The company during the coming spring and summer contemplates making many improvements that should have been made in the past. Among these it will build the extension on Herr Street from Seventh Street to Eighteen-and-a-half Street with the hope of being able to render better service to a rapidly growing section of East Harrisburg. Changes are also contemplated at the power house and carhouse due to the rapidly increasing load and the number of cars operated. At the present time, the company owns 133 cars, 110 of which are of the closed type, and twenty-three are open cars.

New Louisville Director

L. W. Botts, president of the Fidelity & Columbia Trust Company, and connected with the Louisville, Henderson & St. Louis Railroad, controlled by the Louisville & Nashville Railroad, has been elected a member of the board of directors of the Louisville Railway, making the fourteenth member, of the fifteen agreed upon. Mr. Botts was formerly a director of the company.

Duluth Operates At a Loss

Increased Expenses Eat Up Gain in Gross—Surplus 10 Per Cent Less Than Last Year

The annual report of the Duluth-Superior Traction Company, Duluth, Minn., for the year 1919 shows that the cost of rendering service increased more during the past year than the gain in revenues. As a result the net income transferred to profit and loss at the end of the year was 12 per cent less than in 1918.

The gross revenues showed an increase of $272,951 or 16.22 per cent over the previous year and an increase of $315,049 or 19.15 per cent over the year 1917. The net income transferred to profit and loss for the year showed a decrease of $14,288 or 12 per cent as compared with the year 1918 and a decrease of $181,029 or 63.34 per cent as compared with the year 1917.

The increase in operating expenses was attributed to the continued high cost of materials and supplies used in the maintenance and operation of the property, and also to the two wage increases to the employees. The inability of the company to meet its increasing costs with a continual decreasing net revenue made it necessary to seek additional revenue; especially after the citizens in Duluth on April, 1919, had voted against municipal ownership.

In anticipation of the necessity of obtaining increased revenue the company on Sept. 1, 1919, started an appraisal of the property and on Dec. 4, 1919 renewed its efforts with the city of Duluth to obtain an increase in the unit rate of fare. Similar application is also pending before the Wisconsin Railroad Commission. Hearings have not yet begun, pending the completion of the valuation.

An analysis of the accompanying table shows that passenger traffic increased more than 15 per cent with a corresponding increase of 16.27 per cent in passenger revenues. Operating expenses as a whole including depreciation based on the 4 per cent sinking fund method increased 21.57 per cent. The equipment and conducting transportation accounts show the greatest increase—these being 37.95 and 28.95 per cent respectively. The operating ratio increased from 77.7 in 1918 to 81.35 in 1919 or 3.65 per cent. Taxes increased $10,288 or 10.79 per cent notwithstanding the fact that the tax per $100 of gross revenue decreased 26 cents.

STATEMENT OF EARNINGS OF DULUTH-SUPERIOR TRACTION COMPANY

	1919	1918	Per Cent Change + Increase — Decrease
Revenue from transportation	$1,925,726	$1,656,139	+16.27
Revenue from other railway operations	11,417	9,770	+16.83
Total railway operating revenues	$1,937,143	$1,665,909	+16.29
Way and structures	$202,978	$183,496	+10.62
Equipment	213,235	154,617	+37.95
Power	205,432	197,226	+ 4.16
Conducting transportation	735,381	570,390	+28.95
Traffic	1,338	1,488	—10.08
General and miscellaneous	216,472	187,462	+15.48
Transportation for investment—Cr.	*1,722	* 997	+72.70
Total railway operating expenses	$1,573,114	$1,293,682	+21.57
Net operating revenue	$364,029	$372,227	— 2.20
Taxes assignable to railway operation	105,683	95,395	+10.79
Operating income	258,346	276,832	— 6.67
Non-operating income	22,293	20,575	+ 8.35
Gross income	$280,639	$297,407	— 5.64
Interest on funded debt	174,838	175,002	— 0.09
Interest on unfunded debt	110	1,015	—89.20
Miscellaneous debits	923	2,333	—60.50
Total deductions from gross income	$175,871	$178,350	— 1.40
Net income transferred to profit and loss	$104,768	$119,057	—12.00

* Deficit.

STATISTICAL STATEMENT OF THE DULUTH-SUPERIOR TRACTION COMPANY

	1919	1918	Per Cent Change + Increase — Decrease
Gross revenue	$ .959,436	$1,686,485	+16.22
Revenue passengers	38,475,440	33,088,747	+16.25
Transfer passengers	6,408,086	5,728,778	+11.85
Total passengers	44,883,526	38,817,525	+15.64
Mileage—first main track	57.04	57.04	......
Total miles—all track	104.09	103.75	+ 0.34
Revenue from transportation—Per mile of line	$33,761	$29,000	+16.42
Per mile of single track	$18,515	$15,950	+16.10
Passenger traffic—Per mile of line	785,000	682,000	+14.80
Per mile of single track	448,000	374,200	+19.75
Operating ratio (per cent)	81.35	77.70	......
Per cent on $1,500,000 preferred stock earned and paid	4.00	4.00	......
Per cent on $3,500,000 common stock earned	1.28	1.68	—0.40
Taxes—per cent of gross revenue	5.40	5.66	—0.26

Vancouver Pays Dividend

Difference in Exchange Rate Enables Common Stockholders to Benefit by a Bonus

The annual report for the year ended June 30, 1919, of the British Columbia Electric Railway, Ltd., recently issued indicates that notwithstanding the serious twenty-four day strike of June, 1919, the company was able to maintain its dividend payments. This was not due entirely to actual earnings, but to the unusual existing profit on exchange in remitting moneys from Vancouver to London and the appropriation of certain monies held for contingencies, which, under the altered conditions, the directors considered were no longer needed. This amounted in all to £138,419.

The net income transferred to profit and loss from operation during the year amounted to £391,763. The profit from exchange, and transfers of reserves no longer needed, registration fees, etc., made a total of £530,327. Adding the balance from the previous year, less a 5 per cent dividend of £72,000 for the year ended June 30, 1918, on the cumulative perpetual preference stock (really a bond issue) gives £6,085, thus making the total revenue £369,105.

Deductions were as follows—£154,727 for depreciation, equivalent to 3.1 per cent on the book value of the property; directors and trustee fees, office rent, salaries, etc., £12,581; leaving a balance of £369,105 for interest and dividends.

Interest on debentures and debenture stock for the year was £132,447. Dividends on the 5 per cent cumulative perpetual preference stock and an interim dividend of 2.5 per cent on the preferred ordinary stock paid during the year totalled £108,000. The balance therefore available for further distribution was £128,657. At the annual meeting, the directors voted the payment of a final dividend on the preferred ordinary stock of 2.5 per cent for the year ended June 30, 1919, a 3 per cent dividend and a 3 per cent bonus on the preferred ordinary stock, amounting in all to £122,400. The balance for the year therefore was £6,258.

Court Enters Decree of Sale

Judge Sater, sitting in the United States District Court at Cincinnati, Ohio, has entered a decree of foreclosure and sale of the property of the Springfield Terminal Railway & Power Company, Springfield, Ohio. The court has, however, given the company until March 31 to pay the principal of the $250,000 of first mortgage bonds and accrued interest. In the default of making such payments the receiver, George Whysall, is ordered to sell the property at public auction to the highest bidder at the County Court House in Springfield, Ohio, on a day to be named by Mr. Whysall. As the receiver must advertise the property before offering it, there is little likelihood that the sale will take place before early in May.

Louisville Deficit Increases

Expenses of Operation Exceed Revenues Without Depreciation Allowance or Dividend Payments

The Louisville (Ky.) Railway in its annual report to the stockholders for the year ended Dec. 31, 1919, compares present financial conditions with those existing in 1916—the year prior to the World War. This comparison shows that during this period expenses increased five times as fast as the revenues from operation.

Despite the strike of the trainmen operating revenue increased nearly $500,000. It is difficult to give in exact figures the cost of the strike. On the one hand, revenues were diminished. On the other, the expenses of operation were less. What the revenue would have been had there not been a strike, is purely an estimate. That the expenses were less comes from the fact that but few cars were operated a part of the time and not for a number of weeks were normal operations resumed. The best judgment places the net cost of the strike at $327,000. Even a gain of this amount in gross revenue would have been insufficient to pay a depreciation allowance of $85,000 and a 5 per cent dividend on the $3,500,000 outstanding cumulative preferred stock. A deficit of $90,505 would have existed at the end of 1919 without any dividend on the common stock having been paid.

INCOME STATEMENT OF LOUISVILLE RAILWAY

	1919	1916	Per Cent Change +Inc. —Dec.
Railway operating revenue	$3,537,234	$3,078,296	+14.92
Railway operating expenses	2,794,439	1,561,580	+72.60
Net operating revenue	742,795	1,516,716	—51.00
Taxes assignable to railway operation	366,000	315,051	+16.15
Operating income	376,795	1,201,665	—68.60
Other income (*a*)	105,297	182,000	—42.70
Gross income	482,092	1,383,665	—65.10
Interest on bonds and discount on notes sold	639,597	621,750	+28.70
Net income	*157,505	761,750	....
Dividends	None	670,650	....
Surplus	*157,505	91,265	....
Depreciation (not paid in 1919)	....	85,000	....
Balance	*157,505	6,265	....
			Increase
Taxes—per cent of gross revenue	79.10	50.80	29.70
Operating ratio (per cent)	13.50	10.25	2.25

* Deficit. (*a*) Louisville Interurban net earnings in this item.

LOUISVILLE RAILWAY QUOTATIONS

Jan. 1	1920	1917	Loss	Per Cent Decrease
Common stock	25	96	71	74.0
Preferred stock	50	101	51	50.5
First mortgage bonds (5%)	83	103	20	19.4
Second mortgage bonds (4.5%)	64	92	38	41.4
Consolidated mortgage bonds	65	99	34	34.4

One of the outstanding reasons for this deficit is the fact that since 1916 the compensation to employees has increased 87.5 per cent and taxes 16.15 per cent.

In order properly to provide for deferred maintenance, pay the 5 per cent dividend on the preferred stock and a 6 per cent return on the common stock it is obvious that the railway operating revenue must be increased by at least 20 per cent without making a further allowance for wage increases. This actually calls for an increase in the net operating revenue of 100 per cent.

A table is presented showing the effect of public opinion on the increased expenses of the company as reflected by the value of its securities.

$341,000 of Bonds Authorized

The Public Utilities Commission of the District of Columbia has ruled favorably on the application of the Washington Railway & Electric Company for permission to issue $341,000 of general mortgage 6 per cent gold bonds. The commission has, however, carefully laid down the conditions of the issue, it being of the opinion that the expenditures indicated in Schedule "B," amended, were not in whole or in part reasonably chargeable to operating expenses or income.

On Sept. 26, 1919, the company renewed its application to the commission for a certificate of authority to issue and sell general mortgage 6 per cent gold bonds to the amount of $341,000, face value, dated Dec. 2, 1918, payable on Dec. 1, 1923, the proceeds of the sale to be used to reimburse the company's current funds for the balance of the capital expenditures made from Jan. 1, 1909, to Jan. 31, 1915.

In its order the commission said:

> The valuation of the company's property has been completed and the opinions and findings of the commission were announced on Sept. 4, 1919. From the information now before it, the commission is of the opinion that the money to be procured by the sale of the said bonds of the Washington Railway & Electric Company to the amount of $341,000 is necessary to, and reasonably required by, the said company for reimbursement of funds heretofore expended for the purposes indicated in its Schedule "B," excluding therefrom those items enumerated as covered by bonds issued under authority of the commision's order number 143.

Bond Extension Asked

The Maumee Valley Railways & Light Company has asked holders of the $300,000 of first mortgage 5 per cent gold bonds of the old Toledo & Maumee Valley Railway which matured on March 1, 1920, to consent to an extension of the maturity date for one year. Frank R. Coates, president, addressed a letter to all bondholders in which he offers to increase the interest rate to 5½ per cent for the period of extension.

The franchises of the company expired in June and September, 1919, and the company, which was operating at a deficit, has been released from rate restrictions and some other conditions unfavorable for profitable operation of the line.

The Doherty interests took over the road in 1913 and it has shown the following net results: 1913, $6,972; 1914, $6,486; 1915, $10,329; 1916, $11,690; 1917, $2,836; 1918, deficit, $9,156; and 1919, deficit, $28,199.

Passenger rates have been increased and unprofitable freight business has been abandoned, but the management has not had sufficient time to determine the effects of the new conditions, it is announced.

Interurban Earnings Increase

The annual report of Edward Goepper, president of the Toledo, Bowling Green & Southern Traction Company, to the stockholders at their meeting at Findlay, Ohio, on Feb. 24, showed an increase in gross receipts of 11.5 per cent over the previous year, while operating expenses were 18.33 per cent less.

The suspension of car service within the city limits of Toledo by the working of the "ouster ordinance" approved by the people last November caused a loss of $15,000, the president's report indicated.

Injuries to passengers in accidents cost the company $15,175. The most costly accident was a collision of a Clover Leaf Railroad train and a traction car at a crossing south of Toledo on March 10, 1919. This accident alone cost the company $8,873.

Receiver for White Plains Line

Leverett S. Miller on Feb. 28 was appointed by Supreme Court Justice Joseph Morschauser as receiver for the Westchester Street Railroad, White Plains, N. Y. Mr. Miller is the present manager of the railway. Justice Morschauser, acted on complaint of the Farmers Loan & Trust Company, New York, which seeks to foreclose a mortgage of $168,000. The court granted a motion for a receiver in order that the road may be kept running and the public may not be inconvenienced.

The Westchester Street Railroad is controlled by the New York, New Haven & Hartford Railroad and is operated by the same management as the New York, Westchester & Boston Railway. The company owns 22.50 miles of track and operates 7.63 miles additional under trackage rights, making 30.13 miles in all. It leases and operates the Shore Line Electric Railroad, a system with 1.46 miles of track. The Westchester Company has outstanding $700,000 of capital stock and $386,000 of bonds. The Shore Line has outstanding $50,000 of capital stock and $23,737 of bonds. The total capital liabilities of the two companies are therefore $1,159,737.

Losing $2,525 a Day

Frank Samuelson, auditor for the receiver of the New York (N. Y.) Railways, testifying recently before the Board of Estimate, said that operations for January showed a deficit of $78,293. The company is losing on an average $2,525 a day in operation. It lost during recent snow tieup $675,000 in receipts, and the cost of snow removal, with only part of the bills in, was $207,000, making total for February storm of $882,000. Mr. Samuelson admitted that the company had reserve for maintenance and depreciation from $1,700,000 to $1,800,000 under the order of the court to set aside 38 per cent, but defended the necessity for accumulating this amount on the ground repairs come in cycles and it would be impossible to make necessary provision from earnings of any one year.

Henry L. Stimson showed that the gross receipts of the company since reorganization have been stationary or decreasing. Gross receipts for the year ended June 30, 1913, were $13,605,852; for 1915, $13,010,932; for 1917, $11,-195,729, and for 1919, $11,606,853. He said that the saturation point in receipts of company has been reached and the only remedy is an increase in fare.

While the total underlying mortgages of the subsidiary companies is only $21,450,000, the assessed valuation of the land and buildings now under control of the receiver is placed by the city at $19,408,000, and the valuation of the property in the streets including conduits is placed by state assessment at $19,551,900.

Traffic Increases in Atlanta

The 1919 annual report of the Georgia Railway & Power Company, Atlanta, Ga., indicates that the passenger traffic exceeded that of the previous year by nearly 10 per cent notwithstanding fares were increased 20 per cent in April, 1919, except on two lines, due to contracts the fare is limited to 5 cents.

For the three months ended March 31, 1919, before the rate of fare was changed the increase in the number of passengers carried over the corresponding period of 1918 was 7.75 per cent. For the nine months covering the balance of the year, during which time with the exception of first two weeks in April, the 6-cent fare was in effect, the increase in passengers carried was 10.2 per cent over the corresponding period of the previous year.

This gain would indicate that the increase in fare did not have any deterrent effect on the passenger traffic. A part of this, however, may be attributed to the growth of the territory served, for the population inside the corporate limits of the city of Atlanta has increased from 154,000 in 1910 to at least 225,000 and that it is now generally conceded to be the financial, commercial and railway center of the South. The real population served by the 248.14 miles of track forming the electric railway system, which covers more than merely the corporate Atlanta limits, is estimated to be 250,000.

The mention of the traffic details was made in our issue of Feb. 7.

North American Company to Reduce Stock

A special meeting of the stockholders of The North American Company will be held March 17 for the purpose of (1) acting upon the proposition to amend, alter and change the certificate of organization so as to increase the authorized capital stock of the company from $30,000,000, its present authorized capital stock, to $43,750,000, consisting of 500,000 shares of 6 per cent cumulative preferred stock of the par value of $50 each, and 750,000 shares of common stock of the par value of $25 each and (2) acting upon the proposition to decrease the issued capital stock of the company from $29,793,300, the amount now issued and outstanding, to $22,344,975, such decrease to be effected by reducing the par value of the shares now outstanding, viz., $100 each, to $75, to consist of one share of 6 per cent cumulative preferred stock of the par value of $50 and one share of common stock of the par value of $25.

Increase in Net for Holding Company

Earnings of the American Light & Traction Company, New York, for the year ended Dec. 31, 1919, on stocks of subsidiary companies owned were $3,355,055 as against $3,732,941 in 1918, a decrease 10.12 per cent. Miscellaneous earnings totaled $1,006,490, an increase of 69.7 per cent. Gross earnings equaled $4,361,546 as against $4,326,367 in 1918. Deducting expenses, which were $218,683, or 29.8 per cent less than in the previous year, the net earnings were $4,142,863 compared with $4,014,801 in 1918. Adding surplus and reserve of $11,869,329 for 1918, the total surplus earnings applicable to dividends were $16,012,192, as against $17,104,281 in 1918, a decrease of 5.86 per cent.

During the year 35.5 per cent of the surplus was paid out in two cash and one stock dividends amounting in all to $5,689,447. The surplus balance for the year was $10,324,745 a decrease of 13 per cent.

Service-at-Cost Commission

Appointment of a committee of three to draw up for Tacoma, Wash., a service-at-cost plan has been completed by the naming of F. H. Rudkin, United States District Judge at Spokane, who makes the third member of the commission. The city has appointed one man and the railway one. The three will draw up a new franchise embodying the Cleveland idea and establishing, it is believed, a sliding scale of fares. It is planned to submit the franchise to the voters at the April election.

Financial News Notes

Purchase at Gadsden Approved.—The Alabama Public Service Commission sitting at Montgomery has approved the transfer of the electric and the railway properties at Gadsden to the Alabama Power Company. The companies taken over are the Alabama City, Gadsden & Attalla Railway and the Gadsden Railway. The proposed transfer of the properties was referred to in the ELECTRIC RAILWAY JOURNAL for Feb. 7, page 307.

Business Men Save Railway.—Electric railway service was saved for Eureka on Feb. 28 by the business men of the city, who raised a fund of $2,443 to pay the 5¼ per cent State tax on the annual gross earnings of the Humboldt Traction Company, which the company had announced it was unable to pay. Manager J. W. Hale had announced that service would have to be discontinued unless some one came to the rescue of the company, as the security holders had declined to pay the State tax, or spend any further money on the road.

Directs Study of Reorganization Plan.—A bill has been introduced into the Legislature of Rhode Island directing the Public Utilities Commission to investigate the plan for the reorganization of the Rhode Island Company as advanced by the receivers and also to inquire into any other plan that may be offered for reorganizing the company. The bill requires the commission to report not later than March 23. The receivers have suggested State ownership and control for the company with private operation. Their plan was referred to at length in the ELECTRIC RAILWAY JOURNAL for Feb. 28, page 445.

Kansas City Railways Doing Better.— Philip J. Kealy, president of the Kansas City (Mo.) Railways, points out that during the month of January the system cleared approximately $51,-000 above operating expenses, and that the February figure will be greater. In an agreement with the bondholders' protective committee the company is discounting bonds and interest on notes for this year, which at the end of the year will total nearly $2,000,000. Mr. Kealy referred to the 1919 situation, declaring that the company lacked nearly $750,000 of meeting expenses of operation.

First Profit for Municipal Line.—For the first time since it was placed in operation, the Tacoma (Wash.) Municipal Railway, connecting the city with the shipyards and other industrial plants, is said to have operated at a profit in the month of January. A balance of $1,839.23 was left after charging off a depreciation of $2,000.

The net passenger revenues for January were $12,418 with switching revenues of $1,600. It is said the reason for the profit is the establishment of a loading station at the shipyard end of the line, making possible the collection of all fares.

A Loss That Became a Gain.—The municipally owned electric railway between Attleboro and Briggs Corner, Mass., showed a deficit in its first year of operation of $383.54, according to figures made public by Harry J. Goodale, superintendent of public works, who manages the road. The total operating receipts were $17,485.47 and the total operating expenses were $17,873.54. A 7-cent fare is charged. The city considers the road a success inasmuch as practically $2,000 extra was obtained by the city treasury because of the increased valuation on property abutting the road.

Change in Name.—The name of the Mahoning & Shenango Railway & Light Company, operating electric power and light and city and interurban railways in Mahoning and Trumbull Counties, Ohio, and Lawrence, Mercer and Beaver Counties, Pa., with main offices in Youngstown, Ohio, has been changed by the stockholders to The Pennsylvania-Ohio Electric Company. The change in name in no way affects the property, ownership or management. It has been made because the activities of the company have outgrown the old name and the new name is better descriptive of the territory served and the services rendered.

Receiver Must Fix Scrap Value.—At the Federal Court at Cleveland, Ohio, on Feb. 14, C. G. Taylor, receiver of the Sandusky, Norwalk & Mansfield Electric Railway, was given three weeks in which to appraise the scrap value of the system, which is roughly estimated at $175,000. This action was taken in behalf of the majority bondholders who desire to scrap the road. The court, it is stated, has taken steps to give the minority bondholders the privilege of buying in the property. The receiver has jurisdiction over 25.6 miles of track between Norwalk and Plymouth and 6.9 miles between Plymouth and Shelby. It is stated that only the northern division is involved in the courts.

Tacoma Traffic Increasing.—An increase of 19 per cent in the total number of passengers hauled in January, 1920, and 22 per cent increase in the number of revenue passengers over the same month in 1918, is reported by the Washington Water Power Company, Spokane, Wash., to Mayor Fleming in the monthly statement as to railway operations. No comparison with January, 1919, was made because of the existence of influenza last year, which sent traffic totals below normal. Expenses, exclusive of taxes, also show an increase of 19 per cent over January, 1918. Taxes increased 35 per cent, while the pay received by the street railway employees advanced only 29 per cent.

$89,000 of Bonds Authorized.—The Indiana Public Service Commission has authorized the Interstate Public Service Company, Indianapolis, Ind., to issue and sell at not less than 80 per cent of par $89,000 of first and refunding mortgage thirty-year 5 per cent gold bonds to reimburse its treasury for 75 per cent of the cost of additions, improvements and extensions. The Interstate Public Service Company has also been authorized to buy from Martin J. Insull all the capital stock, $150,000 common and $50,000 preferred, and $89,821 of promissory notes of the Indiana Public Service Company for $110,000, such sums to be paid in serial, promissory notes at 6 per cent interest, due in from three to sixty months.

Southern Road Needs Help.—Joseph K. Choate, vice-president of the Augusta-Aiken Railway & Electric Company, Augusta, Ga., at a recent rate hearing before the Georgia Railroad Commission made plain the perilous financial condition of the company. Mr. Choate explained that the railway had obtained a loan of $140,000 through the operating managers of the company, the J. G. White Management Corporation. He said that the affairs of the railway were critical. It needed help instead of adverse criticism and suspicion. This help must come quickly to avoid bankruptcy—to the general detriment of the service and the probable dismantlement of the property of the company.

City Permits Discontinuance.—The city of Davenport, Ia., is planning to order the discontinuance of the Fourth Street line of the Tri-City Railway and to turn approximately 1 mile of the street traversed by this line into a boulevard. The company has for several years urged the discontinuance of the line as it parallels two other lines and has been losing at the rate of $10,000 annually. The company stopped service on this line last year, but was compelled to resume state operation in order to secure a 7-cent fare. The city authorities have now come to realize that the company should be no longer burdened by operating a consistent money-losing line. The city's recent action was taken independently of company suggestion.

Valuation Under Way in Richmond.—Stone & Webster have been engaged by the Richmond Railway & Power Company, Richmond, Va., to make a complete inventory and appraisal of the property of the company in Richmond. It is estimated that the work will be completed in three months' time. The valuation is being made for the purpose of establishing a basis for determining a rate of fare which will enable the company to produce a fair return on the fair valuation. Before beginning the work, Thomas S. Wheelwright, president, extended an invitation to the State Corporation Commission and to the City Council to designate representatives to co-operate with the engineers in order to arrive at a valuation acceptable both to the company and to the public.

Abandonment of Service Proposed.—The board of trustees of the Eastern Massachusetts Street Railway, Boston, Mass., has announced that service will be indefinitely suspended on the Hyde Park Lines unless the municipalities served render financial assistance in the operating expenses. The result of such an act will deprive the communities of Hyde Park, Mattapan, Dedham, Readville, East Walpole, Norwood and Westwood of service and reduce the mileage of the system about 20 miles. The suspension of service will take effect on April 1 unless the relief asked for is forthcoming. The company has announced that owing to the shortage of cars and the conditions of tracks owing to the severity of storms prevalent in this section this winter, service will be indefinitely suspended on the Reading-Lowell, Reading-Lawrence, Woburn-Lowell and the North Reading-North Reading Junction lines.

Rental Payments on Account.—By a decree entered on March 2 in the Superior Court by Presiding Justice Tanner, the receivers of the Rhode Island Company, Providence, R. I., are directed to pay $250,000 to Cornelius S. Sweetland, receiver of the United Traction Company. In explanation of this decree, Eugene A. Kingman, who petitioned the court, stated that the decree authorized the payment of $250,000, on account, to Mr. Sweetland, on behalf of the United Traction Company, toward the rental price that the receivers of the Rhode Island Company may be called upon to pay for the use of the Union, Pawtucket and Suburban Railroad systems. In April last, the leases of these three systems to the Rhode Island terminated, and the receivers have since operated these roads. The matter of the rent to be paid by the receivers for the use of these systems is now pending before Richard E. Lyman as master, who will determine the total price at a later date. The $250,000 payment authorized by the decree is simply a partial payment, the exact wording being "on account."

Puget Sound Will Issue Preferred Stock and Change Its Name.—It is proposed to change the name of the Puget Sound Traction, Light & Power Company, Seattle, Wash., to the Puget Sound Power & Light Company. The company some time ago sold its railway lines in Seattle to the city. At the time the name is changed a proposal will be voted upon to authorize $10,000,000 of 7 per cent cumulative prior preferred stock, issuable from time to time as may be desirable. Since the refunding of the short-term notes in June, 1918, it has been necessary to spend considerable sums on the power system and the directors believe it would be highly undesirable if not impossible to finance all of the requirements by further increases in the funded debt. They feel that the sale of stock not only will make it possible to maintain a more conservative balance between the debt and the capital stock, but also will enable permanent borrowing on a more economical basis if it appears wise to resort to such borrowings.

Traffic and Transportation

Asks Enabling Legislation

Vancouver Company Would Come Under Jurisdiction of Provincial Commission—Inquiry Held Up

It is expected that amending legislation will be passed this spring which will again place the British Columbia Electric Railway under the jurisdiction of the Public Utilities Commission of British Columbia. The company has joined in the petition that this be done. When this has been done it is expected that the investigation will be resumed which was commenced by Commissioner Retallack some time ago to ascertain the fare to be charged in the city of Vancouver and that an appraisal will be made of the property of the company on the mainland.

FARE INQUIRY DROPPED

The investigation by the commissioner into the matter of fares in Vancouver was adjourned temporarily owing to peculiar circumstances. In Vancouver the company is charging a 6-cent fare. This rate was provided by the City Council in July, 1918, authorizing this charge for a period of nine months. The act creating the commission was passed before this period expired. It provided, however, for the continuance of the 6-cent fare, subject to the company being able to satisfy the commission that this rate was just.

The act also provided that until such proof was furnished to the satisfaction of the commission the amount received by the company in excess of the 5-cent fare previously charged should be deposited in a special account in a chartered bank in Vancouver, and that if the rate should be fixed at less than 6 cents the excess amount be handed over to the Vancouver General Hospital.

COMMISSION LOSES JURISDICTION

Owing to an amendment to the general railway act of Canada the railways of the company passed from the jurisdiction of the Province of British Columbia and of the Public Utilities Commission to that of the Dominion of Canada and of the *Dominion* **Railway Board.** This, of course, negatived the inquiry by the local authorities. As stated previously it is now hoped that amending legislation will result in the return of the company to the jurisdiction of the officials of the province.

Lynn Jitneys Given More Time

The City Council of Lynn, Mass., has extended to April 26 the time limit for the operation of jitneys within the city limits. By action of the Council, the licenses of the forty-two Lynn jitney drivers will expire on that date. The Council had previously set March 1 as the date for the expiration of the licenses. The Eastern Massachusetts Street Railway had asked that jitney competition be stopped, so that it could give Lynn adequate service at reduced rates. This action was taken in accordance with its policy of demanding that the communities which it serves choose between the railway and the buses as means of transportation.

Legislation Introduced at Albany

Among the bills introduced recently at Albany are the following:

Senate Intro. No. 506, Print No. 540, Introduced February 17th by Mr. Karle. Adding new section 54-a Railroad Law, by providing that a steam or electric railroad having a franchise in this state operting to and from stations in New York city and owned or operated by a railroad having a franchise from another state shall not charge in such city a rate in excess of rate charged for similar service from such city to stations in adjacent state whether over its own tracks or under agreement with another railroad.

Senate Intro. No. 661, Print No. 678, Introduced Feb. 25, by Mr. Lusk. Amending Section 40 Public Service Commission Law, by providing that if after a hearing on complaint alleging violation of section 26, or upon consideration of facts admitted in writing by a carrier, the Public Service Commission shall determine that any party complainant is entitled to award of damages, the commission shall make an order directing carrier to pay such award.

Senate Intro. No. 695, Print No. 729, Introduced Feb. 26 by Mr. Lusk. Amending Section 161-d Labor Law, by providing that no female under eighteen instead of twenty-one years as at present shall be employed on any street, surface, electric, subway or elevated railroad.

Senate Intro. No. 698, Print No. 732, Introduced Feb. 26 by Mr. Thompson. Adding new Section 194-a Railroad Law, providing for a crew of at least one motorman or driver and one conductor on every street, surface or interurban railway and for one conductor on every trailer. Each separate violation is made a misdemeanor.

Senate Intro. No. 708, Print No. 742, Introduced Feb. 26 by Mr. Shackno. Adding new subdivision 5, Section 57 Railroad Law, prohibiting any railroad company owning or operating a steam or electric road through any of the boroughs of New York City from charging more than a single fare of 5 cents for carrying a passenger from any station in the city to any other station therein on any train scheduled to stop at such stations.

Senate Intro. No. 843, Print No. 922, Introduced March 4 by Mr. Fowler. Enacting the Municipal Utilities Law constituting Chapter 71 of the Consolidated Laws. On application of municipalities the Public Service Commission shall determine the fair value of any utility property subject to acquisition or estimate cost of establishing a municipal utility where it is proposed to be done wholly or partly by acquisition of other property or by new construction. The commission must take into consideration amount of capital honestly and prudently invested, present condition of property, its depreciation and adaptability for municipal utility purposes. The finding of the commission shall not constitute conclusive evidence of value.

Senator Thompson introduced a bill on March 9 to amend the railroad law as an aid to the financial difficulties of street railway companies. By its provisions the companies would only be obliged to pay for paving 6 in. outside the rails. At present, street railway companies are obliged to pay for paving 2 ft. outside the rails. Senator Thompson explained that the bill was introduced at the request of the officers of the New York Electric Railway Association.

Surface Lines Prodded

New York Body Thinks Depreciation Allowance of 38 Per Cent Too Large

The Board of Estimate and Apportionment of New York has temporarily concluded the inquiry into the rapid transit lines and turned its attention to the surface roads. A discussion of the financial condition of the New York Railways, which operates the "green car" lines, took up the March 10 session. Corporation Counsel William P. Burr, who is conducting the inquiry for the city, attacked the present financial methods of the company, chiefly those relating to the fixing of the rate of depreciation.

RESERVE FUND CALLED EXCESSIVE

Mr. Burr declared that the allowance of 38 per cent of the passenger revenue as a reserve fund against maintenance and depreciation was excessive. This amount was awarded the company some time ago by Federal Judge Julius M. Mayer. The Corporation Counsel held that the reserve fund was too high to permit the company to realize any profit on its investment. He contended that if the company had adhered to the old reserve of approximately 20 per cent, allotted by the Public Service Commission in 1912, its books would show a surplus where they now show continual losses.

In reply to the Corporation Counsel's request that the statement made by Henry L. Stimson, counsel for the company, to the effect that the practice of maintaining a reserve of 38 per cent was a common one, be substantiated by testimony, Mr. Stimson called to the witness stand Frank Samuelson, auditor for the company. Asserting that the company had fallen short in adequate protection of the property to the extent of $1.394.000. Mr. Samuelson maintained that the 5-cent fare was at present totally inadequate to meet the operating expenses.

Colonel Stimson offered evidence to show that the lines now in the hands of Job E. Hedges, receiver for the company, had been reduced by order of the Federal Court to less than 100 miles of road from the original 150 miles, and that the lines are not now earning any interest on the investment. He said that the lines in control of Mr. Hedges had lost during February in revenue through inability to operate and cost of snow removal a sum amounting to between $800,000 and $900,000.

Fare Increase Suspended

The Public Service Commission of the State of Washington has suspended for a period of ninety days a schedule of rates of the Grays Harbor Railway & Light Company, Aberdeen, under which the company proposed to raise fares in Aberdeen, Hoquiam and Cosmopolis from 5 cents to 7 cents beginning Feb. 20. No increase was planned in the rate bewteen Hoquiam and Aberdeen.

Seven Cents in Nashville

The Tennessee Public Utilities Commission in an order issued on March 3 authorized the Nashville Railway & Light Company to charge 7-cent cash fares. The commission ordered the sale of four tickets for 25 cents. The company was directed to make improvements in its rolling-stock and trackage, to discontinue certain crosstown lines and to provide more adequate service during the morning and evening rush hours. The higher fare went into effect on March 8.

The company's application for an increase had been before the commission since last December, when it asked permission to charge a 7-cent fare pending an investigation of its financial condition by a board of three members, representing respectively the city of Nashville, the commission and the company. It was proposed that a permanent rate should be based upon the findings of this board.

This is the second fare increase authorized by the commission within a few weeks, the Chattanooga Railway & Light Company having been authorized recently to charge 7-cent fares. The case of the Memphis Street Railway is new pending. Fares in Memphis were raised to 6 cents several months ago.

Louisville Program Under Way

Since the Louisville (Ky.) Railway was reorganized, the company is getting better official and public support, and the managerial committee, which is operating the road, reports progress. It is believed that the new president will be elected during the next three weeks. In the meantime the program will be started for working out the plans of future operation under the reorganization. Some improvement in service is being shown, and some slight economies have been effected in cost of operation. It is planned to drop several parallel lines, and increase carrying equipment on the ones remaining. This will result in faster and better service.

The management is posting notices on cars and in carhouses expressing its desire to improve service and asking maximum co-operation from employees and the public.

One of the notices says:

> To the public: We are endeavoring to provide the people of the city of Louisville with the best car service possible. We have the loyal support of the officials and the men of all departments, and we ask the hearty co-operation of the riding public.

Mayor Smith, the presidents of both boards of the General Council and the directors' managerial committee of the Louisville Railway conferred on March 4 with F. H. Sager, consulting engineer and traction expert of Chicago.

Jitneys Curbed in Muskogee

The city government at Muskogee, Okla., has taken action to stop the operation of jitneys that have been threatening the very life of the Muskogee Traction Company. When the company announced it would suspend all cars on its East Side lines if the jitneys were not stopped, Mayor F. B. Fite ordered the arrest of all owners and drivers of jitney buses. The city had been helpless to protect itself up to a week previous, when District Judge Watts in a decision held that the city had absolute control of its streets and that it was within its police powers to regulate and control, even to prohibition, the jitneys. Mayor Fite said:

> The railway company's revenue is being taken from it by the jitneys that operate just ahead of the cars on streets where cars run. We must protect the company's investment or be classed as a jitney town. I have instructed the police and legal departments of the city to use all their efforts in banishing the jitneys from our streets.

Details of I. R. T. Service Order

Public Service Commissioner Lewis Nixon of the First District, has issued an order directing the Interborough Rapid Transit Company to make material increases in the service which it renders on all of its subway lines, particularly in the non-rush hours. The order calls generally for ten-car expresses instead of eight-car, and six-car trains practically throughout the daytime non-rush hours. A part of the service increase also covers service in evening non-rush hours. Some increases are made in rush-hour local service.

The tracks are now operated practically to capacity for express service during rush hours, and no material increase is possible during such period. The service improvements directed by Commissioner Nixon will add to the service being operated in the non-rush hours a total of 600 cars more than are now operated in these hours, and about 30,000 more seats than are now furnished in these hours.

The order follows extensive investigations made by the commission into Interborough service. The commission gave the company until March 10 to determine whether it would accept the order, and to March 17 to put the new service into effect. The order was referred to briefly in the ELECTRIC RAILWAY JOURNAL for March 6, page 488.

Transportation News Notes

Would Retain 8-Cent Fare. — Rolla Wells, receiver for the United Railways, St. Louis, Mo., on March 4 applied to the State Public Service Commission for permission to continue in effect the 8-cent cash fare charged by the company.

Asks Hearing on Tube Raise.—The New Jersey Board of Public Utility Commissioners on March 6 sent a communication to the Interstate Commerce Commission asking for a public hearing on the reasonableness of a proposed fare increase on the lines of the Hudson & Manhattan Railroad. The company, which operates the tubes under the Hudson River connecting New York and New Jersey, has announced that on April 4 it will raise its fare to 8 cents. The present fare between the Hudson Terminal and Jersey City and Hoboken is 5 cents and between other stations in Manhattan and the latter points, 7 cents.

Freight Service Proposed for Cincinnati.—The Cincinnati (Ohio) Traction Company is working out plans for the establishment of a general freight service on its lines. Walter P. Draper, vice-president of the company, has suggested to Street Railway Director Culkins that the returns from such service would assist in relieving the system's financial condition. As a first step toward the organization of freight service negotiations have been started with several manufacturers of Norwood relative to their financing of an extension of the Edwards Road line to a connection with the South Norwood line.

Supreme Court to Pass on Fares.—The city of San Antonio, Tex., has taken steps to appeal to the United States Supreme Court in its contest with the San Antonio Public Service Company over the question of fares in San Antonio. The last court action was the granting last fall of an injunction in the Federal District Court by Judge Duval West restraining the city from interfering with the company in charging a fare sufficient to meet expenses and insure an adequate return on its investment. The company showed that the 5-cent fare fixed by the city was confiscatory, and on this showing Judge West based his decision. It is now charging a straight 7-cent fare.

Eight Cents Asked in Johnstown. — Notices of a proposed increase in fares to take effect April 1 have been posted by the Southern Cambria Railway, Johnstown, Pa. Single cash fares will be 8 cents for each zone, but tickets will be sold in books at the rate of 7½ cents a zone. There are ten zones on the line from Johnstown to Ebensburg, so that the increase will mean a maximum of 10 cents on a cash fare. On books of tickets, however, and on workmen's tickets, the actual increase is only 5 cents each way. New express tariffs have also been filed, but they provide for increases only on shipments weighing more than 500 pounds on which a reduction in rates had formerly been allowed.

Information at the Source.—As an aid to the improvement of railway service in Toledo, Ohio, officials of the Toledo Railways & Light Company who are not directly connected with the railway department of the company will be assigned to ride cars at rush hours and mix with the public for the purpose of obtaining suggestions from the car rider's viewpoint. On Feb. 25 the first assignments were made. Advertising Manager E. R. Kelsey discovered that in a certain type of car additional straps in the front end would provide room for nearly twenty passengers. The improvement was immediately sanctioned by the railway department. Regular assignments to ride the cars will be made in the future.

Long Hauls Blamed for High Fare.—Street Railway Director W. C. Culkins of Cincinnati has submitted to the City Council a report outlining the reasons for the 7-cent fare charged by the Cincinnati Traction Company. The council had asked for an explanation of the conditions which made the 7-cent fare necessary. Mr. Culkins declares in his report that the city can hope for no reduction in fares until sparsely settled districts through which the company is now operating for long distances at a loss, are built up and become more densely populated. He points out that the company pays an annual city tax of $350,000. According to Mr. Culkins the use of the skip-stop resulted in a saving to the company of $60,000.

Secession Move in Staten Island.—A group of business men of Richmond Borough, Staten Island, N. Y., has organized a movement for the separation of the borough from New York City. The agitation for secession resulted from the transportation situation in Staten Island, a large part of which has been without electric railway service since the Staten Island Midland Railway suspended operation last January because of lack of funds, its request for a higher fare having been refused by the New York City Board of Estimate. A petition for the return of the trolleys at an increased fare has been signed by 15,000 Staten Islanders. The Richmond County Grand Jury is conducting an investigation of the trolley situation in the borough.

Wants Rochester Service Improved.—Corporation Counsel C. L. Pierce of Rochester, N. Y., has filed with the Public Service Commission for the Second District a brief in which he asks the commission to order improvements in the service furnished by the Rochester lines of the New York State Railways. The commission recently conducted three hearings at Rochester into the condition of the company. In his brief Mr. Pierce contends that the company can improve its service while continuing to operate on a 5-cent fare basis. He asks the commission to direct the company to carry out a definite schedule on each line, based upon a specific headway for the line as a whole, this service to continue for a trial period of three months, during which time the company's books should be open to public inspection.

Seven Cents in Worcester. — The Worcester (Mass.) Consolidated Street Railway on March 7 raised fares on its Worcester City lines from 6 cents in each zone to 7 cents and on its suburban zones from 5 cents to 6 cents. The increase was granted by the Massachusetts Department of Public Utilities on the application of Clark V. Wood, president of the company, who stated that an increase in revenue was necessary to prevent bankruptcy. The 7-cent fare is a temporary arrangement. The utilities commission will hold a hearing on April 1 as a preliminary to the fixing of a permanent rate. The company last December established two 5-cent zones on its Worcester lines. In January the fare in each zone was raised to 6 cents. The company's receipts were greatly reduced by interruptions in service during the recent blizzard.

Stricter Jitney Control Urged.—Retention of jitney competition with the Springfield (Mass.) lines of the Eastern Massachusetts Street Railway, is recommended in the report of the jitney committee of the Springfield City Council. The committee states that unrestricted jitney competition is in its opinion unfair, but urges that the vehicles be allowed to operate providing their regulation is made more strict. It recommends that each jitney be capable of carrying twenty persons and that each pay a $100 license fee, furnish a $1,000 cash bond and give $500 in bond or insurance for every passenger carried, thus making the total security at least $11,000 per vehicle. Jitney fares would be made the same as those charged by the Eastern Massachusetts Street Railway, and jitney routes would be lengthened and would include routes not served by the trolley company. The vehicles would operate eighteen hours a day and seven days a week.

Publicity Campaign to Curb Jitneys.—J. M. Ives, receiver for the Danbury & Bethel Street Railway, Danbury, Conn., is conducting a campaign of publicity through the advertising columns of Danbury newspapers, to interest the car riders of that city and Bethel in the company's plight. The company's receipts have been cut into by jitney competition, especially on the Bethel line. Mr. Ives used a full page in the Danbury *Evening News* on Feb. 24 to explain the seriousness of the company's situation, pointing out that, if unrestricted jitney competition continues, the company will be compelled to abandon service on the Bethel line. To bring home to the public what such a suspension would mean, he reprinted in part the article in the January issue of *Aera* dealing with the Toledo situation. On Feb. 28 he reprinted in the *Evening News* extracts from the article in the ELECTRIC RAILWAY JOURNAL for Jan. 31 on the trolley-jitney fight in Massachusetts.

Asks Seven Cents in Fort Wayne.—Robert M. Feustel, president of the Fort Wayne & Northern Indiana Traction Company, operating the lines in Fort Wayne and interurban lines to Bluffton, Huntington and Lafayette, Ind., has petitioned the Indiana Public Service Commission for authority to increase the fare on the Fort Wayne city lines. He asks for permission to charge a 7-cent cash fare and a 6-cent ticket rate. In applying for a higher fare Mr. Feustel stated that the company planned to grant its employees a substantial advance in wages. The company in a public statement recently gave prominence to the following facts concerning its financial condition: Total revenues for the year 1919, $730,809; total operating expenses $638,225; taxes $11,257; net available for returns on investment, $81,327; return on investment of $2,780,000, 2.88 per cent; revenue passengers carried 14,026,200; transfer passengers carried, 2,805,202; average passengers per day, 46,113.

Wins Appeal Against Car-Shortage Penalty.—The Judicial Committee of the Imperial Privy Council has allowed the appeal of the Toronto (Ont.) Railway against a penalty of $1,000 a day for twenty-four days imposed by the Ontario Railway & Municipal Board for failure to carry out the board's order of Nov. 9, 1914, for the supply of 100 double-truck cars by Jan. 1, 1918. Owing to war conditions the company was unable at that time to supply the cars. The city, however, made several applications to the board to compel the company to comply with the provisions of the order. The matter drifted until early in 1918, when special legislation was passed by the Ontario Legislature providing a penalty not exceeding $1,000 a day for non-compliance with an order of the board. The law became effective on March 26, 1918; the board thereupon inflicted a penalty of $1,000 a day from that date for failure to provide 100 cars by Jan. 1, 1918. The company immediately appealed on the ground that the board had no authority to make such an order and that the company had made every effort to supply the cars but was unable to do so because of war conditions.

Would Bar Jitneys From Thoroughfare.—John A. Beeler, who is conducting a survey of traffic conditions in Kansas City, Mo., has submitted a report to the board of control of the Kansas City Railways in which he recommends regulation of vehicular traffic and the installation of loading platforms for the relief of congestion in Main Street. Mr. Beeler would forbid the operation of jitneys on Main Street within the congested district. He maintains that the operation of jitneys in Main Street constitutes a serious hindrance to the operation of street cars, pointing out that they constitute 35 per cent of the vehicular traffic in that thoroughfare. During the period from 4 p.m. to 6 p.m. on a certain day recently a count at Twelfth and Main Streets showed that 795 passenger automobiles carried 1,547 persons including drivers, or an average of 1.9 persons per car. Jitneys numbering 324 carried 1,349 persons, or an average of 4.2 persons per vehicle, not including the driver. Regulations proposed by Mr. Beeler have already been put in effect on Tenth Street. These provide for the relocation of stops, the employment of double-berthing, the readjustment of positive stops, giving the right of way to the heavy lines and precedence to street cars over other traffic.

Personal Mention

Mr. Mitchell Steps Up

General Manager of West Penn Railways Succeeds Williston Fish as Vice-President of System

H. L. Mitchell, general manager of the West Penn Railways, Pittsburgh, Pa., on March 1 assumed the duties of vice-president of the system. Mr. Mitchell was elected to the vice-presidency at a recent meeting of the board of directors to fill the vacancy caused by the resignation of Williston Fish. The latter has been appointed general manager of the Chicago (Ill.) Surface lines, as announced in previous issues of the ELECTRIC RAILWAY JOURNAL.

EIGHTEEN YEARS WITH SYSTEM

Mr. Mitchell has been identified with the West Penn Railways and the companies which it controls during the period of their development into one of the most important utility systems in Pennsylvania. The lines of the company radiate through the Connellsville coke region of southwestern Pennsylvania, penetrating the Wheeling district of West Virginia. Mr. Mitchell has had an active part in building up and organizing this net-work of lines. His election to the vice-presidency came just eighteen years from the date of his first connection with the system.

He entered the employ of the old Pittsburgh, McKeesport & Connellsville Railway at Pittsburgh on March 1, 1902. On February 13, 1903, when the general offices of that road were moved to Connellsville, he became chief clerk to Thomas Elliot, then general manager. From that date until July 1, 1911, he held various positions with the company, among them those of paymaster and office manager. He also had charge of the general and district stores department.

MR. MITCHELL ALSO AT WHEELING

On July 1, 1911, when the West Penn interests acquired additional lighting and railway property in Allegheny, Butler, Armstrong, Washington and Green Counties, Mr. Mitchell was transferred to Pittsburgh as assistant to W. E. Moore, vice-president and general manager. At the time of the reorganization of the West Penn System in November, 1918, he was made assistant manager of the light and power department, continuing in that capacity until July 1, 1918, when he entered the office of Williston Fish as assistant to the vice-president. On Sept. 15, 1918, he was transferred to Wheeling as vice-president and general manager of the Wheeling Traction Company and on Feb. 1, 1919, returned to Pittsburgh as general manager of the West Penn Railways.

Augustus T. Throop, superintendent of the light and power departments of the Wilmington & Philadelphia Traction Company, Wilmington, Del., has resigned.

E. B. Atchley Joins Akron Company

E. B. Atchley, publicity manager of the Kansas City (Mo.) Railways, has resigned, effective March 15, to direct the publicity work of the Northern Ohio Traction & Light Company, Akron, Ohio. Mr. Atchley leaves Kansas City after four years of service under President Philip J. Kealy. During this time he established a monthly magazine for the employees of the company and a weekly leaflet dealing with public affairs which is distributed on the company's cars. Both publications are known as the *Railwayan*, and both have been very successful in promoting a community of interest between company and employees on the one hand and company and patrons on the other.

E. B. ATCHLEY

Mr. Atchley has had a free hand in promoting the interests of the Kansas City Railways through broad and open publicity policies, and has wielded a material influence in making the company's motive understood by the people during the troublous times of the past few years. Prior to his connection with the company he was editor of the Kansas City *Post*, and previous to that was associated in an editorial capacity with the Kansas City *Star*, the St. Louis *Globe-Democrat*, the Omaha *Bee*, and other newspapers.

In going to Akron, Mr. Atchley will take with him the creed which he formulated into ten commandments expressing the policies and aims of the street railway, when he undertook his connection with the Kansas City Railways. This creed has stood the test of four years' application, and it will now be applied to the territory served by the Northern Ohio Traction & Light Company. Mr. Atchley's "Ten Commandments" follow:

1. Thou shalt not, in any manner, deceive the public; and those working, being of themselves the company, shall be likewise undeceived.
2. Thou shalt furnish a proper service for a just compensation at all times.
3. Thou shalt deal fairly with those who ride in the cars, and recognize the rights of the men who operate them.
4. Remember thy promises always—and keep them.
5. Seven days, day and night, rain or shine. shalt thou labor. There is no rest for thee. For the people must have transportation continually.
6. Thou shalt not have "watered" stock or engage in stock juggling. The time for that is past.
7. Honor the city and the community in which you have car lines, that the relationship may be pleasant and that the city and community may continue to be blest by growth.
8. Thou shalt not operate cars recklessly.
9. Thou shalt keep thy cars clean and sanitary and in good repair.
10. Thou shalt not squander the money entrusted to thy care by the people who ride in the cars for those who have built the street railway system. Remember, thou art but husbanding such money. acting as agent for the owners and the people, to produce the maximum service for the minimum cost.

Mr. Hill Returns to California

W. V. Hill, who resigned recently as manager of the Washington office of the American Electric Railway Association, has returned to California, where he will resume his duties as manager of the California Electric Railway Association. Mr. Hill's work at Washington for the national body commenced when he was appointed assistant manager of the American Electric Railway War Board under E. C. Faber. Both in this post and in the other capacities in which he served the association so successfully at Washington, Mr. Hill was able to draw on the large fund of information which he had accumulated in his long and varied experience in active railway work and as manager of the California association.

As stated in the ELECTRIC RAILWAY JOURNAL for March 6, an arrangement has been made with Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., and chairman of the committee on national relations, to take over the active supervision of the affairs of the Washington office.

Mr. Henry will give as much of his time to this work as may be necessary. The office will be open continuously and all communications addressed to Mr. Henry at 950 Munsey Building, Washington, D. C., will receive prompt attention.

The Washington office of the association is equipped to act as agent before the Interstate Commerce Commission for member companies of the association requiring this service. Such companies as are not so represented or who desire to make a change in their present arrangement should communicate with Mr. Henry at Washington.

Executives and others connected with member companies having business in Washington are urged to make the association's rooms their headquarters.

Mr. Heindle Leaves Railway Work

William A. Heindle, general superintendent of the Wilmington & Philadelphia Traction Company, Wilmington, Del., has tendered his resignation to take effect on April 1. On that date Mr. Heindle will go into business in Wilmington as an engineer and contractor. He has been connected with the company since 1910.

Mr. Heindle was graduated from Lehigh University in 1891 with the degree of civil engineer. For the next three years he was employed by the Baltimore City Passenger Railway in the construction of cable and overhead trolley lines. From 1894 to 1899 he was engaged in the construction of lines in Washington, D. C. In 1900 he became associated with J. G. White & Company, Ltd., London, Eng., on engineering contracts in Great Britain and on the Continent.

Returning to the United States in 1906 Mr. Heindle served for four years as supervising and electric railway engineer with J. G. White & Company, Inc., New York. He resigned in 1910 to join the Wilmington & Philadelphia Traction Company.

Mr. Hoover Gets First Washington Award

Herbert C. Hoover was presented with the Washington Award, founded in 1916 by John W. Alvord, at a dinner in his honor in Chicago on Feb. 28. The Western Society of Engineers acted as spokesman for the founder societies and Charles F. Loweth, chairman of the Washington Award Commission, made the presentation speech. Onward Bates spoke as a representative of the American Society of Civil Engineers, James Rowland Bibbins for the American Society of Mechanical Engineers, Bion J. Arnold for the American Institute of Electrical Engineers and Charles H. MacDowell for the American Institute of Mining and Metallurgical Engineers.

To use the words of the donor, the award is for presentation annually "to a member of the engineering profession who has accomplished much for the world about him in vital, important, far-reaching ways, and whose services in general have been noteworthy for merit in promoting the public welfare."

In his acceptance address Mr. Hoover stated that he could not accept the award except as a way of doing homage in a measure to the 1,000 engineers who had associated themselves with him in his work. His address dealt in general with the inter-relationship of general industries and food production and distribution.

Charles N. Ryan, secretary and treasurer of the Wilmington & Philadelphia Traction Company, Wilmington, Del., has resigned.

Edgar E. Clark, of Iowa, has been elected chairman of the Interstate Commerce Commission. The office of chairman is occupied in rotation.

Kenneth P. Allen has been appointed assistant equipment engineer of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. Mr. Allen was formerly connected with the engineering department of the Firestone Tire & Rubber Company.

Charles R. Wright, who for some time past has been connected with the Knoxville Railway & Light Company, Knoxville, Tenn., has resigned to accept a position with the Acme Electric Company, which does electrical contracting.

P. T. Reilly, superintendent of transportation of the Scranton (Pa.) Railway will sever his connection with the company on April 1 to accept the position of general superintendent of the Wilmington & Philadelphia Traction Company, Wilmington, Del.

William E. Dowdell has been appointed general superintendent of the Portsmouth Electric Branch of the Boston & Maine Railroad, with headquarters at Portsmouth, N. H. Mr. Dowdell was formerly assistant general superintendent of the line, which operates between Portsmouth, Rye and North Hampton.

Rodney Hitt, who was associate editor of ELECTRIC RAILWAY JOURNAL from 1908 to 1912, has organized the firm of Hitt, Farwell & Park, with headquarters at 37 Liberty Street, New York, to transact a general investment business. For the past eight years Mr. Hitt has been associated with White, Weld & Company, bankers, New York.

R. A. Leussler, general manager of the Omaha & Council Bluffs Street Railway, Omaha, Neb., was elected second vice-president of the company at the annual meeting of the board of directors. Mr. Leussler will continue to perform the duties of general manager. He has been connected with the company since 1906. A biography and portrait of Mr. Leussler were published in the ELECTRIC RAILWAY JOURNAL at the time of his appointment as general manager in October, 1919.

Archibald Page, general manager of the Clyde Valley Electrical Power Company, Scotland, has resigned. Mr. Page has been appointed a technical member of the Commission under the Ministry of Transport for the control of the electrical supply of the kingdom. In last week's issue it was erroneously stated that Mr. Page had resigned as general manager of the Glasgow Corporation Tramways Department. Mr. Page has at no time been connected with the latter organization.

William B. Skelton, whose election as president of the Androscoggin & Kennebec Railway, Lewiston, Me., was noted in the ELECTRIC RAILWAY JOURNAL for Feb. 21, was born in Bowdoin, Me., in 1871. He was graduated from Bates College in 1892, and in the following year was admitted to the bar. In addition to the practice of law in Lewiston he has taken an active part in municipal and State affairs, serving as Mayor of Lewiston from 1903 to 1905 and as Judge Advocate General with the rank of Colonel on the staff of Governor Cobb from 1905 to 1909. From 1914 to 1919 he served on the State Public Utilities Commission. Mr. Skelton is a member of the law firm of White, Carter & Skelton, Lewiston.

W. V. Neal, assistant general manager of the Monongahela Valley Traction Company, Fairmont, W. Va., has tendered his resignation, to take effect on March 15. Mr. Neal plans to enter the provision business in Clarksburg, W. Va. Before joining the Monongahela Valley Traction Company in January, 1919, he was connected with the Trinidad Electric Transmission, Railway & Gas Comany, Trinidad, Col. For several years he was connected with the Stone & Webster interests with headquarters at El Paso, Tex. He was at one time an employee of the United States Government and had charge of the construction of a number of engineering projects in the Philippine Islands.

Harry C. Stevenson, formerly auditor of the Elizabeth, Plainfield & Central New Jersey Railway and later assistant to Edmund W. Wakelee, vice-president of the Public Service Corporation, has been promoted to personal representative to Thomas N. McCarter, president of the latter company. Mr. Stevenson began his business career in May, 1897, as secretary to Thomas N. Barr, then president of the Worcester (Mass.) Consolidated Street Railway. In 1901 Mr. Barr became the president of the Elizabeth, Plainfield & Central New Jersey Railway at the same time Mr. Stevenson was made auditor. Mr. Stevenson entered the Public Service Corporation when that organization was formed in 1903. In 1907 he was made assistant secretary to the Public Service and its underlying companies, becoming assistant with Mr. Wakelee in April, 1917. Mr. Stevenson will be assigned to the southern division which embraces Camden and the territory as far north as Trenton.

Obituary

R. L. Cadwell, construction engineer of Georgia Railway & Power Company, Atlanta, Ga., died recently at his home in Tallulah Falls, Ga.

A. H. Rogers, president of the Southwest Missouri Railroad, Webb City, Mo., died on March 6 in Los Angeles, Cal. Mr. Rogers was president of the Globe Publishing Company, Joplin, Mo.

H. M. Davis, manager of the advertising department of the Sprague Electric Works of the General Electric Company, died at his home in Brooklyn on Feb. 9. He had been connected with the Sprague Company since December, 1899.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES   BUSINESS ANNOUNCEMENTS

Heavy Ordering of Electrical Sheets

Full Capacity Booked by Mills for First and Second Quarters—Higher Prices Expected For Third Quarter

Steel mills are entirely booked up on electrical sheet through the first half of the year. Where books were opened in November for the first half, the mills concerned had no difficulty in taking care of their capacity in a very short time. Where booking by the quarter is practiced, second-quarter capacity was contracted for in almost no time a few weeks ago, and in some districts a good part of it was done over the telephone.

Realizing that the demand was far ahead of the supply, the mills and their agents writing up second-quarter business first took care of their regular trade of long standing; and even these customers were not always able to secure sufficient sheets to supply their needs. District agents had only their allotment of mill capacity, and this in turn had to be allotted further. New customers and new manufacturers in the field were hard put to it to obtain material, but apparently jobbers held sufficient of the electrical sheets to supply part of their needs anyway.

During the first quarter some customers bought heavily, really more than they would consume in that period, but they were a little ahead of the game when second quarter was allotted. Consequently some mills had small amounts extra that they could hand out, and these were eagerly snapped up by other than regular customers. In one case in point, where the mill agent offered one of these small lots to a rather new customer, the latter was in no hurry to take it. Two weeks later, when he wrote in for it he was much upset to learn that it had been gobbled up by another firm. That is merely one instance in which the nature of the market is shown. Electrical sheets are not now being sold over the counter at the buyer's will.

Books for the second half year or for the third quarter are not yet open. Mills expect just as large a demand as that experienced over the first half year. Slightly better capacity will be available, it is reported. A loosening up of the labor market would place the industry on a still better basis. It is expected that orders may be placed along toward the end of April or early in May when the books will be open. Prices for the second half year will probably be higher than those quoted for the first half, while those for the third quarter are hardly expected to show much advance over those of the second quarter.

The foreign demand for sheets is heavy, but there is extremely little capacity set aside to serve it. In some cases there has been no allotment whatever set aside for this market. Actual orders are on hand for a considerable tonnage from European countries, but the mills have been unable to fill them and care for their regular domestic trade too. In some quarters this policy has been questioned because the good will which might be built up at this time might be very acceptable when the demand for sheets shall have decreased in the domestic market and a foreign outlet for an excess mill capacity be sought.

It has been contended in some quarters that small tonnages would materially help the foreign situation now and undoubtedly help the domestic mill in the future.

Rolling Stock Purchases Break Records

More Than 1/3 as Many Cars as Were Bought During the Whole of 1919 for City Service Have Been Ordered in January and February, 1920

Safety car purchases during January and February have broken all records. For the first two months alone, as far as is known, 545 of these quicker-headway, minimum-energy-demanding safeties have been ordered from the different carbuilders, although late returns may swell the total to more than 600. The former number is equivalent to more than 25 per cent of all cars ordered during the past year for city service.

TABLE 1—SAFETY CARS ORDERED DURING JAN. & FEB., 1920

New England States	
Biddeford & Saco R.R.	2
Boston Elevated Ry.	31
Concord (N. H.) St. Ry.	4
	37
Middle Atlantic States	
Empire State Ry. Corp.	6
Reading Transit & Lt. Co.	12
Salem & Pennsgrove	6
Trenton, Bristol & Philadelphia Ry.	6
Trenton & Mercer Co. Traction	40
United Rys. & Electric Co.	33
Westchester St. Ry.	6
	109
Southern States	
Baton Rouge Electric Ry	8
Birmingham Ry. Lt. & Pr. Co.	10
Columbus (Ga.) R.R.	9
Mobile Lt. & R.R	10
Monongahela Valley Traction	8
Tampa (Fla.) Electric Ry.	8
	53
East Central States	
Hodenpyl Hardy & Co.	118
Galesburg Ry., Lt. & Pr	20
Indiana Ry. & Lt. Co.	10
Decatur Ry. & Lt. Co.	6
Pekin (Ill.) Municipal Ry.	3
Peoria Ry.	20
Urbana & Champaign Ry.	6
	183
West Central States	
El Paso Electric Ry.	10
Galveston Electric Ry.	15
Grand Forks (N. D.) St. Ry.	6
Lincoln Traction Co.	15
Northern Texas Traction	25
Peoples Gas & Elec., Burlington, Ia.	6
Topeka Ry.	8
	85
Rocky Mountain and Pacific Coast States	
Everett Ry., Lt. & Pr.	2
Los Angeles Ry.	45
San Francisco-Oakland Term.	25
Tacoma Ry. & Pr.	6
	78
Total companies placing orders	43
Total safety cars ordered	545

With the 181 double-truck motor cars and trailers added, which have been placed during January and February, as shown in Table II, rolling stock purchases amounting to 726 cars for the two months are equivalent to more than 33⅓ per cent of the total number of cars ordered during 1919 for city service. This number is 126 cars greater than the conservative estimate of the ELECTRIC RAILWAY JOURNAL made early in the year for cars to be purchased during the first two months. Also reference to this table shows the decided trend toward the use of safety cars. The total of double-truck motor cars and trailers, however, does not include electrified steam roads, hence the seventy cars ordered by the Long Island Railroad for its electric division are not included.

Table I gives the list of railways ordering safety cars and is but a slight indication of what may be expected later. Five large city railways are reported to hold options for a total of more than 400 safeties and the greater number of these are expected to be placed during the next sixty days.

With the railways all over the United States in both large and small cities ordering safeties at a rate of between 3,000 and 4,000 cars a year, manufacturers are actively planning production on a large scale to meet the demand which is everywhere apparent. The rush for sheets, plates and shapes, control, air brake equipment, door and step control equipment, motors, etc., has been so strong that manufacturers of the different products are swamped and already long deliveries are being quoted, which may make it physically impossible for the carbuilders to turn out the increasingly large number of safety cars that will be required by the railways.

The St. Louis Car Company, since the completion of its many war contracts, has made necessary changes in the arrangement of its plant to turn out safety cars on a large scale. For the present shop facilities have been arranged for the production of five safety cars per working day. Deliveries by this company, which are thought to be very good, will be announced at a later date. The company also contemplates selling its safety cars, which are of the standard type, direct to the railways.

TABLE II—COMPARISON OF NEW ROLLING STOCK FOR CITY SERVICE

	1916	1917	1918	1919	Jan.-Feb. 1920
Safety cars	187	280	644	1,383	545
Double truck motors, cars and trailers...	2,859	1,718	1,198	746	181

The Osgood-Bradley Car Company is preparing its shops for quantity production. It is reported that the company is now building 300 safety cars for stock purposes although it is known that perhaps 100 of these have already been spoken for.

Prospects for a heavy volume of business in all kinds of equipment accessories and supplies used in the manufacture of both safety cars and double truck cars never were brighter and manufacturers and railway supply men are now openly enthusiastic about the prospects for the coming months.

New Officers of Galena Signal Oil

At the annual meeting on Feb. 24 of the Galena-Signal Oil Company, Franklin, Pa., a stockholders' advisory committee was created consisting of J. S. Cullinan, John B. Dennis and Frederick Strauss, and several changes made in officers and directors. Lauren J. Drake was elected president to succeed J. S. Cullinan who becomes a member of the new committee. W. A. Trubee, who was district manager at New York, and W. F. Walsh, who was district manager at Chicago, become vice-presidents. L. F. Jordan remains as vice-president at New York and F. E. Linahen as vice-president at Franklin. F. French Miller was elected secretary-treasurer at Franklin, L. W. Stull as assistant secretary and assistant treasurer at Franklin and C. W. Hochette as assistant secretary and assistant treasurer at New York.

The directors re-elected are: L. J. Drake, L. F. Jordan, J. French Miller and E. V. Sedgwick. In addition, F. E. Linahen, W. A. Trubee and H. S. Skinner were added to the board.

Lauren J. Drake, the new president of the company, was born at Keokuk, Iowa, on Aug. 27, 1880. He was educated in the public schools of Omaha, Neb., and Chicago, Ill., and in 1899 was graduated from the Shattuck Military School, Faribault, Minn. He then entered the oil business and in 1905 he joined the Galena-Signal Oil Company and was a representative of that company in the Middle West. In 1916 he was transferred to the company's executive offices in New York to become vice-president and director of the company. As president, Mr. Drake will have his headquarters in New York.

W. A. Trubee, who has been elected a vice-president and director with headquarters at New York, was born in Bridgeport, Conn., on March 22, 1867. He attended a private school in Bridgeport and later the Greylock Institute at South Williamson, Mass. During February, 1898, he entered the service of Galena-Signal Oil Company as sales representative at Bridgeport, Conn. In May, 1912, he was transferred to New York office and in March, 1919, he was appointed district manager at New York, which position he held until his recent election as vice-president and director of the company.

National Federation Construction Industries to Meet

The first annual meeting of the National Federation of Construction Industries will be held at the Hotel Sherman, Chicago, March 24-25. The chief business of the meeting will be consideration of several important proposed changes in the by-laws of the organization. Through changes in the by-laws, it is proposed to increase the number of vice-presidents, create an advisory board, provide for a staff council and take measures to develop district organization.

Rolling Stock

Boston Elevated Buys Seventy Large Cars

The Boston Elevated Railway, which was mentioned in the Feb. 7 issue of the ELECTRIC RAILWAY JOURNAL as being in the market for 100 cars, has now placed orders for this number of cars with three different car builders. As previously announced, thirty safety cars were placed with the J. G. Brill Company.

Forty cars for use on the elevated line, similar to those now in use, have just been ordered from the Pressed Steel Car Company. In addition an order has been placed with the Laconia Car Company for thirty standard center-entrance double-truck surface cars equipped for train operation.

Westchester Street Railway, White Plains, N. Y., noted in the Jan. 3rd issue of the ELECTRIC RAILWAY JOURNAL as being in the market for safety cars, has placed an order with the Osgood-Bradley Car Company for six safety cars.

New York & Stamford Railway, Port Chester, N. Y., noted in the Jan. 3rd issue of the ELECTRIC RAILWAY JOURNAL as being in the market for safety cars, has placed an order with the Osgood-Bradley Car Company for seven safety cars.

Boston (Mass.) Elevated Railway, noted in Feb. 7th issue as having placed an order for thirty Birney safety cars, has specified the following details.

Number of cars	30
Builder	J. G. Brill Company
Type	Safety
Seating capacity	32
Length over all	28 ft. $\frac{1}{2}$ in.
Truck wheelbase	8 ft. 0 in.
Width over all	7 ft. $10\frac{5}{8}$ in.
Interior trim	Bronze
Headlining	None
Air brakes	G. E. (CP-27 compressor)
Axles	Hammered steel, 3 in. x 6 in. journal
Couplers	Pocket in bumper
Fixtures	Curtain supply
Curtain material	Pantasote
Designation signs	Hunter illuminated
Door operating mechanism	Brill
Fare boxes	International hand
Fenders or wheelguards	H. B.
Heaters	12 Cutler-Hammer panel
Headlights	Crouse-Hinds incandescent
Journal bearings	Friction
Motors	G. E. 264
Motors	Inside hung
Sanders	Ohio Brass, air
Seats	J. G. Brill
Seating material	Wood—J. G. Brill
Trolley catchers retrievers	Ohio Brass & Keystone
Trucks	Brill special 79-E-1
Ventilators	8-Brill exhaust
Wheels	26 in. diameter steel
Special devices	Railway Utility heat regulators

Reading Transit & Light Company, Reading, Pa., noted in the Feb. 28 issue of the ELECTRIC RAILWAY JOURNAL as having placed an order for twelve safety cars with the Osgood-Bradley Car Company, has specified the following details:

Number of cars ordered	12
Date of order	Feb. 5, 1920
Delivery	In six weeks
Builder	Osgood Bradley Car Company
Type	Semi-convertible safety
Seating capacity	32
Weight, total	16,000 lb.
Length over all	27 ft. $9\frac{7}{8}$ in.
Truck wheelbase	8 ft. 0 in.
Width over all	7 ft. $9\frac{3}{16}$ in.
Height	10 ft. $3\frac{3}{16}$ in.
Body	Semi-steel
Interior trim	Birch
Roof	Arch
Air brakes	G. E.
Armature bearings	Roller
Axles	A. E. R. A. No. E-2
Signals	Consolidated car heating
Control	K-10
Designation signs	Hunter
Fare boxes	Johnson
Hand brakes	Brake shafts
Heaters	Gold double-coil
Headlights	Golden Glow SM-95
Journal bearings	Roller
Lightning arresters	Garton Daniels
Motors	Two No. 264 G. E.
Motors	Inside hung
Paint, varnish or enamel	Both
Registers	International
Sanders	Air operated
Seats	Osgood Bradley
Seating material	Slat type
Trolley catchers or retrievers	Earll No. 10
Trucks	Osgood Bradley type 25-96
Wheels	Griffin FCS

Recent Incorporations

Wichita Fall, Tex.—An electric railway from Wichita Falls to Burkburnett and thence to Wagoner City, is proposed. Representitives of eastern capitalists have been in Wichita Falls looking over the territory which would be served by the road. The line would be seventeen miles in length.

Houston, Richmond & San Antonio Traction Company, Houston, Tex.—The name of the Houston, Richmond & Western Traction Company, which plans to build an electric line from Houston to San Antonio, has been changed to the Houston, Richmond & San Antonio Traction Company. Work on the road will begin shortly. H. A. Halverton of Houston is president of the company.

Spirit Lake Railway & Power Company, Vancouver, Wash.—Articles of incorporation were filed on Feb. 26 by the Spirit Lake Railway & Power company with a capitalization of $350,000. The company is incorporated to operate railways, steamboats on the Columbia River, power plant, generate power, deal in real estate, maintain telephone and telegraph lines, etc. The stock is $1 per share. The trustees are: Dr. Joseph Roane, C. C. Brown and James E. Rice, all of Vancouver.

Track and Roadway

Macon Railway & Light Company, Macon, Ga. — The Georgia Railroad Commission has refused to allow the Macon Railway & Light Company to discontinue service on its Rivoli extension. The company had asked permission to take up the tracks.

Paducah (Ky.) Railway.—The Paducah Railway and the Paducah Electric Company plan to make improvements in their facilities at a total cost of $250,000. The city's car lines will be largely reconstructed. The cost of improvements to the power and light plant will amount to $175,000.

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway will make improvements to its line at Watertown Square.

Kansas City (Mo.) Railways.—The Kansas City Railways has begun work on a line in Eighteenth Street from Central Avenue to Kansas Avenue, Kansas City, Kan.

Cincinnati (Ohio) Traction Company.—The Cincinnati Traction Company has opened negotiations with a number of Norwood manufacturers looking to the extension of the Edwards Road line to connect with the South Norwood line.

Power Houses, Shops and Buildings

Sacramento Northern Railroad, Sacramento, Cal. — This company has opened a new passenger and freight station at Marysville, Cal.

Fitchburgh & Leominster Street Railway, Fitchburg, Mass.—The carhouse of the Fitchburg & Leominster Street Railway with two cars containing tools and other equipment, was destroyed by fire on March 5. The loss amounts to $75,000.

Manchester (N. H.) Street Railway.—A carhouse of the Manchester Street Railway was damaged by fire recently.

Northwestern Ohio Railway & Power Company, Toledo, Ohio. — This company has under construction a transmission line from Curtis, along the shore of Lake Erie to Ryan a distance of twelve miles.

Trade Notes

Rhode Island Glass Company, of the General Electric Company, has begun work on an addition to its plant at Central Falls, R. I. The new building will be about 50 ft. x 96 ft. and will be three stories high.

Van Dorn Electric Tool Company, Cleveland, Ohio, is building a four-story addition of 30,000 sq.ft. of floor space for the manufacture of portable electric drills, reamers and grinders.

A. S. Winter, formerly connected as advertising and sales manager for the William Powell Company, has joined the sales force of the Fairbanks Company, of Pittsburgh, Pa., and will represent them in southern Ohio.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that J. G. Miles, head of the insulation section, has been transferred to the Seattle district office as manager of the supply department.

National Exposition of American Manufacturers, which was to have been held in April, 1920, at Buenos Aires, Argentine Republic, has been postponed until November, 1920, to allow more time for adequate preparations and shipments from other parts of North and South America.

Johnson Fare Box Company, Chicago, Ill., has received an order for 110 registering fare boxes and for metal tickets to be sold four for 25 cents from the Nashville Railway & Light Company. These are in addition to the fifty boxes which the company now has in use.

American Engineering Association will hold its 21st annual convention in Chicago on March 16 to 18. Except for the annual dinner on the 17th the time will be occupied entirely with consideration of the numerous committee reports. The usual exhibition of railway appliances and machinery will be at the Coliseum, March 15 to 18.

F. M. Nourse has joined the Charles L. Benjamin organization at Chicago. Mr. Nourse has been an engineer in the advertising department of the Cutler-Hammer Manufacturing Company, at Milwaukee, Wis., for the past two years and prior to that was associated with the Wisconsin Power, Light & Heat Company, at Portage, Wis.

Lapp Insulator Company, Le Roy, N. Y., announces that it is proceeding immediately to the erection of an additional factory and the installation of considerable new machinery to increase its capacity 60 per cent within the next five months. The capital is also being increased from $150,000 to $500,000 to take care of rapidly increasing business.

Century Electric Company, St. Louis, Mo., is proceeding to increase its manufacturing facilities about 60 per cent by the erection of a 180-ft. x 106-ft. six-story factory building near the present plant. The company has purchased sufficient ground to provide for the growth of its business for some years to come. The present addition is to permit expansion in the lines of alternating-current motors.

Westinghouse Air Brake Company, Pittsburgh, Pa., Catalog unit No. 2021 describing its standardized UC brake equipment for steam road passenger trains, and which, with simple electric attachments, is claimed to comprise the highest development of electro-pneumatic train brake for both electric and steam road passenger trains. The pamphlet is well prepared both as to text matter and illustrations.

Green Fuel Economizer Company, Beacon, N. Y., announces the opening of an office at 1006 Finance Building, Philadelphia. The office will be in charge of W. F. Wurster, assisted by G. E. Kille. The company was formerly represented in this territory by the Baker-Dunbar-Allen Company. Mr. Wurster has been doing engineering and sales department work with the Green Fuel Economizer Company for the last six years.

Martindale Electric Company, 11,737 Detroit Avenue, Cleveland, Ohio, is the new name of what was formerly The Handy Supply & Manufacturing Company, the change dating from Jan. 1. E. H. Martindale is president and general manager and only recently resigned as sales engineer of the National Carbon Company to become president of The Handy Supply & Manufacturing Company. Mr. Martindale is a graduate of Case School of Applied Science, class of 1908, a member of the board of directors of the American Institute of Electrical Engineers and spent a year in France as captain in an engineering regiment. In addition to its business in commutator stones, commutator slotting files and insulating varnishes, the Martindale Electric Company will act as exclusive agent for Volk refillable fuses, Marble-Card direct-current motors and generators, St. Louis Electrical Works alternating-current motors as well as distributing products of the Efficiency Electric Company.

New Advertising Literature

Breeze Manufacturing Company, Newark, N. J.: A folder giving the many uses of "Fle-x-met," a flexible metallic tubing.

Magnolia Metal Company, New York, N. Y.: A twenty-four-page booklet "New Truths and Old Fallacies" containing instructive information concerning babbitt metals.

Laclede-Christy, St. Louis, Mo.: A forty-two-page bulletin, "Boiler Capacities with Chain Grates," showing the importance of fuel-bed temperatures in increasing the maximum capacity attainable.

Wellman-Seaver-Morgan Company, Cleveland, Ohio.: Bulletin 49. 8½ x 11 in.; illustrated. Description of this company's open-top railroad car dumper, showing some installations with working drawings of device.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 55 New York, Saturday, March 20, 1920 *Number* 12

"Merchandising Transportation Starts at the Carhouses"

THE above headline is quoted from the words of a leading street railway manager. To carry out this thought we may say that while platform men are important factors in merchandising transportation, the real place where transportation is sold is at the carhouses and repair shops. If a company will maintain cars well, keep them clean, paint them often, wash the windows, and make running gear as nearly noiseless as possible, a big step is taken toward obtaining many satisfied riders.

Try a line of well kept cars in parallel with a line of poorly maintained equipment, and see where the traffic goes. Maintenance tells the story and "sells the goods."

At Last Railways Begin Purchases on Large Scale

IT SEEMS almost too good to be true, but the fact is that, after years of enforced spendlessness, the electric railways are buying. It was shown in the markets columns last week that during the first two months of this year more than a third as many cars were ordered as during the entire twelve months of 1919. As was plainly predicted in our issue for Jan. 3, deliveries are rapidly lengthening.

It is true that the purchases now being made by electric railways are either to cut down cost of operation or to make necessary repairs. The interesting part, however, is that the roads are going ahead in these necessary expenditures. The market is awakening and, like a snowball, continues to gain in volume as it passes along.

Maintenance Costs Have Been Kept Well in Hand

THE annual maintenance issue of the ELECTRIC RAILWAY JOURNAL has developed year by year with the requirements of the industry until now it has become an epitome of the best in maintenance practice in all branches of the work. This year the editors have been unusually fortunate in getting the co-operation of men in all departments and in different sections of the country, for these men realize that they must give if they are to get. From Buenos Aires to Indianapolis, and from San Francisco to New Haven, have come the articles which make up the technical pages of this issue.

The maintenance problem is one of the most pressing that weighs upon the willing and sturdy, but sometimes over-tired, shoulders of the master mechanic, way engineer, overhead superintendent or power plant operator. He simply cannot get more money for his work to compensate for the increases in wages, the skyrocketing of material costs and the reduced efficiency of workers. The money "ain't thar." He therefore deserves great credit for keeping the wheels going under present conditions, and it has been only by the exercise of ingenuity and perseverance that this has been possible. This work is reflected in the present issue of the JOURNAL which, in turn, we believe, will make possible the still more rigid control of maintenance costs. To this end new tools, new methods and new spirit may be necessary during the coming year, but they will, no doubt, materialize as necessary.

New York City Plans to Start a Bus Line

NEW YORK CITY, which is receiving no return on some $250,000,000 that it has invested in rapid transit construction because it refuses to permit the companies to charge an adequate fare, is now proposing to go extensively into the bus transportation business. Two hundred buses are to be purchased for $1,140,000, and they will not only revolutionize the city's traffic problems and eliminate the street cars, according to an interview with one of the prominent members of the Board of Estimate which appeared in the daily papers the day following the vote, but the buses "will also afford to the City of New York an additional source of revenue which is much needed."

The latter part of the statement—that an additional source of revenue is much needed—is undoubtedly true. Teachers are leaving the New York public schools because they do not receive sufficient salaries, and real estate owners are complaining because of prospects of an increased tax rate. But we wonder how much net revenue the city expects to get from its buses with their 5 cent fares and with the rising prices for gasoline.

Why cannot New York settle its traction situation in a rational way? In other large cities in this country and abroad the fact is recognized that labor and materials have greatly increased in price and that some increase in railway fare must follow. In New York, the opposite attitude has been taken. The railway managements have been scolded in hearings and out of them; no attention has been paid to their requests for relief, and now the roads are to be "eliminated" by competition!

The idea that the city or any one else can supply a bus service at 5 cents a head under anywhere near the same conditions as regards headway, length of ride and safety as exist on the electric railways, is, of course, preposterous. It is being done nowhere else, and there is no reason to believe that it can be done in New York. In the meantime the citizens of New York are suffering from inadequate transportation because the companies which could supply these facilities are not permitted to charge a reasonable fare. Is it not time for some of the prominent civic bodies in the city to be heard in protest against this state of affairs?

Restricted Way Department Budgets Have Not Prevented Progress

THE activities in the way departments were greatly restricted during 1919. Our statistical issue of Jan. 3 indicated that both the items of new construction and reconstruction were the lowest recorded during the past ten years. In consequence there was but a limited opportunity for development of new methods or devices. While the new work was at a standstill, there was a necessarily large increase in the amount of work classed as maintenance. In the latter field effort was concentrated upon reduction of cost by improvement in method.

The scope of the arc welder and the rail grinder was extended and many a piece of track or special trackwork, which heretofore would have sought the scrap heap, was rehabilitated for long periods of further service. But there is a limit beyond which these saving methods may not go, and when we consider the small amount of reconstruction recorded for the past three seasons, there is every reason to believe that a fairly large amount of such work must be undertaken this year. Otherwise there will soon be a rather sudden and general breakdown of a very large track mileage, which will be most likely to occur in heavily-used, congested tracks where it can be least afforded from a revenue point of view. The indications, from rail and special trackwork inquiries now being received by the manufacturers, are to the effect that the absolute need for a more extensive program of track and special trackwork renewals during the current season is becoming increasingly apparent and that the gradually bettering income situation will result in greatly increased budgets for reconstruction purposes.

Increased programs may be faced with some degree of complacency in view of the greatly increased efficiency which has resulted from the efforts of way engineers to keep costs down in face of the constantly rising costs for both labor and material. By the introduction of machinery and through closer supervision, the engineers have been able to show an increased cost for track work of but 63 per cent, while the labor rates have advanced 124 per cent when both are compared with the costs and rates prevailing in 1914. No further proof of the value of machinery in track work could be asked for than the data given in the article by C. H. Clark in the issue of this paper for Feb. 21, 1920. Such results, nevertheless, will surely serve to spur those in charge of track matters onward in their search for further achievement in cutting the H. C. W. (high cost of work) as Mr. Clark so aptly puts it.

In reviewing the work of the way departments during the year 1919 we note several developments which are worthy of attention, since they show that the activities and research work of the way engineers have not lain dormant although retarded somewhat by the greatly reduced schedules which prevailed throughout that year.

In the rail-joint field, a service test installation at Pittsburgh was made of the resurrected type of electric-weld joints, under the comparatively new Jacobs patent which had been held back during the war period. It will be remembered that the original electric-weld joints were of the butt-weld type as devised by Elihu Thomson. These were succeeded by the electric bar-weld process after a short time, as it was almost impossible in that early day (1894) to secure uniformity of result with the butt welds as then made. Meanwhile, some of the earliest butt welds are still doing business, helping the rails wear out in operating tracks that are twenty-four years old. The new butt weld gives promise of producing the desired uniformity and the performance of the test installation will be watched with great interest by way engineers.

We have had occasion heretofore to call attention to the desirability of carefully selecting and training skilled labor. An editorial in the issue of this paper for March 8, 1919, pointed out that the training of this class of labor which is necessary for advancement must be furnished by the employer. That such educational steps are receiving increased consideration at the hands of those who are responsible for labor results, is evidenced by the inauguration of a training course for track foremen by the Denver Tramway. The need for competent track foremen has been increasingly noticeable of late. Apparently men are not born with the "track instinct" any more, and the older foremen have left the service to an extent which is tending to handicap the resumption of extensive outside work. There is no doubt that the training scheme as applied in Denver will be taken up in other quarters.

Meanwhile several large companies have been working along somewhat similar lines through the plan of holding monthly meetings of track foremen and supervisors at which track problems of an educational nature are discussed. Likewise there is a tendency toward the provision of illustrated books of instruction covering the principal methods of doing work properly, together with details of construction which are constantly used but often varied improperly through ignorance or neglect of the foremen. All this is along the line of "human engineering," an almost untried field in which there is promise of great results in efficiency and in betterment of mutual relations between the employer and employee.

Don't Worry If Automatic, Power-Saving and Safety Devices Increase Maintenance Costs

THE past year has seen an increased use of automatic, safety and power-saving devices in connection with electric car equipment. Each has its particular field of usefulness in producing economies. The use of automatic devices gives additional comfort to passengers and makes the duties of car operation more attractive. Economies are also produced through speeding up the service by increasing the accelerating and braking rates and by decreasing the duration of stops. Safety devices have reduced accident and damage costs, and power-saving devices have produced economies by proper and the most efficient operation of the equipment. These economies necessarily increase somewhat the budget of the equipment maintenance department.

The criterion in this matter is, of course, the total operating expense as compared with the gross revenue. but so many things are now contributing to increase maintenance costs that these are being scanned more and more closely. In this line it cannot be emphasized too strongly that comparisons on a car-unit basis and without regard to the number of pieces of apparatus that constitute the car equipment are sure to be misleading.

The superintendent of equipment not only finds that maintenance costs increase as the number of pieces of apparatus is increased but he also discovers that his men are not familiar with the new classes of apparatus and that troubles result from this lack of familiarity. This brings the cars into the shop at more frequent intervals and overtaxes its capacity, so that the work has to be done under unfavorable conditions. These added burdens are not relished by the mechanical superintendent, and when the general manager asks him to explain why his maintenance costs per car-mile are higher than those of a neighboring road operating older types of equipment he curses the advent of modern appliances which are of advantage to the operating department only and longs for a return to the old days and the old class of equipment, as was so aptly explained by a contributor in the issue of this paper for Feb. 7.

If the maximum usefulness from these devices is to be had they must be maintained in a high state of repair, and this requires enthusiasm for their use and co-operation from the men in the mechanical department. The savings resulting in directions other than maintenance are so great that the additional cost of repairs and inspection is readily absorbed. The maintenance men are quickly convinced of the usefulness of the new devices and if the men a little higher up will recognize at once that additional forces and facilities are necessary to take care of the added equipment and in making comparisons of costs will consider the number of pieces of apparatus on a car as well as the car-miles operated, a closer agreement will be reached. Any comparisons made of the efficiency of conducting the mechanical department before and after the new devices are installed must show an increase in cost per year but when the number of pieces of equipment is considered, an increased efficiency will no doubt be evident.

Kansas City Again in the Foreground

FOR a clean, straightfoward discussion and appreciation of the problems of local transportation, the report to the Kansas City Chamber of Commerce just made by its Committee of One Hundred, is certainly to be commended. As with other cities, there was a street railway problem, not only from a traffic standpoint, but from the more general situation arising from the increases in all costs of operation which made the former fare unprofitable. To Kansas City the question seemed a commercial one, and not a political matter and, as such, one in whose solution the Chamber of Commerce could and properly should take an active part. Kansas City has many hard-headed, clean-thinking and square-dealing business men and the summary of recommendations made by this committee evidences the clear analysis and hard work that has been put upon the study of the question. Kansas City tackles most of its problems from the standpoint of the city's best welfare. Its politics sometimes prevents the realization of its desires, but times are improving. The people are for fair play.

This committee states its purpose thus: "From the beginning of the investigation to the final recommendation in this report, the committee has been guided by the principle of justice. First, to the car rider through good service at a reasonable fare; second, to the street railway employee through a just wage; and last, to the street railway investor, through confidence in a just and sure recompense."

The principal recommendations are: A service-at-cost principle with a variable fare and an inverse variable return on capital with a minimum of 6 per cent; the entire remission of any charges against the railway for paving, street cleaning, licenses, snow removal, etc.; a complete co-operation between city and company to improve service; a Kansas City chairman of the Board of Directors, and some financial details of special local interest. On the surface it seems that this platform should appeal to all fairminded folks. It is an earnest of the present day attitude in a progressive American city. We hope that the results in this case will not fall short of the anticipated satisfactory solution for all concerned and that this will prove to be another leading forerunner of many other cases of thorough understanding of the transportation problem. The Chamber of Commerce voices this same hope and feels its responsibility, for it calls attention to the several similar investigations under way, some national in character and scope, of which this is about the first to result in a published analytical report.

Electrification Studies Get Impetus at A. R. E. A. Meeting

AS THIS issue goes to press, the twenty-first annual convention of the A. R. E. A., is in progress with a large attendance after the detracting influences of the last two years. The volume of matter to be presented to the association through committee reports exceeds that of any previous year, and the delegates seem to be expressing their pleasure in the return to private operation by an unusual manifestation of interest. President Earl Stimson perhaps sounded the key note of endeavor for the next few years in two statements in his address. First, he pointed out that the immediate concern of the engineers is maintenance rather than construction. Beyond that, he intimated the trend of much construction work when he spoke of the great interest centering in the report of the committee on electricity, because of the "consideration being given to the subject of electrification by so many roads as a matter of economy in operation and as a means of increasing the capacity of present facilities." There is evidence also in the report of the committee on electricity that the work of electrifying the steam roads is to receive a great impetus in the next few years, for the economies that will thereby result are more necessary now than ever before, if private operation is to be made permanent.

This committee also makes the statements in its report (1) that 110,000-volt transmission line and 3,000-volt trolley potentials are practicable and reliable for electric railway service for 100 miles or over of single track; (2) that such a system of electrification will increase the capacity of a road 25 to 35 per cent; (3) that such a system will prove more economical if traffic is favorable for electric operation; (4) that electric locomotives with regenerative braking have made possible the haulage of heavier trains at higher speeds on mountain divisions with greater safety and reliability under all climatic conditions. This would seem to indicate that the attention of the steamroad engineers will be earnestly turned to the possibilities of electrification and, in fact, has already been directed to this problem on a great many roads. No greater service looking toward the conservation of the nation's resources on the one hand and the well being of the railroads on the other could be done than for the A. R. E. A. to get solidly behind this movement and bring out the full possibilities as applied to each and every railroad.

Maintenance Practice of the Anglo-Argentine Tramway—I

Consolidation of Eleven Operating Companies Offered a Fine Opportunity for Standardization of Cars, Equipment, Tools and Maintenance Methods

BY R. FRANCISCO APESECHE
Assistant to Chief Engineer Anglo-Argentine Tramway, Buenos Aires, Argentina

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CARS LEAVING PLAZA MAYO, BUENOS AIRES, ARGENTINA

BUENOS AIRES has a street railway system that can compare with the best operated and largest in the world. The Anglo-Argentine tramway system presents to anyone interested in street railway work an opportunity to study and appreciate the great progress that this company in its nine years of operation has made, not only in its well-maintained physical property but also in its harmonious operating organization.

The electrification of the several street car companies that were operating in Buenos Aires began in the year 1897 and was finished in 1906. In 1908 there were eleven street car companies in Buenos Aires, but during that and the following year, eight of the most important were fused into the Anglo-Argentine Tramway Company, which resulted in the most extensive street railway system of South America. A straight fare of 4½ cents ($0.10 Argentine money) was charged with a special fare of 2.2 cents ($0.05 Argentine money) for workingmen during certain hours of the day. In 1911 the construction of the first of the underground lines of the company was started and these were finished in 1913.

Buenos Aires is a fairly level city and the company's tracks have very few grades. The accompanying map shows the surface and underground lines now in operation, as well as the situation of substations, carhouses, operating carhouses, etc. The Anglo-Argentine Tramway has 390 miles of single track; 368 miles located within the city limits. Of this 9 miles is used by the underground line. The gage is 4 ft. 8½ in.

With a rolling stock equipment of 1,750 motor cars, 870 trailers, and 84 subway motor cars, this system serves a population of 1,700,000, and carries 318,000,000 passengers annually on its surface lines and 32,000,000 passengers on its underground line.

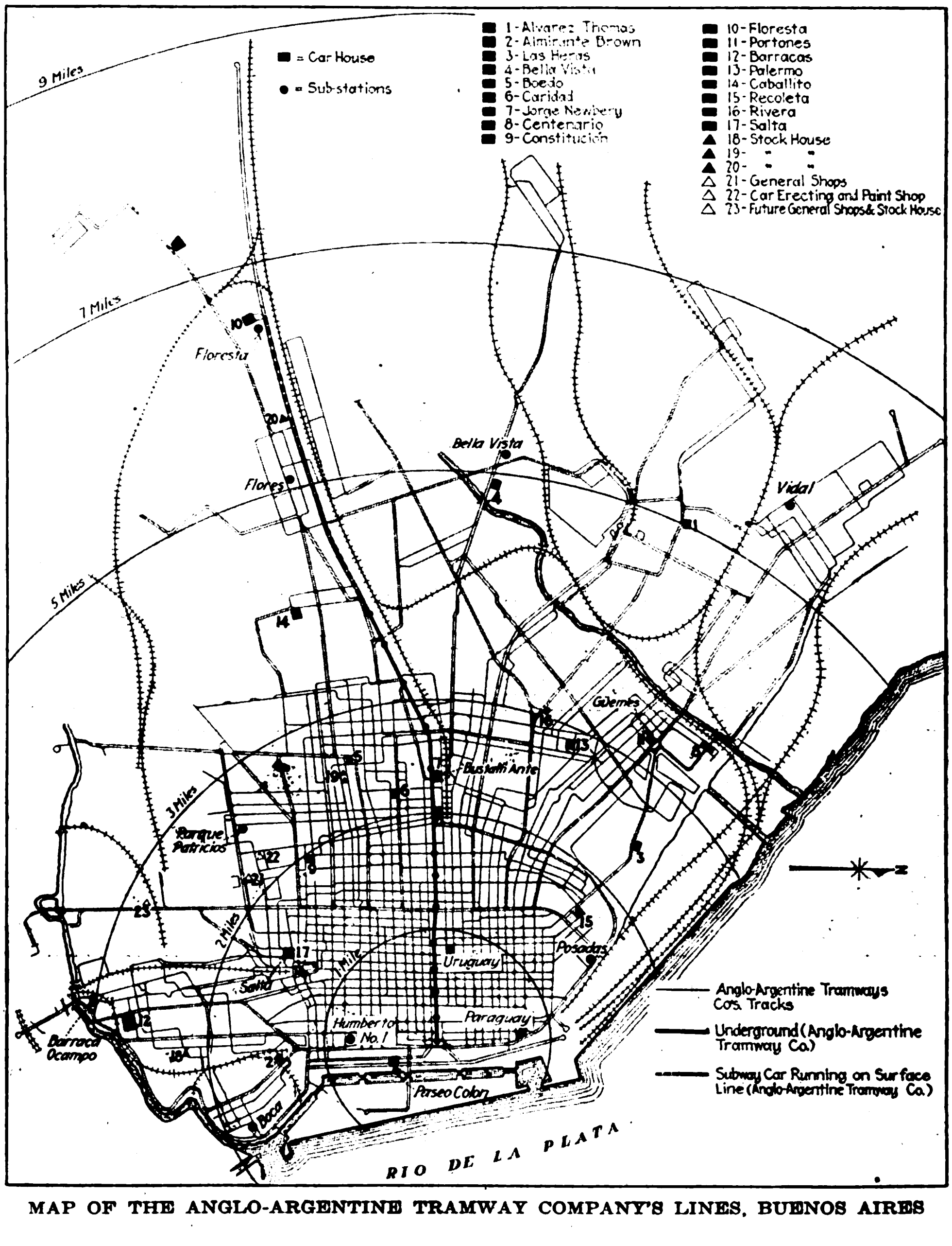
The result of the consolidation was that the newly-formed company came into possession of a great variety of car equipment, trucks, bodies, motors, control equipment, gears, brakes, etc., and as great a variety of shop equipment and maintenance methods.

At the time of the consolidation, the rolling stock of the company consisted of 1,399 open-platform motor cars, 630 trailers (of which 283 were open) and twenty-eight general work cars. In this stock we had double and single-truck cars of twelve different types, fifteen types of body of one and two decks and with a capacity ranging from 22 to 46 seats, eight types of non-ventilated motors of 20 to 30-hp. capacity, and eight types of equally as primitive controller equipment.

As we have very few cars with double trucks, and very few miles of interurban track, practically all surface double-truck cars have been changed to the single-truck type, the Brill 21-E single truck having been adopted as standard. This carries a standard body 31 ft. 2¼ in. long over canopies and 8 ft. 2½ in. wide over pillars, with two operating platforms and a seating capacity of 32 persons. The car fully equipped weighs 12 tons. Accompanying illustrations give details of our standard motor car.

The motor equipment comprises two Dick Kerr 3A4, or two A. E. G.-67A motors with A. E. G.-B8gm controllers or A. E. G.-U140, or two A. E. G.-U158 interpole motors with A. E. G.-B30gm controllers. The last-named motors are of the semi-ventilated type, of 40-hp. capacity. Cars are provided with both hand and electric brakes, but the electric brake is used only in emergency.

All cars that undergo the general reconstruction, which is given to each every ten years, are rebuilt according to the standard adopted. To all cars not scheduled for reconstruction within a short time, a regular standardization process is applied during the general overhauling that takes place every eight months. This includes remodeling the braking mechanism, windows, lifeguards, lighting system, and changing the position of cable hose, etc. Every year the platforms of a certain number of cars are enclosed. At present 30 per cent of the motor cars have closed platforms; of these one-fourth are new cars imported from England, and the rest are cars rebuilt or newly built in our shops.


■ = Car House
● = Sub-stations
■ 1-Alvarez Thomas
■ 2-Almirante Brown
■ 3-Las Heras
■ 4-Bella Vista
■ 5-Boedo
■ 6-Caridad
■ 7-Jorge Newbery
■ 8-Centenario
■ 9-Constitución
■ 10-Floresta
■ 11-Portones
■ 12-Barracas
■ 13-Palermo
■ 14-Caballito
■ 15-Recoleta
■ 16-Rivera
■ 17-Salta
▲ 18-Stock House
▲ 19- " "
▲ 20- " "
△ 21-General Shops
△ 22-Car Erecting and Paint Shop
△ 23-Future General Shops & Stock House
9 Miles
7 Miles
5 Miles
3 Miles
2 Miles
1 Mile
Floresta
Flores
Bella Vista
Vidal
Guemes
Bustamante
Parque Patricios
Salta
Uruguay
Posadas
Humberto No. 1
Paraguay
Paseo Colon
Barraca Ocampo
Boca
RIO DE LA PLATA
Anglo-Argentine Tramways Co's. Tracks
Underground (Anglo-Argentine Tramway Co.)
Subway Car Running on Surface Line (Anglo-Argentine Tramway Co.)

MAP OF THE ANGLO-ARGENTINE TRAMWAY COMPANY'S LINES, BUENOS AIRES

For the first three years after the consolidation very little was done scientifically to organize the rolling stock department. At the beginning of 1912 the first steps were taken to introduce a rational system of inspection and overhauling that would make possible the prevention of failures by detecting and repairing small defects that otherwise would have developed into larger ones. Lack of this attention would require us to keep the cars out of service for a longer time, increasing the cost of the repair and increasing the working force at the carhouses. To arrive at this result it was necessary first to organize the working forces at the operating carhouses. Previous to 1912 every carhouse had two chief foremen, one for day and the other for night duty, since as much work was intended to be done at night as during the day. These two chief foremen with their corresponding assistants were exchanged every two weeks, with very prejudicial results to the work carried out due to the antagonism developed between them. The result of this inefficient system went even farther in the way the repairs were made, due to the lack of knowledge and of instruction of the foremen in charge of the work.

The fifteen operating carhouses, now reduced to eleven, were divided into three groups of five each. Each group was placed under the supervision of a roll-

ing stock inspector selected from among the best of the chief foremen. The inspectors visit the carhouses daily, and act as assistants of the chief of the department. They report every other day to the rolling stock chief and receive at the same time the instructions and explanations that have to be given to the chief foremen. Each operating carhouse is under the immediate direction of a chief foreman, assisted by two shop foremen, one for the day and the other for the night, who are exchanged every two weeks. The force consists also of a first mechanic who takes the place of either foreman in case of absence, repairmen, electricians, brakemen, painters, oilmen and general repairmen, the distribution depending on the number of men in each classification and the importance of the operating carhouse. The average working force is 35 men per carhouse, excluding the car cleaners, who, although under the supervision of the rolling stock department, belong to the traffic department.

A book of rules and instructions is given to every chief foreman and assistants in which all work done at the carhouses is detailed and explained. This contributes greatly to the standardization of the maintenance work. The company has a general shop but, due to the

TABLE I—COMPARATIVE STATISTICS OF THE ANGLO-ARGENTINE TRAMWAY ROLLING STOCK OF THE SURFACE LINES ONLY

Car Mileage—Car Pull-In—Energy Consumption

Description	1911	1912	1913 *	1914	1915	1916	1917	1918
Motor car mileage (in thousand miles)	41,450	42,900	45,000	42,500	42,350	42,400	43,100	43,200
Total mileage: motor-trailer (in thousand miles)	52,000	53,750	57,350	54,600	53,500	53,900	55,000	55,800
Total cars pull-in	14,730	7,218	3,128	3,242	2,140	1,489	1,206	1,000
Cars-miles per pull-in	2,860	5,830	14,380	13,250	19,750	28,500	35,800	45,200
Number of motor cars in service (maximum daily average)	....	....	1,413	1,287	1,197	1,184	1,205	1,211
Miles per motor car (daily average)	....	....	88	91	97	98	98	98
Hours of delay due to cars pull-in	968	722	284	270	198	136	150	145
Hours of delay due to cars derailed	530	863	625	343	120	49	45	40
Total energy consumption per car-mile: kilowatt-hours	1.125	1.1	1.01	0.977	0.954	0.954	0.97	0.98

* In December of 1913 the first subway was inaugurated which justifies the drop of mileage in the following years.

TABLE II—COMPARATIVE STATISTICS OF THE ANGLO-ARGENTINE TRAMWAY ROLLING STOCK OF THE SURFACE LINES ONLY

Electrical Equipment—Parts That Have Been Repaired or Replaced

Description	1911	1912	1913	1914	1915	1916	1917	1918
Armatures, open-circuited	1,262	580	265	161	105	75	56	76
Armatures, short-circuited	929	592	313	292	169	108	105	104
Field coils, burnt	2,161	1,557	277	186	106	51	38	69
Armatures repaired	2,492	1,921	1,414	577	575	549	554	423
Armatures rewound	1,311	968	527	387	208	181	179	141
Field coils replaced and repaired	6,983	4,480	1,667	600	388	363	242	209
Field coils rewound	2,823	1,565	922	384	207	....	....	....
Circuit breakers	....	1,564	....	....	435	520	174	66
Power switches	....	824	....	....	222	254	168	37
Power fuses	76,425	49,797	31,239	18,080	7,525	7,200	7,120	5,897
Carbon brushes	....	40,325	29,163	19,138	15,582	17,292	8,008	9,139
Controller finger contacts	....	17,460	28,550	14,624	10,331	10,536	10,151	6,996
Controller segments	....	20,857	37,499	20,227	15,849	12,786	6,967	7,399
Electric lamps	....	105,347	98,335	57,360	37,721	32,948	26,569	22,695
Number of trolley wheels	8,999	8,841	10,126	6,918	3,248	2,071	2,571	2,904
Service mileage per trolley wheel	4,600	4,850	4,480	6,150	13,000	20,500	16,750	14,880

TABLE III—COMPARATIVE STATISTICS OF THE ANGLO-ARGENTINE TRAMWAY ROLLING STOCK OF THE SURFACE LINES ONLY

Consumption of Lubricants and Bearings

Description	1911	1912	1913	1914	1915	1916	1917	1918
Pounds of lubricants per 1000 car-miles	....	6.7	5.48	4.69	3.365	3.01	2.125	1.9.
Cost of lubricants per car-miles in dollars	....	$0.341	$0.308	$0.267	$0.191	$0.169	$0.152	$0.14.
Motor bearings	....	4,003	2,120	1,373	876	1,101	729	750
Armature bearings	15,369	19,394	16,134	8,699	4,914	3,542	3,919	4,620
Journal bearings (motor and trailer)	....	6,454	3,542	3,132	2,538	2,170	1,943	1,554
Car-miles per motor bearing	....	42,900	85,000	130,000	193,500	154,000	237,000	231,000
Car-miles per armature bearing	9,560	8,370	11,250	19,700	34,500	48,000	44,000	37,500
Car-miles per journal bearing (motor and trailer)	....	32,400	64,700	70,000	84,400	99,500	113,200	111,200

TABLE IV—COMPARATIVE STATISTICS OF THE ANGLO-ARGENTINE TRAMWAY ROLLING STOCK OF THE SURFACE LINES ONLY

Axles, Wheel Tires, Gears, Pinions and Brakeshoes Replaced

Description	1911	1912	1913	1914	1915	1916	1917	1918
New tires	....	4,377	2,658	2,452	2,122	1,155	880	971
Tires sent to the general shops to be turned	....	3,294	3,904	3,718	2,798	1,495	1,912	2,153
New axles	....	871	650	416	490	239	196	235
Gears	....	1,212	623	585	426	305	222	230
Pinions	....	3,335	3,459	2,835	1,960	1,204	1,224	1,186
Brakeshoes	....	42,124	41,035	35,525	23,467	20,548	19,313	16,119
Miles run per new tire installed	....	39,210	67,800	69,300	79,800	146,800	196,000	178,000
Miles run per new axle installed	....	98,500	138,500	207,000	172,800	354,000	439,000	368,000
Miles run per new gear installed	....	71,000	144,500	146,500	198,000	279,000	388,000	375,000
Miles run per new pinion installed	....	25,600	26,000	30,400	44,200	70,400	70,200	72,800
Miles run per new brakeshoes installed	....	4,080	4,380	4,820	7,220	8,260	8,930	10,710

TABLE V—COMPARATIVE STATISTICS OF THE ANGLO-ARGENTINE TRAMWAY ROLLING STOCK OF THE SURFACE LINES ONLY

Most Important Works Done to the Surface Line Cars in the Company Work Shops

Description	1911	1912	1913	1914	1915	1916	1917	1918
Total number of motor cars at close of last year *	....	....	1723	1768	1800	1814	1798	1731
Total number of trailer cars at close of last year †	....	....	790	818	835	831	853	889
Total number of special cars at close of last year	....	....	12	13	13	13	13	13
Total number of working cars at close of last year	....	....	78	77	83	83	82	82
New cars bought (erected at company shops)	....	....	....	46	64	24	16	....
Cars totally reconstructed (new body)*	....	....	37	30	....	....	....	15
Trailers totally reconstructed	....	....	....	40	....	....	46	....
Cars generally repaired without inclosing platforms †	....	....	....	....	112	139	92	41
Cars generally repaired including inclosing of platforms †	....	....	202	99	18	35	14	18
Construction of special cars for different purposes	....	....	....	2	....	....	....	....
Trailers generally repaired without enclosing platforms	....	....	99	33	64	22	58	....
Motor cars transformed into trailers	....	....	....	....	20	10	25	50
Cars painted anew	....	....	189	138	125	190	109	77
Trailers painted anew	....	....	15	80	59	25	58	....
Cars: half painted, retouched or varnished at the carhouse	....	....	875	1066	863	644	913	668
Trailers painted, retouched or varnished at the carhouse	....	....	438	346	416	301	328	336

* These cars use the mechanical and electrical equipment of other cars, but their body is built totally anew.

† These cars are partially or totally dismantled, the parts in good condition are used again, advantage is taken to standardize them.

lack of organization, much work that could be done better and more cheaply at this shop was formerly done at the operating carhouses. Steps were taken to centralize as much as possible all heavy repairing and manufacturing at those shops where first-class machinery is available and where it is possible to have fewer but more skillful workmen under the immediate supervision of specialist foremen who can give all their attention to the production of better work with less labor cost.

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SUBWAY ENTRANCES, AVENUE MAYO, BUENOS AIRES

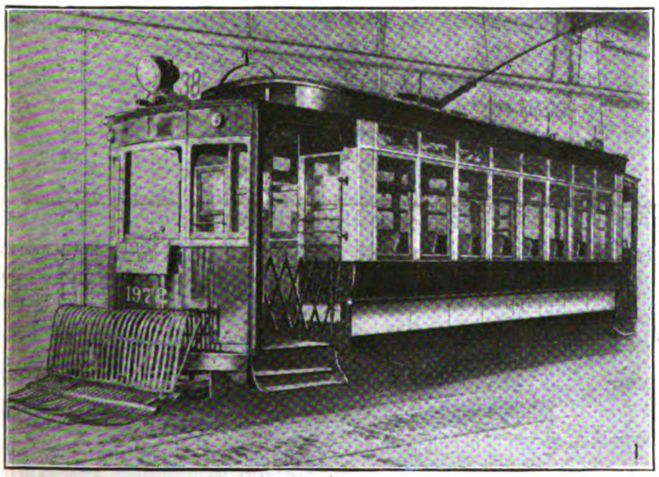
Although the car equipment maintenance organization was established during 1912, the present organization is the result of careful experimentation and study. Modifications have been introduced from time to time to assist in keeping the rolling stock in such condition that good and efficient operation is possible and to effect the greatest economy in maintenance.

The inspection of the car equipment is done at regular time intervals. Although the mileage basis is theoretically the most rational, the regular time interval is practically the best for our conditions. The mileage run by the different cars of any of our carhouses does not vary more than 5 per cent; therefore by using the time-interval basis we get the advantages of the mileage system, and clerical economies also result.

The frequency of the inspection periods and of the general overhauling periods must be determined by the length of time that the different parts of the equipment can work in an efficient and economical manner. This frequency can be decreased by the improvement in bearing materials and lubrication methods, by the use of modern types of motors and in general by a very conscientious inspection organization which thoroughly instructs the men how to do the work and holds them responsible for failures that could have been avoided had they done their work carefully.

The results obtained after seven years of scientific maintenance can be judged by the statistics given in Tables I, II, III, IV and V.

The maintenance cost per car-mile has been reduced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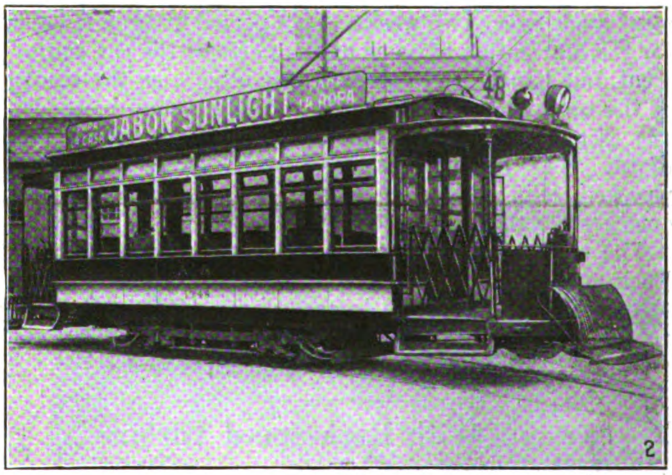
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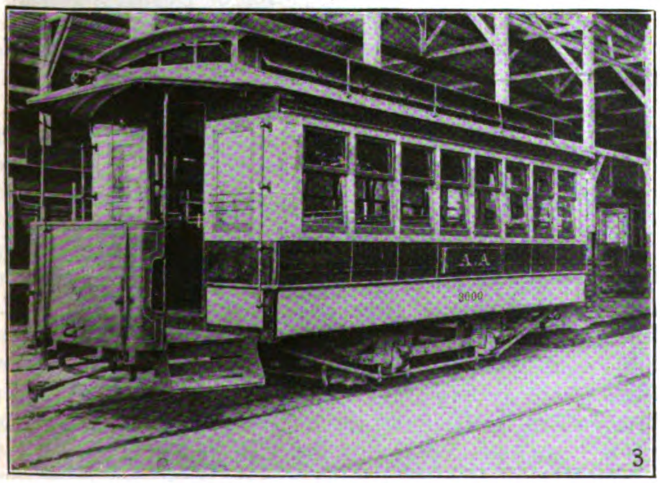
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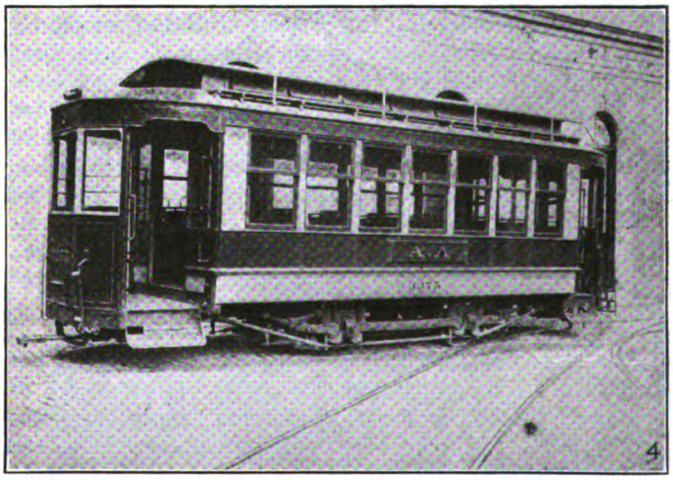
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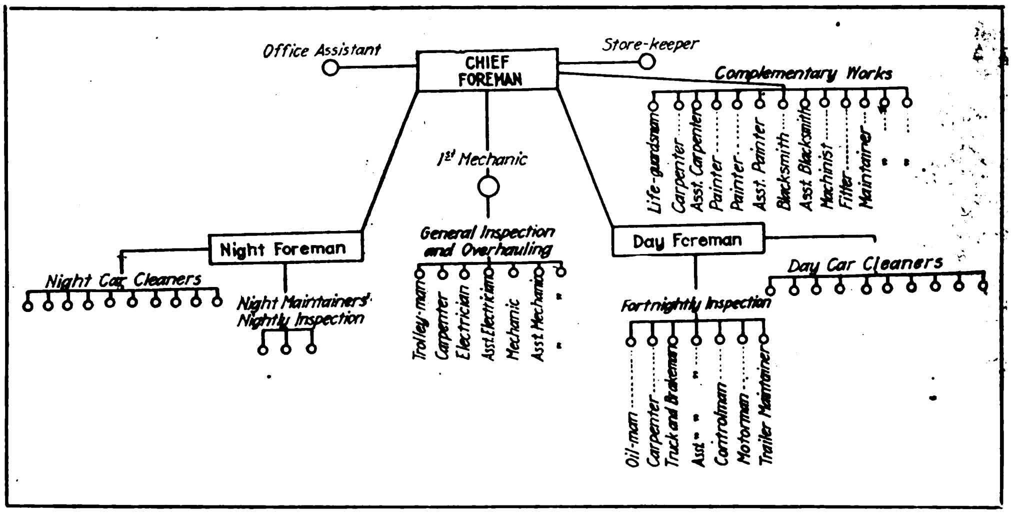
TYPES OF THE ROLLING STOCK USED

1. Standard motor car, closed platform, thirty-two seats.
2. Open platform motor car, thirty-two seats.
3. Open platform trailer, thirty-two seats.
4. Closed platform trailer, twenty-eight seats.



CAR MAINTENANCE ORGANIZATION CHART

35 per cent since 1912, which means that our rolling-stock maintenance expenses in 1917 were $500,000 less than in 1912. The miles run per pull-in increased from 2,860 in 1911 to 45,200 in 1918. The maintenance work done in the car shops can be divided into four general classes: (1) The general overhauling which is determined by the life of the armature bearings. By the use of better material the overhauling of the cars is now done every eight months where previously it was done every four months. (2) The lubrication inspection and brief inspection of all mechanical and electrical equipment made every two weeks. This period of time is kept for the lubrication of some of the parts of the car equipment, but it has been increased for others, as the result of the use of better lubricants and lubrication methods. (3) Nightly inspection, without repairing during the night. (4) Supplementary work, such as repairing wrecked cars, changing wheels and gears, painting, emergency call answers, etc.

The work has been planned in a very systematic way. Each man knows what he is going to inspect, how to go at it and how to repair it in accordance with the book of rules and instructions. The accompanying diagram shows the organization of an operating carhouse.

Results With High-Speed Turbines

A writer in the current issue of the *General Electric Review,* in summarizing the present situation regarding high-speed, high-capacity steam turbines, notes that machines of 50,000 kva. operating at 1,200 r.p.m. have been built and are operating satisfactorily. Machines of 38,889 kva. at 1,500 r.p.m. have also been built and are in successful operation. In the 1,800 r.p.m. class, there are a number of machines in commercial service with ratings of 31,250 kva. at 0.8 p-f., and 33,333 kva. at 0.9 p-f., while at the highest speed, viz., 3,600 r.p.m., machines of 7,500 kva. are in operation, and two of 9,375 kva. are under construction.

The American Institute of Consulting Engineers has made a protest against the entrusting of the design of bridges by public bodies to architects. As a class, the protest says, the external architectural treatment and decorative effect in such structures is secondary in importance to the engineering design, which should provide safety, adaptability and durability of construction.

Bureau of Standards Studies Rail Joints

THE Bureau of Standards has published a new edition of its bulletin on modern practice in the construction and maintenance of rail joints and bonds in electric railways. The author, E. R. Shepard, states among his general conclusions that the most important tendency as revealed in the investigation upon which the report is based, is the attitude the companies are now taking toward the whole subject of bonding. That it is an engineering problem deserving of as much skill and attention as any other problem in connection with the operation of an electric railway is apparently being realized by the large majority of the railway engineers. There is a marked tendency to get away from all types of soldered bonds which, even in recent years, have been installed in great numbers. A few companies who employ thoroughly experienced and capable workmen still continue to use them, but the number is relatively small.

Practically all types of standard modern bonds, when selected to meet local conditions and installed according to the best practices will give satisfactory results with an almost negligible percentage of failures on joints which are properly maintained. The problem of rail bond maintenance is largely that of joint maintenance. No bond can be expected to last continuously on a loose and poorly supported rail joint. No one type of bond can be said to be better than all other types. Each has its advantages and disadvantages, and the selection of a bond for any particular service should be governed by the type of construction on which it is to be used, the grade of labor available for installation and numerous other local conditions.

While welded joints are being used more than ever before, there is a growing tendency to adopt improved mechanical joints and various forms of special joints, several of which are a combination of welded and bolted or welded and riveted joints. These special joints seem to be meeting the demands of service with fewer failures and better results generally than any of the standard types.

It has been demonstrated that the saving of power alone would not justify the best modern practice in bonding. Such practice, however, is justified and strongly recommended from the standpoint of good voltage conditions in the return circuits, which not only make for good electrolysis conditions but also for more satisfactory operation.

Attention is again called to the fact that the problem of track bonding is still in a state of evolution. New inventions and improvements in methods and practices have been so frequent during recent years that many types of bonds and joints can still be said to be in the experimental stage. Carefully kept records and a free interchange of experiences on the part of the operating companies will do much toward the establishment of definite and standard practice in this particular field.

Low-First-Cost Low-Maintenance-Cost Track

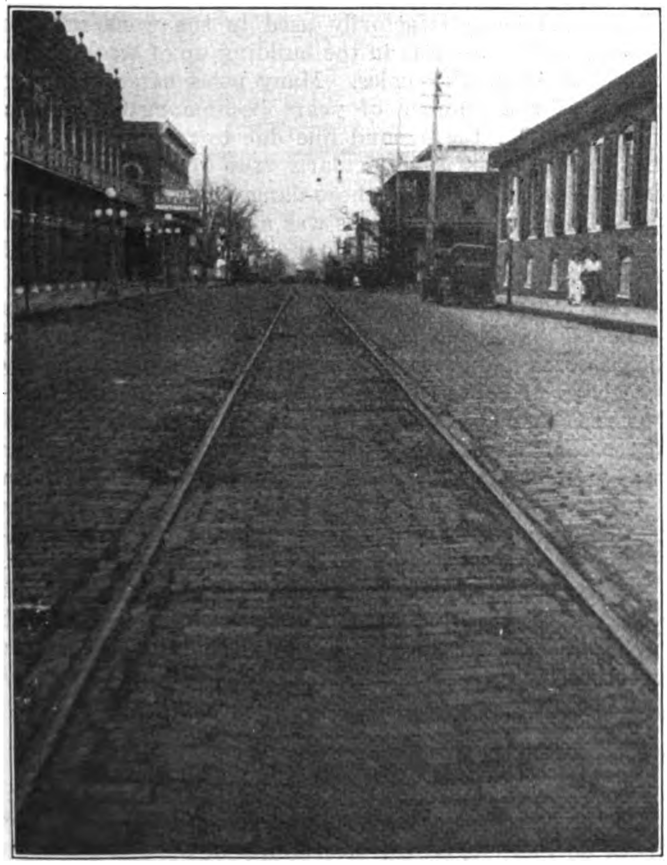
Tampa Electric Company Has Had Wonderful Success With a Unique Type of Construction—The Life Is Unusually Long, Joint Repair Is Infrequent and Corrugation Is Unknown

THE Tampa (Fla.) Electric Company enjoys a unique position in connection with the character of track construction which it has employed with unusual success. While the construction is very different from that used anywhere else, in the knowledge of the writer, it is certainly justified by its low first cost of both track and paving, its low maintenance cost, the great ease with which it can be opened up and repaired when occasion demands, its freedom from corrugation and the low noise feature. The same general type of construction has been used by the company for twenty years and there are now about 40 miles of it in service. A piece of track on Ninth Avenue, between Thirteenth and Fifteenth Streets, laid with 56-lb. rail, has been in continuous regular service for twenty years. This had to be opened up once at the joints and the fish plates renewed or repaired, but the same rail and subgrade construction and the same brick paving—the first done in Tampa—are still in service. The secret of the whole track plan lies largely in the sandy character of the soil.

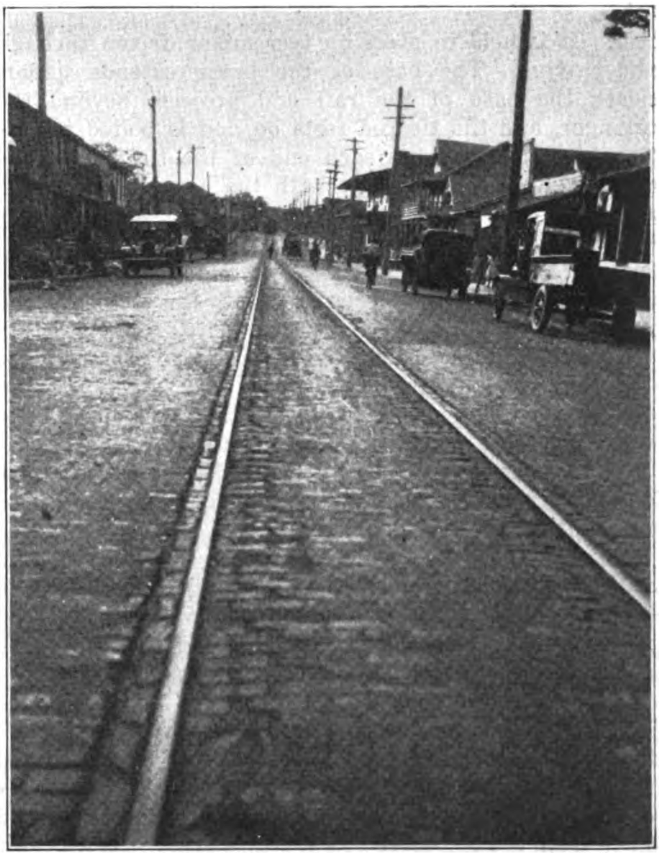
In general, the construction comprises 5-in. A.S.C.E. 80-lb. rails laid on wood stringers supported on cross ties, and making use only of sand for ballast and for track and paving foundations. As far back as twenty years ago, in connection with the first paving jobs done by the street car company, the city was about to force the company to put in a concrete foundation for the track and pavement, and in fact had ordered this. It came about because, with the use of the 5-in. rail, there was not sufficient foundation material between the pavement and the top of the ties and the bricks would settle between ties, making a wavy surface along the rails. The company, however, was very desirous of retaining the 5-in. standard T-rail and to this end tried out the plan of mounting the rails on stringers. This arrangement gave a good depth of sand between the paving and the tops of the ties and apparently eliminated the objection. The city was then induced to accept this stringer construction in lieu of a concrete substructure as ordered and it has been in use ever since. Some experimenting has since been done with a 7-in. T-rail, but there was no need to put this on stringers and yet the construction seemed to be very unsatisfactory without stringers, so that the use of the high T-rail was abandoned.

DETAILS OF CONSTRUCTION

In building this type of track, the trackway is excavated to the proper depth and 4-in. x 8-in. cypress cross ties laid at about 2-ft. centers. The stringers

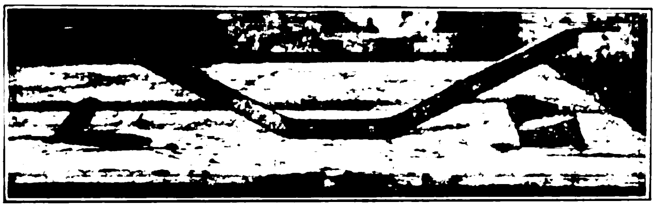


TYPICAL SURFACE APPEARANCE OF TAMPA'S TRACK AND BRICK PAVING



A STRETCH OF TRACK AND PAVEMENT ON NINTH AVE. STILL IN USE AFTER TWENTY YEARS are then laid on the ties and four 60-dwt. spikes toe-nailed into each tie, two on either side of the stringer. The ties are then tamped up to grade with sand and the stringers lined up so that the rails can be spiked to gage at the center of the stringers. The stringers are 8-in. x 10-in. x 16-ft. cypress timbers and the rails are spiked to these with reverse point spikes. Six-bolt continuous rail joints are used and these are held in place by Harvey grip-nuts and bolts with no washers. Concealed soldered bonds patented by T. C. Folsom, roadmaster, installed underneath the fishplates are used on new work but not on repair work because of the cost of removing the fishplate. In repair work, therefore, an electric welded bond is placed on the head of the rail.

Among the unusual features of the track is the use of a peculiar design of tie rod, a picture of which is shown herewith. These rods are spaced every 15 ft. and used in conjunction with a special rail brace shown in the same picture. The ordinary tie rod was found to be in the way of the paving, causing a bad joint in the bricks. Mr. Folsom therefore developed this tie rod made of ⅜-in. x 1½-in. strap iron, and having a 10-in. downward offset in it. At each tie rod location one of the special rail braces is installed. This is placed underneath the base of the rail with the brace part fitting underneath the rail head on the outside of the rail. It is held in place by two spikes driven through the casting. The base of the brace extends underneath the base of the rail and projects beyond the stringer, and the tie rod rests on and is bolted to this base. A half turn at each end of the tie rod brings the flat surface in contact with the brace at the ends, and with the side of a tie, at the center. At the center of the rod, two square holes are punched so that it may be spiked to the tie.


SPECIAL RAIL BRACE AND TIE ROD USED IN TAMPA

After the rails have been spiked to the stringers and surfaced and aligned, the track structure is filled in with sand and then flooded with water and tamped down thoroughly. No other ballast is used except in low wet places. The bricks are then either tamped by hand or rolled with a heavy roller. Thereafter, the paving and track construction are permitted to settle for some time, after which any low spots developing are leveled up and then the bricks grouted in.

In special work locations, the rails are laid on 8-in. x 14-in. pine stringers because the spikes seem to hold better in pine than in cypress. On curves, 8-in. x 12-in. x 10-ft. pine stringers are used, the 10-ft. lengths being short enough to provide for the curvature.

Cypress costs about the same as pine but lasts much longer. In damp places, the cypress will last indefinitely. Its average life is about fifteen years in closed track. The life of cypress cross-ties laid in open track on one of the company's suburban lines has been found to be from ten to twelve years. One piece of track built as described above with cypress ties and stringers was taken up after it had been in the ground ten years and the timber was found to be all sound. It was used again and has now been in the ground ten years more, with no evidence of deterioration to date. The ties and stringers used by the Tampa company are not treated but are all heart, and locally grown.

One of the interesting things in connection with this track construction is that corrugation is absolutely unknown. Mr. Folsom also states that cases of joint trouble are very rare, and of course when there is a low joint to be repaired, the process of opening up the track and getting at the joint is so simple that the cost is very low. The entire track structure seems to hold its alignment and grade and remains in good condition with remarkably little maintenance, though subjected to a rather frequent service of large double-truck summer cars and Birney cars. The absence of extreme cold in winter and of marked changes of temperature have a bearing on this, no doubt. The initial construction cost is also very low, of course, running in the neighborhood of $1.50 a running foot of single straight track, exclusive of special work but including paving.

Welding Steel Poles

BY G. H. McKELWAY
Engineer of Distribution Brooklyn Rapid Transit System

THE USE of electric welding equipments has become very common on many railway properties, but their use has nearly always been confined to work either on the track or in the shops, with some little use by the electrical department in connection with the maintenance of equipment in the power or sub-stations.

The writer has never seen any description of the use of such equipments by the line department, although he knows of at least one case where it was proved that they could be satisfactorily used in the work of that department. This was in the building up of weak points in old steel tubular poles. Many poles after being in service for a number of years become rusted at the joints or near the ground line due to moisture collecting there. This is particularly true of poles on which iron collars are used at these danger points. The practice of applying such collars was at one time much more common than at present, as they were then considered to add to the appearance of the pole.

The writer was interested in some work which was done at the line department yard of this company on poles which had been removed from the ground. The job consisted of depositing a layer of metal from the welding rods in the groove which had been made by the rust and which was first cleaned out before the arc welder was used on it. While the work was entirely in the form of an experiment to see what could be done there was no doubt, at the conclusion, that it could be done satisfactorily and the life of the pole increased thereby. In fact, there seems to be no reason why such work could not be done on the poles while they were still set in the ground, although it would be difficult to perform it from ladders, and a more secure working platform would probably have to be provided for the welders.

M. O. Leighton, chairman of the National Public Works Department Association, addressed a meeting of members of the National Engineering Societies in New York on Feb. 19, on the desirability of a department of public works. A hearing on this plan was given on Feb. 11 by the Senate committee on public lands.

Economy in Car Painting

Reduced Costs of Car Painting Do Not Result From Using Cheap Material or Labor—Analysis of the Causes of Paint Failure Show that Many Might Be Avoided by Using a Little More Care

BY DENNIS O'BRIEN
Foreman Painter Brooklyn (N. Y.) Rapid Transit Company

BOILED OIL
BOILED OIL
RAW OIL
RAW OIL
TURPEN
TURPEN
DENATURED ALCOHOL
JAP

CONVENIENT OIL STORAGE IS A GREAT HELP TO THE PAINTER

THE high costs of paint, oil, and labor have made it necessary for railway organizations to economize in the painting of their equipment. Economy in painting does not result from buying cheap material. A manufacturer or salesman who offers a gallon of oil paint or enamel for $2, when oil is selling around $2.25 per gallon and who says, respecting it, that it is pure linseed oil paint, should be branded as a fraud. A good paint, well ground, whose vehicle is pure linseed oil will have a greater spreading rate under the brush, that is, it will cover more square feet of surface than a cheap, poorly ground paint the vehicle of which is a linseed oil substitute.

In order to get longer life from the paint used we must eliminate the small defects, as it is these small defects which usually lead to larger ones. We find in the last analysis that failure is due to defects which might have been overcome had we exercised a little care and prudence.

The causes of paint failure are two-fold; unpreventable and preventable. The unpreventable causes are moisture, sulphur compounds, ammonia, acids and carbon monoxide. These are found in the atmosphere of large manufacturing cities, and it is a problem for the paint chemists to make a combative paint. The preventable causes are poor workmanship, improper mixing, improper foundations and improper drying conditions. These are directly up to the painter and the paint department.

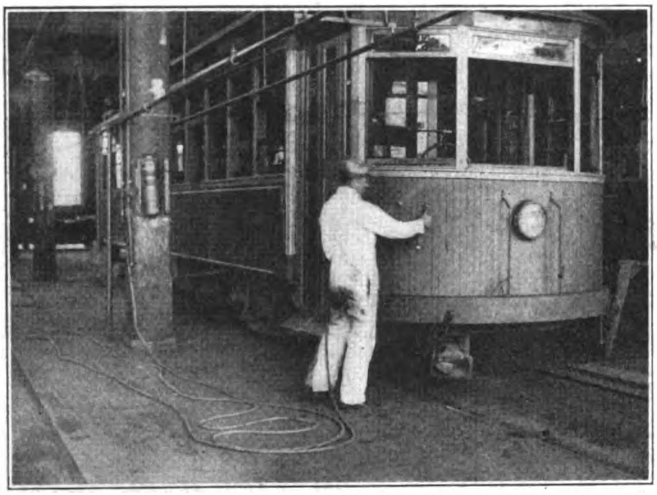
The trade of car-painter is too often supposed to consist of manual processes only. It is thought by many that a young man has only to follow others in order to become a competent workman. There is, however, an element of technique that obtains in painting as in every other trade; it is this that the foreman must impart to the mechanic and he must never consider that man an interloper who asks questions appertaining to the work.

Sagging, running and wrinkling are defects that are sometimes caused by poor mechanics who apply too much paint or enamel or who have no idea of thoroughly brushing out the paint. On the other hand I have seen severe cases of this trouble which were entirely due to the manufacturer. A paint will sag, run and wrinkle where the article in question contains an excess of oil or insufficient volatile matter. Another reason for the appearance of such defects may be the lack of a proper binder. In this case the paint becomes what is known as a "fugutive paint" if there is not something present to bind together the vehicles and pigment. When paint starts to contract or shrink the oil will desert the pigment and the entire surface will be covered with ugly sags and runs.

IMPROPER FOUNDATION IS DIRECTLY DUE TO POOR WORKMANSHIP

The prime coat is the foundation upon which the entire job is to be built. If the foundation is faulty the entire superstructure will topple over. The man who applies the prime coat should be as good a mechanic as he who applies the finishing coat. This rule has been often neglected by foremen who trust the priming coat to helpers. The essential requisites of the prime coat are firm adhesion, impermeability and a uniformity of the layer of the thickness desired. These can only be obtained by a first-class mechanic who thoroughly understands the importance of brushing out his paint.

Nothing is more discouraging to the foreman painter than to find, after a job has been finished, that the surface is covered with minute and large blisters. This condition is far more common on cars finished with an oil enamel, which is used extensively in car painting today, than on cars painted by the older process. While it is true that in some cases blistering is due to an excess of oil or fat in the oil, in the majority of cases blistering can be justly attributed to painting over damp or moist surfaces. Blisters are more than mere blemishes on the paint film, they are serious defects which if allowed to persist will ultimately destroy the entire painted surface. In due time the blisters will crack and allow water to get in under the paint film itself and thus destroy the under coats.


A SMOOTH DRY SURFACE IS ESSENTIAL IF BLISTER FORMATION IS TO BE PREVENTED

Where the job calls for the car to be scrubbed and enamelled, care should be taken to see that the surface is thoroughly dry before the enamel is applied. If the surface is damp or moist when the enamel is applied countless water molecules will spread over the surface under the thin enamel film. When the car leaves the shop the rays of the sun beating upon the surface of the car will draw these molecules of water together at a point where the structure of the paint film shows the least resistance.

While the paint is drying it is constantly taking on oxygen. The moisture, oxygen and oil, aided by the heat of the sun, tend to generate a gas under the film. This causes the expansion which we call blisters. Of course these factors do not absolve the paint manufacturer from all blame and it is all up to the foreman painted to fix responsibility.

PROPER MIXING IS MOST EFFECTUAL

Too must stress cannot be placed upon the importance of proper mixing of the paint. Many a job has failed because the paint has not been properly mixed. Paint is composed of ground inorganic matter or the pigment, the organic or liquid matter with which we mix it, or the "vehicle", and volatile matter. The finer the pigment is ground the better the mixed paint will be because the greater the number of particles of pigment on the surface the better the protection the dried oil will receive.

In mixing the paint it is important that the oil be added to the paste and then paddled until every particle of pigment is incorporated in a close union with the oil. Under no circumstances should any tinting colors, driers or turpentine be added until this close incorporation has been effected. The paint should be mixed to a workable consistency so as not to bring about much muscular fatigue to the painter using it. The use of paint that is hard to work under the brush tempts the painter to thin it out. This has caused many paint jobs to fail, where the reason for the failure could never be traced.

JAPAN DRIERS ARE NOT FAVORED

Japan driers are carriers of oxygen. A paint that is supersaturated with oxygen loses its toughness and becomes brittle. Under no circumstances do I approve of using japan driers. Boiled oil, because of its peculiar manufacturing processes, possesses drying properties, and it was always intended as a vehicle to accelerate the drying of mixed paint, but not as a general paint vehicle. The foreman painter who does not recognize the true merit of boiled oil as a drier and insists upon destroying the neutral oil in the paint by adding japan driers is either incompetent or not on the level with the firm which is paying him wages. In either instance it is folly to retain him in a business where he will burn up good paint and waste money.

Turpentine, while making the paint more workable, should ever be used conservatively and should be added only in quantities sufficient to aid the paint to penetrate the under coats. It should never be used to thin out or extend the paint after it has been mixed. Up to the present time nothing has been found to equal linseed oil as a paint vehicle. While Tung oil or China wood oil is superior to linseed oil in resisting water, it has never made any marked impression as a general paint vehicle.

Care should be taken to see that the oil used is pure. Adulteration of oils is frequently the cause of failure of an expensive painting job. I have seen paints that possessed neither drying nor binding qualities because of the oil foots. Oil should be tested for its drying qualities. Any man who has been handling oils for any length of time can detect adulterated oil by smelling and tasting it. When placed in a test tube and held to the light a cloudiness and a heavy precipitation will give evidence of oil foots.

Boiled oil flowed on a piece of glass and placed in a vertical position in a room of about 70 deg. temperature, should dry free from tackiness in thirteen hours. A simple and fairly accurate test for pure turpentine is to place a drop on a sheet of white paper. Rapidity of evaporation without any pronounced greasy residue will prove the purity of the article.

Paints dry by absorbtion, oxidization and evaporation. In order to facilitate these the shop should be warm, well ventilated and free from dampness and obnoxious gases. Another important feature in painting is not to use any soap, cleaners or renovators which contain acids, ammonia, free lime or any other alkali. Careful cleaning and proper drying are necessary.

Overhead Practice and Experience in Atlanta

Iron Trolley Wire Used With Success on City Line—Special Construction Practices Which Have Materially Reduced Maintenance Costs

BACKBONE CONSTRUCTION ON CURVES AND CATENARY CONSTRUCTION OVER STRAIGHT TROLLEY IN FRONT OF ATLANTA CARHOUSE

CROSS CATENARY SUPPORT FOR OVERHEAD, ALONG FRONT OF CARHOUSE CAN BE SEEN IN THIS VIEW OF "PERMANENT" OVERHEAD CONSTRUCTION

FOR the past three and one-half years, T. F. Johnson, superintendent of transmission and distribution, Georgia Railway & Power Company, Atlanta, Ga., has been making a more and more extensive use of iron trolley wire until about 25 miles have been installed to date. As this company has had very satisfactory results from the use of iron wire on its city lines, its experience is enlightening.

The use of iron wire was originally tried in Atlanta as a means of reducing the rapid wear and consequent need for very frequent replacement of certain sections of the copper trolley. It was not gone into as a means of reducing the investment required or to get away from the use of copper for other reasons although the very high price of copper during the war, coupled with its scarcity, undoubtedly influenced a greater use of the iron wire than would naturally have followed without these unusual conditions.

There was a viaduct where the copper trolley wore out so rapidly that it had to be replaced every six months and it was at this point that the iron wire was first installed. This original wire has now been up three and one-half years and upon a recent inspection it was declared to have a remaining life of at least two and one-half years. The wire used on this first installation as in the later ones, was of No. 000 round section. In the catalog of the manufacturer, the John F. Roebling's Sons Company, it is loosely termed "iron wire", but in reality is a mild steel, or a steel having a very low carbon content. This wire is galvanized so that the rust will not fall down on the roof of the cars as they pass. The galvanized surface wears off quickly on the under side of the wire which becomes bright like a steel rail but remains on the top and sides of the wire to protect it from rusting.

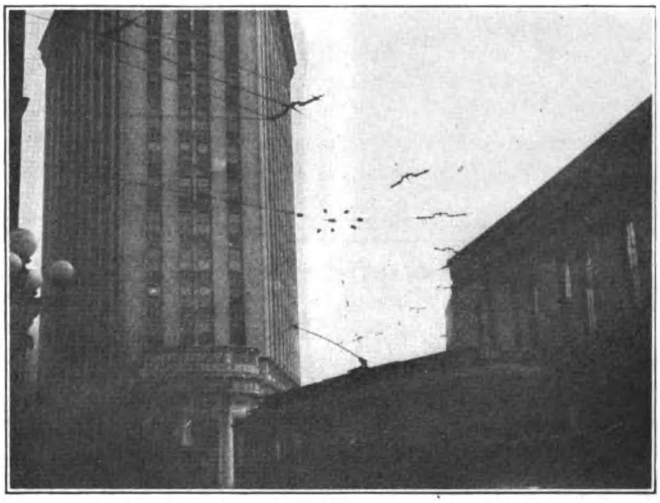
The iron wire having demonstrated its adaptability for service on this initial installation, the Atlanta company began the practice of installing it on curves. At these locations copper trolley wears rough, whereas the iron wire becomes polished and smooth, seemingly indicating that the wear on trolley wheels is much less. The iron wire is also desirable at these locations because of its greater strength.

On straight line work the iron wire has been installed in Atlanta only in those locations where there was sufficient capacity in the feeder cable along that street to carry the full load without including any of the conductivity of the trolley itself. However, it was stated that on this basis iron wire could be used on 60 per cent of the whole Atlanta system with the present feeder installation. No wire has been installed, however, in the down-town section, except for that on the curves, because of the large number of cars which pull current from a short section of the wire at a time. It would take too much feeder copper to make the use of iron wire in this district possible, and furthermore the company does not have the poles to carry such feeder. The practice followed in the down-town section is to use ring feeders and to have also special work inside the ring of iron wire.

Iron wire is installed under a tension such that it is practically without sag in the winter and has a 3-in. sag in summer. Taps from the feeder to the trolley are cut in at every other span, using the ordinary feed-in ear for connecting to the trolley wire. One of the difficulties in connection with the use of iron wire has been that for some reason not fully determined the brass ears used with it burn off very rapidly—much more rapidly than with the copper trolley. To eliminate this defect, an effort has been made to secure iron ears. but a satisfactory design had not yet been secured at the time of this writing.

W. A. Wilder, general foreman of trolley work, states that the linemen like to work with the iron trolley wire because it is much easier to handle than hard-drawn copper wire. When a break occurs in the iron trolley, the ends simply fall down but do not snap and fly as the hard-drawn copper does. For this reason, it is easier for the men to repair the break, an ordinary mechanical splicing ear being used. Also, if the iron wire touches the rail in falling, it burns off but does not anneal, so that all of the wire that is left intact can be used in making the repair and there is no waste.

In connection with trolley breaks it is interesting to point out that the annealing of copper trolley for considerable distances back of a break has led the Atlanta company to install an equalizing connection between the two trolleys at every fourth span over the entire system. It has been found that with these cross connections a trolley coming in contact with the rail will anneal back to the equalizer only. Apparently the combined conductivity of the two trolleys from this point gives sufficient current carrying capacity so that the heating does not reach the annealing temperature. These equalizer wires are made from old pieces of trolley and connected by means of Ohio Brass feed-in ears. It is claimed that their presence saves a great deal of trolley. The overhead system in Atlanta is not sectionalized.



BACKBONE REINFORCEMENT OF TROLLEY CURVE AT BUSY DOWNTOWN CORNER WHERE ABSENCE OF ANCHOR POLES BROUGHT BULL-RING CONSTRUCTION INTO USE

The only thing the line department has against the use of iron wire is that it has found that there seems to be a rather frequent splice in it as it is unreeled, and that frequently there will be a kink at the splice. If it is attempted to hammer out the kink the wire frequently will snap, seeming to be very brittle at that point. It is understood that in the process of manufacture it is necessary to have about forty-two such splices on a full reel holding about 4½ miles of wire. These splices are made by butt-welding and it is possible that the unfavorable experience of the Atlanta linemen resulted from these welding points being cooled too rapidly and thereby hardened. The manufacturing process is such that each splice is supposed to be thoroughly annealed to prevent brittleness at the splices.

PRACTICES DESIGNED TO REDUCE MAINTENANCE AND CAR DELAYS

The practice of backboning curves is not a new one but it has probably been carried further on the Atlanta property than in nearly any other city. For all curves in the entire system have been rebuilt in the manner illustrated in accompanying photographs. The result has been that the delay of a car on account of a break at a curve is practically unknown, for with the present construction if a break does occur, only a very short piece of the wire hangs down and the car can coast by the break without being delayed. Because of this assurance of not tying up the cars even if a break does occur, it is possible with the back-bone construction to leave the trolley up until it is completely worn out. In other words, early replacement of the wire does not have to be made as an insurance against breakage.

The messenger cable forming the backbone is put up to parallel the trolley all the way around the curve. If it is a double-track curve, both trolleys are backboned. But the backbone is not made in one continuous wire but is turned back and served up at each pull-off, so there is a short piece between adjacent guy wires. The backbone is separated from the trolley only by the hanger arm and wood strain insulator. At each end of the backbone, the guy wire is made to pull off as nearly tangent to the curve as is possible, considering the possible locations of a pole or other anchor. With this backbone construction the pull-off guys are so arranged that should any one of them become detached from the trolley, it will not hang down far enough to obstruct the street.

One place where this backbone type of construction has proved to be particularly effective is at the carhouse. Here there are twenty-seven tracks entering the building, seventeen turning in one direction and ten in the other, with an overhead trolley over each one. Before the present overhead construction was installed it was an unusual day that the line crew was not called to the carhouse to repair the overhead. The present construction, which is quite clearly pictured in two accompanying halftones, has now been up two years during which time the line crew has been called to the car house very rarely.

All of the trolleys turning into the car house are of iron wire while the wire over the straight track along the street in front of the building and that inside the barn is copper. A circuit breaker was placed in each bay of the car house to localize any short circuit disturbance.

The straight wire along the street is supported by a long catenary messenger cable which is attached to each trolley switch by means of a wood strain insulator and a piece of trolley wire looped through the two side eyes of the switch and the eye of the insulator. Another catenary messenger cable was strung parallel to the front of the car house and about 15 ft. in front of it. It was installed to provide an additional support for the twenty-seven trolleys as they straighten to enter the carhouse. This catenary was fastened between trolley wires to the span wire by means of a hanger and three-bolt clamp and clevis.

Each curve is backboned and switch guys and backbone guys are installed for each curve. Thus very large number of guy wires was distributed among seventeen anchor poles placed along the street. The backbone tangent guys were fastened to a pole at one end and to the building at the other end. In the latter case, a bolt and nut in the top frame of the Kinnear doors which held the latter to the steel column was removed and a bolt with a female eye head used instead, thus serving the double purpose of bolting the Kinnear frame and as an anchor for the guy. A No. 504 O.B. porcelain strain insulator was inserted in these guys as a double safeguard against grounding, the woodstrain insulator between the trolley and the backbone cable providing the ordinary insulation.

NOVEL INSTALLATION OF TROLLEY PROTECTORS

In using trolley protectors in 5-ft. and 6-ft. lengths at the approach to switches it was found that the trolley wire wore out very rapidly just in front of the first end of the protector. After some experimenting it was found that if about 6 in. of the first end of the protector were cut off and this section inverted so that it was placed on top of the wire instead of underneath, the wear at this point was practically eliminated. Placing a short piece of protector in this position apparently makes an approach to the section of the protector placed in the usual position such that there is no bump to cause any arcing.

The Atlanta company saved $2,700 for the first ten months of 1919 by handling overhead junk material in a manner to realize the greatest junk value. For example, the trolley ears turned in for junk are sent to the repair shop where one man continuously employed on this work separates the copper wire from the brass ears and removes the iron set screws. If the ears were sold as they come in, without separating the different metals, they would bring the scrap value of the lowest valued metal, or about 10 cents a pound. By separating them, the copper can be sold for say 18½ cents a pound, the brass for 10 cents or 12 cents. Further, if in reclaiming these metals, the workman finds a dozen good ears in a day which may be saved with a little repair work, it means a saving of twelve times $1.25 or $15. In handling this work, the storekeeper charges out 1,000 lb. of scrap at 10 cents a pound to this workman, who makes his returns to the store room in about these proportions: 500 lb. of scrap brass, 400 lb. of copper, 100 lb. of good ears. The workman's time is charged to the work order on which the reclamation work is done, the net saving totaling up a surprisingly large profit as indicated from the figures given above.

Remote-Control Sectionalizing Switch

A Saving of More than $400 per Month Resulted from the Installation of This Simple and Inexpensive Device

BY H. P. BELL
Electrical Engineer San Francisco-Oakland Terminal Railways, Oakland, Cal.

THE San Francisco-Oakland Terminal Railways have recently installed a novel economy in substation operation and insurance for continuity of power service in its Richmond substation. The installation as shown in the wiring diagram is an adaption of an automatic sectionalizing switch with the GE-DB-276 contactor remodeled to take care of the special conditions encountered in this case.

The limiting conditions calling for this particular installation were as follows: On account of power contract relations it was necessary and desirable to serve power to the cars of this division entirely through the conversion apparatus at Richmond substation during the time when there was any appreciable load in this district. Incidentally, Richmond substation is fed on the alternating-current side under contract from one of the larger power company's 11,000-volt lines from hydro-electric sources. Although it was desirable to shut down this substation between the hours of 1:30 a. m. and 5:30 a. m. in order to eliminate the no-load losses in the plant and the cost of the station attendance, it was necessary to keep the district-current lines "hot" to provide for moving, repairing and testing on cars in the yard and carhouse, and also to take care of the necessary street and crossing lights. It was also true that the alternating-current source of power for the district just south of the section insulator which separated that district from the Richmond district was much more reliable than the alternating-current power to Richmond substation. Therefore, from all angles of economy and continuity of service it was desirable to have a connection with another 600-volt direct-current source of power which could be operated at will from the switchboard of Richmond substation, and which would also provide protection from shorts and overloads as between the two sections.

The only source of 600-volt direct-current power reasonably available other than from Richmond substation was located 4.2 miles from that station.

After looking over the available apparatus on the market which could be installed at a reasonable cost and which would come anywhere near performing the desired functions, it was decided to remodel and adapt a General Electric automatic sectionalizing switch for our use. The relay of this switch in its standard commercial form is provided with two coils, one shunt and one series, operating a contact which is closed in the normal "down" position. This contact is in the contactor operating-coil circuit. An excessive flow of current through the series coil from one section to another will open the relay contact and drop out the contactor. The shunt coil, being connected across the two sections, will hold the relay contact open so long as there is sufficient difference of potential between the two sections. It can be seen from a study of our requirements that the relay shunt coil was not a desirable feature, in fact its use would rob us of manual control of the contactor. The coil was therefore eliminated. The negative side of the contactor operating coil was carried over an iron wire line to the substation switchboard. The negative side control was used to eliminate the expense of a two-wire line which would have been necessary for the positive side control. Iron wire was used for economy both in the line and as a substitute for other resistance.

The switchboard installation at the substation as shown in the wiring diagram consists of a knife switch F, an indicating lamp G, a 600-volt push-button switch K and a relay H-J, operated on three parallel circuits which contain the necessary fuses and resistances. Upon the closing of the knife switch F, an indication is received through the indicating lamp G, as to whether or not there is power on the 600-volt direct-current lines in the section Z, into which it is proposed to tie. Then when it is desired to tie into this section Z, the push button switch K is closed energizing the coil H of the switchboard relay which closes the contact J, completing the control circuit to ground, and energizes the contactor-closing coil D, thus tying the two 600-volt systems Y and Z together.

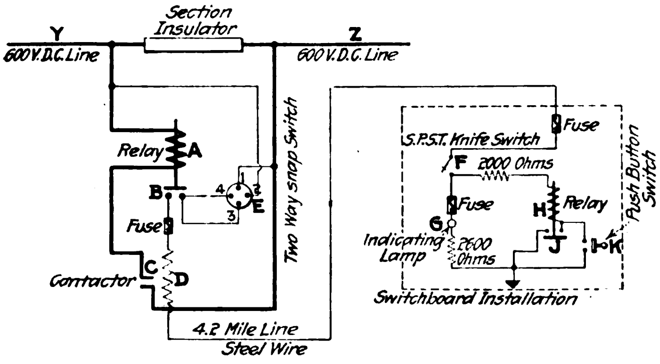


DIAGRAM OF CONNECTIONS FOR REMOTE-CONTROL OPERATING SWITCH

WHAT HAPPENS WHEN A "SHORT" OCCURS

If a short should occur on the Richmond 600-volt system Y, an excessive flow of current would energize the series coil A of the switch relay and open the control circuit contact B, which would allow the contactor C to drop open, separating the systems. The opening of the control circuit at B would also de-energize the switchboard relay coil H, opening its contact J so that the systems would not automatically tie themselves together again as soon as the contactor C opened and interrupted the rush of current through the series relay coil A at the switch. The circuit would remain open until the night foreman of the carhouse, upon entering the station, could determine where the trouble was by observing the indicating light and trying the push-button switch once to see if the systems again separated after being closed. If they again separated the emergency lineman would be called as usual to clear up the grounded line.

A two-way snap switch E is cut into the positive side of the control line to provide for reversing the control in case it is ever desired during emergencies to provide power on section Y and at the same time feed into section Z.

This installation has been in service for about six months, has proven entirely satisfactory, and has developed no failures whatever. The only maintenance required has been a monthly inspection and cleaning of contacts. It has yielded a saving of $412 per month, and the longest power interruption in the 600-volt direct-current service to this district since the installation has been four minutes, although we have had several severe interruptions in the alternating-current service to the substation of from sixteen to fifty-seven minutes' duration.

Coal Heaters Electrically Equipped for Intermittent Use in Spring and Fall

THE Sioux City Service Company is installing on each of its cars Peter Smith forced ventilation hot-air heaters equipped with four electric heating coils. The object is to provide this ready means of securing the small amount of heat needed only for an hour or two at a time during the fall and spring months.

The electric heater coil equipment is very simply incorporated into the coal heating system by installing four 500-watt coils, one in each corner of the outer steel casing of the stove, between the outer and inner casings. The cold air taken in through the floor of the car is drawn up over the four heater coils by the blower and forced down through the inner casing into the distributing duct along the side of the car.

The four coils are permanently mounted in a vertical position and are so connected electrically that current cannot be turned on through them until after the blower switch has been closed. This circuit is used to prevent any possibility of burning out the inner casings or coils if there were no circulation of air. During the winter months when the coal heat is required, the fuse in the circuit of the four heater coils is removed so that they cannot be used. The wiring diagram taking care of these two provisions is illustrated in an accompanying drawing.

It is claimed that this auxiliary electrical equipment in the coal heater system overcomes an objection which some railway men have expressed, that it made the cars too warm at times in the fall and spring; or that it was necessary to build a fire which would last for many hours in order to supply heat needed for perhaps only an hour. The additional cost of the system with the four electric coils incorporated is small.

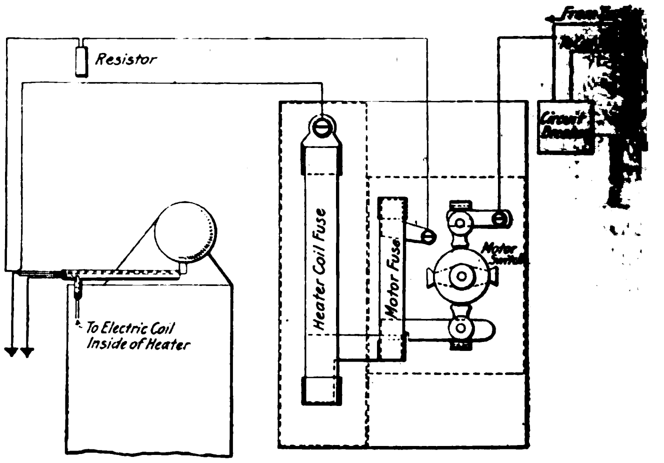


DIAGRAM OF CONNECTIONS FOR COMBINATION ELECTRIC AND COAL CAR HEATING SYSTEM

Car conductors have a habit of leaning against the coin box supports. The backs of their coats wear out at the point of contact with the support. New coats cost money nowadays, so any device that will save them from wear will be appreciated by trolleymen. An inventive genius has solved the problem. A reinforcing strap of leather, leather substitute or heavy rubberized fabric about three or four inches wide is sewed all the way across the back of the coat at the point where it rubs against the support.

Rehabilitating an Overhauling Shop

By Utilizing the Space Formerly Occupied by Carpenter and Blacksmith Shops, the New York State Railways, Utica Lines, Was Able to Increase Their Facilities for Overhauling Equipment and Rebuilding Cars

By H. S. SWEET,
Master Mechanic New York State Railways, Utica Lines

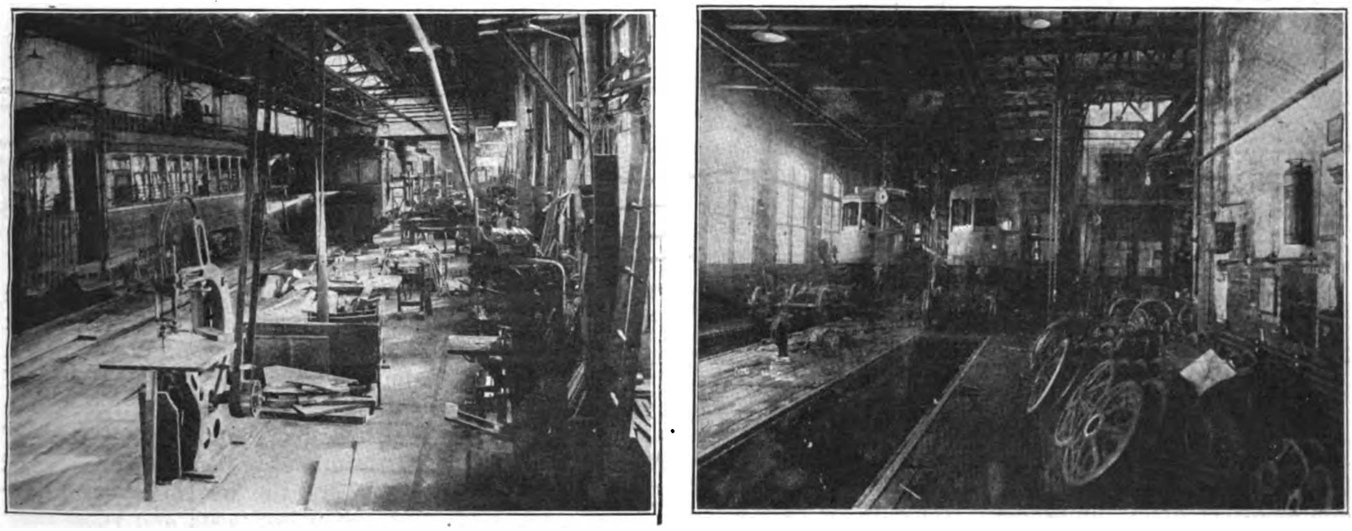
THE Utica Park shops of the New York State Railways take care of the car equipment necessary for operating the Utica, Rome and Mohawk city lines, as well as an interurban line which runs from Rome to Little Falls. The growing business of the company and facilities required for carrying out a car rebuilding program which had been undertaken by the company made it necessary recently to obtain increased space, as the previous arrangement of the shops so limited their capacity that this additional work could not be taken care of properly.

The principal point of congestion was in the overhauling shop. With the old layout it was possible to hoist but three cars at a time, and as all of the wheel and armature changes for both the city and interurban lines were taken care of here, this overhauling shop was necessarily very greatly overloaded. During the winter months, when car repairs reached their maximum, it was almost impossible to take care of the equipment.

Slight Changes Almost Double Overhauling Capacity

A drawing on page 568 shows the layout of the shop, both before and after the changes were made. The carpenter shop, which was formerly located in the rear of the truck shop, was removed to an adjacent carhouse which was formerly used for storage purposes, and an annex, 45 ft. long x 12 ft. wide, was built at the center of the overhauling shop for use as a blacksmith shop. This was the only additional building necessary and the location of the blacksmith shop opposite the truck overhauling section provided a very convenient location for carrying on the work. The carpenter shop was located close by. By these changes the capacity for overhauling was practically doubled.

By referring to the former layout of the shop it will be seen that at the side of the carpenter and truck shops, which occupy the central part of the building, were located the electrical department and armature room, a mill room, a blacksmith shop, a machine shop, a store room and the main office. In the layout as rearranged the armature room was left in its old location, but the controller and resistance work formerly taken care of at a bench in the rear of the armature room was moved to a balcony built in the rear of the room. This gave increased space of approximately 17 ft. x 15 ft. A commutator slotting saw of General Electric make was installed in the armature room to take care of this work which was previously done on a planer.



AT LEFT, NEWLY ARRANGED CARPENTER SHOP. AT RIGHT, TRUCK SHOP

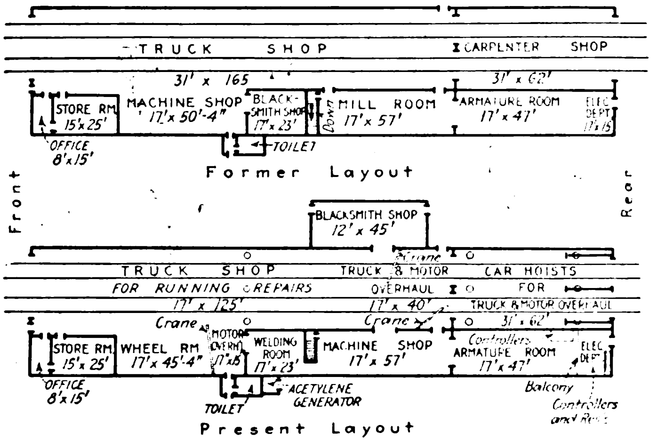
The location of the machine shop was changed from a point just in the rear of the store room to the space previously occupied as a mill room. All of the machines except a wheel press and boring mill were removed into this space; then, by rearranging the wheel press and boring mill, additional room was provided for motor overhauling. A hoist for handling the work conveniently, and a number of benches were installed in what was formerly the machine shop.

The space previously used as a blacksmith shop was fitted up as a welding room and an acetlyene generator was installed just outside this room. This location right back of the space used for motor overhauling and adjacent to the truck overhauling part of the shop was chosen as being most convenient.

In the rear of the truck shop where the carpenter shop was formerly located, car hoists were installed for use in overhauling. Cranes were set up in front of these in such a location that they would swing from each side to do the work necessary in overhauling the trucks. One of three hoists which was formerly used for wheels and armature work was also made available for overhauling by the equipping of two carhouses with the facilities necessary to enable them to change their own wheels and armatures. This diminished the work of this class which it was necessary to take care of at the Utica Park shops.

In the previous arrangement the hoists used for the wheel and armature work were on travelers running on beams hung below the trolley wire. This arrangement was very unsatisfactory as it necessitated the pulling off of trolleys whenever cars were moved around the truck shop. This location also resulted in many minor accidents. In the rearrangement the hoists were raised so as to run on beams above the trolley wire which was arranged with narrow gaps so that the trolley wheels could run over without making it necessary to remove the trolley from the wire. This gap allowed a thin iron plate from which the hoist hangs to be installed.

As will be seen from the revised layout the truck and motor overhauling is done now in the center of the shop, the car hoists used in this work are located in the rear formerly occupied by the carpenter shop and the front part of the shop is used for running repairs. By having the truck and motor overhauling done in the center of the shop, the necessity for turning cars when but one end requires raising is avoided and as the overhauling tracks run entirely through the shop the work can be arranged so as to be carried out without interference.



PRESENT AND FORMER LAYOUTS OF UTICA PARK OVERHAULING SHOPS, NEW YORK STATE RAILWAYS UTICA LINES

Two additional illustrations show views of the truck shop and carpenter shop so rearranged. The carpenter shop and mill room are now located in front of the paint shop which takes up a space of 195 ft. in the rear of a 500-ft. carhouse. In this rearrangement, all that was necessary was to put up a partition near the end of the carhouse, lay floors and install heating and lighting fixtures. The paint shop, which has a capacity of ten cars, was not enlarged as it was considered ample to handle the present work.

The shop changes and additions have enabled the company to carry out its extensive motor and truck overhauling program which would have been impossible under the old arrangement, and this thorough overhauling of the electric equipment has proved of great value during the severe winter months through which the company has just passed. The shop changes and additions described were carried out under the writer's supervision together with advice and help from J. F. Uffert, superintendent of equipment of the New York State Railways.

Old Tie Rods Made Over Practically Without Waste

TIE RODS saved from old track have accumulated rapidly in the yards of the United Railroads of San Francisco and an effort was made to find the best plan for making them again fit for service. As piled up in the storage many of the rods were badly bent, and practically all of them were deeply pitted by rust or electrolysis. The threaded ends were unfit for further use. A glance at the pile strongly suggested the scrap heap. The rods are being made over, however, so that they will serve their purpose practically as well as when new.

The first operation is to cut off the threaded ends, making one of these cuts an angular or scarf cut so that the end has only to be heated to be ready for welding. The rods are then straightened and piled up beside a preheating furnace. After preheating they are passed into an adjacent furnace where they are brought up to welding heat. Beside this furnace stands a power hammer into which special dies for welding rods can be fitted. The actual welding is done so quickly that a blacksmith and one helper handle the rods through the two furnaces and complete the weld at an average rate of one rod per minute. In fact, this rate can be maintained throughout the working day. After thus being extended to suitable length, the rods are re-threaded and fitted with new nuts. In this condition they are as easily handled and are thought to have almost the same life as new rods.

Reinforced Concrete in Railway Work

IN THE *Bulletin* of the *International Railway Association*, Vol. 1, p. 207, is an elaborate "note" on the use of reinforced concrete in England for railway work other than bridges and buildings, by L. Weisenbruch, chief engineer and administration manager in charge of railway signaling of the Belgian State Railways. In view of the comprehensive plans for electrification of the railway lines of Belgium, this paper is of unusual interest. The author covers the use of concrete for signal masts and telegraph poles, posts and ties.

He concludes that owing to the increasing scarcity of wood, and the present high prices of wood and steel, reinforced concrete can be economically applied at once on railways for signal masts and telegraph poles, fencing, supports for pulleys, etc., and ties for sidings and inspection pits.

Among suggestions regarding concrete ties he says that the best fastenings for securing the rails to the concrete ties are bolts going right through the latter. It seems advisable to interpose between the rails and the ties, in addition to a layer of bituminized card, a sole plate made of compressed maple 1 in. thick. The length of the tie should be as nearly as possible that of a wooden tie. It must be packed firmly under about 36 in. at each end, leaving in the middle an unpacked space of about 24 in. to prevent the formation of cracks. Hollow ties have, besides the advantage of lightness, that of having a large seat for a given weight.

All track joints are being double bonded by the Birmingham Railway, Light & Power Company as a means of making doubly certain of the continuity of the track return circuit. A 4-0 pressed terminal bond is placed under the fishplate and an Elrico bond on the head of the rail.

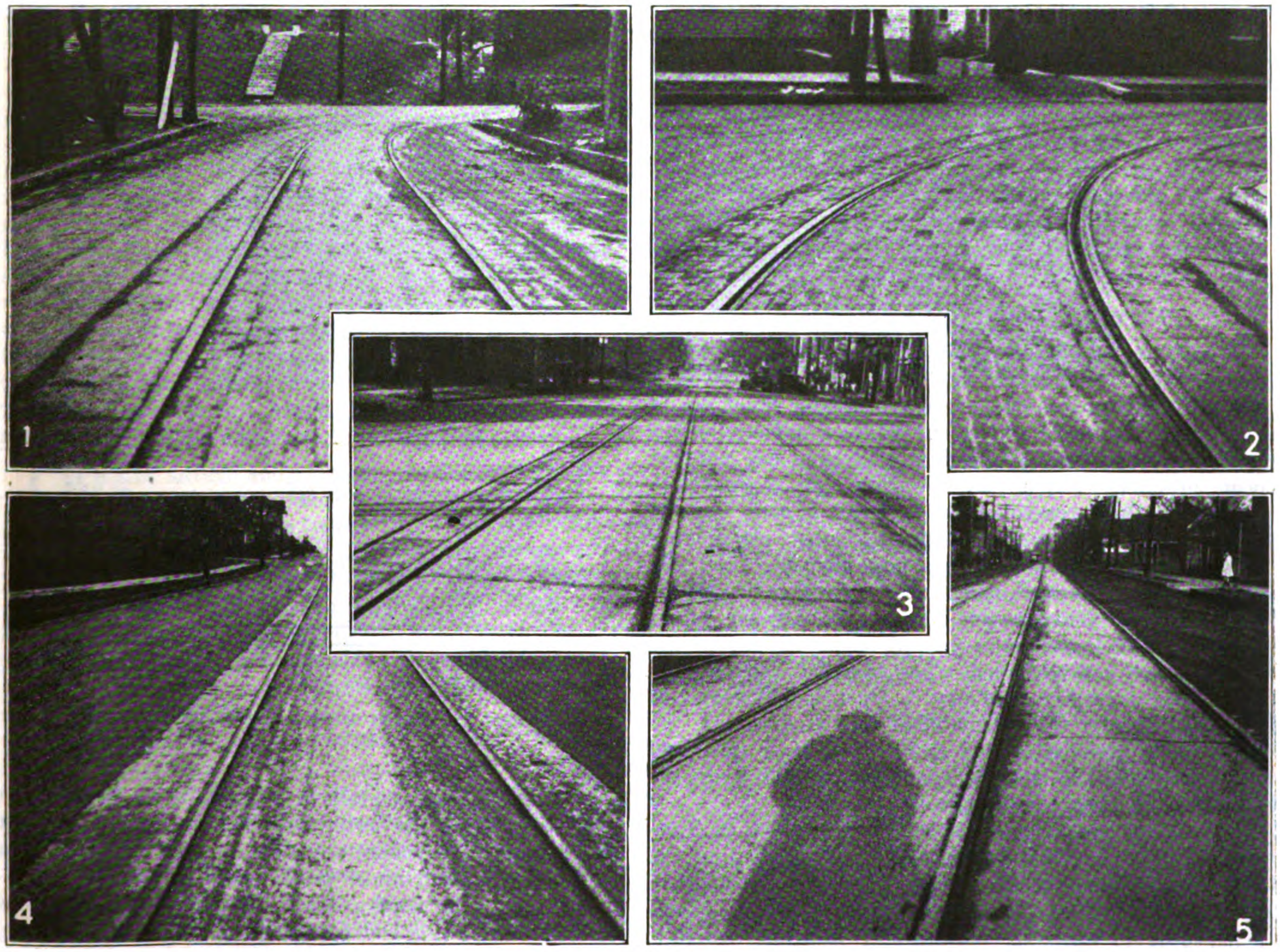
Track Construction From the Paving Maintenance Standpoint

The Birmingham Railway Has Tried a Number of Types of Track Construction in an Effort to Reduce the Surface Maintenance Expense—Its Experiences Are Related in the Following Paragraphs

THE maintenance-of-way engineer's work on a street railway property is devoted in no small part to the problem of devising a type of track and paving which will minimize the expenditures necessary for the surface maintenance. Along this line of endeavor, L. L. Newman, vice-president and chief engineer Birmingham (Ala.) Railway, Light & Power Company, has experimented with a variety of types of construction and thus obtained valuable information as to the merits and weaknesses likely to be found.

The most satisfactory service in Birmingham has probably been obtained with a rigid concrete substructure and a vitrified brick paving, wherein the paving between rails is so crowned that the bricks adjacent to the rails fit in underneath the heads of the T-rails, avoiding the use of any nose blocks. This construction is shown in an accompanying drawing. The substructure is made with 1-3-6 slag concrete which is carried from a distance of 6 in. below the wood ties up over the base of the rails to the paving level, less 1 in. A form board of the proper contour is used to smooth off the concrete between the rails and to provide the proper foundation contour for the brick surface. The bricks are laid on a 1-in. cushion of sand and the space between bricks and that along the rails is grouted in. The level of the paving is brought up even with the rail heads on the outside.

It has been found that this manner of paving to form



TYPES OF TRACK CONSTRUCTION USED IN BIRMINGHAM

No. 1—One row of bricks adjacent to each rail is laid crosswise while those between are laid longitudinally.

No. 2—All bricks between rails are here laid longitudinally. The rows can be carried around the curves in the same manner without complication.

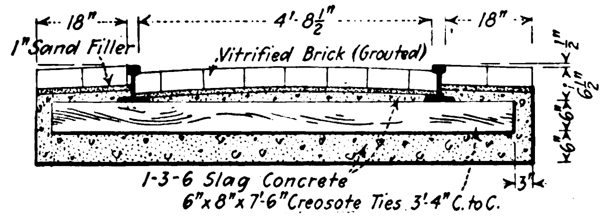
No. 3—Earlier concrete paving showing deterioration at the formed flangeway and at the expansion joints; also note the groove worn in at the joint between company and city paving.

No. 4—Concrete crowned underneath the rail head. Some deflections in the flangeway can be seen and also the noticeable joint between city and company paving.

No. 5—Monolithic construction without expansion joints and poured only between the outside rails, leaving the 18-in. outside for simultaneous pouring with city paving to avoid bad joints.

the flangeways has resulted in a much slower deterioration of the brick adjacent to the rails than was experienced with special nose blocks (other than Belgian blocks which are considered too expensive in this locality) which chip off badly. It will be noted that the substructure of this track is a monolithic slab of concrete, poured complete in one operation.

Two or three plans of laying the bricks in the above construction have been tried. The majority were laid with the length of the bricks across the track and staggered in the usual manner. On another stretch the row of bricks adjacent to the rails was laid crosswise of the track, while the bricks between were laid longitudinally. On still another stretch, all of the bricks were laid longitudinally between rails. The latter two plans have the advantage that the bricks can be laid much faster and with much less labor, since they do not have to be broken except at the starting point. The pavers can continue the brick right along on straightaway and on curves without any fitting. It was thought that with the bricks laid longitudinally, that is, parallel with the directions of travel, grooves would be likely to develop between rows, but this has not occurred after two years' use. These latter two schemes of laying the bricks are shown in two accompanying photographs.


18"
4'-8½"
18"
1" Sand Filler
Vitrified Brick (Grouted)
1"½
6"½
6"
6"
1-3-6 Slag Concrete
3"
6"x8"x7'-6" Creosote Ties 3'-4" C. to C.

SECTION THROUGH CONCRETE TRACK WITH BRICK SURFACE WHICH HAS GIVEN EXCELLENT SERVICE IN BIRMINGHAM

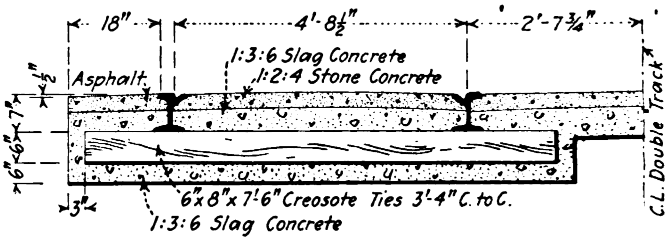
EXPERIENCE WITH CONCRETE PAVING

A number of different construction plans have been followed in Birmingham looking toward the development of a concrete substructure and paving which would give a satisfactory service, but while considerable improvement has been realized, a structure has not yet been produced which has overcome the tendency to crack. In the later construction work of this type of track and paving construction, the substructure concrete and the paving slab have been poured practically at the same time as a means of securing a monolithic construction. This avoids the seam between layers where the paving slab is poured separately after the substructure has hardened. The two-slab construction has shown a greater tendency to crack and it seems to be more noisy. The monolithic construction, on the other hand, tends to expand and contract as a unit, and there seems to be less likelihood of trouble from the seasonal temperature changes.

This monolithic type of construction, which is illustrated in an accompanying drawing, is poured in the following manner: The excavation is made to a depth of 6 in. below the ties, which for a 7-in. rail means a depth of 19 in. The ties are then laid and the rails spiked to them to gage. The structure is then brought to grade and alignment by using double wedges made from 4-in. x 6-in. rectangular blocks sawed in two diagonally. These wedges are 18 in. long and are placed directly on the ground if this is hard, otherwise on boards. The concrete mixer is then put onto this track and arranged to pour behind itself. It is first moved forward a distance of from 50 to 100 ft. and a course of 1-3-6 mix poured up to well over the base of the rail. The mixer is then moved back and the 1-2-4 paving mix poured up to the surface level. This makes the pouring of the two courses not over an hour apart, so that the entire structure sets as a monolith. Where the pouring is stopped at the end of a day, the concrete is permitted to run off in a natural taper. The next day the new mix is poured in over the taper, forming a kind of beveled joint, the presence of which cannot be detected in the finished work.

When girder groove rail is used the level of the paving slab is brought up even with the rail top on both sides. With T-rail, however, the paving surface is crowned down to below the rail head, rather than to form a flangeway in the concrete adjacent to the rails. Formed flangeways were used on some of the earlier concrete paving, but it was found that it chipped off very badly and gave an unsightly appearance after being subjected to traffic for a time.

The crowning of the concrete between rails down to below the head has not been altogether satisfactory, either, though an improvement. Under the punishment of truck and wagon wheels, the concrete along the flangeway has been found to break down to a certain extent, probably due to imperfections in getting the mix thoroughly tamped in under the head of the rail and against the web. This breaking down can be seen in an accompanying photograph which also shows another objectionable feature of concrete paving which has been eliminated in the most recent construction of the Birmingham company, namely, the seam or joint between the paving built by the railway company and that built by the city. In this latest construction, which is also illustrated herewith, the street railway company poured its paving slab only in the area between the outside rails of the two tracks. Paving of the 18-in. strip which the company is compelled to install outside of the rails was deferred until such time as it could be poured simultaneously with the city's paving, thus eliminating the joint. The picture shows the company's paving prior to the installation of the city's portion outside the rails. The street was left in this condition for about a year, and while the outer rail had no lateral support on one side, the concrete inside the rail did not seem to be deteriorated under traffic, as a result.



SECTION THROUGH MONOLITHIC SUBSTRUCTURE AND PAVING

The city has always forced the company, previous to the time of this last construction, to build its 18 in. of pavement outside the rails in advance of the city's work. This has invariably resulted in the wearing of a bad groove at the joint, and so the city's engineers have finally been prevailed upon to permit the pouring of the entire area outside the rails at one time, thus avoiding the joint altogether.

On the first installations of concrete track and paving construction, where there was a seam between the substructure and paving slabs, an expansion joint was put in every 16 ft. Despite this precaution, cross cracks developed and the expansion joints wore low and made unpleasant, regularly spaced bumps in the paving. On subsequent pieces of construction the expansion joints were put in 33 ft. apart, then 50 ft., then 100 ft., and finally eliminated altogether. On some of the monolithic types of construction built without any expansion joints, and which have now been down for two years and over, no defects have developed which could be attributed to their absence. About two miles of this type of construction is in use.

The cross cracks continue to make their appearance after the track has been in use a comparatively short time, despite all efforts to overcome this defect. They often develop into bad holes under heavy traffic and require patching. Regardless of the distance between expansion joints, in the earlier constructions, one or two cracks would develop between joints in almost every section. In the latest type with the expansion joints eliminated, the cracks have also developed, in some places, with a noticeable regularity. However, these cracks are often very small and do not wear to any extent for long periods of service, so that the maintenance expense is fairly low and the life of the paving quite long.

Repairs to Car Seats and Curtains

A Summary of the Work Being Done and the Apparatus Used by Several Electric Railways in the Maintenance of These Simple but Important Furnishings

THE CURTAIN REPAIR DEPARTMENT IS A BUSY PLACE

SPEED, safety and comfort are looked upon as the three chief fundamentals in electric railway transportation and the repair ,of seats and curtains forms a considerable part of the work necessary to keep cars in attractive and comfortable condition for the traveling public. The following summary of the maintenance practice of several electric railways has been arranged in order to give those interested as much information as possible regarding their several practices in this work.

The practice followed by the Detroit United Railway in connection with the maintenance of cane or rattan-covered seats is to shellac and varnish with two coats all new seats before placing them in service. The shellac is put on with a brush while the varnish is sprayed on. After the cane becomes dirty from use the seats are scrubbed with soap and water and then cleaned or bleached with a solution of oxalic acid which removes the varnish and dirt with it.

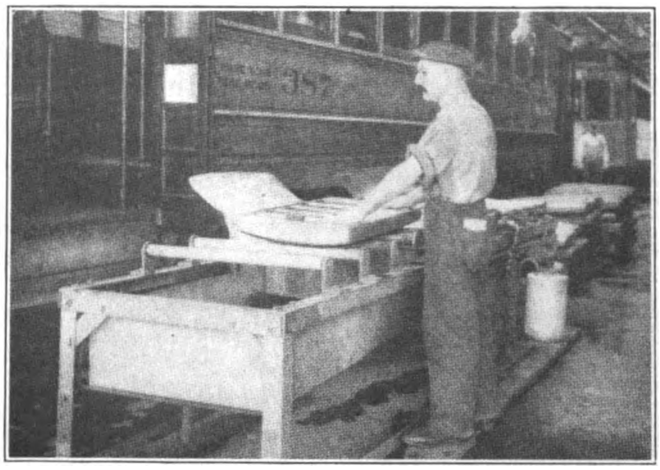
This solution of oxalic acid is made by dissolving 1 lb. of crystals in 5 gal. of water. Both are placed in a 5-gal. crock and boiled by means of an electric heater dropped into the crock, until all crystals have gone into solution. After the solution has been painted on a seat and allowed to remain for about one-half hour the rattan is wiped dry with rags and the seat is painted with a coat of straw-colored cane enamel.

About once a year thereafter the cushions are washed with linseed-oil soap and water and if the enamel is in bad shape the cushions are painted with a new coat of enamel. Before the re-enameling, any small holes are repaired by weaving in new cane. In washing the seats, a stiff hair brush is used.

PLUSH SEAT RENEWAL

Plush-covered seats used by the Detroit United Railway in interurban service are cleaned with vacuum cleaners frequently by the regular car cleaners. About once a year, when the car is shopped for painting, the seats are renewed, if not in bad shape, simply by cleaning with gasoline. If the plush is faded, use is made of the Wilson Paint Company's cleaning and renovating preparations. One of these preparations draws the color slightly and the other fixes it. These solutions can be used, of course, only on solid-colored seats. If the plush is worn, new sections are put on if the seats are sectionalized, otherwise a whole new cover is necessary. This is done by hand work and three upholsterers are able to do all of the rattan and plush seat repair work for the entire system. The painting and cleaning of the rattan seats requires practically the entire time of two painters.

Hugh Savage, general foreman of the Detroit United Railway shops, states that the renewal or reclamation of the pantasote curtains used entirely by the company has been very unsatisfactory. He has had them washed with soap and water and cleaned with gasoline, and has tried various other methods but has found none of them of much avail in renewing the faded fabric. Water and dust stains can be washed out, but if the colors have run or the curtain is faded, practically nothing can be done. Some curtains were sent to a Detroit shade-cleaning company as an experiment, but the curtains came back stiff and not clean, and the job was considered generally unsatisfactory. The practice of washing the curtains with soap and water about once a year is now followed. As they become faded they are taken off and the rolls and ends are changed. By this means a life of seven or eight years is secured.



SEAT SCRUBBING MACHINE

A hand press which makes the work of putting on new rattan covers on car seats a much easier task and a better job, has been devised by William H. Sanders, employed in the carpenter shop of the Newport News & Hampton Railway Company. This press consists of a 24-in. x 40-in. frame into which the rattan and then the seat cushion are placed, and above which are two yokes providing a clearance of about 12 in. Five $\frac{7}{8}$-in. jackscrews, two at the front side of the frame, two on the top and one at the end, are then screwed down against 4-in. x 4-in. timbers placed on the top, end and side of the cushion which lies in the frame, bottom side up. As these three screws are tightened, the rattan is pulled tight and finally is tacked over the bottom of the cushion frame. With the help of this hand press a seat can be covered easily by one man in forty-five minutes or less, it is done without injuring the hands and the rattan is evenly and securely fastened.

In the two accompanying photographs the seat cushion is wrongly shown with the cane side up. In actually using the press, the cushion is put in bottom side up and forced down against the rattan sheet.

CHICAGO ELEVATED AND NORTH SHORE LINE PRACTICES

In cleaning and reclaiming rattan-covered seats the Chicago Elevated Railways are making use of one of the Wilson Paint Company's rotary brush scrubbing machines and the bleacher or varnish remover solution which that company supplies for this purpose. Water and a small amount of the bleaching liquid are forced through the brush from the inside of the cylinder. This process has proved very effective in removing the dirt. If the cane is blackened, a coat of Wilson cane enamel or varnish is painted over the cushion. This process brings out the natural cane color and makes a very satisfactory job.

The above practice is used only when the cars are shopped for painting, the ordinary cleaning being done simply with soap and water.

For cleaning the plush seats used mostly on the Chicago, North Shore & Milwaukee Railroad, just soap and water and a drying process have been used thus far. In speaking of this, H. A. Johnson, superintendent of equipment, said that it would probably be necessary soon to make use of a good dye to restore the color on some of the most faded cushions.

Like the Detroit United Railway, the Chicago Elevated lines and North Shore line have not found any satisfactory means of reclaiming the fabric on one side of the pantasote curtains. For this reason all curtains purchased during the last year or two have been specified to have the pantasote on both sides.

At the South Side shops of the Chicago Surface lines, whenever a car is shopped for a complete overhauling, the seats are put through a cleaning and renewal process. They are first taken to a cleaning tank and there thoroughly scrubbed by hand with a special bristle scrub brush, making use of a soap-and-water solution to which has been added a preparation of much the same character as "Gold Dust" or "Dutch Cleanser." This scrubbing is continued until all dirt is removed, no bleacher being used. The cushions are then rinsed off, dried and given a coat of varnish. No enamel is used on the seats at all. When they are new, they are given two coats of half body and half finish varnish.

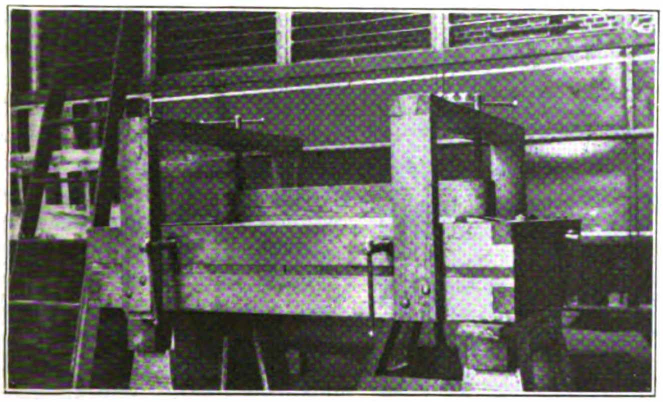
In connection with car curtain maintenance, the experience of the Chicago Surface lines has been much like that of the Detroit United Railway. Nothing has been found which is effective in brightening the fabric on pantasote curtains when it becomes faded. The Chicago company cleans the curtains by thoroughly washing them with a brush and soap and water, and the pantasote side is coated with pantasote glaze which renews its finish. After four or five years' service, the curtain is reversed on the roller, bringing the unfaded top into the exposed lower position and thus improving the appearance.

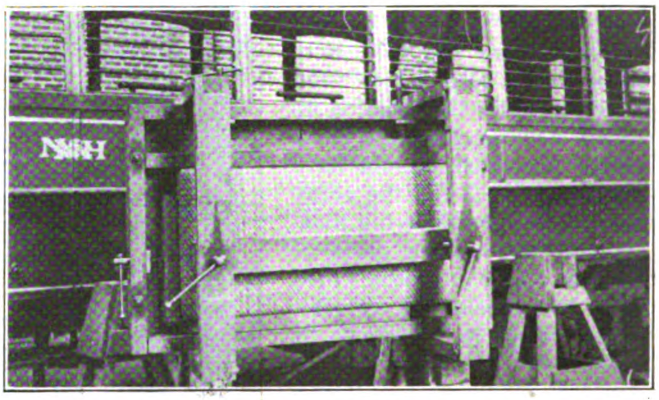
NO VARNISH OR ENAMEL USED

The practice followed at the West Side shops of the Chicago Surface lines is simple and yet the results obtained seem to be very effective. The seat cushions and backs are merely washed with a rather strong solution of laundry soap and water, making use of a rather stiff brush and sponging the soap off and rinsing the cushions thoroughly, though drying promptly so that the canvas backing does not get wet. No oxalic acid or other bleaching fluid is made use of. One point in which the seat maintenance practice of these shops differs from that of most roads is that a great majority of the seats have never been varnished or enameled at all, not even when the seats were first put into use, except for what little varnishing may have been put on by the manufacturer. Dependence is placed simply on the natural luster of the cane. Some of the newer rattan which is coming through from the manufacturer recently seems to be drier, softer and whiter than the rattan received on seats heretofore. On this a coat of rattan varnish is sometimes put to protect the surface, but after this first coat no further varnishing is done after the periodical cleaning process.

In cleaning the curtains, use is made of soap and water only, on both sides. Sometimes a little neatsfoot oil is used on the pantasote side to remove any stain and soften the material. No satisfactory process of brightening the fabric after it has become faded has been found.

In Brooklyn the work necessary for keeping seats and curtains in repair is centralized at two of the principal shops. All curtain repairs are taken care of in the curtain department of the 39th Street repair shop and seat maintenance is done at the Eastern Division elevated shop. Modifications and improvements have been made in the older type of seats to overcome minor difficulties and troubles in operation. A particular source of trouble was that nails would gradually work their way up and eventually penetrate the rattan and project so as to tear the clothing of passengers. Another source of annoyance was the breakage of the steel springs. To overcome these difficulties strips are riveted to the spiral springs and are carried only to within one-half inch to one inch of the side frame. The edges of these strips are bent back by a special machine so that there is no possibility of the sharp edges cutting through the seating. A strip of canvas is riveted over each spring steel strip and this canvas is glued to the framework and carried around and nailed to the bottom of each side piece. The locating of the nails in the bottom of the framework prevents their working out and doing damage. When the seat is ready for its covering of rattan it is placed in a press with a bed of proper size. One end and one side of this bed frame are adjustable and are operated by means of a pair of screws. The seat covered with loose rattan is placed upside down in the bed and the screws are applied while the seat springs are compressed from above by hinged levers, which press against a cross-bar placed over the seat slats. The entire seat is thus placed under compression which permits the rattan to be properly tightened for nailing.


RATTAN SEAT COVER PRESS, SHOWING THE FIVE JACK SCREWS


RATTAN COVER STRETCHED TIGHTLY OVER THE SEAT IN THE PRESS

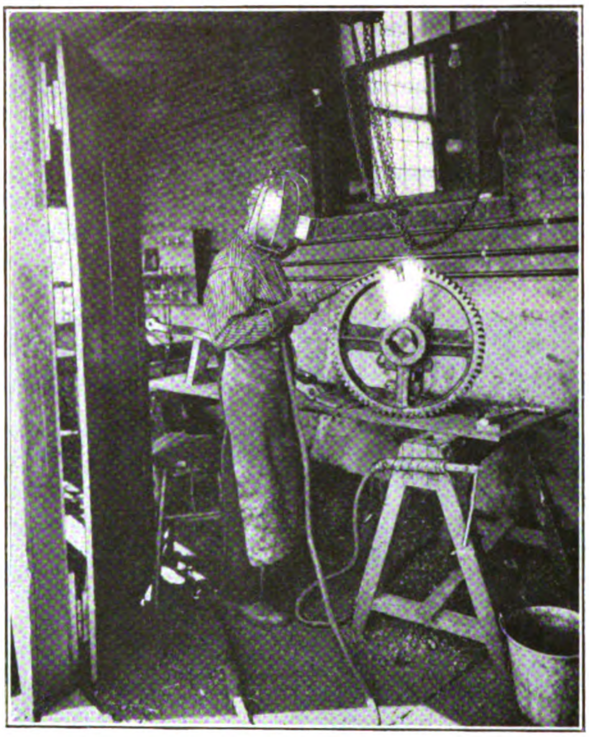
The curtain department not only takes care of the repairs to car curtains but also makes other canvas and leather articles which are used on the railway system, such as money bags, mail bags, hand bags, fire extinguisher straps, hand straps, canvas aprons for snow sweepers and the like. The work of manufacture and repair of curtains done in this department has been so successful that the company no longer buys complete curtains except where they form an integral part of a bid for new cars. In addition to the repairs necessary to the damaged parts of the curtains a systematic cleaning and painting is also carried on. Previously it was the custom to use two coats of paint to secure a glossy finish but it has been found possible now to obtain the same result with one coat by adding a thin solution of Japan drier. The freshly painted curtains are hung on rollers and are permitted to dry for ten hours. An important feature in connection with this curtain department is the scrap collecting and handling. All inspection and maintenance shops are required to send all discarded curtain material or damaged curtains, no matter what their condition may be, to this shop. In this way it is possible to reclaim many springs, rollers, screws, pieces of curtain cloth, etc.

The Auburn & Syracuse Electric Railroad cleans its curtains thoroughly and washes all water stains out with soap and water. The curtains are then drawn through a vat containing 12½ lb. of paint of any color desired in oil, ¾ gal. of turpentine, 1 pint of Japan drier, 1 lb. drop black in oil and ¾ gal. of raw linseed oil. After the curtains are thoroughly saturated they are allowed to drain for about two minutes and are then laid over a bench and brushed thoroughly while the fabric is still wet. This operation raises the nap of the cloth and prevents the linseed oil from leaving the cloth stiff. After brushing, the curtain is hung up with the roller end down for stretching and is allowed to dry for twenty-four hours. The cost of this process is about 18 cents per curtain. Curtains made up of leather on one side and fabric on the other are not dipped, but the paint is brushed into the fabric while it is laid flat on a bench.

In the shops of the Beaver Valley Traction Company, New Brighton, Pa., the following formula is used as a mixture for cleaning the seats in the shop. Aqua ammonia, 2 oz.; soft water, 1 quart; saltpeter, 1 large teaspoonful; Ivory soap, shaved, 1 oz. The soap is thoroughly dissolved in hot water and then the saltpeter and ammonia are mixed in. This is applied with the ordinary scrubbing brush, after which the seats are scrubbed with clear water.

Arc Welding in Car Equipment Maintenance

Building Up of Worn Armature Shafts, Welding of Broken Motor Shells, Filling in of Flat Spots on Wheels and Welding of Large Variety of Broken Steel Castings Used on Cars Have Produced Far-Reaching Economies



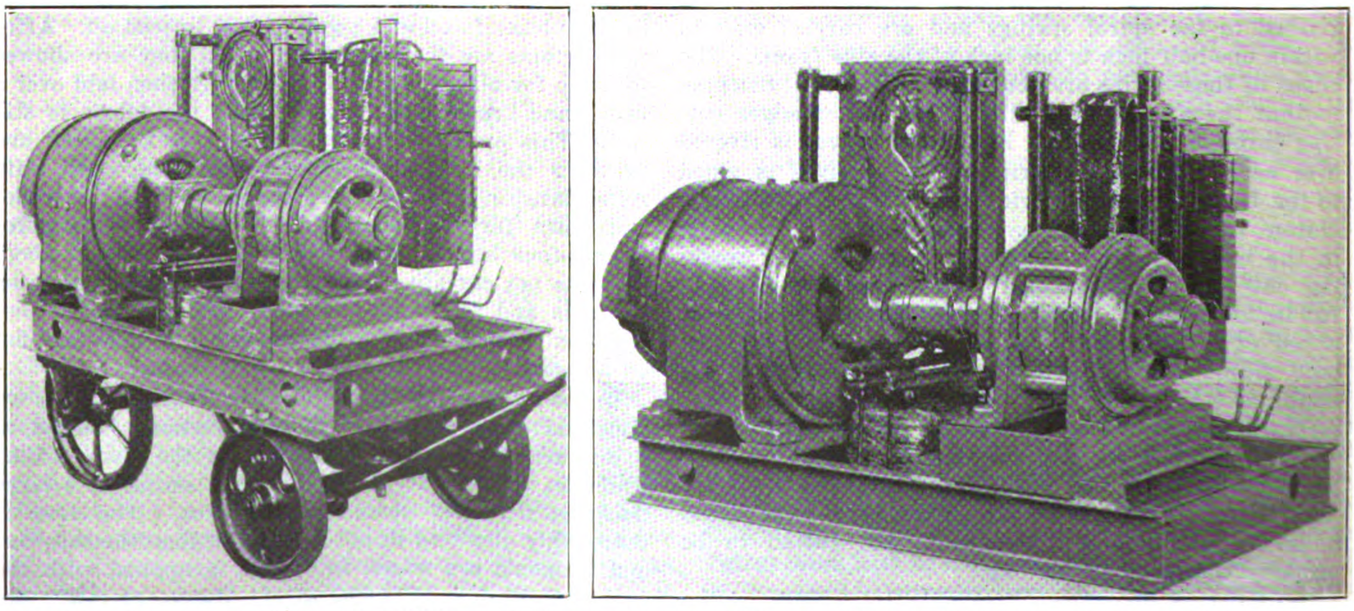
WELDING SPLIT GEAR INTO SOLID ONE

THE growing possibilities of electric welding processes in connection with the maintenance of rolling stock and other railway equipment have been a source of amazement to every electric railway man who has come into contact with the practice. This began with the repair of broken members of the various parts of electric car equipment and has led to its use in a still larger field, which includes the building up of worn surfaces of steel parts which previously would have been headed for the scrap heap. The accompanying illustrations show some parts of electric car equipment which have been reclaimed by electric welding in the shops of several electric railways. This work was begun at a time when it was very difficult to obtain railway equipment parts and it has resulted in large savings and has enabled the equipment to be returned to service so quickly, that the work is being extended and used for defective-part repair which previously would not have been considered.

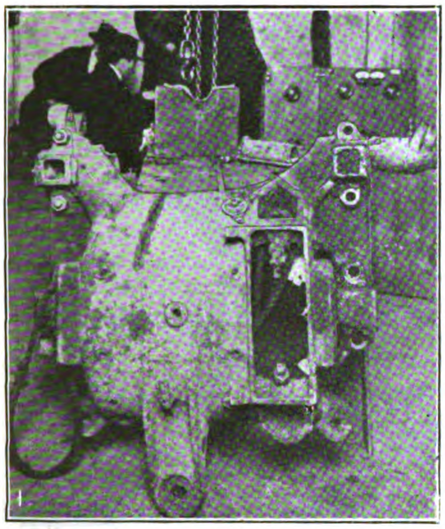
The United Traction Company, Albany, N. Y., constructed a special concrete building for its electrical repair work a year ago. A separate room was built at one end of this building and arranged particularly for electric welding, and all important details were incorporated in the design to fit this room for the purpose to which it was to be put. The building is a concrete structure throughout and the floor of the welding room is also of concrete. In dimensions this room is about 10 ft. x 30 ft. and it is entirely inclosed and separated from the rest of the building.

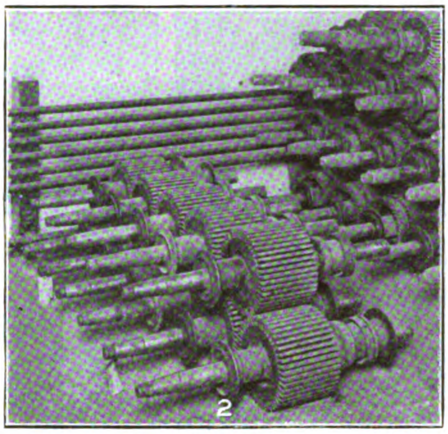
As a safety precaution no one is allowed to enter the welding room while work is in progress. Two observation windows are provided on either side of the entrance door, in which colored glass has been installed as a protection to the eyes of the observer. Any one having business in the welding room can see when welding work is being done and thus avoid the danger of any harmful effect from the light of the arc.

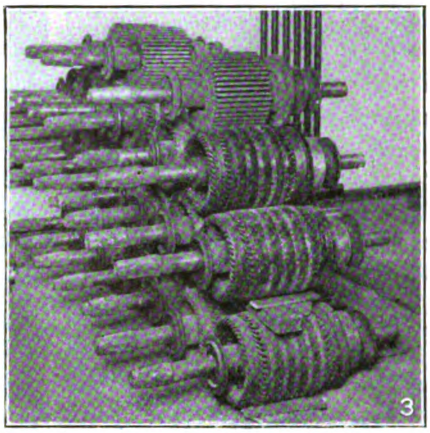
The equipment at present in use in the welding room consists of a General Electric motor-generator set and an oxyacetylene welding outfit, a welding table, convenient holders, masks and other welding equipment, and a chain hoist which travels on an I-beam the length of the room and also outside the entrance to pick up heavy work and facilitate the handling of heavy parts. Since the instal-



AT LEFT, PORTABLE WELDING OUTFIT FOR ELECTRIC WELDING. AT RIGHT, GENERATOR DIRECT CONNECTED TO MOTOR WITH CONTROL HANDLE AND STARTER



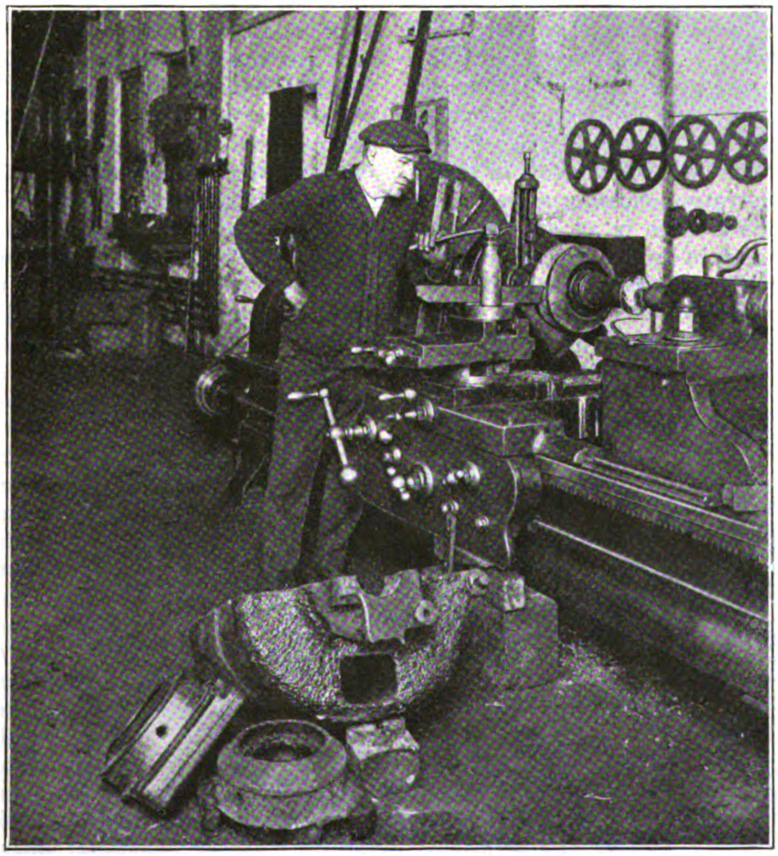




NO. 1—BROKEN CAST-IRON MOTOR SHELL RECLAIMED BY WELDING. NOS. 2 AND 3—WORN ARMATURE SHAFTS BEFORE AND AFTER WELDING

lation of this equipment the General Electric Company has developed a self regulating welding generator which constitutes a part of its single-operator metallic electric arc welding equipment. This can be either stationary or portable and as it is self-contained it makes a very desirable combination. The generator has a two-pole armature, in a four-pole frame, with commutating poles, and generates sixty volts, open circuit. Bucking the shunt field is a series field, with taps brought out for different welding currents. As current flows from the main brushes through the series field windings it reduces the generator voltage to the proper welding value. Accompanying illustrations show some of the different types of welding equipment.

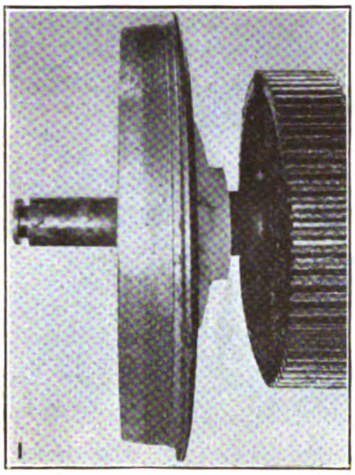
One of the most important operations and one which shows far reaching economies in the work undertaken by the United Traction Company is the building up of worn armature shafts. Accompanying illustrations show a number of these armature shafts before and after welding. The pinion ends of the shafts were "chewed up" due to the wear of the keyways for the pinions. The defective ends of the shafts which were to be repaired were carefully cleaned of all oil and dirt and sufficient metal was welded on so that the shafts could be remachined and rethreaded. A large number of these armatures were all right except for the damage to the keyways, so that they were returned to service as soon as the shafts were remachined and fitted. Others had damaged coils or grounded insulation and where it was necessary to rewind an armature this was stripped before the welding operations took place. For welding operations of this character where a large amount of work is to be done which is similar in character the General Electric Company has developed an automatic welding outfit. This was described in the ELECTRIC RAILWAY JOURNAL for Feb. 21. Its chief advantage lies in the increase in speed which is possible and the uniformity of welds which results. In the work done at Albany the building up and remachining of the shafts cost from $3 to $4 each, which was only about one-tenth of the cost of a new shaft. As local conditions as to labor costs as well as the cost of energy vary to quite an extent detailed costs for the various operations are not included, but on roads which are performing this work and which have actual data regarding the purchase cost of the various parts, the savings which result offer convincing proof of the economies which can be effected with the use of electric arc welding in this reconstruction period through which we are now passing.

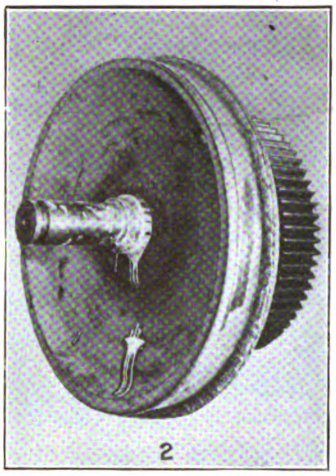


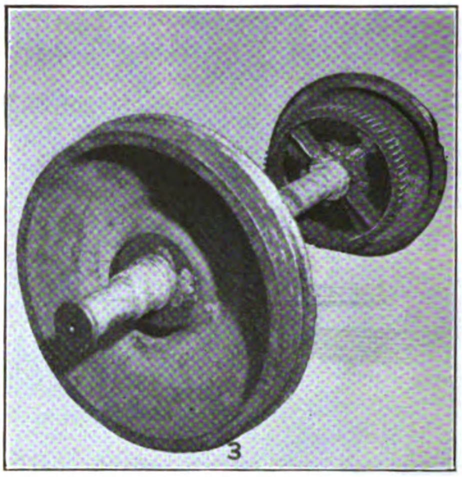
BROKEN CAST-IRON MOTOR SHELL AND AXLE HOUSINGS REPAIRED BY ELECTRIC WELDING (CASE BROKEN IN TWELVE PIECES)

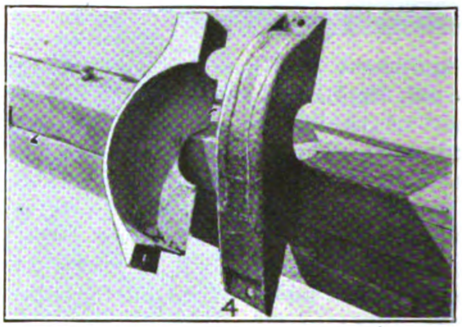
Another illustration shows a pile of motor cases in the yards of the United Traction Company. Before the advent of the welding equipment many of these motor shells were intended for scrap due to various breakages and excessively worn parts. By the use of the welding equipment a large proportion of these have already been reclaimed.

The method employed in welding broken lugs or broken ends of motor shells









No. 1—Wheel turned down ready for welding. Note thinness of flange.
No. 2—Flange built up ready to be shaped in wheel lathe.
No. 3—Finished wheel ready for service.
No. 4—Gear cases with patches welded on.
No. 5—Axle enlarged by welding for use with solid gears.

consists first in fitting the broken parts together and lining them up in their correct position. The pieces are then welded at a few points so as to hold the broken parts in position and, where necessary, the fracture is cut out "V" shape to provide additional space for the welding metal. Much of the success which has been obtained in his class of work at Albany is attributed to the use of studs for interlocking the metal which is added to the broken parts. Holes for the ⅝-in. studs are drilled and tapped at several points adjacent to the break and the studs are so inserted as to extend above the motor shell to about the same height as the thickness of the studs to which additional metal is to be added. The deposited metal is then allowed to bridge over these studs in welding and so obtains additional support which helps to strengthen the weld. In the illustration showing repairs made to a broken gear-case suspension arm, one of these studs can be seen projecting from the casting.

As an example of what can be accomplished, in repairing broken shells, the illustration showing a welded end of a motor shell alongside a lathe is an extreme case. This motor shell was broken in twelve pieces and from the illustration it will be seen that nearly the entire end was welded.

Another record job made in the shop of the United Traction Company was the welding of a truck bolster. The car, under which was a truck with a broken bolster, was brought to the shop and placed on a track adjacent to the welding room. The car body was jacked up and the bolster was repaired in approximately eight hours. The work was started at 9 o'clock after the morning rush hour and the car was ready for service again at 5:15 p.m.

In addition to the class of work illustrated as being done by the United Traction Company other interesting work is reported from various electric railways showing what has been accomplished. The Spokane & Inland Empire Railroad has done some work in reclaiming wheels with sharp flanges. Three views are given to illustrate the methods used. The first of these shows a wheel with the flange turned down ready to receive new metal. The second shows the flange with a new layer of welded metal. The third shows the finished wheel after it has been shaped up. After the new metal has been added the flange is merely shaped up with a forming tool. It is left quite rough in some cases, but as the practice has always been to put on new brake shoes when the wheels are repaired, the company has had no difficulty in wearing down the tread to a smooth contour. A number of steam railways are at present reclaiming all of their cold rolled steel wheels which are slid flat or have flaked-out places, as well as those with sharp flanges. This operation creates quite a saving in itself as often the car is merely placed over the drop pit and the work can then be taken care of with the car

MOTOR SHELLS WHICH WERE RECLAIMED BY WELDING fully equipped. By this method the car is withheld from service but a short period. In the welding of sharp flanges it is not contended by those who have had extended experience that the metal deposited will give the life of the parent material, but they agree that savings are created as a result of maintaining the car in service until such time as it is necessary to shop it for major repairs.

Another example of reclaiming electric car equipment is shown in the repairs to gear cases. One of the illustrations shows a fair sample of the repairs that are frequently found necessary. In this case patches are made of No. 10 sheet iron. In welding these patches on, the operator first determines the size of the patch and outlines it with chalk on the old case. He then builds up a layer of metal just outside the chalk mark. The patch is then laid on and welded to a layer of metal. In this way a tight and secure joint is made. As gear cases are frequently covered with oil when they are brought in for repairs, they should be cleaned off as much as possible. In making a patch that requires a bend, as in the case illustrated, the operator first welds the patch to the bottom of the case, then heats the patch with his tool and bends it into shape.

SPLIT GEARS MADE SOLID

Some electric railways which have split gears have found it advisable to change these to solid gears by welding and then to press them on the axles. Accompanying illustrations show a gear which is being welded in this manner and also an axle which has been built up so as to increase the gear seat. The method employed in welding the gears consists, first, of cutting a "V" along the joint of the gear down to the bolts with a carbon electrode. The operator then builds up with new metal and welds each bolt. In order to increase the size of the gear seats on the axle, the operator welds a layer of new metal about 8 in. in length and fills up the old keyways. This seat is then remachined and a new keyway is cut. Broken teeth in gears have also been repaired by welding.

Another use of welding which has been of benefit to electric railways is in the maintenance of housings for the bearings of railway motors. Constant vibration and heavy jarring causes the fit in the motor frame to become badly worn and many railways have used shims to take up this wear. A small layer of metal deposited by the electric arc and then machined to the desired dimensions provides a more serviceable job than that of the shims, and when a tight fit is once secured, the wear is eliminated.

The filling in of bolt holes in various parts of the car equipment is another use which is showing far-reaching results. Heavy duty and constant vibration cause the holes to become worn, and the bolts then readily become loose and often fall out. The filling in of these holes and their redrilling takes very little time and the cost is extremely low.

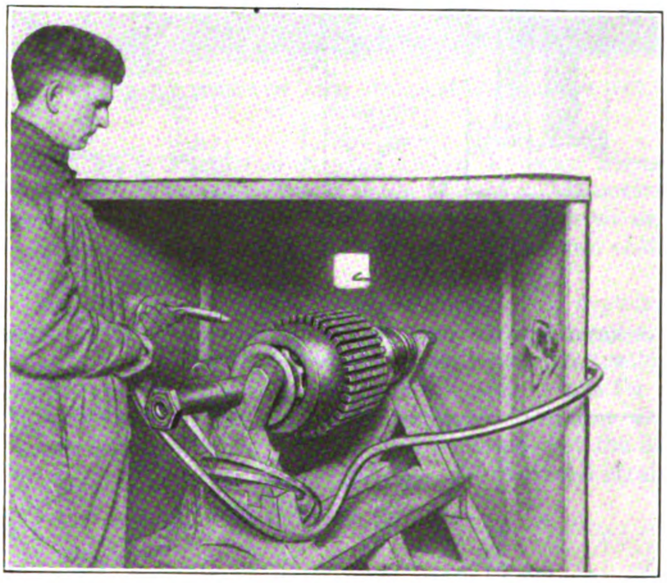
Some other welding operations which have been carried out with success are these: side bearings which have become badly worn have been built up, brakeshoe heads and hangers have been welded and truck side frames have been repaired in numerous cases. A large number of uses for electric welding are constantly presenting themselves to all railways. Enough instances have been cited to demonstrate the fact that the art of welding has greatly increased the resources available for lengthening the life of equipment.

This Makes Armature Cleaning a More Pleasant Job

A Home-Made Air Ejector Serves Admirably to Remove Dust-Laden Air from the Armature Cleaning Hood

THE Connecticut Company has in its Grand Avenue, New Haven, repair shops a simple and ingenious arrangement for carrying off the dust filled air around an armature which is being cleaned by compressed air. Similar devices were described in the ELECTRIC RAILWAY JOURNAL for March 15, 1913, page 485, and July 20, 1918, page 120. Everyone knows the discomfort of having to breathe this dirty air and of being covered with a layer of armature cleanings. Also, the whole shop after a while gets a deposit of this sticky and annoying dirt.

The arrangement referred to, and shown in the accompanying illustration, consists of a canvas-covered cubical compartment, open on one side and contracting on the opposite side to a sort of flue or horizontal pipe which leads out doors through a wall or window. Whenever compressed air is turned into the hose and nozzle used by the operator to blow out the armature, compressed air is also turned into a branch pipe which is in the center of the flue and thus causes a draft through the flue. This draft can draw only from the compartment and so carries away the dust filled air.

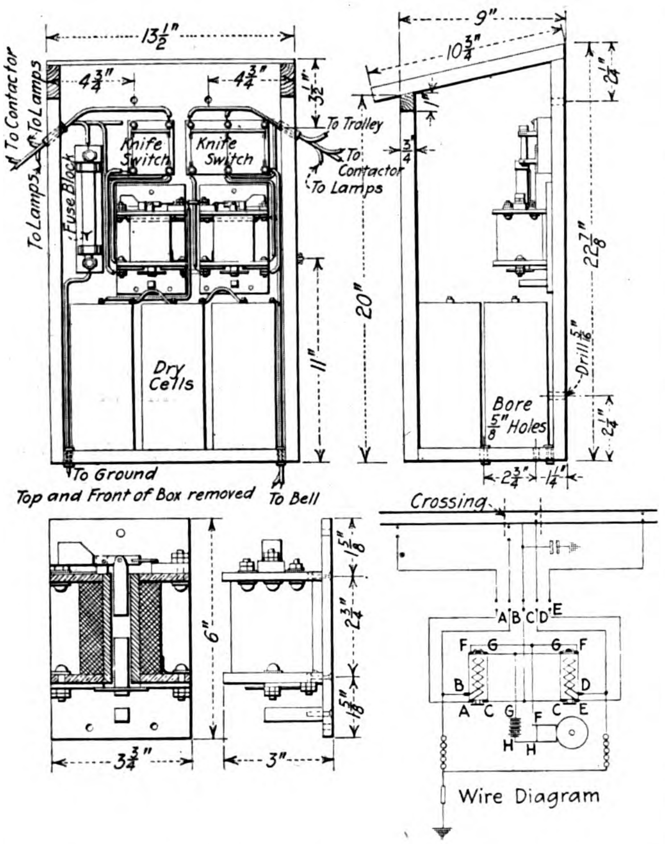


CHAMBER FOR CLEANING ARMATURES BY COMPRESSED AIR

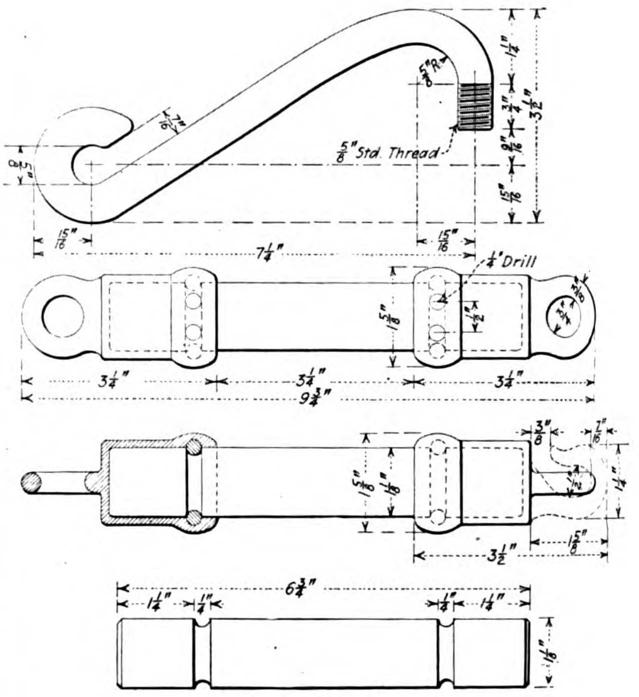
This "ejector" for creating a draft out of the hood is used here in place of a fan on account of its simplicity. While for continuous service an electrically-driven blower would undoubtedly be more efficient, this scheme serves well here, because the apparatus is used only intermittently. It is another illustration of the utility of compressed air in and about the shop.

The construction is simple and inexpensive. The compartment is about five feet cube — merely a wooden frame covered with canvas. The flue is about ten inches square and eight or ten feet long. Armatures are wheeled into the open side of the cube on the usual wheeled horse or rack and cleaned in the usual manner by air blast. This particular installation has been in satisfactory use for several years.

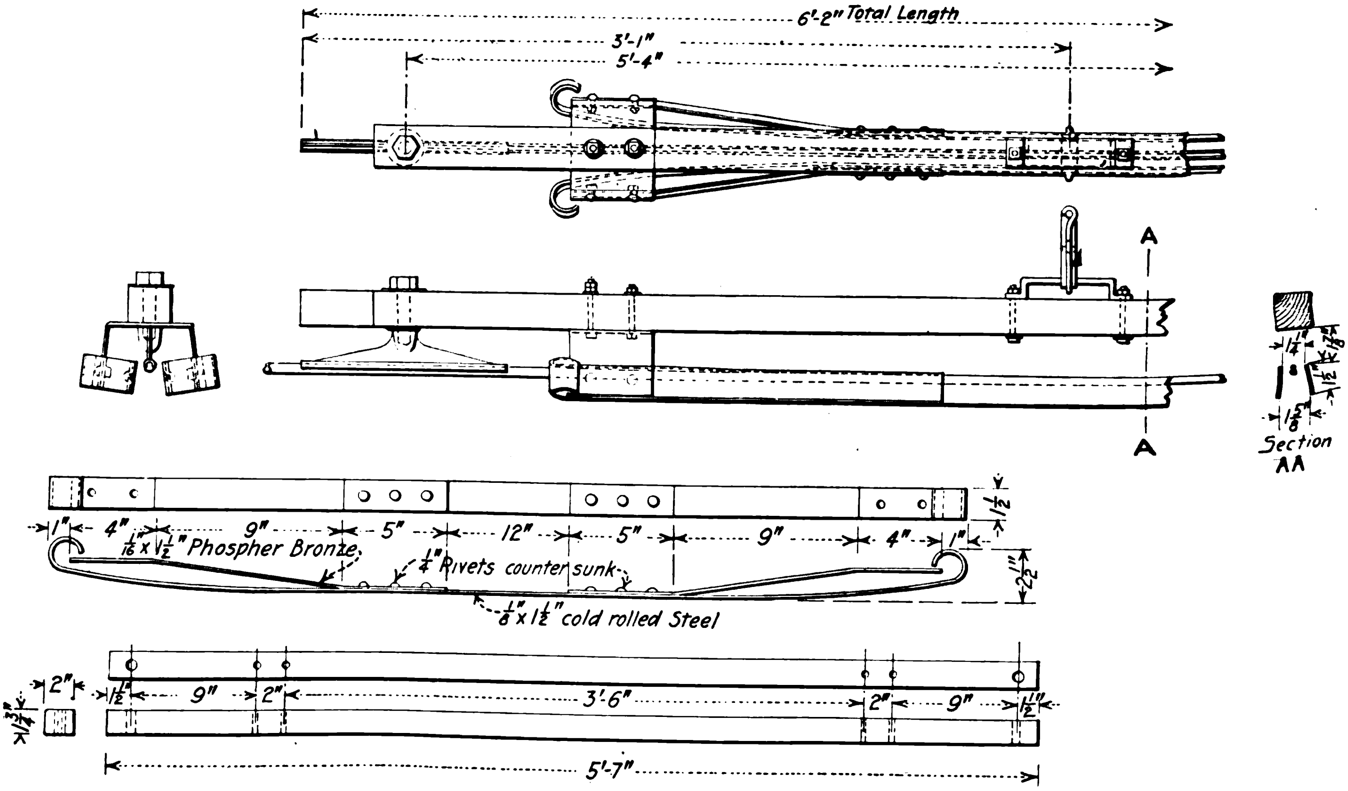
Detail Drawings Illustrating Signal Maintenance and Overhead Kinks


13½"
4¾"
4¾"
9"
10¾"
To Contactor
To Lamps
To Lamps
Fuse Block
Knife Switch
Knife Switch
To Trolley
To Contactor
To Lamps
Dry Cells
20"
11"
22⅞"
Drill 5/16"
Bore ⅝" Holes
To Ground
Top and Front of Box removed
To Bell
6"
3¾"
3"
Crossing
A B C D E
F G G F
B D
A C G F C E
H H
Wire Diagram

CONSTRUCTION DETAILS OF DOUBLE TRACK CROSSING SIGNAL RELAYS AND BOX


⅝" Std. Thread
7¼"
¼" Drill
3¼"
3¼"
3¼"
9¾"
3½"
6¾"

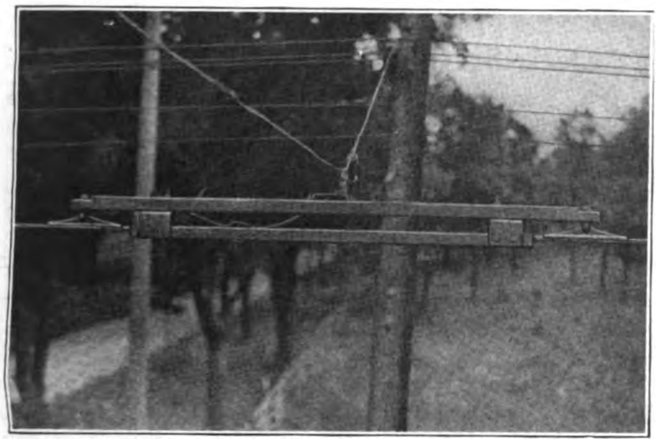
CONSTRUCTION DETAILS OF STRAIN INSULATOR AND NEW GOOSE-NECK


6'-2" Total Length
3'-1"
5'-4"
A
A
Section AA
1" 4" 9" 5" 12" 5" 9" 4" 1"
1/16 x 1½" Phospher Bronze
¼" Rivets counter sunk
⅛ x 1½" cold rolled Steel
2½"
2"
1¾"
½" 9" 2" 3'-6" 2" 9" ½"
5'-7"

DETAILS OF CONSTRUCTION OF CROSSING SIGNAL CONTACTOR

Signal Maintenance and Overhead Kinks

A Description of Double-Track Crossing Signals and Other Overhead Equipment Developed on the Minneapolis Street Railway in an Effort to Reduce Maintenance Work



THE MINNEAPOLIS SIGNAL CONTACTOR IN SERVICE

SIGNAL LIGHT, RELAYS AND BELL MOUNTED ON POLE AT CROSSING

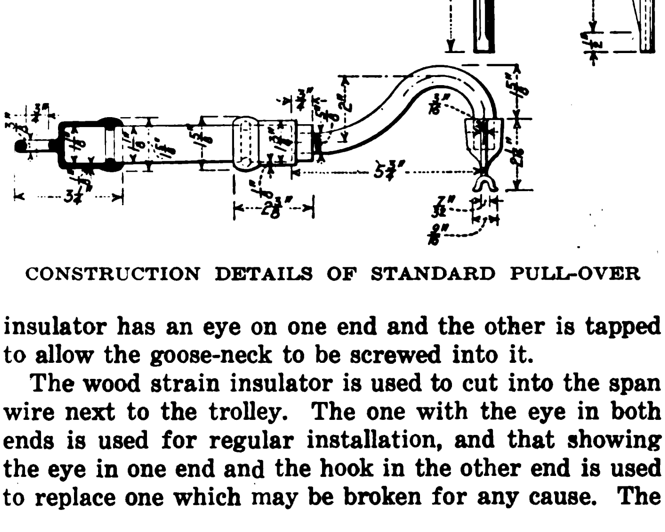
On the lines of the Twin City Rapid Transit Company, Minneapolis, Minn., several pieces of equipment have been developed recently by the overhead department. These include such apparatus as double-track crossing signals, special pull-off goose-neck and strain insulators, electrically-lighted switch lamps, etc. The maintenance of signals on this property is taken care of by the same crew which looks after all of the overhead maintenance, including telephone lines. A description of the equipment with which this maintenance work is accomplished appeared in an article in the July 19, 1919, issue of the ELECTRIC RAILWAY JOURNAL, page 121.

The drawings on page 578 show the construction details of a double-track crossing signal, relays and box, used on the suburban lines of the Minneapolis company. The object of the double equipment is that cars passing in one direction will not check the operation of the lights and bell for cars going in the opposite direction at the same time. A second drawing shows the details of construction of the trolley contactor used in connection with this crossing signal.

In operation the trolley wheel of the car makes a contact with the cut-in hanger placed approximately 1,300 ft. from the crossing. This contact lights the bank of lamps over the signal relay box, and the current for the lights energizes the coil which closes the trolley circuit contact to keep the lights burning and also closes the battery contact which keeps the bell ringing until the car reaches the crossing. At the same time the station is also illuminated, showing passengers waiting for the car and warning passengers of the approaching car. At the crossing the wheel makes a second contact with the trolley contactor and this acts as a short on the relay coil allowing the armature for the trolley contact and the battery current to be released. This causes the bell to cease ringing and extinguishes the lights. The locations of the bank of lamps, the relay box and the signal bell are shown in an accompanying photograph.

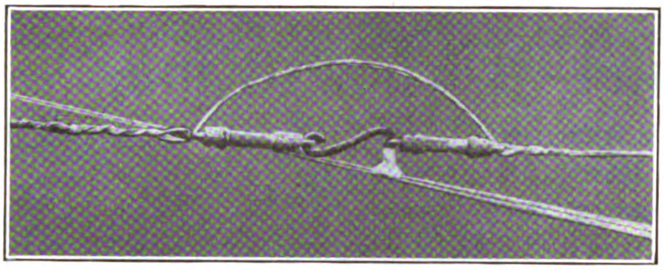
The relay boxes are constructed of ⅞-in. pine lumber and receive two coats of light olive paint. The bell is a 10-in. gong, furnished by the Union Railway Signal Company. The contactor is made of cold rolled spring steel and the trolley ear suspension bar is made of ash saturated with hot linseed oil and painted with two coats of black insulator paint.

Another device shown in an accompanying drawing and a photograph is a goose-neck and strain insulator that is being used at the present time. One illustration shows the standard pull-over that has been in use for a number of years and another the strain insulator and goose-neck now being used. It will be noted that the old goose-neck is threaded at both ends and the wood strain insulator has an eye on one end and the other is tapped to allow the goose-neck to be screwed into it.



CONSTRUCTION DETAILS OF STANDARD PULL-OVER

The wood strain insulator is used to cut into the span wire next to the trolley. The one with the eye in both ends is used for regular installation, and that showing the eye in one end and the hook in the other end is used to replace one which may be broken for any cause. The



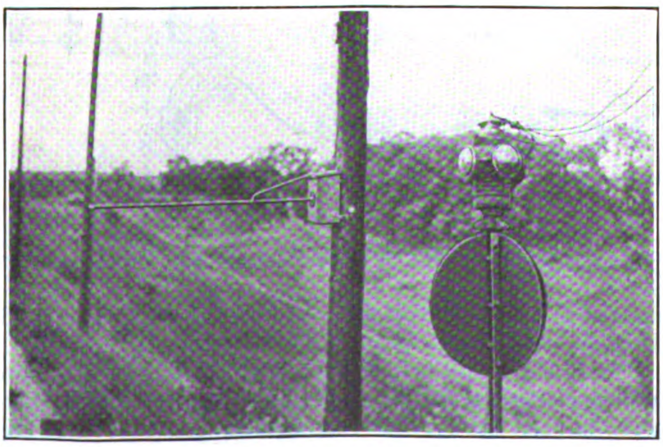
PULL-OFF GOOSE-NECK IN SERVICE

eye in the strain insulator is shown with the goose-neck threaded through it, so that the span wire can be hooked into the end of the insulator without the necessity of undoing the ends of the span wire. A photograph shows the new goose-neck with the two insulators attached to it and with the safety jumper over the top, so that in case either of the insulators is broken the span wire will not hang down from the trolley on the opposite track or from the pole. In the same way of substitution, one of these insulators with the hook on one end can be used as in the case previously described.

The advantage of the new goose-neck is that it will be necessary to carry in stock only the wood strain insulator with the eye in each end and the one with the eye in one end and the hook in the other. This will permit doing away with the insulator which has the eye in one end and the other end blank and tapped to allow the old goose-neck to be screwed into it as shown in the illustration.

An accompanying photograph shows an electrically-lighted switch lamp. A short distance away from the switch lamp is a box attached to a pole with a long arm reaching out from the pole toward the track. This arm is to enable the motorman to turn the switchlight on and off without leaving the cab of his car. The lamps are in series with other lamps on the pole, thus making up the necessary number for a series-burning circuit. At some of these switch locations, part of the extra lamps have been installed in the telephone booths at various places along th line where the motorman stops to get his orders from the dispatcher. Thus at night he is furnished with light to see that he makes proper notation of the dispatcher's orders.

In the box on the pole is a 3-amp. switch. The extension arm is ordinary ½-in. pipe of the desired length, fastened to the box by a floor plate and with a bracket as an additional support. Inside the pipe is a rod connected to the button on the switch and with a handle on the outer end with which to turn the switch on and off. There is no indicator to show the position of the switch as it is a simple matter, if the lamps do not light, to give the handle an additional turn. The lamp on the switch stand is one of the old pattern of oil switchstand lamps with the tank and burner removed and a wall socket attached to the inside of the cover. Thus the incandescent bulb hangs in a vertical position and by opening the cover of the lamp, the bulb is conveniently inspected.



OIL TYPE OF SWITCH LAMP WIRED FOR ELECTRICITY

Electrification Considered in Chicago

At a joint meeting of the Chicago sections of the A.I.E.E. and A.S.M.E. and the electrical and mechanical sections of the Western Society of Engineers, held at the Western Railway Club on March 4, S. T. Dodd, General Electric Company, Schenectady, presented an illustrated talk giving "some comments on the present status of steam railroad electrification." In pointing out the extent to which trunk line electrification has advanced to date, Mr. Dodd stated that 1,239.59 miles of route and 2,706.45 miles of track in the United States are now electrified. There are 364 electric locomotives and 1,020 motor cars in use on these roads.

The theme of the paper was the tremendous saving in coal that could be realized through a complete electrification of the steam roads, this tending to show the economic necessity of early electrification. The speaker gave figures to show that practically 15 per cent of the total ton-miles of steam road operation is of a non-revenue character, a waste which could be eliminated through electrification. The immense consumption of coal by the railroads was emphasized by pointing out that 24 per cent of the total coal production of the United States and 5.8 per cent of the total oil marketed in the United States in 1918 were consumed by the steam locomotives. The total saving in coal which could be brought about through the elimination of the non-revenue ton-mileage under steam-road operation, and the more efficient burning of the coal in large generating plants as compared to the inefficient burning in steam locomotives, would be 122,500,000 tons per year.

N. F. P. A. to Hold Public Hearing

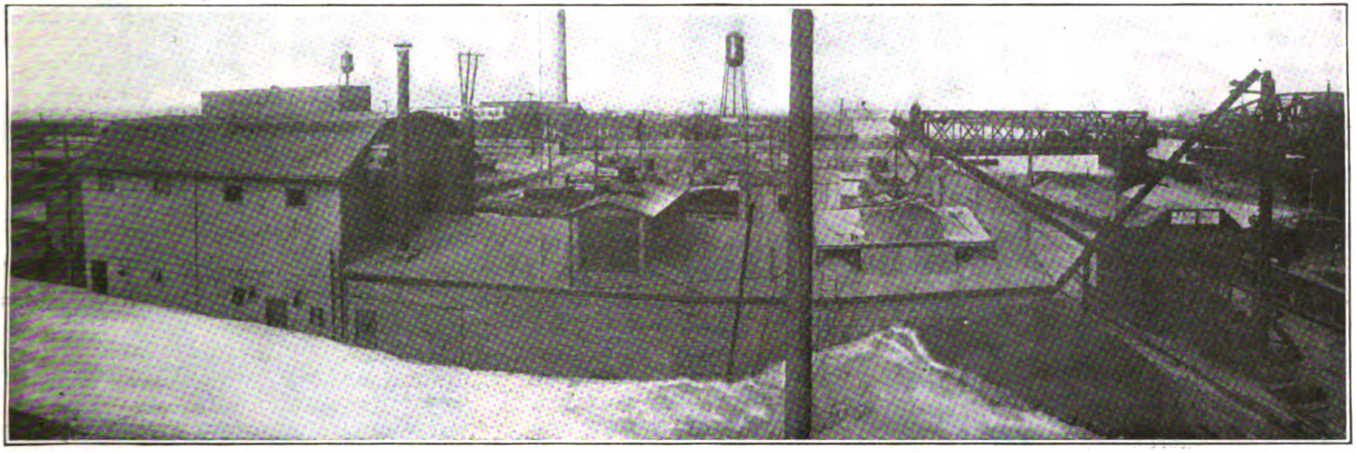
THE electrical committee of the National Fire Protection Association, on which the American Electric Railway Association is represented by Martin Schreiber, will hold a public hearing and committee meeting in New York City on March 23 and 24, at which the revision of the rules regarding carhouse wiring will be considered. The standing committee on cars and railways, consisting of Mr. Schreiber, R. C. Bird and Ralph Sweetland, will recommend the revised rules for carhouse wiring, which were approved by the Engineering Association at the Atlantic City convention.

The committee will report that the subject of carhouse wiring was given consideration because Rule 41 of the "Code" had become out of date, but that it was the desire of the committee to preserve as far as possible the intent of the old N. E. C. rules, but to put them in a form that would meet the wishes of the various parties interested. As the new section 41 was printed by the Engineering Association and distributed in advance of the Atlantic City convention, it will not be necessary to reprint it here.

Handling Wet Sand From a Hopper

The Writer Describes How the Daily Output of a Sand-Drying Plant Was Increased and the Cost of Operation Decreased

BY HOWARD H. GEORGE
Assistant Engineer, Public Service Railway of New Jersey,
Newark, N. J.



PANORAMIC VIEW OF PUBLIC SERVICE SAND PLANT

PRACTICALLY every street railway company is obliged to provide dry sand for one purpose or another in the operation of its system. Where comparatively small quantities are required the problem is of course very simple, but as the total requirements increase, the ordinary equipment, which generally consists of a stove surrounded by a perforated cylinder within which the wet sand is placed, or some similar arrangement, fails to turn out dry sand in quantities sufficient to meet the demands. Recourse must then be had to the rotary type of dryer and the experience described in this article may prove of considerable interest to railway men who are facing the problem of increasing the efficiency of their plants and decreasing the operating costs.

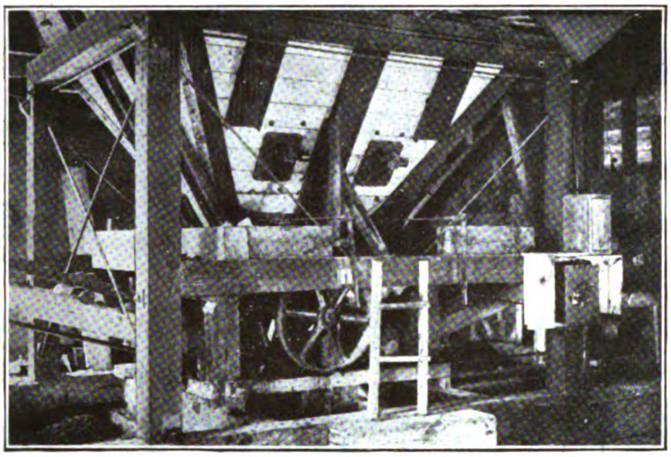
All of the sand used on the Public Service Railway in this section is dried at a central plant located on a river front at our main material storage yard. The sand is received on scows and unloaded on the dock immediately adjoining, by means of a stationary stiff-leg derrick equipped with a grab bucket. The sand-drying house is located within easy reach of the swing of the boom of the derrick.

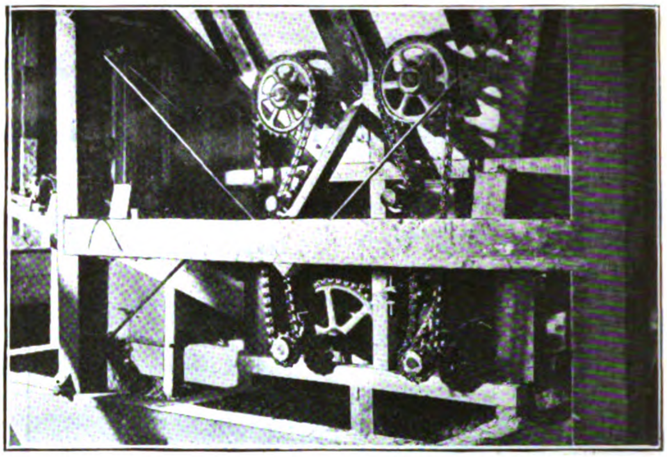
A few years ago the writer was assigned the work of studying the operation of the plant, to determine what improvements could be made in its operation. The first step was the determination of the actual output, and for this purpose arrangements were made to run a test of the plant as it stood, over a considerable period of time.

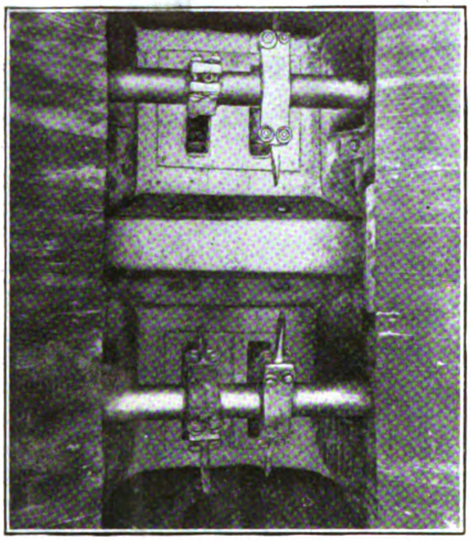
Before discussing these tests, I shall explain the operation of the plant as it was conducted at the time. The equipment consisted of two electrically-operated revolving drying drums, hard coal being used for fuel with forced draft. In front of these dryers was a floor space in the center of which the wet sand was deposited by bucket through an opening in the roof. Belt conveyors led from each side of the sand pile and fed into the upper end of the drums. Upon rejection at the far end of the drums, the dry sand dropped into small pits where it was picked up by bucket-chain conveyor elevators and raised to the storage bins. Each half of the equipment was entirely independent of the other. One man was required to attend to the fires and operate the machinery and another had to devote a part of his time to operating the clam-shell bucket. A minimum of four laborers were required to shovel wet sand from the pile to the belt conveyors when both units were in operation, which was ordinarily the case. If it was desired to work the plant to its capacity it was necessary to have additional laborers shoveling sand in order to keep the delivery to the drums reasonably uniform, for, although a man can shovel at a lively rate at the beginning of a day's work, his efficiency falls off rapidly as the day approaches its end, until it is not unfair to him to say that it is probably only about 25 per cent at the end of the day.

CAREFUL RECORDS MADE

In order to obtain the necessary data for a fair analysis of the existing conditions, a number of forms for use in the tests described below were prepared and used with excellent results. The dry sand storage bins were measured and carefully gaged and during the test all sand was leveled in them at the end of each day's run. Every sand car which took dry sand for delivery to carhouses or for direct application to slippery rails was also measured, and its capacity was registered against it and a record was kept of the number of times it called each day for sand. A part of the dry sand was bagged for delivery to points where the sand storage bins were not within shoveling distance of the car, and a record was made of the quantity of sand bagged each day. Determination was also made periodically during the day of the weight of a given volume of wet sand, the measuring box being filled in a manner approximating as closely as possible the condition of the wet sand in the pile. This sand was then

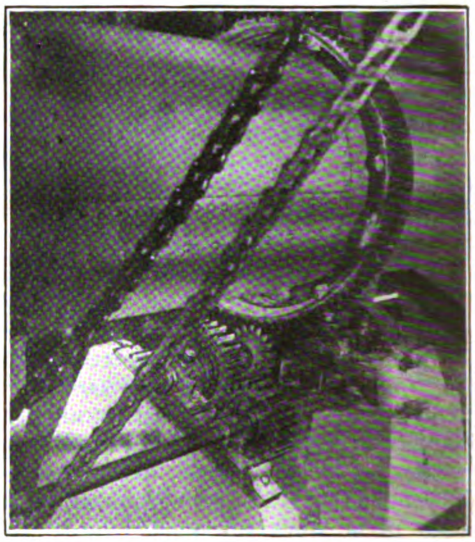


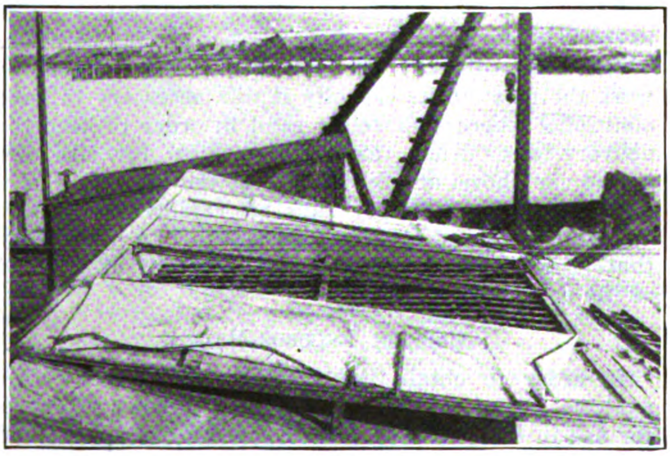


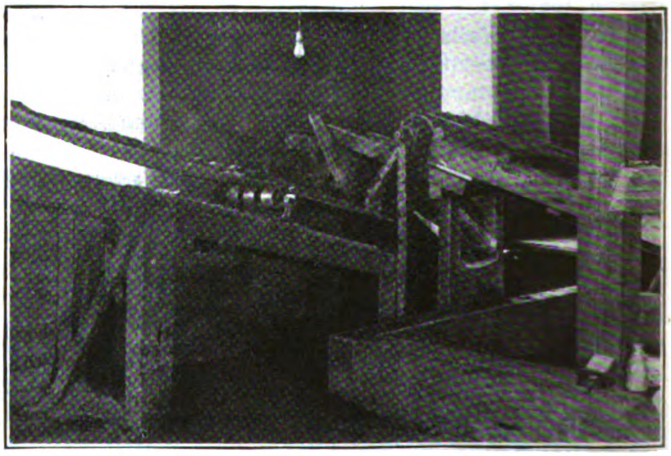


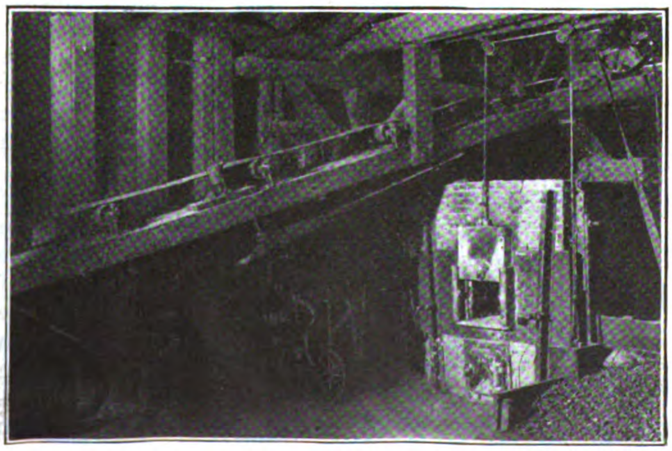
Plant for Handling Wet Sand

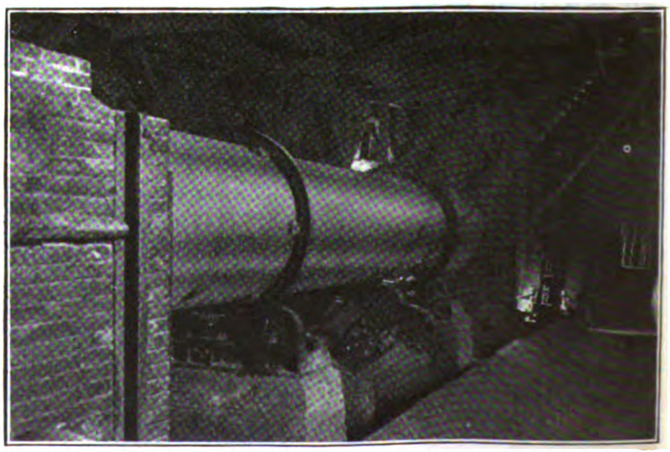
At top, front and rear views of sand hopper. At left, looking down into hopper. At right, gear and pinion drive for drum. Below at left, grating and hinged doors over hopper. Below at right, main and auxiliary belt conveyors. At bottom, left, one of the main conveyors with firebox at head of drum. At bottom, right, revolving drum with dry sand bucket elevator.











carefully dried and again weighed to determine the loss in weight due to evaporation of moisture and the sand was also remeasured to determine its shrinkage in volume. The coal in each bin was weighed at the beginning of each day and again at night, together with any additions during the day's run. Watthour-meter readings gave the power consumption. This showed a total of 79 kw.-hr. for the 530 cu.yd. of wet sand dried during the first test period, the total coal consumption for the same period being 22,973 lb. The test showed that there was an average evaporation of 2.32 lb. of water per pound of coal consumed and that the coal consumption averaged 1.90 lb. per cubic foot of dry sand. Note was also made of all other materials used in the operation of the plant, such as oil, grease, waste, etc. The test covered a period of eight working days, the actual operating time being 62¾ hours.

TABLE I—RESULTS OF TESTS OF SAND-DRYING PLANT

	Before Making Changes	After Making Changes
Total cubic yards of wet sand dried	529.71	467.40
Total cubic yards of sand after drying	452.38	399.17
Total duration of test, hours	62.75	31.50
Weight of coal burned, pounds	22,973	11,595
Labor, man-hours	300	105
Water evaporation per pound of coal, pounds	2.32	4.165
Coal consumption per cu. ft. of dry sand, pounds	1.90	1.075
Total energy consumption, kilowatt-hours	79.0	61.4
Output of dry sand per 10-hr. day, cubic yards	72.09	126.72

With the information thus obtained it was possible to state with reasonable accuracy the actual output of dry sand per day and the various items entering into its production. In studying the problem and analyzing the results of the test, it was at once evident that the big leak was in the delivery of the wet sand to the drying drums. The necessity for keeping the belt conveyors running full emphasized the necessity of some mechanical device for feeding the wet sand. Investigation was accordingly made of the possibility of satisfactorily handling wet sand from a large hopper or receiving bin and the best method of delivery from such a bin to the main belt conveyors, so that the flow of sand to the drums would be continuous and uniform. Any one who has had any experience with wet sand knows how it packs and arches when dumped into a hopper, the extent of such action varying considerably with the degree of moisture in the sand. Also they have probably experienced difficulty in handling such sand during freezing weather.

NEW HOPPER HELPS CONDITIONS

The result of our study of the problem was the development of the machine shown in two accompanying illustrations, which also show the chain drives for operating the two agitator shafts referred to later.

Experiments which we made determined the practical minimum slope with which the bottom of the hopper had to be designed in order to insure free slippage as the wet sand was run out of the bottom of the hopper. Two parallel openings were provided in each half of the bottom, each pair feeding to one of two short auxiliary belt conveyors which in turn delivered the sand to the main belts. The size of these openings could be made larger or smaller as the needs required depending upon the degree of moisture in the sand. Arching was prevented by running two large shafts through the hopper over the valve openings and just below the point where the arching would take place. Keyed into each of these shafts were two cutting blades set at right angles to each other, each rotating so as just to cut through their respective openings when in the lowest position. These blades or agitator bars cut through any sand that might arch above and keep it churned, and in addition keep pushing it through the valve openings onto the belts. At the end of these blades where the wear is greatest, they were finally reinforced by doubling their section. The view looking straight down into the hopper from the top shows the two shafts, the four agitator bars and the openings through which the wet sand is fed to the two auxiliary belt conveyors.

No difficulty is experienced in controlling the flow of sand perfectly during ordinary weather. In the winter when the sand is apt to contain large frozen lumps, these lumps are rejected by a steel rail and pipe grating which was constructed across the top of the hopper. The openings are of such a size that any lumps passing through them will be handled through the valve openings below without any trouble. In the view showing this grating the hinged doors by which the opening is closed during freezing or very rainy weather when the plant is not in operation can be seen. It is, of course, necessary for a man to climb up and break such larger lumps as remain on the grating. The only precaution which must be taken in freezing weather is to see that the hopper is run until empty at the end of each day's work.

The apparatus is driven by a 10-hp. motor, controlled from a starting rheostat. The size of the openings is regulated by sliding plates connected to levers located in the center of the mechanism, one of which appears on each side of the small ladder in the center of the view of the hopper. These levers move the valve plates forward and backward.

FORCE OF THREE MEN USED

On man operates the hopper and also breaks up any lumps which may collect on top of the grating. Another man tends the two fires and operates the other machinery, and the services of still another man are required a part of his time to keep the hopper filled, the remainder being devoted to operating other machinery around the yard. In this way the services of a minimum of three men were dispensed with in the operation of the plant and it was possible greatly to increase the production through the constant and uniform feeding of wet sand into the drying drums.

This steady flow is evident in the illustration which shows sections of both the main and auxiliary belt conveyors at the point where the sand is transferred from one to the other. When two men were feeding each belt it was our observation that there would be about one shovelful of sand to every 6 or 8 ft. of belt. The hopper machinery was so designed that either one or both sides could be feeding at the same time, and either side could be shut down when not required.

At the time the tests were first run, the drum was rotated by a friction drive. It was noticed that any attempt to feed wet sand into it beyond a comparatively low rate resulted in stopping its rotation, although in ordinary operation, with two men shoveling on each belt at their regular rate, this point was never reached. As the result of this observation, and in view of the fact that it was planned to have the belt conveyors running full, it was decided to change the drive, and a gear-and-pinion drive was substituted. This appears in detail in another illustration.

The work was started late in the fall and completed the first of the following year, including the time required to make certain changes from our original design which experience later proved to be necessary. The remodeled plant has now been in regular operation for several years during which repairs have been limited to an occasional replacement of a worn gear, pinion or broken link in the chain drive, and an occasional replacement of a worn agitator bar.

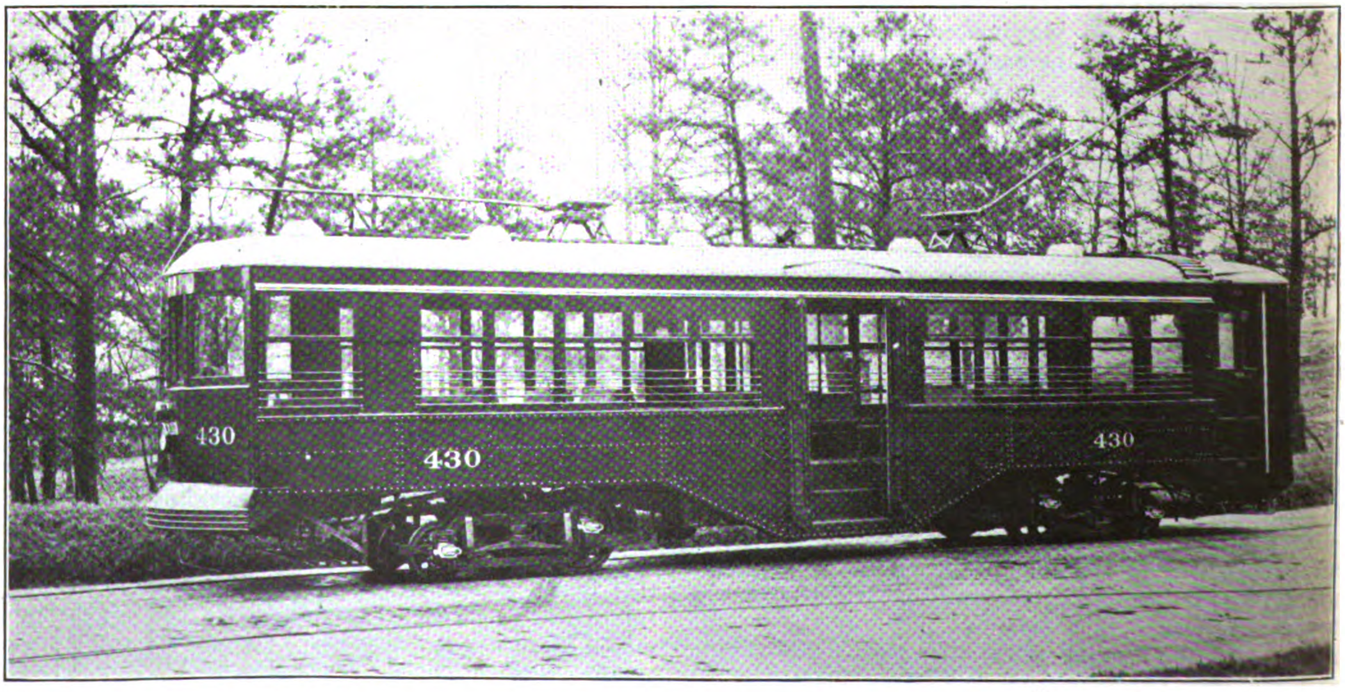
When the construction was first recommended we estimated that it would save more than its first cost in reduced operating expenses the first year. The tests run after the plant had been in operation after all the changes had been completed proved that it would do even better than this. Actual costs have not been given for the reason that the plant was remodeled at a time when the cost of both labor and material was quite low and these costs would mean practically nothing now, when the items composing them have advanced anywhere from 100 per cent to 400 per cent, but the data given in the accompanying table show very well what was accomplished in this particular case.

New Cars in Atlanta

INTERIOR VIEW OF ATLANTA CAR

TWO views of one of the new cars recently placed in operation by the Georgia Railway & Power Company, Atlanta, are shown herewith. The new cars are of the center entrance and exit type but built without a well in the center. The floor level of the cars is reached by three fixed steps inside the car of 15⅝ in., 12 in., and 11 in. heights. The center double-door opening is 48 in. wide and the conductor's position is opposite the entrance. A 30-in. folding door at each end of the car equipped with one folding and two fixed steps and having the same step heights as prevail at the center entrance is provided for the use of the motorman only. All seats except those in the two vestibules and the folding seats at the center of the car are of the cross-seat type. In general, the car is of semi-steel construction, measures 44 ft. long overall, 8 ft. wide over the side plates, and weighs 34,000 lb. It is equipped for double-end operation and the platform at each end measures 5 ft. to the bulkhead. The cars are mounted on Brill 39-E maximum traction trucks equipped with General Electric 201-1 motors, and K-35 control, and General Electric straight air brakes. The trucks are mounted on 23-ft. centers and the wheelbase is 4 ft. 10 in. The cars seat fifty-one passengers. The height of the cars is 10 ft. 10 in. from rail to top of trolley boards, and 7 ft. 6 in. from floor to headlining. The cars were built by the American Car Company, St. Louis, Mo.

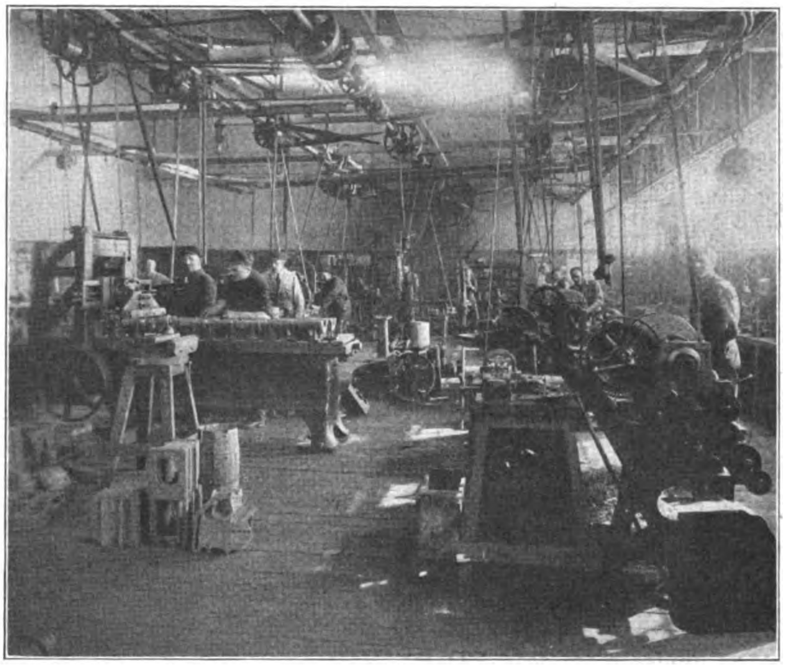
The Public Service Railway of New Jersey, which made a highly creditable record for good service during and after the recent heavy snows, reports excellent results from the "Detroit drag-board" described last in the issue of this paper for Aug. 31, 1918, page 371. To quote a high official of the company they proved a "life saver." They will be put on old single-truck cars for emergency snow fighting. At Camden the local master mechanic has applied the boards to some double-truck cars.



NEW TYPE CENTER-ENTRANCE AND EXIT CARS RECENTLY INSTALLED IN ATLANTA, GA.

Reclamation Shop Effects Saving of More Than $86,000 in 1919

Centralization of Maintenance, Special Construction and Salvage Work on Connecticut Company's System Results in Large Economies



GENERAL VIEW OF MACHINE SHOP OF CONNECTICUT COMPANY'S RECLAMATION SHOP

NEARLY two years ago, the officials of the Connecticut Company believed that large economies could be realized in the maintenance of rolling stock by centralizing in one shop the reclamation and special construction jobs and all except the routine maintenance work for the entire system. Thus, as was described in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 31, 1918, a reclamation shop was installed at New Haven, Conn., about January, 1918, in what had formerly been an old paint shop and storage house. Since the publication of that article, the shop has been in continuous operation, and figures and facts are now available to show what has actually been accomplished.

The work of the reclamation shop might very properly be divided into three classes; maintenance, special construction and salvage. The maintenance work covers those jobs which can be done in quantity, such as boring and babbitting armature and axle bearings and rewinding armatures, and such work as overhauling compressors, repairing headlights and trolley catchers, refilling fuses, etc. In fact all but the light routine repairs are handled in this shop. Probably the largest single item of maintenance is the rewinding of armatures.

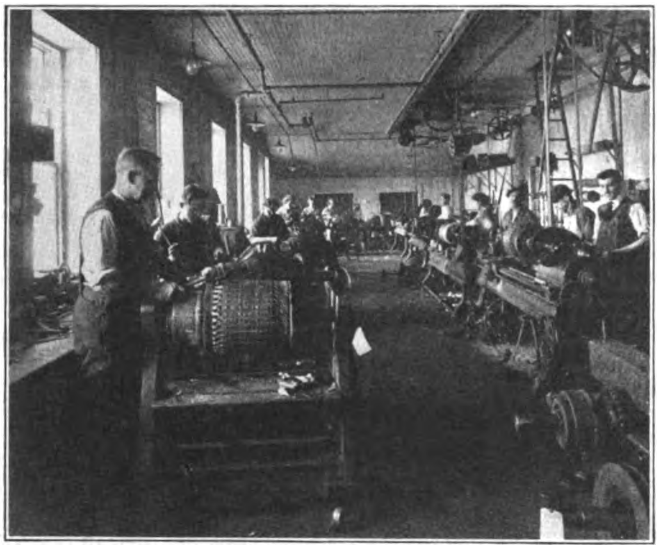
Since the previous article appeared, the armature department has been moved from the main floor and a special room constructed, forming a second story over the welding shop. This department now employs eight men and seven women and handles practically all of the armature and coil work for a rolling-stock equipment of some 2,000 motor cars. The equipment in this department includes an armature-coil winding machine, a field-winding machine, two banding lathes, a lathe for turning commutators and equipped with an attachment for slotting commutators, and a special lathe for winding contact magnets and other cylindrical coils.

Under the heading of special construction jobs which are handled in the reclamation shop might be included those items which are manufactured, such as trolley wheels and harps, axle bearings and collars, door castings, truck axles, brakeshoe heads, armature-coil winding, turning down axles from the rough, etc. In addition to these should be mentioned such special jobs as the construction of a steel ash car welded throughout and a 900-gal. underground oil storage tank.

The equipment in the machine shop for handling these diversified jobs includes three engine lathes, turret lathe, boring mill, axle lathe and keyseater, two drill presses, hacksaw machine, two emery grinders, 100-ton wheel press, axle straightener, 24-in. shaper, 26-in. x 8-ft. planer, babbitting machine, small sensitive drill, small speed lathe and bolt cutter. For use with this equipment in handling maintenance work, many special jigs have been planned and built. Several of these were covered in the previous article on the reclamation shop. A few of the others are described in the following paragraphs.

In the line of salvage work handled at the reclamation shop, welding is the main item. This includes building up axles at the journal and the axle bearing seat, welding motor frames, building up and welding of Westinghouse 101 armature housings, repairing truck frames and line tools, building up and welding together broken armature shafts, welding gear cases and journal boxes, etc. Steel wheels have also been successfully built up and switch tongues and switch parts are repaired for the track department. Occasionally also the welder is called out on special jobs such as welding boiler tubes, stoker parts and engine cylinders at the power plant. Probably the one item which forms the largest percentage of the work handled in this department is the repair of gear cases.

Another item which forms a large part of the welding work is the repair and rebuilding of journal boxes from Standard 0-50 trucks. When these boxes come into the shop the outer shell on the back side is badly



HALF OF THE FORCE IN THE ARMATURE DEPARTMENT ARE WOMEN

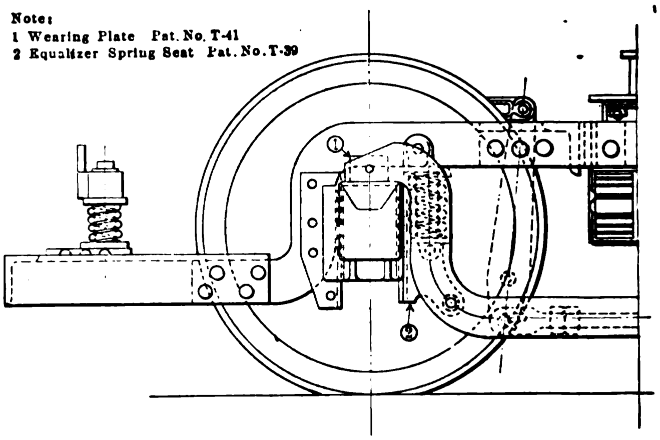
worn and often worn entirely through by the wheel, as shown in an accompanying group illustration. The boxes are also badly worn on the top by the equalizer bars and the equalizer spring seat is often cracked or badly worn. In the latter case the first step is to knock this seat off with a cold chisel. The various steps in the rehabilitation of these boxes are shown in the group illustration referred to.

After the spring seat is knocked off both the sides and the top of the box are planed off in the big planer. The top is smoothed and the sides are made 5¾ in. between faces with the equalizer bar guides ¾ in. deep. If the shell is only badly worn on the wheel side it is built up with the electric welder, as is also the worn surface on the top. If, however, the shell is worn entirely through, a piece of ⅜-in. or ½-in. boiler plate is welded over the face and the hole is later cut out either by means of the arc or the acetylene torch.

A special spring seat and wearing plate have been made up to replace the parts planed off. These are shown in an illustration and their application to the truck is also illustrated. The cost of repairing the boxes depends upon the amount of work which has to be done upon them, in other words upon how badly worn they are. On various jobs the cost has been anywhere from $1.99 to $4.25 per box with a general average of perhaps $2.25. Sometimes as many as fifty boxes per month are repaired in the foregoing manner.

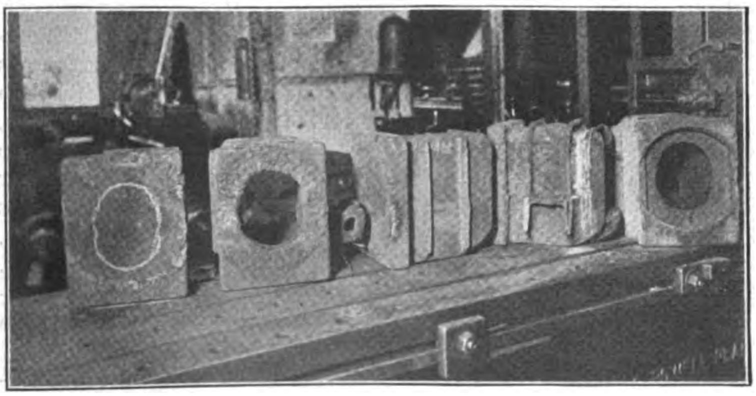
The various jigs which have been built are simple in construction but greatly simplify the operations for which they have been designed. An accompanying photograph shows the attachments made for use on the bed of the 24-in. x 26-in. x 8-ft. Woodward & Powell planer. These attachments, which are plain castings with two V-shaped rests, permit the simultaneous planing of eighteen axle-bearing halves, of the same size. For this work a special head was also made up in two parts and mounted on the standard head of the machine. This special head provides for adjustment of the cutting tools laterally so that the four tools will always be cutting simultaneously regardless of the size of bearings being planed. The head rests against two adjustable supports which hold it in a vertical position and relieve the strain when the tools are cutting.

The supports which hold the axle bearings in place are dovetailed to the bed of the planer and the bearings are held in position by clamps which are bolted down, a single clamp holding the adjacent ends of two bearings. With this equipment it is possible to plane off eighteen axle-bearing halves in approximately forty minutes.

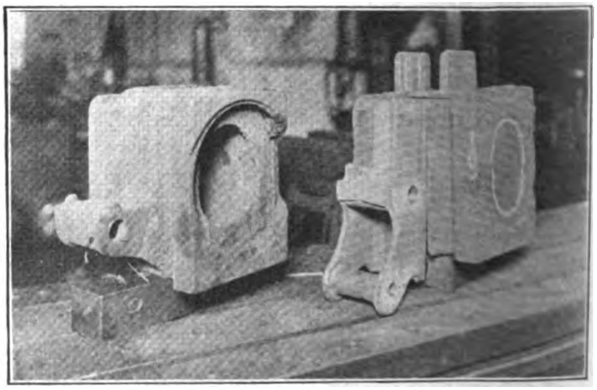

Note:
1 Wearing Plate Pat. No. T-41
2 Equalizer Spring Seat Pat. No. T-39
①
②

APPLICATION OF REHABILITATED JOURNAL BOX TO TRUCK SHOWING NEW SPRING SEAT AND WEARING PLATE IN POSITION

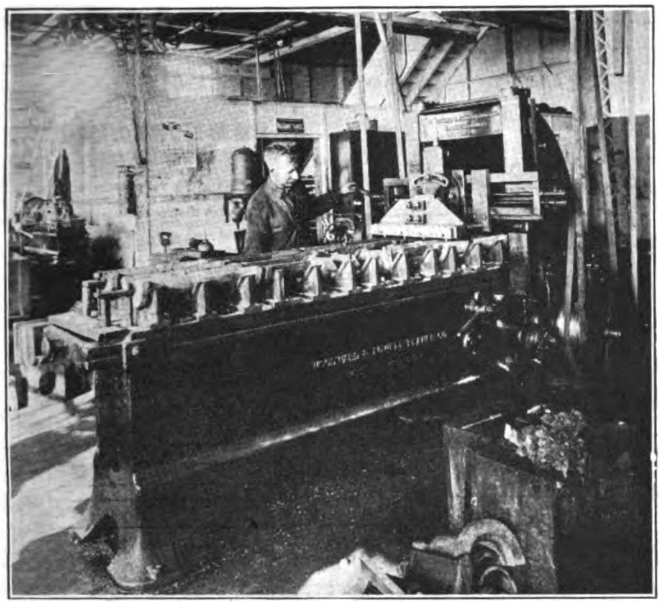
Another jig, which is illustrated, facilitates the correct and speedy drilling of axle bearings. This box-shaped device is made of steel, the several pieces being held together by steel dowel pins. The construction details are shown in the accompanying illustration. This jig is adjustable to accommodate any size of bearing and the bearings may be so easily and quickly inserted and removed that approximately forty halves can be drilled per hour. The segment marked "A" on the illustration



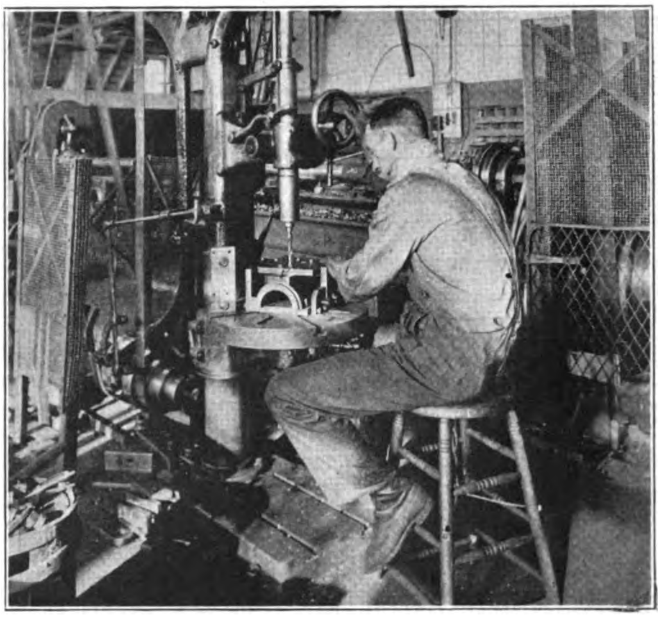
SUCCESSIVE STEPS IN REHABILITATION OF WORN AND BROKEN JOURNAL BOXES—STEPS PROGRESS FROM RIGHT TO LEFT



SPECIAL SPRING SEAT AND WEARING PLATE WHICH REPLACE PARTS BROKEN AND PLANED OFF



ATTACHMENTS TO LARGE PLANER PERMITTING SIMULTANEOUS PLANING OF 18 AXLE BEARING HALVES



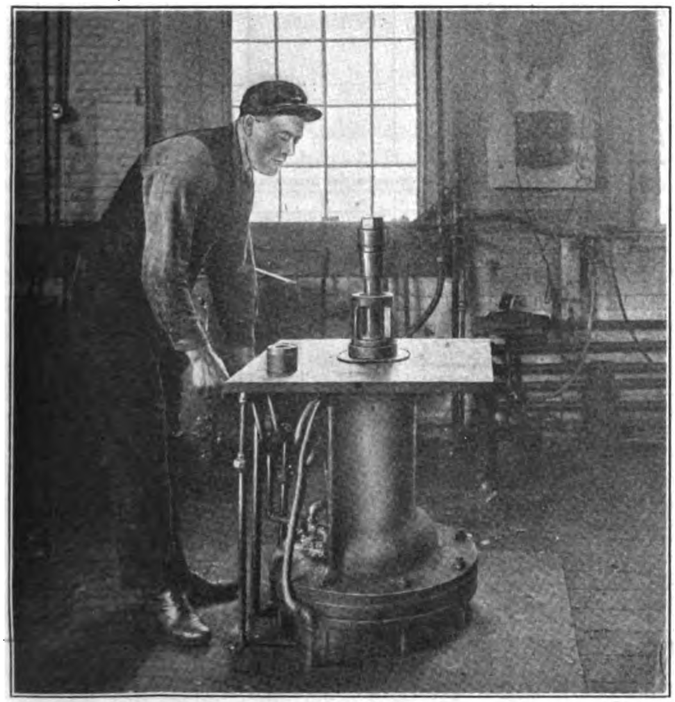
THIS JIG MAKES IT POSSIBLE TO DRILL ABOUT FORTY AXLE BEARING HALVES AN HOUR

is that part which is interchangeable to accommodate the various sizes of bearings.

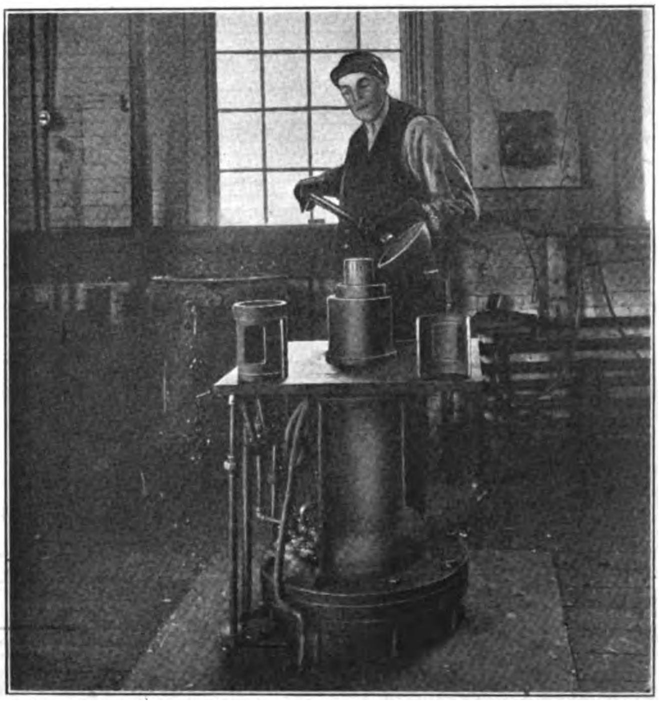
For the drilling operation the bearing is slipped into the box until the fillet rests firmly against the segment "A." The thumb screws are then tightened to hold the bearing firmly in position and the hole is drilled. The adjustable segment is held in the box by the four screws. All segments have these four screw-holes so arranged that the length of the segment beyond the box brings the one or two dowel holes, as the case may be, in the proper position for the particular bearing for which the segment is designed.

A third device which is illustrated is that for drilling dowel holes in armature bearings and is quite similar in operation to that already described for the axle bearings. Because of the shape of the armature bearing, the box in this case has a hinged top and a cam lever to hold the cover firmly shut when the bearing is in position. In the bottom of this box there is an interchangeable lug which fits into the window of the bearing and prevents any rotating movement. The adjustable segments are made and used on the same principles as those already described and are held in position by two screws. The two illustrations, one showing the box closed with the bearing in position ready for boring and the other with the lid raised, show clearly the details of construction. With this jig about forty bearings per hour can be drilled. In both of these jigs the drill holes are lined with tool steel bushings.

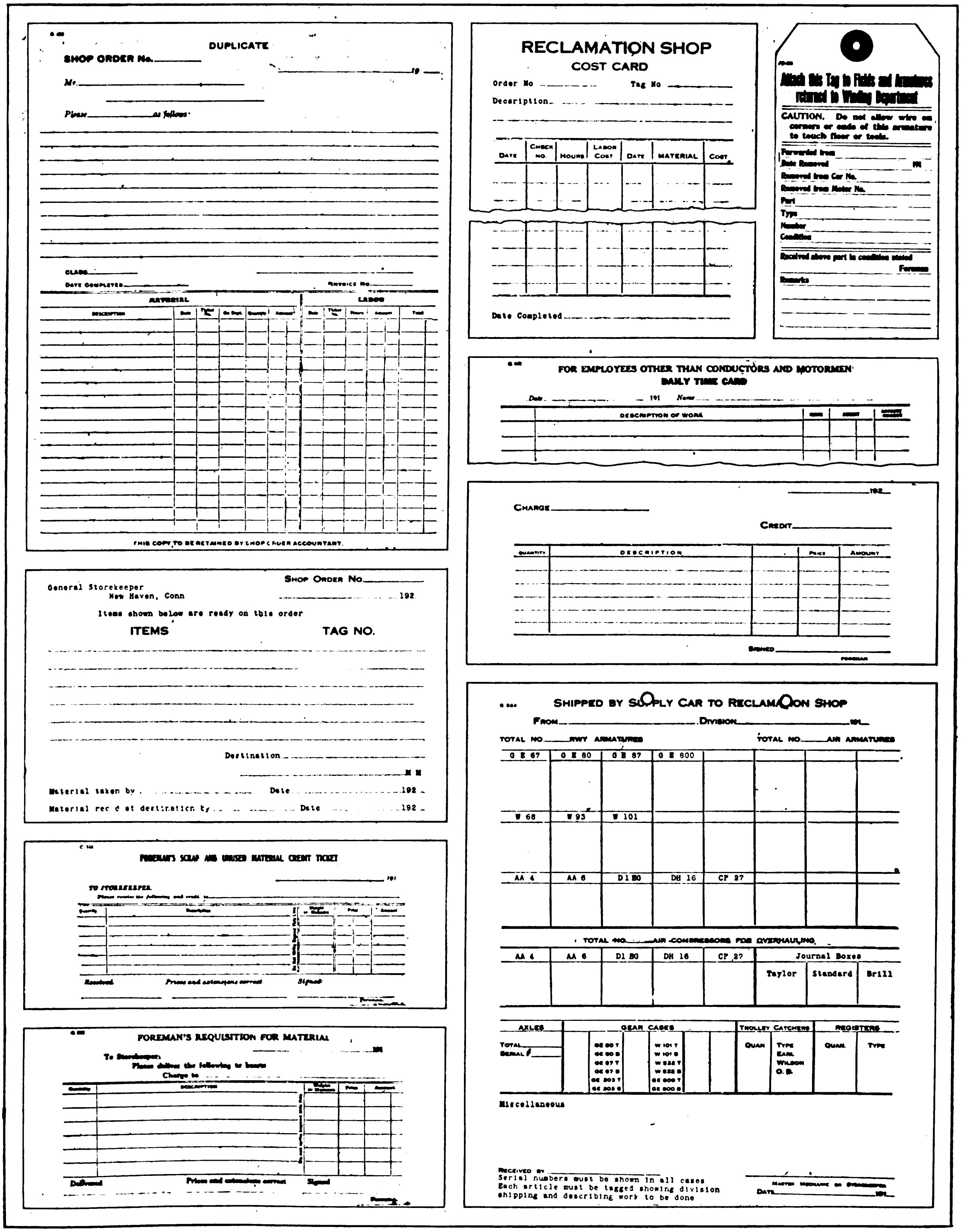
A special arrangement which greatly facilitates the babbitting of armature bearings is also illustrated. The device consists of a working stand through which is



ALL BEARINGS WHICH ARE BABBITTED ARE BROACHED RATHER THAN BORED



WITH THIS MACHINE ONE MAN CAN BABBITT 100 BEARINGS A DAY



DUPLICATE

SHOP ORDER No.__________

____________________19___

*Mr.*____________________

*Please*____________*as follows*

CLASS__________

DATE COMPLETED__________ INVOICE No.__________

MATERIAL						LABOR				
Description	Date	Ticket No.	On Dept.	Quantity	Amount	Date	Ticket No.	Hours	Amount	Total

THIS COPY TO BE RETAINED BY SHOP ORDER ACCOUNTANT.

RECLAMATION SHOP

COST CARD

Order No __________ Tag No __________

Description____________________

Date	Check No.	Hours	Labor Cost	Date	Material	Cost

Date Completed____________________

Attach this Tag to Fields and Armatures returned to Winding Department

CAUTION. Do not allow wire on corners or ends of this armature to touch floor or tools.

Forwarded from__________

Date Removed__________191

Removed from Car No.__________

Removed from Motor No.__________

Part__________

Type__________

Number__________

Condition__________

Received above part in condition stated

__________ Foreman

Remarks__________

FOR EMPLOYEES OTHER THAN CONDUCTORS AND MOTORMEN

DAILY TIME CARD

*Date*__________191 *Name*__________

	DESCRIPTION OF WORK	[illegible]	[illegible]	[illegible]

____________________192__

CHARGE__________

CREDIT__________

QUANTITY	DESCRIPTION		PRICE	AMOUNT

SIGNED__________ FOREMAN

SHOP ORDER No.__________

General Storekeeper
New Haven, Conn

____________________192

Items shown below are ready on this order

ITEMS	TAG NO.

Destination__________

____________________M M

Material taken by__________ Date__________192_

Material rec'd at destination by__________ Date__________192_

FOREMAN'S SCRAP AND UNUSED MATERIAL CREDIT TICKET

____________________191

TO STOREKEEPER.

*Please receive the following and credit to*__________

Quantity	Description	Weight or Measure	Price	Amount

Received *Prices and extensions correct* *Signed*

__________ __________ __________ Foreman.

FOREMAN'S REQUISITION FOR MATERIAL

____________________191

To Storekeeper:

Please deliver the following to bearer

Charge to__________

Quantity	DESCRIPTION	Weight or Measure	Price	Amount

Delivered Prices and extensions correct Signed

__________ __________ __________ Foreman.

SHIPPED BY SUPPLY CAR TO RECLAMATION SHOP

FROM__________DIVISION__________191_

TOTAL NO.____RWY ARMATURES TOTAL NO.____AIR ARMATURES

G E 67	G E 80	G E 87	G E 800				
W 68	W 93	W 101					
AA 4	AA 6	D1 EG	DH 16	CP 27			

TOTAL NO.____AIR COMPRESSORS FOR OVERHAULING

					Journal Boxes		
AA 4	AA 6	D1 EG	DH 16	CP 27	Taylor	Standard	Brill

AXLES	GEAR CASES						TROLLEY CATCHERS		REGISTERS	
TOTAL____ SERIAL #____		GE 80 T GE 80 B GE 67 T GE 67 B GE 203 T GE 203 B		W 101 T W 101 B W 532 T W 532 B GE 800 T GE 800 B			QUAN	TYPE EARL WILSON O. B.	QUAN.	TYPE

Miscellaneous

RECEIVED BY__________

Serial numbers must be shown in all cases
Each article must be tagged showing division
shipping and describing work to be done

__________ MASTER MECHANIC OR STOREKEEPER

DATE__________191_

Various Orders, Requisitions, Charge and Cost Forms Used in the Reclamation Shop

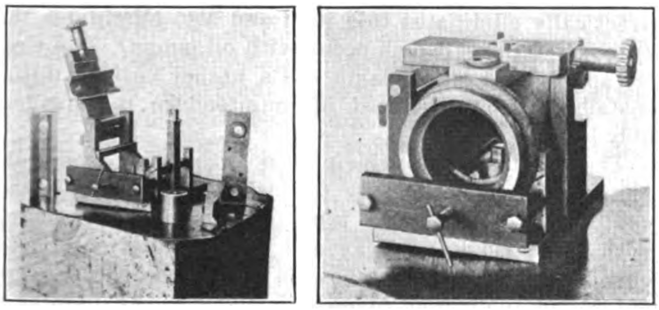
TABLE I—ESTIMATED MONTHLY SAVINGS FROM WELDING AND REPAIR JOBS DURING 1919

Class of Work	January	February	March	April	May	June	July	August	September	October	November	December	Total
Welding........	$3,555.32	$3,650.50	$3,057.95	$2,423.63	$5,512.19	$2,015.08	$3,653.50	$3,055.15	2,179.10	$2,697.58	$902.20	$2,078.42	$34,780.62
Repairs.........	2,469.16	1,618.57	2,521.78	1.952,48	2,454.11	2,424.09	3,258.40	2,169.92	1,923.37	2,061.65	868.47	2,269.47	25,991.47

inserted the plunger of a 16-in. air cylinder. The piston of this plunger is removable and any diameter of piston can be used to suit the desired interior diameter of the babbitted bearings. The outside cylindrical form is bolted to the table top and has a hole in the base slightly larger than the largest piston which may be used. This form is interchangeable for the various sizes of bearings.

In the babbiting operation a ring, whose outside diameter is the outside diameter of the bearing to be babbitted and whose inside diameter fits snugly the piston to be used, is placed in the bottom of the outside form and over the piston. The semi-cylindrical plates shown are then placed around the bearing, one plate having an interchangeable lug which fits the window of the bearing. These plates are also long enough so that when this equipment is placed in the cylinder over the piston, the plates surround the ring already in place. This insures the proper centering of the piston.

As soon as the babbitt is poured the piston is withdrawn. This piston is hollow and is water-cooled as withdrawn. The babbitt cools and shrinks so quickly that the piston can be almost immediately raised and lifts the bearing with it. This is then placed at one side and the operation repeated. With this device approximately 100 bearings can be babbitted in a day by one man.



THIS TYPE OF JIG IS USED TO DRILL ARMATURE BEARINGS

All bearings which are babbitted are broached rather than bored, the same machine being used. The broacher is illustrated and consists of a reduced section piston with a shoulder and a threaded end. Over the end of the piston and down against the shoulder is placed a brass ring and then a heavy washer. Upon this is placed the broaching tool which is held firmly in position by a heavy nut. To broach the bearing the piston is lowered and the tool is pulled through, making the babbitt compact and free from air pockets and leaving the inside diameter correct.

Another jig of interest is that used for boring trolley harps. The harp is placed in the jig and held in position by a screw. The jig is placed on the drill press and one boring forms the trolley pole hole. The jig is then turned on its side and a second boring forms the trolley-axle hole in each arm. The jig is next reversed from its first position and the trolley axle cotter pin holes are drilled in two more operations. This jig is built of ⅜-in. mild steel and the holes are lined with tool steel bushings.

When the reclamation shop was first installed, it was thought that for some of the items handled in the shop a premium system of payment would be put into effect. This was tried out during the past year on welding and on the manufacture of various articles, but did not work out well and has since been abandoned. The total force in the reclamation shop now includes thirty-six persons, seven of whom are women, and two of whom are employed in the office. All of the women, with the exception of one office clerk, work in the armature room. They make coils, including the coils for air compressors, do banding on all kinds of armatures and rewind armatures.

At present there is adjoining the armature room a small electrically-heated bake-oven used for compressor-

TABLE II—TABULATION OF MATERIALS REPAIRED AND RECLAIMED DURING JULY, 1919

MATERIALS REPAIRED

No.	Description	Total Cost	Net Saving
3	Air armatures repaired..........................	$40.82	$19.18
3	Air armatures repaired..........................	9.47	20.53
3	Air armatures repaired..........................	16.53	13.47
4	Air armatures repaired..........................	32.03	7.97
1	Air armatures repaired..........................	4.71	5.29
14	Air armatures rewound..........................	304.88	255.12
1	Air armatures rewound..........................	18.25	21.75
21	Air armatures rewound..........................	422.78	417.22
1	Air armatures rewound..........................	17.25	22.75
1	Air armatures rewound..........................	20.05	19.95
6	Air armatures rewound..........................	149.04	90.96
8	Air armatures rewound..........................	141.17	178.83
1	Motor armatures repaired........................	31.06	8.94
19	Motor armatures repaired........................	135.14	149.86
2	Motor armatures repaired........................	18.75	11.25
14	Motor armatures repaired........................	97.81	112.19
2	Motor armatures repaired........................	14.66	15.34
1	Motor armature repaired........................	11.63	3.37
3	Motor armatures rewound........................	136.24	88.76
3	Motor armatures rewound........................	132.17	92.83
5	Motor armatures rewound........................	248.03	126.97
1	Motor armature rewound........................	65.00	15.00
8	Motor armatures rewound........................	773.99	226.01
6	Fare registers overhauled........................	5.73	9.27
8	Fare registers overhauled........................	18.44	21.56
3	Fare registers overhauled........................	4.72	2.78
3	Fare registers overhauled........................	2.07	5.43
5	Air compressors overhauled......................	217.57	157.43
1	Air compressor overhauled......................	66.42	8.58
6	Air compressors overhauled......................	264.20	185.80
3	Air compressors overhauled......................	109.37	70.63
3	Squires track magnets rewound...................	68.57	21.43
2	Squires track magnets rewound...................	24.57	15.43
1	Squires track magnet rewound...................	5.86	4.14
1	Squires track magnet rewound...................	13.62	6.38
1	Cont. switch box repaired........................	11.78	3.22
53	Field coils repaired..............................	34.26	230.74
2	Field coils repaired..............................	9.73	2.27
34	MS 46 switches repaired..........................	51.23	118.77
2	Crank cases overhauled..........................	59.78	10.22
1	Truck grinder repaired..........................	5.66	1.84
1	Trolley base overhauled..........................	6.61	3.39
1	G. E. Eng. valve overhauled.....................	3.60	3.40
1	K6 controller repaired..........................	26.05	8.95
1	Switch tongue repaired..........................	3.70	1.30
2	Engine slide valves repaired.....................	8.59	7.41
1	N. H. Squires Register overhauled................	2.65	2.35
4	Wilson trolley catchers repaired..................	2.17	37.83
7	Wilson trolley catchers repaired..................	32.92	37.08
12	G. E. 80 armature bearings repaired..............	32.00	64.00
3	D coils rewound.................................	12.07	11.93
2	Pit jacks repaired...............................	25.38	4.62
1	Cheatham track magnet rewound..................	6.79	33.21
1	62-tooth gear repaired...........................	3.62	14.38
1	Type K motor repaired...........................	55.72	24.28
6	D coils rewound.................................	27.10	12.90
5	D coils rewound.................................	11.10	12.90
44	Fare registers overhauled........................	120.64	55.36
61	Fare registers overhauled........................	298.07	61.93
6	Pit jacks overhauled.............................	77.94	72.06
20	Pos. journal bearings repaired...................	100.34	49.66
	Total...	$4,762.10	$3,238.40

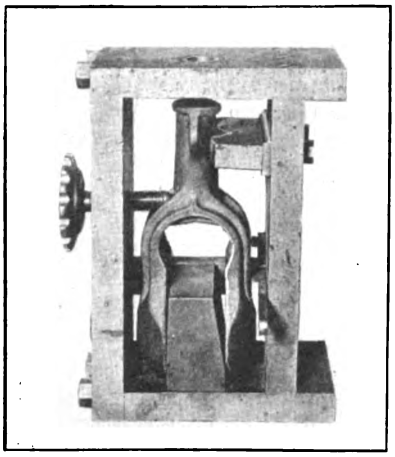
MATERIALS RECLAIMED

No.	Description	Total Cost	Net Saving
161	Half gear cases..................................	$188.49	$2,548.51
3	Axles...	41.78	78.22
1	Axle..	21.04	18.96
6	Axles...	93.87	146.13
4	Armatures......................................	104.92	45.08
5	Armatures......................................	23.62	51.38
1	Armature.......................................	12.62	12.38
1	Armature.......................................	6.16	18.84
1	Armature.......................................	2.64	22.36
1	Wilson trolley catcher...........................	0.59	0.91
1	Bearing for coal elevator.........................	1.33	3.67
4	Standard 0-50 equalizing bars....................	14.59	35.41
2	Standard 0-50 brake beams......................	.....	.....
105	Standard journal housings.......................	273.32	671.68
	Total...	$784.97	$3,653 53

motor armatures and coils. Plans are being prepared, however, to extend the armature room on out over the receiving room and to install a dipping tank and large electrically-heated baking oven which will accommodate thirty-six armatures at once. The tank will be placed in the floor and reached by a trap door.

CAREFUL COST RECORDS ARE KEPT OF ALL WORK

The procedure of handling equipment which comes into the shop for repair insures that a careful record is kept of the piece until it is again returned to the division, and makes possible accurate cost records of repair work. As an example of how this is accomplished, consider a simple piece of equipment such as an armature. When this is placed on the supply car at the division point it is accompanied by a "Shipped by Supply Car to Reclamation Shop" order, in duplicate.



WITH ONE SETTING OF THE TROLLEY HARP IN THIS JIG ALL HOLES ARE DRILLED BY CHANGING THE POSITION OF THE JIG

Everything coming into the reclamation shop is received at the store room. Here the armature receives a tag to which in turn is attached a small tin disc bearing a number. This number follows the article through the shop and against it is charged the cost of the work. At the same time the armature is tagged, a shop order is made up in four copies, one being sent to the master mechanic's office together with a copy of the "Shipped by Supply Car to Reclamation Shop" order. One copy of the shop order is retained by the stockroom accountant, one by the storeroom and the fourth is sent to the foreman performing the work.

When the master mechanic's office receives the shop order, a "Foreman's Requisition for Material" order is filled out for the necessary material to perform the repair work. When the job is completed, the foreman fills out a form describing the work which was done and the materials used in the job. This form also shows credits which should be deducted for scrap salvage. There is also for this purpose a separate form which the foreman fills out and sends to the storekeeper, covering not only the scrap salvage but any unused material.

When the equipment is repaired and ready to go out to the division, a shipping order is made up in four copies, two of these go with the piece of equipment and two are retained in the master mechanic's office. One of those which accompanies the piece of equipment out of the shop is signed by the individual receiving it at the division point and later returned to the master mechanic's office. From the employee's time slip and the credit and charge forms the cost data are made up and recorded on the reclamation shop "Cost Card." All of the various forms mentioned above are reproduced in an accompanying illustration.

Some of the results actually attained at the reclamation shop should be of interest. During the year 1919 the estimated monthly savings in welding and repair jobs were as recorded in Table I. The total savings for the year are estimated at $86,442. An example of the work done and savings accomplished during a representative month is given in the tabulation of the report of materials repaired and reclaimed as shown in Table II.

Electric Lighting of Railroad Signals Discussed

Illuminating Engineering Society Takes Up Theory and Development of Electrically-Lighted Signals

AT A meeting held on March 11, 1920, one of the subjects discussed by the New York section of the Illuminating Engineering Society was "The Electric Lighting of Railroad Signals." L. C. Porter, Edison Lamp Works of the General Electric Company, and F. S. Stallknecht, Thomas A. Edison, Inc., Primary Battery Division, presented the subject. An abstract of the discussion follows:

Along some sections of railroads, electrically lighted lamps have been operated from local power circuits and in remote cases gravity and storage batteries have been used as the source of energy. In the majority of cases, however, the caustic soda primary cell is rapidly coming into general use for this purpose.

It is believed that the one factor which has done most to hasten the installation of electrically-lighted signal lamps is the increasing cost of labor. The electric lamp practically eliminates this item and also eliminates the frequent failures which occur with oil lamps. The electrically-lighted signal lamp has a higher cost of initial installation, but the cost of maintenance is considerably lower.

The fundamental principles of projection were explained in some detail by the assistance of slides and exhibits of the various types of lamps experimented with. The adapter blocks and focusing devices developed and the equipment now in most general use were also illustrated. The filament finally decided upon as a result of exhaustive tests was the C-2 form. This type gives a high beam candle power, a good spread, and is easy to locate at the focal point. Also as a result of the tests a G-12 bulb double-contact bayonet base with a 1¼-in. light center length was determined upon as the standard.

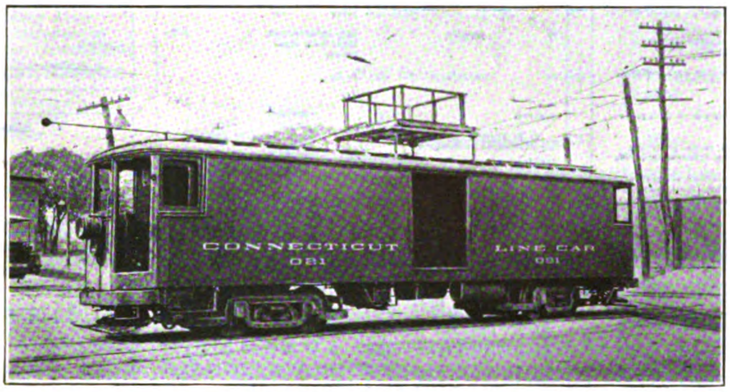
It is believed that the lamp should be renewed every time the battery is renewed, thus preventing interruption of service through lamp failures, and it is estimated that the batteries and lamps will need attention under average railroad service not more frequently than twice a year.

The interesting devices developed from the use of electric signal lamps have been the adapter block and the focusing device. By means of these the maximum efficiency of the low-voltage incandescent lamp is utilized and the focusing of lamps is placed on a basis which is so certain as to be almost mechanical. It is anticipated that the majority of initial installations in railroad work will be converted oil lanterns, but as these wear out and have to be replaced, it is assumed that the reflector type of lantern will be installed.

What is said to be the largest jet condenser yet built was recently completed by the Westinghouse Electric & Manufacturing Company, for the Alabama Power Company. It is capable of passing 13,000,000 lb. of water per hour.

Keeping the Overhead System Fit

Systematic Inspection and Careful Analysis of Failures Tends to Reduce the Latter, Not Only by Eliminating a Defect Before It Proves Serious, But by the Use of More Suitable Equipment Where Failures Persist



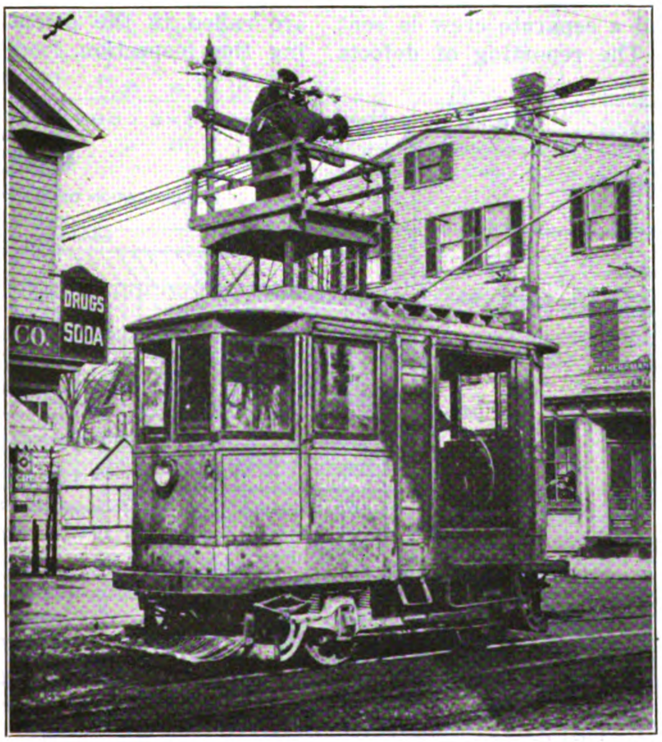
ONE TYPE OF TOWER LINE CAR USED BY CONNECTICUT COMPANY

THE work of maintaining the trolley and low-voltage lines of an electric railway property, being not more radically unique than that of other departments, depends to a certain extent upon the inherent conditions of the particular locality and property. Routine maintenance practice, however, need not differ in any important respect on various properties where even approximately similar conditions exist. In this article the results of a study of overhead maintenance practice of the Connecticut Company is given to illustrate the ways in which progressive companies are endeavoring to keep their lines in good form. This company operates approximately 700 miles of track in Connecticut, serving most of the cities and towns, both large and small, in that state. The railway system includes eleven divisions, and each of the overhead division forces takes care of its own construction, inspection and maintenance under general supervision of P. W. Ripple, chief engineer of power and equipment, and H. M. Gould, who is supervisor of lines of the company.

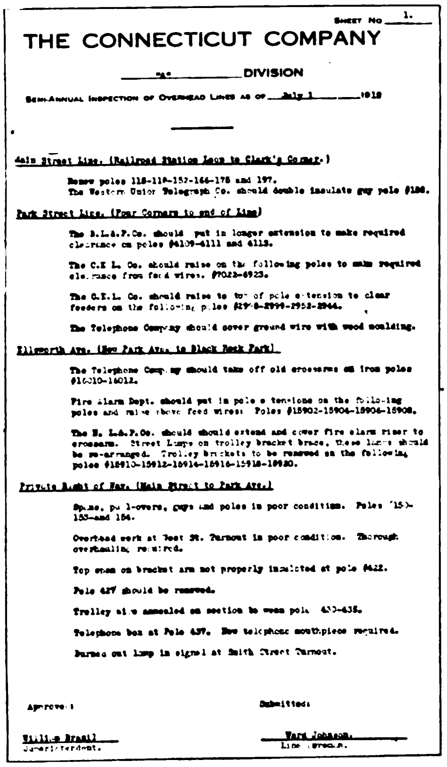
The line work in each of the eleven divisions comes under the direct supervision of a line foreman, with the necessary force of linemen, groundmen, etc., the number of men depending upon the size of the division. Table I shows the approximate mileage of each division, average number of men employed on the overhead work and the tower truck, car or wagon equipment in operation. This table would be misleading without the added information that these men look after the high-tension system as well as the trolley and low-voltage lines. It is impossible, therefore, to make any clear division of duties, and assign a definite number of men to the low-voltage work. The Hartford, New Haven and Middletown divisions all include some miles of high-tension lines.

In further explanation of Table I it should be stated that the Hartford, Middletown and New Haven divisions, which, as already noted, include high-tension lines, each have one man patrol these lines one day a week. The tower trucks in use at New Haven, Waterbury, Bridgeport and Hartford are Pierce-Arrow cars which are used mainly for emergency construction and maintenance. Ford runabouts are used by the signal maintainers.

Through the passage by the Public Utilities Commission of Connecticut of so-called Docket No. 1447 Order D, approving and establishing rules and specifications governing the construction and use of joint wood-pole lines, an inspection and report is made to the commission on Oct. 1 and April 1 each year. At these times complete inspections are made of the high-tension trolley and low-voltage system, and a detailed report of all defects found is made on the form shown in an accompanying illustration. The regular crew on each division makes the semi-



ONE TYPE OF TOWER LINE CAR USED BY CONNECTICUT COMPANY



SHEET NO. 1.

THE CONNECTICUT COMPANY

"A" DIVISION

SEMI-ANNUAL INSPECTION OF OVERHEAD LINES AS OF July 1 1919

Main Street Line. (Railroad Station Loop to Clark's Corner.)

Renew poles 118-119-152-166-178 and 197.
The Western Union Telegraph Co. should double insulate guy pole #180.

Park Street Line. (Four Corners to end of Line)

The B.L.&.P.Co. should put in longer extension to make required clearance on poles #4109-4111 and 4113.

The C.E L. Co. should raise on the following poles to make required clearance from feed wires. #7022-6923.

The C.E.L. Co. should raise to top of pole extension to clear feeders on the following poles #2948-2999-2952-2944.

The Telephone Company should cover ground wire with wood moulding.

Ellsworth Ave. (New Park Ave. to Black Rock Park)

The Telephone Company should take off old crossarms on iron poles #16010-16012.

Fire Alarm Dept. should put in pole extensions on the following poles and raise above feed wires: Poles #15902-15904-15906-15908.

The B. L.&.P.Co. should should extend and cover fire alarm riser to crossarm. Street Lamps on trolley bracket brace, these lamps should be re-arranged. Trolley brackets to be removed on the following poles #15910-15912-15914-15916-15918-15920.

Private Right of Way. (Main Street to Park Ave.)

Spans, pull-overs, guys and poles in poor condition. Poles 152-153-and 154.

Overhead work at Post St. Turnout in poor condition. Thorough overhauling required.

Top span on bracket arm not properly insulated at pole #422.

Pole 427 should be removed.

Trolley wire annealed on section between pole 430-435.

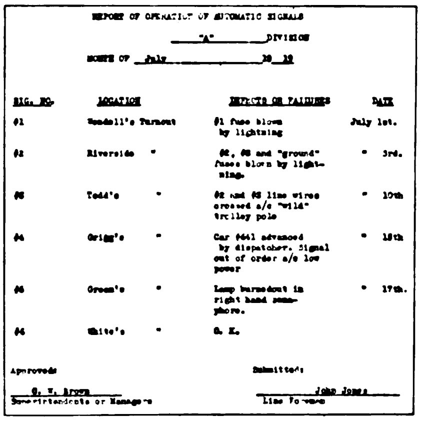
Telephone box at Pole 437. New telephone mouthpiece required.

Burned out lamp in signal at Smith Street Turnout.

Approved: Submitted:

William Brazil
Superintendent.

Ward Johnson.
Line Foreman.



REPORT OF OPERATION OF AUTOMATIC SIGNALS

"A" DIVISION

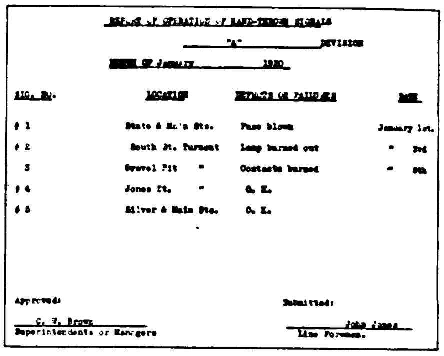
MONTH OF July 19 19

SIG. NO.	LOCATION	DEFECTS OR FAILURES	DATE
#1	Wendell's Turnout	#1 fuse blown by lightning	July 1st.
#2	Riverside "	#2, #8 and "ground" fuses blown by lightning.	" 3rd.
#3	Todd's "	#2 and #3 line wires crossed a/c "wild" trolley pole	" 10th
#4	Grigg's "	Car #641 advanced by dispatcher. Signal out of order a/c low power	" 15th
#5	Green's "	Lamp burnedout in right hand semaphore.	" 17th.
#6	White's "	O. K.	

Approved: Submitted:

G. W. Brown
Superintendents or Managers

John Jones
Line Foreman



REPORT OF OPERATION OF HAND-THROWN SIGNALS

"A" DIVISION

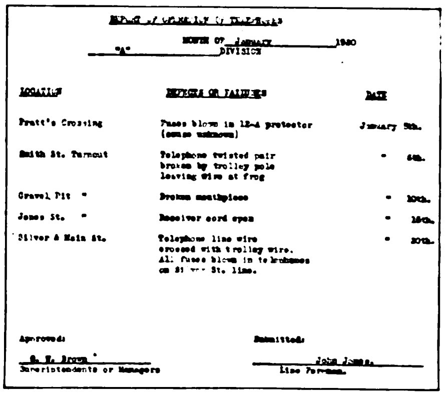
MONTH OF January 1920

SIG. NO.	LOCATION	DEFECTS OR FAILURES	DATE
# 1	State & Main Sts.	Fuse blown	January 1st.
# 2	South St. Turnout	Lamp burned out	" 3rd
3	Gravel Pit "	Contacts burned	" 8th
# 4	Jones St. "	O. K.	
# 5	Silver & Main Sts.	O. K.	

Approved: Submitted:

G. W. Brown
Superintendents or Managers

John Jones
Line Foreman.



REPORT OF OPERATION OF TELEPHONES

MONTH OF January 1920

"A" DIVISION

LOCATION	DEFECTS OR FAILURES	DATE
Pratt's Crossing	Fuses blown in 12-A protector (cause unknown)	January 5th.
Smith St. Turnout	Telephone twisted pair broken by trolley pole leaving wire at frog	" 6th.
Gravel Pit "	Broken mouthpiece	" 10th.
Jones St. "	Receiver cord open	" 15th.
Silver & Main St.	Telephone line wire crossed with trolley wire. All fuses blown in telephones on Silver St. line.	" 20th.

Approved: Submitted:

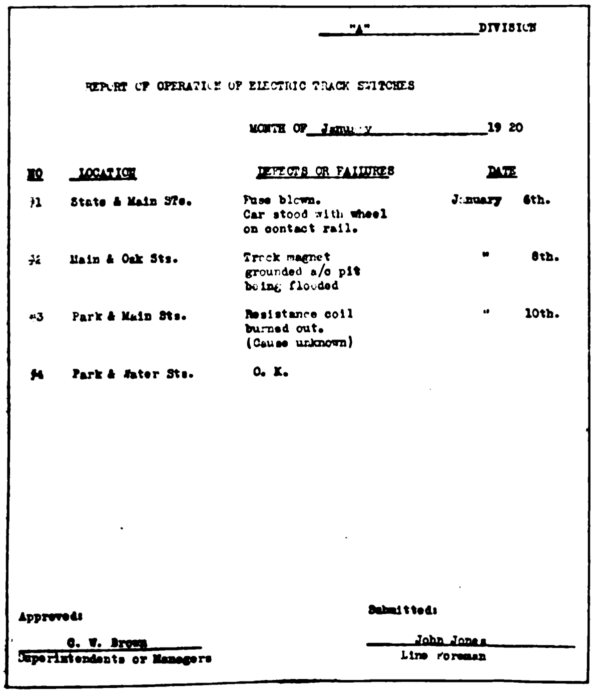
G. W. Brown
Superintendents or Managers

John Jones.
Line Foreman.

AT LEFT, SAMPLE OF REPORT ON SEMI-ANNUAL INSPECTION. ABOVE AND AT RIGHT, TYPE OF MONTHLY REPORTS MADE ON INSPECTION OF AUTOMATIC SIGNALS, HAND-THROWN SIGNALS AND TELEPHONES

annual inspection for that division. As many men as necessary are used to complete the inspection quickly. Each man is assigned to a definite portion of the system and proceeds on foot and inspects all parts, including poles, trolleys, feeders, etc.

If from the observation point on the ground the trolley wire appears badly worn or otherwise defective, the location is recorded and a tower inspection is later made. No maintenance work is done at the time of the inspection unless a dangerous condition which needs immediate attention is found. If the condition is dangerous but does not need immediate attention, the superior officer is notified and a separate crew is sent to handle the repair work. The reporting of defects pertaining to insulators, brackets, poles or feeders is simplified by the fact that each pole is stenciled with a number and the name of the company. On poles used jointly by several utility companies, which is common in the State of Connecticut, one company is appointed custodian of that pole, and the name of that company only appears on the pole. To avoid any confusion or misunderstanding as to responsibility, a standard form of contract has been adopted for pole-line agreements. On rural lines it is the general practice to stencil and number every fifth pole. On poles jointly used by other companies defects in the lines of any of these companies are called to the attention of that company, following the inspection.



"A" DIVISION

REPORT OF OPERATION OF ELECTRIC TRACK SWITCHES

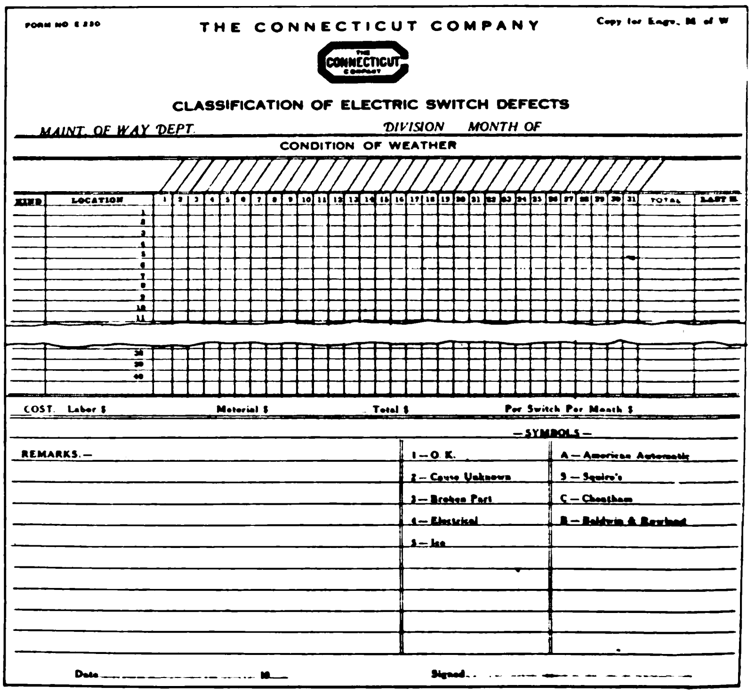
MONTH OF January 19 20

NO	LOCATION	DEFECTS OR FAILURES	DATE
#1	State & Main Sts.	Fuse blown. Car stood with wheel on contact rail.	January 6th.
#2	Main & Oak Sts.	Track magnet grounded a/c pit being flooded	" 8th.
#3	Park & Main Sts.	Resistance coil burned out. (Cause unknown)	" 10th.
#4	Park & Water Sts.	O. K.	

Approved: Submitted:

G. W. Brown
Superintendents or Managers

John Jones
Line Foreman



FORM NO. E 230

THE CONNECTICUT COMPANY

Copy for Engr. M. of W.

CLASSIFICATION OF ELECTRIC SWITCH DEFECTS

MAINT. OF WAY DEPT. DIVISION MONTH OF

CONDITION OF WEATHER

KIND	LOCATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	TOTAL	LAST M.
	1																																	
	2																																	
	3																																	
	4																																	
	5																																	
	6																																	
	7																																	
	8																																	
	9																																	
	10																																	
	11																																	
	38																																	
	39																																	
	40																																	

COST. Labor $ Material $ Total $ Per Switch Per Month $

—SYMBOLS—

REMARKS.—

1—O. K.	A—American Automatic
2—Cause Unknown	S—Squire's
3—Broken Part	C—Cheatham
4—Electrical	B—Baldwin & Rowland
5—Ice	

Date .... 19....

Signed ....

TWO MONTHLY REPORTS ARE MADE ON THE OPERATION AND INSPECTION OF ELECTRIC TRACK SWITCHES

TABLE I—MILEAGE, PERSONNEL AND EQUIPMENT OF OVERHEAD DIVISIONS

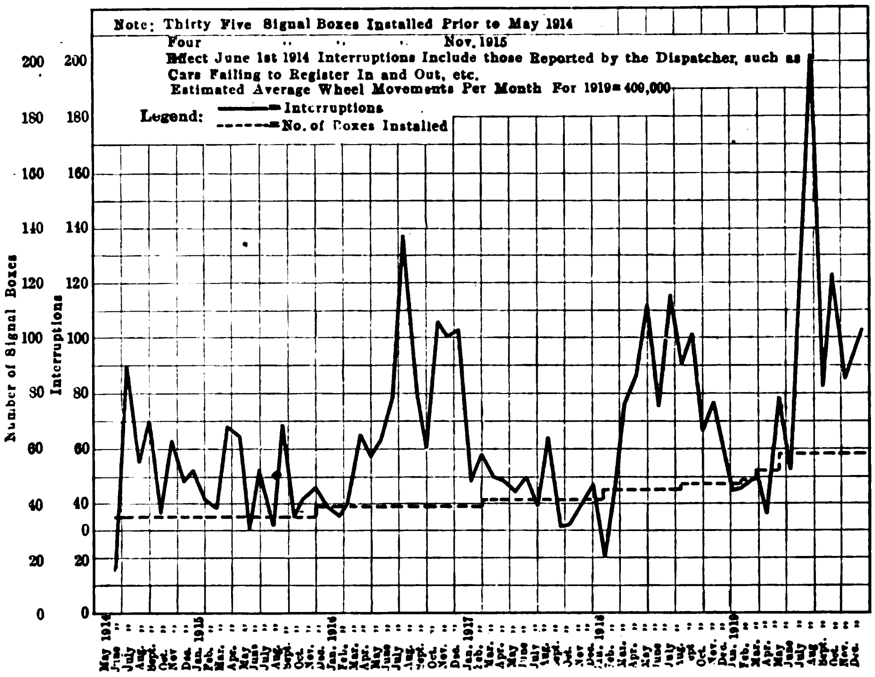
Division	Track Miles	Number of Men	Equipment
Stamford	23	1 Foreman 3 Men	1 tower wagon
*Hartford	183	1 Gen. Foreman 3 Gang Foremen 1 Sub-Foreman 1 Maintainer 15 Men	1 tower truck 2 line cars 1 tower wagon (seldom used)
*New Haven	151	1 Gen. Foreman 3 Gang Foremen 1 Emergency Foreman 5 Emergency Men 1 Signal Maintainer 21 Linemen, Groundmen, and Teamsters	1 tower truck 4 line cars 2 tower wagons
Bridgeport	101	1 Gen. Foreman 3 Line Foremen 1 Maintainer 15 Men	1 tower truck 1 Ford runabout 2 line cars 2 tower wagons (seldom used)
Waterbury	82	1 Gen. Foreman 3 Gang Foremen 2 Maintainers 13 Men	1 tower truck 3 line cars 1 tower wagon (seldom used)
Derby	25	1 Foreman 4 Men	1 line car
Meriden	38	1 Foreman 5 Men	1 line car 1 tower wagon (seldom used)
*Middletown	35	1 Gen. Foreman 2 sub-foremen 5 Men	1 line car 1 Ford runabout
New Britain	41	1 Foreman 6 Men	1 line car 1 tower wagon (seldom used)
Torrington	13	1 Man	1 line car

*This division includes also high tension lines.

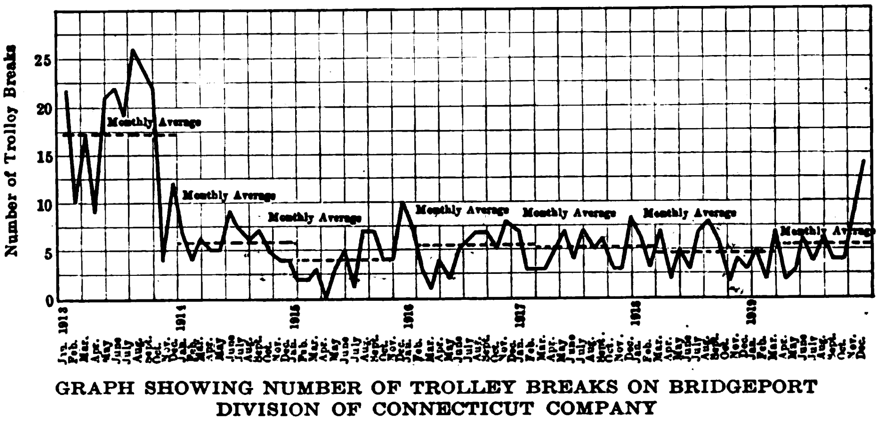
The report of the inspection, the form of which has been previously referred to, is made up in six copies. One of these is retained by the local foreman, one by the local manager and four are sent to the supervisor of lines. Two of these latter are sent to the Public Utilities Commission and two are kept in the office at New Haven. The copy of the report retained by the local foreman is used as a guide to assist him in planning his routine maintenance work. The holders of other copies of this report can check up at any time to ascertain whether the defects reported have been corrected. In the matter of routine maintenance, the crews recorded in Table I include in their regular work the duty of maintaining signals, telephones, electric track switches, etc. The New Haven division has, in addition to the regular repair and maintenance gangs, an emergency force consisting of a foreman and five men, three of whom are on duty at all times. They alone utilize the Pierce-Arrow tower truck. At Hartford, Waterbury and Bridgeport, one crew is detailed to handle construction, maintenance and emergency work on the city lines only. The four main divisions, namely, Hartford, New Haven, Bridgeport and Waterbury, each have a special signal maintainer who devotes his time to signals, electric track switches, lamp clusters, etc.

In addition to the semi-annual inspection each division is equipped with spare signal contactors and spare signal relays and is expected to replace three or four of each of these every month whether any defects are apparent or not. This method is believed greatly to reduce the number of emergency calls. At least once a month every signal box is inspected, the dust is blown out with a hand bellows, contacts are cleaned, etc. Thus, at least once every month a superficial inspection is made of all automatic signals, hand-thrown signals, electric track switches and telephones.

The type of monthly reports made on the inspections noted above is made clear by accompanying illustrations. On the automatic signals the report includes defects and interruptions reported by the dispatcher as well as those detected on special calls and in routine inspection. Where it is reported that a wrong light is displayed by a car passing in or out of a signal block, this may be due to the overhead frog being out of line, but more often it is caused by the improper operation of the car through the switch, and upon inspection the signal is found "O.K."



CURVE SHOWING NUMBER OF AUTOMATIC SIGNAL INTERRUPTIONS ON THE WATERBURY DIVISION OF THE CONNECTICUT COMPANY



GRAPH SHOWING NUMBER OF TROLLEY BREAKS ON BRIDGEPORT DIVISION OF CONNECTICUT COMPANY

TABLE II—TABULATIONS OF REASONS FOR INTERRUPTIONS TO AUTOMAT

No.	Type of Interruptions	1914								1915												1916									
		May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
1	Fuses blown by lightning	1	17	4	23	...	10	6	...	...	...	...	...	2	7	5	35	14	...	...	...	...	...	...	7	1	3	47	19	2	...
2	Fuses blown—cause unknown	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	1	...	1	1	...	2	...	...	1	...	2	1	1	...	...
3	Cars failing to clear signals, *i. e.*, trolley wheel left wire at frog, or contactor failed to function, etc	No report										60	49	23	39	21	26	16	31	39	29	30	34	23	36	56	69	83	54	55	99
4	Cars failing to get signal, *i. e.*, contactor failed to function, etc	2	...	...	...	...	...	...	...	2	...	1	1	...	1	...	...	1	1	1	...	...	...	...	...	...	...	...	...	2	...
5	Low-line voltage	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	35	...	...	...	...	1	...	...
6	Broken signal linewires	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	1	...
7	Broken signal contactor line wire	5	3	...	...	3	...	...	1	...	1	2	4	...	...	2	1	...	1	...	...	1	...	...	1	...	...	...	2	...	...
8	Contactor sticking	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1
9	Broken springs in signal contactors	4	1	...	1	1	1	...	1	...	...	1	...	...	3	...	3	...	1	...	...	...	...	...	...	...	...	...	...	...	1
10	Broken and burned contact fingers in signal contactors	...	4	2	1	...	...	1	2	...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	3
11	Other broken and burned parts in signal contactors	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
12	Signal contactors clogged with snow and ice	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...	...	...	...	...	41	...	3	1	...	...	...	...	...	...	1
13	Signal lamps burned out	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	1	...	...	1	...	1	1	1	...	...	...
14	Resistance tubes burnedout!	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...
15	Relays open circuited	...	2	...	5	1	1	...	...	...	...	...	...	1	1	2	2	1	...	1	...	...	...	...	...	...	3	1	1	...	1
16	Minor defects, *i. e.*, loose screws, nuts, etc., in signal box	...	...	...	...	...	...	...	...	...	...	...	3	...	1	...	...	...	...	...	...	...	1	1	2	...	...	...	...	...	...
17	Broken signal boxes, broken lenses, etc	1	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
18	Line wires grounded thru lightning arresters	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	2	1	1	2	...	...	...	2	...	...	...	...	...	...
19	Signal line wires crossed	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	4	...	...	...	...	...	...
20	Simultaneous action, *i. e.*, cars at opposite ends of block operating setting contactor at same instant	...	...	...	...	...	...	1	...	...	...	3	...	...	...	...	...	...	3	1	1	1	2	2	3	5	...	...	2	...	1
21	Signals inoperative on account of linemen working on same, etc	...	...	...	...	...	...	...	...	...	...	...	1	1	1	...	...	...	2	...	...	...	...	...	...	...	...	1	...	...	...
22	Total per month	13	27	7	30	5	12	8	4	3	1	68	64	29	55	31	69	36	42	44	39	34	40	66	56	63	78	37	80	60	107
23	Average per box per mo.	0.37	0.77	0.2	0.85	0.14	0.34	0.23	0.11	0.08	0.03	2	1.9	0.83	1.6	0.91	2.03	1.05	1.1	1.1	...	0.87	1	1.7	1.4	1.6	2	3.5	2	1.5	2.7

The monthly report made on the operation of hand-thrown signals shows blown fuses, burnt-out lamps, etc. If reports indicate that this trouble is habitual with any particular switch, a further investigation is made to ascertain the real cause of the trouble. In the maintenance of electric track-switches there is necessarily a division of responsibility between the overhead and track departments. In order to eliminate the possibility of a tendency to avoid the responsibility relative to the real cause of a defect reported, it is now arranged so that both the line foreman and the roadmaster make reports on electric track-switches. A sample of each of these reports is reproduced, and special attention is called to the report made by the way department. This is made up in five copies, each on a sheet of different color. One is sent to the engineer of maintenance of way, one to the local manager, one to the supervisor of lines, one to the local line foreman and the fifth is retained by the roadmaster. In this way every one concerned with operating electric switches is conversant with all defects and the steps of rectification.

As it is of the greatest importance that automatic signals, to insure correct operation, be maintained in the best condition possible, a careful study is made of the monthly report on this type of equipment. From the automatic signal report a special graph has been prepared showing the interruptions since May, 1914, for the Waterbury division. The term "interruptions" includes not only the defects found by the line department, but also defects reported by the dispatcher and often found to be groundless.

TYPICAL TELEPHONE INSTALLATION ON CONNECTICUT SYSTEM

TYPICAL SIGNAL INSTALLATION ON CONNECTICUT SYSTEM

TABLE III—TABULATION OF REASONS FOR TROLLEY BREAKS ON BRIDGEPORT DIVISION AS ILLUSTRATED.

Causes of Breaks	1913	1914	1915	1916	1917	1918	1919	
Breaks at soldered sleeves	63	10	1	..	..	..	..	74
Breaks at end of cut-outs	13	1	1	..	..	..	..	15
Breaks from wild trolley poles	42	7	8	26	31	32	21	167
Breaks from natural causes (poor wire)	57	9	6	10	8	12	15	117
Breaks at end of safety over cut-out	1	..	1	..	..	..	..	2
Breaks from grounds and electric light wires	..	6	3	10	1	..	..	20
Breaks at end or middle of soldered ears	28	8	3	2	7	2	6	56
Breaks at end or middle of mechanical ears	..	9	3	..	4	..	6	22
Breaks at end of bridge pan	..	1	..	..	..	..	1	2
Breaks at point of bend on splicing ears	3	..	..	..	..	..	..	3
Breaks at strain ears	1	1	1	..	..	..	..	3
Breaks from falling trees	..	2	..	1	2	1	..	6
Breaks from truck pulling wire down	..	1	..	..	..	..	..	1
Breaks from ears backing up	..	2	..	..	3	..	2	7
Breaks from pulling out of K. & I. sleeves	..	8	2	..	1	..	..	11
Breaks at Clark splicers	..	1	..	..	..	..	..	1
Breaks from pulling out of Cleveland splicer, chucks were too small	..	2	1	..	..	..	..	3
Breaks from breaking of flexible steel cable on Congress St. Bridge	..	1	..	..	..	1	..	2
Breaks from wire being burned down on account of sleet	..	..	7	..	..	2	..	9
Breaks from wire being burned down by grounding on Railroad Viaducts	..	..	4	6	3	2	..	15
Breaks from O. B. S. Beam Section Insulator pulling apart	..	..	6	1	..	..	1	8
Breaks from Cleveland splicer breaking in two	..	..	1	2	..	..	6	9
Breaks from wire burnt down by steam shovel	..	..	..	3	2	4	..	9
Breaks from Macallen section ins. pulled apart	..	..	..	1	1	..	..	2
Breaks caused by advertising banners	..	..	..	..	..	..	1	1
Breaks defective hangers	..	..	..	..	..	..	1	1
Breaks at end of Cleveland splicer	..	..	..	..	..	..	1	1
End of Strain Anchor Plate	..	..	..	..	..	..	2	2
End in loss of Cleveland splicer	..	..	..	..	..	..	2	2
Total	208	69	43	62	63	56	65	Grand Total 571

IGNALS ON WATERBURY DIVISION AS ILLUSTRATED

	1917												1918												1919												
Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
..	..	..	..	..	6	8	11	34	..	3	..	..	..	..	2	..	30	1	40	32	..	..	1	..	..	..	..	..	8	8	17	3	9	8	..	..	424
..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	4	2	1	3	3	..	..	..	3	1	..	..	2	..	1	1	3	1	41
9	46	53	48	47	38	35	28	25	28	27	35	28	7	42	70	80	74	64	56	36	77	33	28	25	28	45	31	26	66	31	74	177	56	101	74	84	2,894
..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	2	1	..	..	23
..	..	..	..	..	..	..	..	..	..	..	..	3	1	..	..	..	..	5	..	..	13	..	10	1	7	..	1	3	..	..	21	7	..	1	..	2	111
..	..	1	1	..	..	2	..	1	..	..	1	2	..	..	1	1	2	..	2	..	..	2	5	2	2	..	1	3	..	2	4	4	8	3	3	2	38
..	..	..	..	1	..	..	..	..	1	..	1	1	..	..	1	..	..	1	1	1	1	5	5	1	4	..	3	1	..	..	1	2	1	1	..	1	61
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
..	..	..	..	..	1	..	..	..	..	..	1	1	1	..	1	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	25
1	..	..	..	..	..	..	..	..	1	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	21
.	..	..	..	..	..	..	..	..	..	..	..	1	1	2	..	3	5	..	3	5	7	2	6	4	..	1	1	..	4	1	2	6	6	4	4	5	72
1	..	..	..	..	..	..	..	..	..	..	1	9	..	..	..	..	..	..	..	..	..	..	1	..	..	..	5	..	..	..	..	..	..	..	..	..	30
.	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	2	1	1	..	..	..	..	..	1	1	..	..	..	..	..	18
.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
.	..	1	..	..	..	1	..	3	..	1	..	..	1	..	..	..	2	..	..	5	..	..	1	..	..	..	1	2	..	..	1	1	..	2	..	1	48
.	..	..	..	..	..	2	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	14
.	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8
.	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	6	..	..	1	..	..	..	..	..	..	..	..	..	1	..	2	1	2	25
.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	9	1	..	..	1	..	..	..	2	1	..	..	1	..	25
.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	2	3	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	5	43
.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	..	12	4	25	4	..	3	..	..	..	..	..	..	1	..	..	61
2	48	58	50	48	45	49	39	64	31	32	40	46	21	44	76	88	113	74	114	91	102	68	76	60	45	46	50	37	78	43	124	203	83	123	86	103	4,003
6	1.1	1.4	1.2	1.2	1.1	1.2	0.95	1.6	0.75	0.70	0.93	1.1	0.49	1	1.75	1.8	2.5	1.6	2.5	2	2.2	1.5	1.6	1.3	0.96	0.98	0.89	0.66	1.4	0.77	2.2	3.5	1.43	2.12	1.5	1.78	

Among other things this graph illustrates that during the months of July and August, when the heaviest lightning disturbances occur, the number of signal interruptions reaches the maximum. This period during 1919 seems to have been particularly severe. This graph is of maximum value when considered in connection with the number of operations of the signals in a given period. The approximate number of wheel movements per month through all signals on the Waterbury division for the year 1919 was 400,000.

To supplement the graph a table is made up showing the causes of all interruptions. (See Table II.) It will be noted from Table II that more than 70 per cent of the interruptions were due to cars failing to clear the signals. This in many cases is due to improper operation of the signal contactor, to the trolley wheel leaving the wire at the frog or to some other cause which is not the fault of the signal. Another 10 per cent of the interruptions are due to lightning. At the peak recorded in the month of August, 1919, out of 203 interruptions, 177 were due to the first cause discussed above and only 3 per cent to lightning. Thus the graph alone would be misleading without an accompanying analysis. Normally, the peaks during July and August have been caused by lightning interruptions. Considering 40,000 wheel operations as the limit of possible failures, the number of interruptions in the worst month, namely, August, 1919, was ½ per cent, while in the best month of that year the number of interruptions was only 0.09 per cent.

Another graph of interest which has been made up by the Connecticut Company is that reproduced in an accompanying illustration showing the number of trolley wire breaks on the Bridgeport division since Jan. 1, 1913. This graph shows clearly that during the first ten months of 1913 the number of breaks was exceptionally high, and it was found that the largest percentage of these were due to breaks at the end of soldered sleeves. This type of sleeve was eliminated and the Cleveland splicer was substituted. A large number of the breaks which occurred during 1913 were also due to poor wire and "wild" trolley poles.

Electric Rivet Heaters Prove Efficient

FRONT VIEW OF ELECTRIC RIVET HEATERS

A NEW electric rivet heater has been placed on the market by the General Electric Company, Schenectady, N. Y., which has proved both efficient and economical and gives promise of superseding the coke forge and the oil-burning furnace for rivet heating. The machine is shown in the accompanying illustration and at the first glance gives one the impression of a portrait camera ready for action. The rivets to be heated are placed between two electrodes and complete the circuit. These electrodes can be operated separately by the use of pedals, so that the man operating the machine can take out a heated rivet from one side, replace it with another to be heated and then shift to the other side for the next heated rivet. A switch on the back of the machine gives the variations of current needed in heating rivets of different sizes. The machine as constructed is capable of heating 800 rivets per hour, which is believed to be the maximum number an operator can handle.

Some of the advantages claimed for electric rivet heating are saving in time, reduction in danger of burning, and no smoke, ashes or gas to inconvenience the workers.

Richard Sachse, chief engineer Railroad Commission of the State of California, states that great interest has been manifested in England, France, Germany, Sweden and Japan in the report of inductive interference, which was reviewed in the issue of this paper for Feb. 28, page 455.

Signaling the Approach of Cars for Connection

A Description of Equipment as Developed to Signal Main-Line Cars When a Branch-Line Car Is Approaching to Make Connection

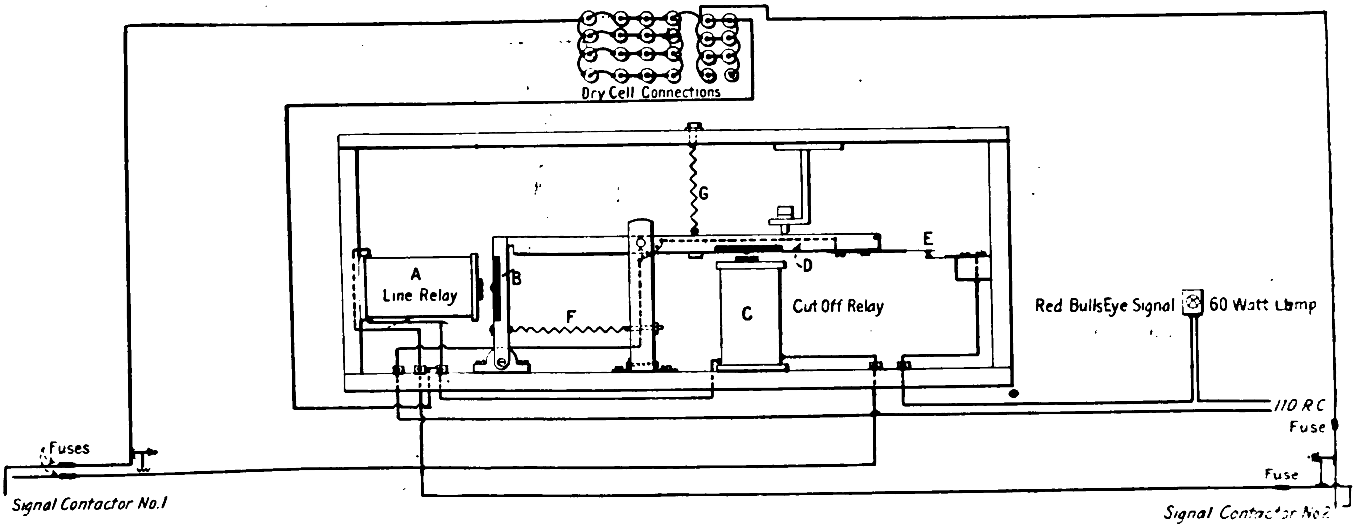
By Harry Restofski
West Penn Railways, Connellsville, Pa.

THERE is a branch line a little over two miles in length on our line on which one car makes a round trip every half hour. This branch connects with the main line a short distance from a waiting room, as shown in an accompanying diagram. The branch line car is due at the waiting room on the hour and half hour, at which time main line cars pass others at the siding located at this point.

Prior to the installation of the signal described herewith, there was no way of knowing how late branch-line cars might be. For this reason it became the practice of crews not to delay main-line cars in order to wait for the branch-line cars to make the connection. At times the branch-line car would arrive immediately after the departure of the main-line cars, so that it would then be necessary for passengers to wait a half hour in order to make connection.

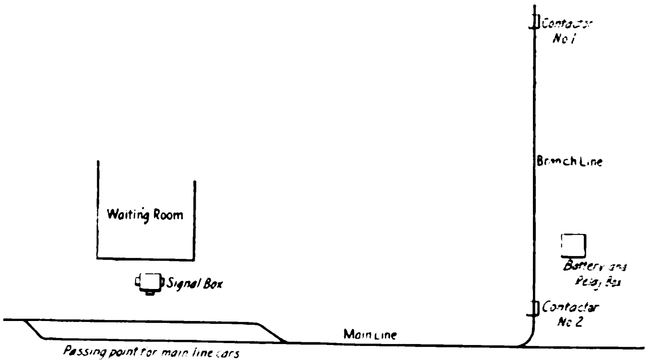
The equipment shown in a second illustration was installed to remedy this condition. Two directional contactors were attached to the trolley of the branch line. No. 1 contactor was located such a distance from the waiting room that the running time for the car from this point was two minutes. The other contactor was located at a point where the two lines join just below the waiting room. A battery box with relay equipment was located near contactor No. 2 and a signal box with red bull's-eye lenses was installed in front of the waiting room.

The equipment is automatic in its operation and the sequence of operations is as follows: The trolley wheel of an approaching branch-line car operates contactor No. 1, which causes the momentary closing of a circuit from the battery through relay C. Armature D is thus operated causing contact to be made at E, and thus supplies 110 volts alternating current to the 60-watt signal lamp located in the signal box. As soon as the armature D operates, a spring F pulls the armature B to the right and under the offset end of D so that the latter is held in place against the action of the spring G. The signal light continues to burn until the car reaches contactor No. 2, when a circuit is established through the relay A and a portion of the dry batteries. Relay A then attracts the armature B which allows the spring G to open the alternating-current contact at E and so interrupt the flow of current to the signal line.



APPARATUS LOCATED IN BATTERY AND RELAY BOX.

The signal thus shows red when the branch-line car is within two minutes of the waiting room and if necessary main line cars are held that length of time.



LINE CONNECTION AND LOCATION OF SIGNAL APPARATUS.

The relays might have been operated from the trolley or with 110 volts alternating current, but it was decided to use dry cells as it was thought that less trouble would thus be experienced. Fewer cells are used in the circuit to No. 2 contactor than in the No. 1 contactor circuit because the former is closer to the relays and there is therefore less line loss. The battery as installed has a life of from six to eight months as current is used only at the instant that contact is made at one of the directional contactors. These contactors are a standard type built by the United States Signal Company. Fuses and grounded carbon blocks are used for the protection of the contactor circuit. This equipment has now been in use for nearly two years and has proved entirely satisfactory.

A branch of the National Safety Council has been organized in Minneapolis with committees on finance, public safety, industrial safety, traffic, organization, schools and membership. It is planned to engage an expert safety engineer to take the lead in this work.

A. I. E. E. Holds Traction Meeting

The Papers at the Pittsburgh Meeting of March 12 Covered Substation Problems and the St. Paul Locomotive—They Were Abstracted in Last Week's Issue—The Discussion Is Abstracted in This Issue

ONE OF the best attended meetings of the American Institute of Electrical Engineers which has been held outside of New York City took place in Pittsburgh on Friday, March 12. The entire day was devoted to discussion of railway apparatus and equipment, including descriptions of the two designs of locomotive for the latest Chicago, Milwaukee & St. Paul electrification. The papers for this meeting were abstracted in the March 13 issue of this paper.

> WE MUST LOOK at the subject of electrification broadly. Every heavy electrification so far installed has proved successful. No steam railroad operator who has an electrified section would consider reverting to steam. Electrical engineers must not becloud these facts in their discussion of types and details of locomotives. In the present instance, both locomotives will doubtless give satisfactory service on the St. Paul.
>
> CALVERT TOWNLEY
>
> President American Institute of Electrical Engineers

The morning was devoted to an inspection of the Westinghouse Electric & Manufacturing Company's works at East Pittsburgh, during which the visitors had opportunity to see one of the new automatic switchboards which are being built for operation in one of the Cleveland Railway's substations. The most interesting event of the morning, however, was the inspection of one of the ten St. Paul locomotives which the Westinghouse company is furnishing. After an interesting motion-picture exhibit of railway electrification, the Westinghouse company entertained the group at luncheon in the Women's Cafeteria. The afternoon session was devoted to two papers on short circuit and rotary flashing protection, and to two papers on automatic railway substations. The evening session, held after an informal evening dinner, was devoted to the discussion of the two designs of the St. Paul locomotive. Over 300 were seated at the dinner and nearly 500 attended the meetings.

During the morning the board of directors held a meeting, at which, in addition to other matters considered, President Calvert Townley was authorized to appoint, after conference with W. S. Murray, a committee for the specific purpose of study and report on the super-power scheme for the Northeastern Atlantic Seaboard. It will be recalled that at a meeting of the Institute held in New York City on Feb. 20, a resolution was passed requesting the board to consider the advisability of appointing such a committee.

PROTECTION AGAINST FLASHING ANALYZED

In the discussion of the papers on "Short-Circuit Protection for Direct-Current Substations" by J. J. Linebaugh and on "Flashing of 60-Cycle Synchronous Converters and Some Suggested Remedies" by M. W. Smith at the afternoon session, F. D. Newbury made the point that a modern high-speed breaker is a greater potential danger than an ordinary breaker. Unless it clears the circuit before flashing occurs, it may cause flashing by its opening. If the circuit is not opened at all, there is less danger from flashing than if it is opened just after flashing occurs. That is, if on account of the high current there is sufficient gas generated to "short" the machine, then that "short" will continue even after the circuit is opened. Mr. Newbury also pointed out that the two papers do not agree as to the effectiveness of flash barriers as a protection against flashing. While perhaps the question is not finally answered now, it is hoped to find the answer of flash protection without the use of barriers, which form obstructions around the commutator and brush-holders. The high reluctance of the commutating pole is an improvement which will assist materially in the solution of this problem.

C. H. Jones, electrical engineer Chicago, North Shore & Milwaukee Railroad, quoted some interesting experiences with reference to flashing in its substations. From its experience, the new commutating-pole converters are apparently much more liable to flash than the older converters. Whether this is a bad effect accompanying better design in other ways, as compared with the older types of converters, or whether there is some other reason was not analyzed by Mr. Jones. He stated that he was merely presenting experience. New equipment has been installed with barriers and none of these rotaries have flashed. Sometimes the rotaries have been heard to "squeal" as though they were about to flash, but they have never done so. Two of the rotaries which had been installed without barriers flashed on occasion; since adding barriers there has been no record of a flash. The stresses imposed which have caused flashing, when flashing occurred, and "squealing," when flashing seemed imminent, have been as great as those involved in starting a four-car train in front of a substation, the train drawing 1,000 amp. per car at the start.

In closing the discussion on these papers the point was made that in order to prevent flashing by means of a high-speed breaker the circuit must be broken before one commutator bar can move from one brush to another, and this time element usually cannot exceed 0.008 sec. The General Electric Company experiments, in which a breaker was timed, included one test (which was verified by repetition) of breaking dead short circuit five times in seven seconds without any subsequent flashing. A high-speed breaker is particularly effective with a machine having high-reluctance commutating poles, and, if the development along this line is perfected, flash barriers may be done away with. A combination of a high-speed breaker, cutting in resistance, with a low-speed breaker which breaks the circuit completely somewhat later, has been used. However, the high-speed breaker upon operation, when it cuts in resistance, starts a cyclic variation on the alternating-current side, and, if the low-speed breaker operates seven or eight cycles after this, the machine is still likely to flash due to the variations on the alternating-current side not having been damped. If, on the other hand, the low-speed breaker does not operate until seventeen or eighteen cycles, the operation is satisfactory.

AUTOMATIC SUBSTATIONS FAVORED

Much interest was evident in the discussion of "Automatic Railway Substations" by F. W. Peters, and "Automatic Substations for Heavy City Service" by R. J. Wensley. S. Q. Hayes related what seemed to him a coincidence, that only on the preceding day he had received information from Brown, Boveri & Company, that one automatic substation is now installed in Switzerland. This, however, is not automatic in the sense in which the term is used in this country, in that the station starts operation when the load approaches it, but rather that it starts and stops automatically by a clock arrangement, starting at a certain given time in the morning and stopping at a set time in the evening.

C. H. Jones stated that from the two and a half years' experience of his company the automatic substation is a success, at least in heavy interurban traction service, in fact, he feels that the automatic substation is more satisfactory than the manual. On this road there are five substations, three of 500-kw. capacity each, one of 300-kw., and one of 1,000-kw. All are 25-cycle, but one is being changed over to 60-cycle, and a new 60-cycle substation is on order. These five substations operate on an interurban system where 47-ton steel cars are used in from one to four-car trains. Mr. Jones emphasized, however, that an automatic substation cannot go forever without attention. It needs careful observation and maintenance, and he has found it necessary to make inspection once per day.

Mr. Jones made the additional point that he has found it desirable to know what the station has done between inspections. At the present time no recording instruments of any kind are furnished by the manufacturers to indicate what happens in the station between inspections. Manufacturers should provide some such equipment. In its absence he has installed Veeder counters on each piece of operating mechanism and, by checking up the number of times one piece operates against the number of times the others operate, some idea of the general action of the various pieces is obtained. But this is not sufficient.

Another speaker argued that the installation of automatic substations allows a road to carry over peaks with smaller installations on account of the inherent characteristic of intermittent operation. Continuous operation, even with low loads, keeps machine temperatures up, whereas intermittent operation, over the peak only, allows a greater peak load. Another feature is that the low trolley voltage, due to the inadequate system of distribution from manually operated stations, the number of which must be affected by the operator's wages, may be much improved by redistribution of substations on the automatic basis. As an inverse to the taking down of copper in Mr. Wensley's analysis, an automatic substation may prove its economy by savings realized by obviating the necessity for putting up copper. Many electric railways must also control auxiliary circuits, such as lighting, sometimes industrial power, and sometimes pumping, and this may also be done from the automatic substation. Another economic feature with reference to shut-downs due to labor strikes is that in many cases where some labor can be obtained, the main power house can operate and automatic substations will keep the system going, thus making a saving in preventing the loss of revenue which would occur through non-operation of the road.

Another speaker said that little had been said about high-tension switching. On interurban roads which are competitors of steam roads, continuity of service is of extreme importance. Where the road depends upon a long-distance high-tension supply line a steam station is usually kept in "hot standby" and, if the long-distance line falls, the steam station cuts in. Such interurban roads using automatic substations must then have duplicate lines with additional relays to cause automatic transfer from a disabled line to another line, so arranged that, when the disabled line is restored the station automatically returns to it. Another feature in the case of a "disconnect" due to overload is that a manual station's operator usually is told to make three trials to close the circuit, spacing these trials about a minute apart, and, if trouble still exists, to report to someone higher up. In automatic substations there must be something to take the place of this, and a motor-operated switch has been used to close the circuit three or four times at satisfactory intervals. Then, if trouble still exists, the switch is locked up and the dispatcher is automatically signaled.

FUTURE POSSIBILITIES OF THE AUTOMATIC SUBSTATION

Donald Bowman, Commonwealth Edison Company, raised a question in regard to the future possibility of the application of automatic substations to extremely heavy low-tension direct-current service. His question related to a system where the whole distribution plant is underground and the element of continuity of service is at least equivalent in importance to operating cost. In many substation operations it is satisfactory if everything is done as per schedule, but if on a large system a generating unit or a substation unit burns out, either of which seriously impairs continuity of service, then there must be emergency switching, both high-tension and low-tension. And in part the switching done must be developed by the needs of the moment and can hardly be scheduled in advance. Similar conditions arise when a manhole "blows out" or when some other heavy accident happens in the underground distribution system.

In closing the discussion on these two papers Mr. Peters stated he was in thorough agreement with Mr. Wensley on the analysis of concentrated city service. To be sure, most of the present installations are interurbans and there is no doubt as to the return on the investment in those cases. On the other hand, in heavy city service the equipment is not so cheap and the attraction to automatic stations in big centers must be based on an analysis such as Mr. Wensley has given and on more effective operation in general. If all engineers took the interest in automatic substations which Mr. Jones does they would be much better off. He said also that there are several automatic substations operating in Australia and one is now being shipped to New Zealand.

Mr. Peters said also that the application of automatic substations to industry has been urged, as these are excellent in large factories. For example, in the case of an industrial plant having a long low-voltage distribution, the fixed charges on the actual investment in copper plus the heating losses will more than take care of the installation of small automatic substation units in the industrial establishment. One large manufactory is now installing several of these to replace its heavy low-voltage distribution.

ABSOLUTE AUTOMATIC OPERATION IMPROBABLE

Mr. Wensley first answered Mr. Bowman's question as to intensified low-voltage systems and stated that this was a real problem, perhaps the biggest problem in the application of automatic substations. There have already been developed as part of the standard product selective power relays to clear out from the tie bus feeders which are giving trouble. Power can be fed in through several buses from different directions and automatically relays can pick a satisfactory live bus. Many other operations like this can be performed. But, in Chicago, where there is one of the largest networks in the country, it will probably be impossible to make the whole system automatic. The system operator, however, might be enabled by some method of selection, such as is used in the automatic telephone system, to control individual switches in a substation and thus take care directly of the emergency switching.

On the other hand, the automatic substation has some inherent characteristics in the case of serious shut-downs which can never be equalled by the present manual method of operation. Reference here is made to a condition in which there is a complete, or very large partial, shut-down of service and in which service must be restored. Under manual operation, if the whole or a large part of the system is down it is frequently necessary to send out men to cut off individual buildings and large feeder sections, so that the load may be taken on a little at a time. Under the automatic system the feature of load-limiting resistance helps the system to come back gradually and pick up the entire load without any such universal disconnection. Mr. Wensley was willing almost to guarantee that an automatic substation system could pick up a full load within three minutes after power was supplied again, as compared with an estimated three hours under manual operation.

Of course the principle of load limiting resistance is not limited in its application to automatic substations, but it might be installed as an auxiliary to manual operation. However, the additional automatic features of the automatic substation are well worth while, for they tend to make the operation most rapid, in fact, some series of operations are completed in the same time that the station operator would be deciding as to which switch to throw first.

Referring to the necessity for applying high-speed circuit breakers to automatic substations, Mr. Wensley said that by the automatic introduction of three steps of resistance in cutting down a short circuit before opening up, the necessity for a high-speed circuit breaker is eliminated.

A MUSICAL TREAT AT THE DINNER

After the informal dinner in the evening, short addresses were made by E. H. Sniffin, manager of the power department of the Westinghouse Electric & Manufacturing Company, by A. W. Thompson, president of the Philadelphia company, which owns and operates the local electric light and power company, gas company and railways and by Calvert Townley, president of the Institute.

During the dinner the guests were very pleasantly entertained by a musical treat by Phillips Thomas of the Westinghouse Company. Mr. Thomas produced his music electrically. By means of a convenient keyboard mechanism he connected various values of inductance and capacity in a resonating circuit whose source of energy was a mercury vapor lamp and to a piano accompaniment played a large number of popular and even classical airs. A loud speaking transmitter served to make the music audible to all in the large dining hall.

LOCOMOTIVE DISCUSSION LACKS EXCITEMENT

At the evening session the two papers by A. F. Batchelder and S. T. Dodd of the General Electric Company and N. W. Storer of the Westinghouse company were presented in discussion of the two designs of locomotive for the Chicago, Milwaukee & St. Paul Railroad. Judged from the tenor of previous Institute meetings on matters having to do specifically with methods of trunk line electrification, the discussion at this meeting was, as Mr. Storer expressed it, exceedingly tame. None of the lively discussions between representatives of the two schools of thought developed, as might have been anticipated from earlier traction meetings.

Mr. Storer, after reading his paper, made the additional remark that it would be difficult to imagine two results or two locomotives differing more than these do and yet made to fill the same specifications. On the other hand, this very difference shows the flexibility of the application of electricity, not only to traction, but to industry in general.

R. L. Wilson, recalling his practical experience in the beginning of heavy electric traction on steam roads, said that the early impression was that the electric locomotive was so complicated as to be not readily accepted by steam railroad operators. It still appears to some railroad men to be a complicated piece of machinery, but its reliability has been proved. There is quite a divergence mechanically between these two locomotives. The Westinghouse locomotive is the well-known Pacific type, but what led to the other type is not apparent. It seems that the General Electric Company expected its locomotive to react on the track and that certain devices have been introduced to overcome this tendency. One of these is the use of rollers under the cab. On the New York, New Haven & Hartford locomotives a roller is used under the cab, but, while similar to the one now adopted on the St. Paul locomotive, it differs in that all rollers continue to bear weight, whereas there is a possible objection in this one in that the roller on one side rolls up an incline and is active, but the roller on the other side may be left without weight on it and thus prove a weak point.

The slow speed motor on the General Electric locomotive would naturally call for high copper losses. The question was raised as to the reasonableness of the amount of heat which would be produced in the motors on the long grade which these locomotives must negotiate on the St. Paul. Another question related to the temperature rating, the paper having given 266 hp. as the rating of the motor at 120 deg. temperature rise, but having said nothing as to the maximum operating temperature expected. Considerable stress having been laid upon the efficiency of the gearless motor at high speed, the question was raised as to what would be the average speed at which these locomotives would operate.

Mr. Storer was asked as to possible contemplated difficulties with the exciter, which is mounted like an ordinary interurban motor. The point was brought out that this means a reversal of the ordinary drive between gear and pinion in this type of mounting, in that the usual drive is a small pinion driving a large gear, whereas in this case the large gear drives the small pinion. Mr. Storer's reply was that the size of the axle-driven generator was so much over the amount of power it would be called upon to give that no trouble with this was anticipated.

A. M. Candy, in discussing the complexity of the modern locomotive, related his experience in connection with the Pennsylvania electrification. In this case a man was placed on each locomotive to help the engineer in case of trouble and these men vied with each other in finding quick answers to hypothetical troubles and stayed up late at night familiarizing themselves with all the various details of the locomotive, but in no case was there any opportunity to test their ability. The complexity is apparently over-emphasized. Another speaker called attention to the fact that in comparing the electric locomotive with the steam, if every little detail of the steam engine from the chemistry of its coal to the final mechanics of its valve motion were taken into consideration, it might be found as complex in its way as the electric locomotive is in its own.

SUCCESS OF ELECTRIFICATION EMPHASIZED

President Townley emphasized the fact that the electrification of the steam road must be looked at broadly; that so far every electrification of a steam road had been successful; that, to be sure, these electrifications had all been with different types of locomotives, varying in design and efficiency, but that electrical engineers must emphasize the uniform success of electrification. No steam railroad operating man who has an electrified section would discard it now and replace it with steam. When electrical men argue too much about the types and locomotives, steam railroad operators may grow skeptical. What will probably happen in the present instance is that both of these locomotives will perform to the entire satisfaction of the Chicago, Milwaukee & St. Paul Railroad, and while electrical engineers may learn something from the comparison of the two designs for a given specification, the argument about these two designs should not be emphasized in such a way as to throw any doubt upon the intrinsic value of either. Electrifications now planned and to be executed in the near future will call for so many locomotives that all the facilities of all the manufacturers will not be enough to satisfy the demand.

In closing the discussion Mr. Dodd said that he did not know the temperature at which the motors would operate, but that he knew the motors would perform service and called attention to the successful operation of similar motors on the New York Central. As to complexity, he stated that if it were desired he could show diagrams much more complex than those showed by Mr. Storer but emphasized again the point made by Mr. Townley that the first thing to look toward is service. With reference to the center of gravity, he stated he did not see that it made much difference where it is, so long as the weight is properly distributed to make a locomotive ride the track satisfactorily. In this connection he called attention to a previous discussion of this point by Mr. A. F. Batchelder before the American Society of Mechanical Engineers at its annual meeting in December, 1916.

He brought up another point of Mr. Townley's that there is a big job ahead in electrification and it is splendid to have these two designs upon which to base further developments. At the present time there are about 350 heavy traction electric locomotives and about 63,000 steam locomotives, so that the work of electrification is just beginning and there is much to work out before electricity comes into its own.

Mr. Storer said he was sorry the meeting had been so tame. He said he tried to start a few things but could not get any reaction. He did emphasize that he was very glad that the two companies were both working on the same job, that both locomotives would probably perform good service for the railroad, and that, as a result of the divergent designs, the whole art would benefit from the results of the study of the service of the two locomotives.

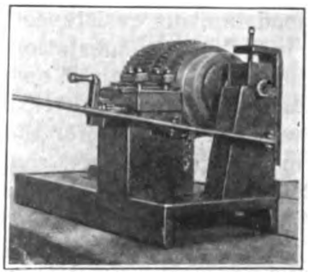
Light, Hand-Hammer Drill

HAND HAMMER DRILL

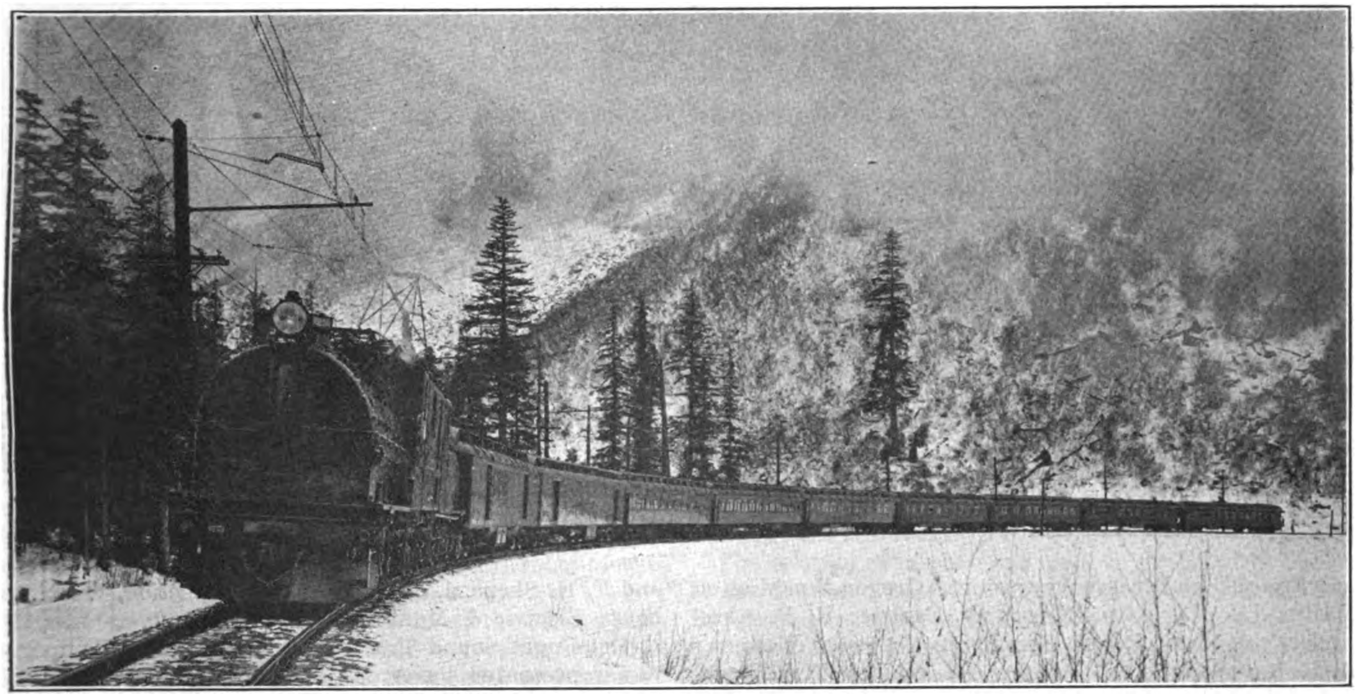
A SMALL, light, hand-hammer drill has been developed by the Ingersoll-Rand Company, New York, N. Y. This machine is known as the "Bar 33 Jackhamer." Its weight is 21½ lb. and it is recommended for drilling holes in concrete or other foundations, where a machine of extreme light weight is necessary. It is not recommended for drilling deep holes or for use in hard rock.

Commutator Slotter for Small Armatures

THE accompanying illustration shows a small, simple commutator slotting machine which was made up in the shops of the Georgia Railway & Power Company, Atlanta, Ga., to do the slotting work on the air compressor armatures. As there are only about two armatures to be repaired each week, it was not considered worth while to devise a power-driven machine using a revolving saw for cutting away the mica.


SMALL HAND-OPERATED COMMUTATOR SLOTTER FOR SMALL ARMATURES

In this machine a sharpened piece of hack-saw blade is held in the tool post by two yokes fastened to the tool head by four bolts and nuts. The tool head is shifted toward and away from the commutator by means of a crank and a ⅝-in. screw. This tool post is also machined so that it may be moved laterally or axially by means of a lever having its fulcrum on the pedestal which supports the armature. This handle is attached to the tool head as seen, and a slot in the lever permits of oscillating the tool back and forth by means of the lever. The lever is 5 in. long from fulcrum to the point of tool head attachment and 12 in. long from this point to the end.



ELECTRICALLY-OPERATED TRAIN ON COAST DIVISION OF THE CHICAGO, MILWAUKEE & ST. PAUL RAILROAD ON THE SUMMIT OF THE CASCADE MOUNTAINS

St. Paul Electric Service Out of Seattle Begins

Notable Inauguration of Service on March 5 Attended by Representatives of Railroad, Power and Manufacturing Interests

THE inauguration of electric passenger service on the Coast Division of the Chicago, Milwaukee & St. Paul Railroad occurred on March 5, 1920, when a train drawn by a General Electric locomotive made the run from Seattle to Cle Elum and return. On board was a party consisting of officials of the road, executive heads of the Puget Sound Traction, Light & Power Company and the Stone & Webster companies, representatives of electrical manufacturing companies, newspaper men from all over the Northwest, technical and trade journal correspondents, five motion-picture operators and a number of commercial photographers. In all 114 persons were on board the train as the guests of the Puget Sound Company which furnishes power for the operation of this section of the road. The trip occupied eleven hours, and the program worked out according to schedule. This locomotive is one of five which will furnish passenger service on the Coast Division, where the freight locomotives will be regeared G. E. locomotives transferred from the Rocky Mountain Division. The passenger service formerly given with the last-named will be given with the new Westinghouse locomotives described, together with the G. E. machines, in the issue of this paper for March 13. The accompanying photographs show the train and the party, and give an idea of the scenic beauties en route. Officials of the Chicago, Milwaukee & St. Paul on the "special electrical" train were: H. B. Earling, vice president; Macy Nicholson, general manager; J. L. Brown, assistant superintendent of transportation; J. R. Veitch, assistant traffic manager; R. Beeuwkees, chief electrical engineer; F. B. Walker, assistant electrical engineer; H. W. Williams; A. P. Chapman, Jr., assistant general passenger agent; W. L. Hubbard (all from Seattle); E. A. Lalk, Tacoma; W. P. Warner, Spokane; F. J. Allman, Tacoma; F. C. Dow, Tacoma, and J. F. Bahl, A. J. McCarthy and R. F. Randall, Seattle. Others in the party were: W. S. Elliott, general manager, O. W. R. & N., Spokane; W. H. Wingate, trainmaster, Milwaukee, Seattle; William Emerson, traveling engineer, Milwaukee, Seattle; Frank Rusch, superintendent motive power, Milwaukee, Seattle; R. J. Middleton, assistant chief engineer, Milwaukee, Seattle; R. H. Dean, electrification department, Milwaukee, Seattle.

TRAIN STARTING ON RETURN TRIP FROM CLE ELUM TO TACOMA TERMINUS

Representatives of steam railroads and electrical manufacturing companies were guests on the trip, as follows: I. B. Richards, general superintendent Northern Pacific, Tacoma; W. H. Olin, assistant gene-

OFFICIALS OF THE MILWAUKEE AND PUGET SOUND TRACTION, LIGHT & POWER COMPANIES, NEWSPAPERMEN AND GUESTS OF THE COMPANIES ON THE INITIAL TRIP OVER THE MOUNTAINS. PICTURE TAKEN AT CLE ELUM, WASH.

ral freight and passenger agent, Oregon-Washington Railroad & Navigation Company, Seattle; H. F. Alexander, president, Pacific Steamship Company, Tacoma; A. M. Ingersoll, H. R. Williams, A. I. Bouffler, W. C. Dawson, C. D. Phillips, A. F. Marion, O. S. Bowen, A. R. Cook, Charles E. Peabody (all of Seattle and Tacoma); J. B. Cox, General Electric Company; H. E. Plank, General Electric Company, Seattle; W. D. McDonald, Westinghouse Electric & Manufacturing Company; Captain R. B. Childs, Inter-Mountain Power Company, Seattle; C. M. Riddell, mayor, Tacoma; J. W. McCune, chairman Tacoma Commercial Club; J. H. Davis, president Tacoma Commercial Club; Rene Martin, London; A. B. Howe, Tacoma; E. E. Kimball, General Electric Company; Allen W. Eshelby, Westinghouse Company, Seattle; S. Kaneko and Mosuke Higuchi, representing the Osaki-Shosen Kaisha Steamship Company, Seattle and Tacoma, and F. H. Shepard, director of heavy traction, Westinghouse Electric & Manufacturing Company.

The Puget Sound Traction, Light & Power Company was represented by A. W. Leonard, president; W. J. Grambs; D. C. Barnes; John Harisberger, superintendent of power; R. T. Sullivan, George Newell; H. B. Sewall; George Quinan, chief engineer; H. J. Gille, E. A. Batwell, E. H. Thomas, W. H. Somers, Judge C. W. Howard and Scott Z. Henderson.

As the details of this electrification have been given in several recent issues of this paper, they will not be repeated at this time.

A map of the newly electrified section of the road was printed on page 481 of the issue of the ELECTRIC RAILWAY JOURNAL for March 6, and a news account of the inauguration of electric service followed in the issue for March 13, page 533.

TRANSPORTATION OFFICIALS ON THE TRIP

Left to right: J. L. Brown, Assistant Superintendent, Milwaukee; Macy Nicholson, General Manager, Milwaukee; A. L. Bouffler, Seattle; F. M. Dudley, General Attorney, Milwaukee; R. F. Weeks, Division Freight & Passenger Agent, Milwaukee; H. W. Williams, Chief Draftsman, Milwaukee; H. B. Earling, Vice-Pres., Milwaukee; R. J. Middleton, Assistant Chief Engineer, Milwaukee; J. R. Veitch, Assistant Traffic Manager, Milwaukee; A. W. Leonard, President, Puget Sound Traction, Light & Power Company, Seattle; J. F. Bahl, Assistant Ticket Agent, Milwaukee; R. Beeuwkees, Chief Electrical Engineer, Milwaukee

C.E.R.A. Discusses Energy Saving

Paper by Prof. D. D. Ewing and Formal Discussion by Four Energy-Saving Device Manufacturers Are Features of Second Session — Abstracts of Two Papers on Bonding, Presented March 10, Are Published

A BUSY second-day session of the annual meeting of the Central Electric Railway Association March 10 and 11 at Louisville, Ky., was given over very largely to the presentation of a paper by D. D. Ewing, professor of electric railway engineering, Purdue University, on the "Economical Use of Electricity for Car Purposes," and the formal discussions by L. E. Gould, L. M. Clark, C. H. Koehler and William Arthur which followed. Abstracts of this paper and the discussions which followed will be published in a later issue. The report of the March 10 session and abstracts of two of the papers were printed last week. Abstracts of the other two papers of March 10 appear below.

President John F. Collins presided at the second session Thursday morning and made the paper and the discussions mentioned above the first order of business. At the conclusion of the discussion of these papers, Charles L. Henry commented upon the splendid points which had been brought out for making further economies in operating costs and admonished the members to put them into use, saying that the suggestions were of no value unless they were put into practice. He complimented the association and the program committee for the manner in which it had always gone down into the meat of things and developed studies and data and information which were of the greatest value to the member companies.

H. A. Nicholl, Anderson, Ind., when called upon to discuss the energy saving schemes, said that his company had recently undertaken an energy-saving campaign through the use of watt-hour meters because it believed that this would result in making available better data on the cost of operation, and would bring about a better distribution of equipment since it would show what cars were the heavier energy users. This made it possible to use the cars consuming the least power on those lines where the least power was available. It was also thought that valuable data would result as to the energy consumed by empty and loaded cars and that required for pull-ins; and further that the inspection of equipment on a kilowatt-hour basis, a plan afforded by the watt-hour meter, would result in economies of very great value indeed. Mr. Nicholl said that he thought the matter of energy saving through the use of one of the several devices was a subject which should be carefully looked into by every company.

As members of the committee on a national safety code to work with similar committees from other electric railway associations, President Collins appointed James Harmon, safety manager Interstate Public Service Company, New Albany, Ind., chairman, and H. A. Nicholl, Anderson, Ind., and E. C. Hathaway, Railway Audit Inspection Company, as the other members.

H. A. Nicholl, chairman, W. H. Bloss and Allen Edwards were appointed a committee of three to consider the president's address.

W. G. Stuck, master mechanic Kentucky Traction & Terminal Company, Lexington, spoke briefly of the plan of his company to equip all interurban cars with fare boxes on the rear platform and to make use of a combination pay-enter and pay-leave system of fare collections. Passengers boarding cars at the principal terminals will pass into the car without paying their fares but will receive a check on which appears the name of the town at which they boarded. These passengers will then pay as they leave the car, according to the distance traveled from the name which appears on the check. Passengers boarding the cars at rural points will pay as they board the car.

The election of officers was made an order of business at the Thursday session. Their names were chronicled in this paper, issue of March 13.

One of the pleasant features of the Louisville convention was that President Collins and a party of railway and supply men made the trip to and from Louisville in Mr. Collins' private car, the "Michigan." The round trip comprised over 1,200 miles. On the trip south, the car left Jackson, Mich., at 7 a.m., Monday, and arrived at Louisville at 8 p.m. Tuesday. The members of the party boarded the car principally at Fort Wayne and at Indianapolis on the trip south, and took leave of the car at these same points on the return trip. The route followed by the car was as follows: Jackson to Detroit via the Michigan Railway and Detroit United Railway lines; Detroit to Toledo, Ohio, via the Detroit, Monroe & Toledo Short Line Railway; Toledo to Lima, Ohio, and Fort Wayne, Ind., via Ohio Electric Railway; Fort Wayne to Bluffton, Ind., via Fort Wayne & Northern Indiana Traction Company; Bluffton to Muncie and Indianapolis via Union Traction Company of Indiana; and Indianapolis to Louisville, Ky., via Interstate Public Service Company. On the return trip the car proceeded from Indianapolis to Toledo by way of Dayton, Ohio, passing over the Terre Haute, Indianapolis & Eastern Railway, the Ohio Electric Railway, and the Western Ohio Railway.

The Interstate Public Service Company operated a special car from Indianapolis to Louisville and also a return car for the convenience of the delegates, a large party of whom availed themselves of this service.

Distribution Problems of Interurban Railways*

BY J. S. HAGAN

General Engineering Department Westinghouse Electric & Manufacturing Company

FROM an operating standpoint a high average voltage on an interurban line is very desirable. An article on "The Effect of Low Voltage on Railway Motors" by G. M. Woods in the ELECTRIC RAILWAY JOURNAL of Jan. 27, 1917, discusses the subject in detail, and points out the advantages of high voltage, and the disadvantages which result with low voltage. Because of the distances involved and the comparatively light traffic on the average interurban road, the expense involved in supplying substation and feeder capacity to maintain a high average voltage is very great. It is the purpose of this paper to consider the factors which enter into choosing the location of substations and size of feeders and bonds on interurban roads.

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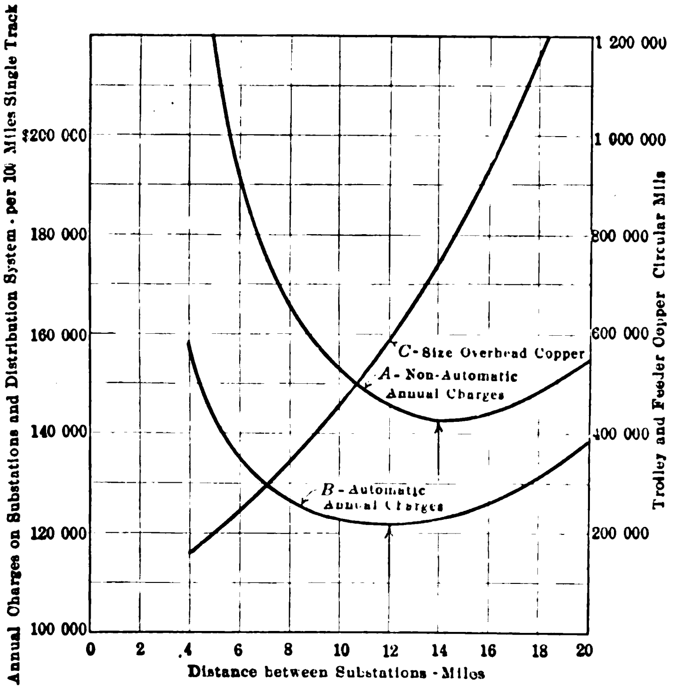
*Abstract of paper read at annual meeting of Central Electric Railway Association, Louisville, Ky., March 10, 1920.

In operation the ideal condition would be obtained if the power distribution were such that the voltage at the cars would at all times be that of the substation. The most economical distribution system is that in which the fixed charges on the investment are equal to the cost of the power lost in the distribution system. The minimum average voltage at which typical car equipments will maintain a desired schedule is fixed within limits; and the voltage which will occur with recurring "bunching" of cars should not be below 350 volts as minimum on a 600-volt line.



CURVES SHOWING ECONOMICS OF SUBSTATION SPACING

With a given substation voltage and substation spacing, the choice of sizes of trolley line, feeders and bonds is dependent upon the profile of the road, size of the rail, number of tracks, weight of trains, headway and schedule speed of the equipments operating. Since the voltage at the train is determined by the sum of the voltage drops in the overhead copper and the return circuit through the rails, it is evident that, all other factors remaining equal, less feeder capacity would be required if there were two tracks than if there were one. Less feeder would be necessary with a single track of 90-lb. rails, than with one of 60-lb. rails.

WEIGHT OF TRAIN IS A BIG FACTOR IN FEEDER REQUIREMENTS

The current required to accelerate a two-car train is twice that required for a single car, and with a given substation spacing the increase in the amount of feeder to keep the voltage the same is much greater than in proportion to the currents. To illustrate the effect which the train weight has upon the feeder required, assume that a 600-volt single-track road with 70-lb. rails and No. 0000 bonds has substations spaced 10 miles apart. Take the weight of a single car with load as 60,000 lb. Assume that cars run on a 30-min. headway and, with an average of one stop in two miles, make a schedule speed of 30 m.p.h. With these conditions there is never more than one car moving in each direction between substations. Assuming that one car is running while the other is starting at a passing track midway between substations as the worst voltage condition, there would be required 456,600 circ.mil of overhead copper to keep a minimum of 350 volts on the trolley at the car.

If multiple-unit operation with 2-car trains were advisable the same traffic would be handled by running on a 60-min. headway. As before, assuming that two of these trains were passing midway between substations, 1,381,600 circ.mil of copper in the trolley and feeders would be required to maintain the same minimum voltage as with single car. In this instance a 100 per cent increase in train weight required a 203 per cent increase in feeder copper. Actually, with such a difference in train weights the investment involved in increasing the number of substations and slightly increasing the overhead copper would be less than increasing the feeder by the amount indicated and keeping the same number of substations.

The selection of the proper gear ratio for different classes of rolling-stock has a very important bearing upon feeder capacity. An equipment which is geared for a high speed takes a high current in starting, and a greater amount of feeder and substation capacity is required than would be necessary with equipment geared for lower speeds. Where competition or local conditions demand high-speed passenger service, there is no alternative but to install substation capacity and feeders to take care of that service. However, on many lines equipments are geared for a speed greater than the service demands and might readily be changed to a lower-speed gearing with the resultant advantages of higher voltage.

LOCOMOTIVES SHOULD BE GEARED FOR SLOW SPEED

The question of slow-speed equipments is especially important with regard to freight haulage. A freight car or locomotive equipment which is geared for a speed comparable to that of a passenger car will impose a power demand which is too great for the substation and feeder system of the average road. A large proportion of the time a freight train is on the road is consumed in terminal, switching and standstill time, and the actual running time is comparatively small. A slight reduction in running speed therefore has little effect on the service rendered shippers, but the use of low-speed equipments is very advantageous to railways in reducing the peak demand on substations. By using slow-speed motors with maximum reduction gearing on locomotive and freight-car equipments, relatively heavy trains may be hauled and the power requirements are so low that in many cases, with proper dispatching, no additional substations or feeders are required.

From the foregoing it is evident that the feeder requirements for interurban roads will vary between wide limits. One 600-volt interurban road 17½ miles in length, handling comparatively light traffic, has only one power house and substation located at the center of the line. With stub end feeding distance of 8¾ miles only the No. 0000 trolley is used. A double-track 600-volt road in one of the eastern states, 90 miles in length is operating multiple-unit trains on a 40-min. headway. The substations are spaced approximately 10 miles apart, and two No. 0000 trolleys and 1,000,000 circ.mil of feeder extend the length of the road with several miles of 1,500,000-circ.mil feeder. Instances may be cited of roads using amounts of feeder varying between these extremes. Most interurban roads have No. 000 or No. 0000 trolley and from 300,000 to 600,000 circ.mil of feeder. However, the number of railways which do not come within these limits is so great that the only conclusion which can be drawn is that the distribution layout of each road must be considered separately to meet the local requirements.

A number of interurban roads are using 1,200 to 1,500 volts on the trolley. The effect of increasing substation voltage is apparent. The same factors which enter in determining substation spacing and feeder capacity for low voltages apply to the higher voltages. Due to the decreased current in transmitting a given amount of power a smaller number of substations of increased capacity and less feeder may be used with high voltages.

GOOD BONDING IS A PRIME DISTRIBUTION NECESSITY

The size of rail for an interurban road is determined primarily by the weights and speeds of the cars. Ordinarily, in outlying districts where electrolysis is not a determining factor, the rail size which will be most economical from a maintenance standpoint has sufficient conductance to provide a return circuit without additional negative feeders. In recent years the importance of maintaining a return circuit of low resistance has been recognized.

On interurban roads it is seldom that traffic is so heavy that the size of rail bonds is determined by continuous current capacity. Ordinarily, rail bonds which are large enough to keep the track loss within limits have sufficient capacity to carry the current without overheating, provided the bonding is in good repair. For instance, a No. 0000 bond will carry a current of 450 amp. continuously without overheating, and for short periods will carry five times that current. These values are in excess of the demand imposed by average interurban road traffic. The current-carrying capacities of bonds, of course, vary directly in proportion to their sizes. The resistance of the return circuit is more dependent upon having all joints well bonded rather than upon the use of heavy bonds. The length of bond is short compared to the length of rail, and the total *I R* drop through the bonds is a small percentage of the total drop in the return circuit. In a track with 70-lb. rails and No. 0000 bonds 10 in. long, only 9.2 per cent of the total track drop is in the bonds if good contact is made with the rails. By the use of 500,000-circ.mil bonds the loss in bonds would be reduced to 4.6 per cent of the total track drop. Putting it in a different way, an increase in first cost of bonds of 137 per cent results in reducing the track drop by less than 5 per cent.

It is impracticable to use bonds which have a conductance equal to that of the rail. On this basis a 70-lb. rail would be bonded with 795,000-circ.mil copper, and a 90-lb. rail with 1,020,900-circ.mil copper. Since so little is gained by the use of large bonds, their higher first and maintenance costs are not justified. Mechanical considerations as well as current-carrying capacity fix the minimum size of bond for electric railway use at about No. 0. Practically the largest bond in use is 500,000 circ.mil. Most electric railways use expanded-terminal or welded No. 0000 bonds, 10 in. to 12 in. in length.

Up to this point the effect of the various factors on the choice of feeders and bonds has been considered on the assumption that the locations of substations were fixed. While the location of manually-operated substations may be determined to some degree by the existing freight or passenger stations, where the agents may serve as substation operators, in general it is possible to choose locations which will permit approximately the most economical layout of substations. For a given investment a relatively large number of substations and little feeder, or few substations and larger feeders, may be installed with the same loss of power in trolley and track. However, the sum of fixed and operating charges, or total annual charges, will be very different with different substation spacings.

With the automatically operated substation the elimination of substation attendance, except for inspection, is an obvious advantage. In many localities substation heating is eliminated, and in some cases the reduction of no-load losses of the substation effects a considerable saving in power. Due to the reduction in annual charges per substation, automatic substations may be more closely spaced than manually-operated ones. For the conditions of traffic which obtain upon each road there is combination of substation spacing and feeder size for most economical operation. These spacings are different for the manually-operated and automatic substations.

The accompanying curves illustrate the variations of annual charges with both manually-operated and automatic substations with various spacings for a set of conditions assumed nearly typical for a high-speed interurban line. On a 600-volt road having 75-lb. rails and No. 0000 bonds, single cars weighing 60,000 lb. are operated on a one-hour headway. The cars are geared for a schedule speed of 30 m.p.h. with an average of one stop in 2 miles. With these conditions the cars are spaced 30 miles apart, and with normal operation there is never more than one car moving in each direction between substations. It is assumed that the minimum voltage permissible with one car starting and one car running midway between substations is 350 volts, and the feeder requirements for each substation spacing are based on these assumptions.

In the diagram the abscissæ represent miles spacing between substations. Curves *A* and *B* show the total annual fixed and operating charges on the complete distribution system, except track, for manually operated and automatic substations respectively. Curve *C* shows the amount of trolley and feeder in circular mils required for each substation spacing to keep the minimum of 350 volts on the trolley at the car.

The points at which curves *A* and *B* become horizontal show the substation spacings and feeder sizes which are most economical for manually-operated and automatic substations. For this assumed case the proper spacing for manually-operated substations is 14 miles and 750,000 circ.mil of overhead copper should be used. With automatic substations the spacing is decreased to 12 miles, with 590,000 circ.mil of overhead copper. It will be noted that the total annual charges are less with automatic than with manually-operated substations, and that the greatest saving is made by increasing the number of substations and decreasing the amount of feeder.

It should be borne in mind that the exact relation of the curves depends upon the nature and volume of traffic, and that these curves are applicable only to the particular case set forth. However, the general relation of substation spacing for manually-operated and automatic substations is that illustrated.

The advantages inherent in automatic substations have only recently been recognized by railway operating men, and it is to be expected that most future substation installations will be of the automatic type. The interurban electric railway of the future will have single-unit automatic substations closely spaced, and relatively small feeders.

Some Bonding Results*

By R. J. Custer
Engineer Maintenance of Way Interstate Public Service Commission, Indianapolis, Ind.

BETWEEN May 1 and Sept. 30, 1918, we installed 5,084 new No. 0000 bonds between the Indianapolis City Limits and Taylorsville with an electric arc bonding machine. This track is laid with 60-lb. A. S. C. E. rail and has been bonded with three or four different types of bonds including those with compressed, soldered and brazed terminals, the greater proportion of which had finally failed on account of broken strands or of having been knocked loose entirely.

Two men were used with the machine. At first they pushed it ahead on the rails from joint to joint. Later when the locations requiring rebonding became widely separated, the machine was placed on the line car and these places were bonded as the car passed over the road on its regular maintenance supervision.

The cost of installation of these 5,084 bonds was $2,807.60 or 55 cents each, the material cost per bond being 40.2 cents, and the labor cost 14.8 cents.

By the end of September we found that our power consumption had been reduced 0.76 kw.-hr. per car mile which, at an average production cost of 2.2 cents at the d.c. feeder, shows a saving of 1.67 cents per car mile. As production conditions at the power house remained the same and the same class of equipment was operated all through the period of bonding, this saving is undoubtedly due to the improved conditions produced by the new bonds. An illustration will show what this saving means. In September our car miles operated were 97,700 which at the 1.67 cent reduction in cost per car mile shows a saving for that month alone of $1,631.59. You can readily see that the entire cost of the installation of these bonds was very quickly returned.

Between Aug. 19 and Sept. 30, 1919, we installed 3,500 bonds on our track between Sellersburg and Jeffersonville. This track is laid with a 75-lb. A. S. C. E. rail and was originally bonded with two concealed bonds with compressed terminals. The condition of these bonds became so bad that a complete failure of our automatic signal system resulted.

The method of procedure on this job was as follows: The bonding machine was placed in an old city motor car, properly grounded and equipped with the necessary operating switches. All the supplies necessary were kept in this car. The bonding crew consisted of a motorman, a brakeman and the bonding operator. The brakeman kept the mould clamp loaded and adjusted ahead of the operator. The motorman followed the operator from joint to joint. During the last week's work on this job this crew worked at night and installed an average of 200 bonds in eight hours actual working time. The average number of bonds installed per day during the twenty-eight working days was 124.

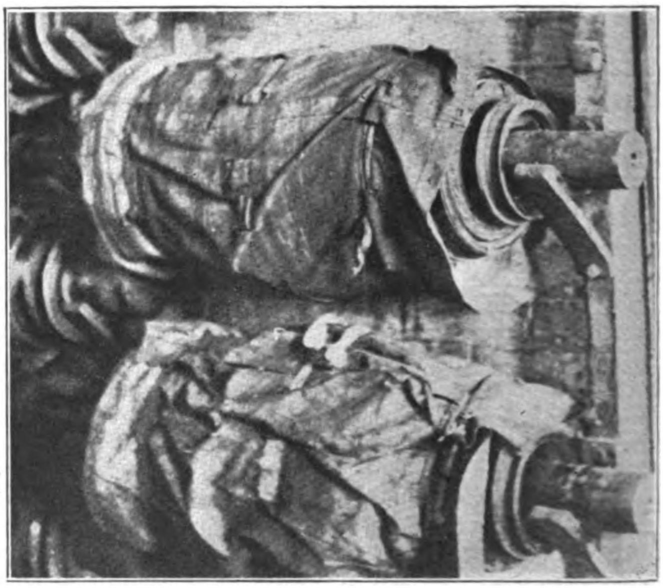
The cost of installation of these 3,500 bonds amounted to $1,616.50 or 46.2 cents each, the material cost per bond being 35.1 cents and the labor cost 11.1 cents.

The average consumption per car mile for the three months following the completion of this job in comparison with that of the three months previous to the starting of the job showed a reduction in power consumed of 0.48 kw.hr. per car mile. The power on this portion of our line is purchased at an average cost of 2 cents per kw.-hr. delivered to the d.c. feeder so that our saving is here shown to be 0.96 cent per car mile. As 51,192 car miles were operated during these latter three months, our saving will amount to $491.44 or an average of $163.81 per month. In this instance the cost of installation will pay for itself in power saved within ten months after the completion of the job.

After the installation of these bonds, in each case, it was noticed by the trainmen that it was easier for the trains to make their regular running time and this fact was often called to our attention by them.

Keeping Dust Out of Armatures

FEW electric railways appear to realize the desirability of covering railway motor armatures after rewinding, to protect them from dust, but at the Salem (N. H.) shops of the Massachusetts Northeastern Street Railway all armatures stored on racks are covered with discarded car curtains as shown in the accompanying photograph. The curtains are wrapped around the armatures and fastened in place with tape, and this simple expedient is undoubtedly a factor in reducing service troubles.



ARMATURES COVERED WITH CURTAINS

Richard Sachse, chief engineer Railroad Commission of the State of California, states that great interest has been manifested in England, France, Germany, Sweden and Japan in the report on inductive interference, which was reviewed in the issue of this paper for Feb. 28, page 455.

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*Abstract of paper presented before Central Electric Railway Association meeting at Louisville, Mar. 10.

Oklahoma Utility Men Meet

Publicity, Mutual Insurance and Franchises Were Among the Subjects Discussed

THE Oklahoma Public Utilities Association, the membership of which is composed of officials of traction lines, electric light and power companies, gas companies, waterworks and other public service corporations, which met in an annual convention in Oklahoma City, March 9-11, adjourned with a banquet on the night of March 11. The convention elected officers as follows:

J. W. Shartel, vice-president of the Oklahoma City Railway Company, president; C. E. Devin, Apache, first vice-president; J. M. Gayle, Oklahoma City, second vice-president; William Mee, Oklahoma City, treasurer; H. A. Lane, Oklahoma City, manager. The new members of the Executive Commitee are: E. W. Smith, Okmulgee; W. H. Crutcher, Oklahoma City; W. W. Lowe, Bartlesville; C. E. Devin, Apache; J. M. Gayle, Oklahoma City; F. B. Hathaway, Oklahoma City; J. G. Cronin, Oklahoma City.

R. C. King, an accountant of McAlester, was awarded a prize for the best explanation of the duty of a public service utility to the people.

A committee that has been working out a plan for compensation insurance for the utilities, reported that the details of the plan would be completed within a short time and submitted to the members of the association for their consideration.

The Legislative Committee reported that it had no special legislation to urge, but suggested that steps should be taken soon toward securing a revision of the system for taxing utilities, and also that provision should be made for indeterminate franchises for all public utilities. This is important, it was pointed out, when a utility faces the problem of securing money with which to make extensions and improvements to its service.

Bernard J. Mullaney, general manager Peoples' Gas, Light & Coal Company of Chicago, in an address declared that frankness on the part of public utilities in presenting to the public its claim for community support was important because the people should know the facts concerning the operation of a utility and should not merely be fed up on a lot of propaganda. Absolute frankness, he said, would go much farther in getting the desired results than any other course that might be pursued. Mr. Mullaney said that this idea had been carried out in Illinois in as practical a way as could be arranged up to the present time. The home paper, he told the convention, was the proper place for the manager of a utility to appeal to the people for community support, but he added that there were other ways in which this could be augmented.

A. Hardgrave, American Public Service Company, Dallas, Texas, said that the problem of operators having to appeal to the money markets in selling stock could be obviated somewhat by selling the securities locally to customers. He said this undoubtedly would improve the attitude of the public toward utilities.

H. S. Cooper, secretary Southwestern Gas & Electric Association, Dallas, Texas, discussed "current stealing," and told how effective work has been done in Texas, with the help of a State law, in discouraging this popular means of "beating" the electric light companies. Mr. Cooper was requested to send to the secretary of the Oklahoma Association a copy of the Texas law which would be used as a model in framing a bill to be presented to the Oklahoma Legislature.

Drilling Square Holes in Solid Material

A DEVICE for drilling a square hole in metal without previous preparation, which can be attached to a milling machine or drill press is being marketed by the Fairbanks Company of New York City. The trade name for the attachment is "Radebore Head."

The accompanying illustrations show how the holes are drilled. The attachment end of the drill is arranged for a swivel connection and has a positive drive from the spindle of the machine. The shank of the drill follows around inside a square guide formed by the adjustable jaws of the head. Cutting edges are ground on the end of the drill. When the type of drill shown in Figs. 2 and 3 is used, square holes with "filleted" corners will be drilled. To make a hole with square corners a shank as indicated in Fig. 1 is used with one cutting edge longer than the other so that this will go into the corners to square them. The cutting lips follow a path determined by the adjustable jaws of the head so that no preliminary round hole is necessary.

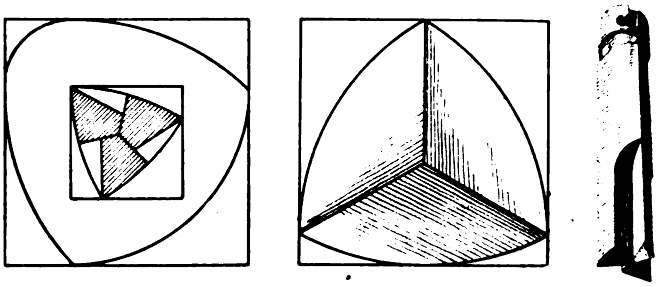
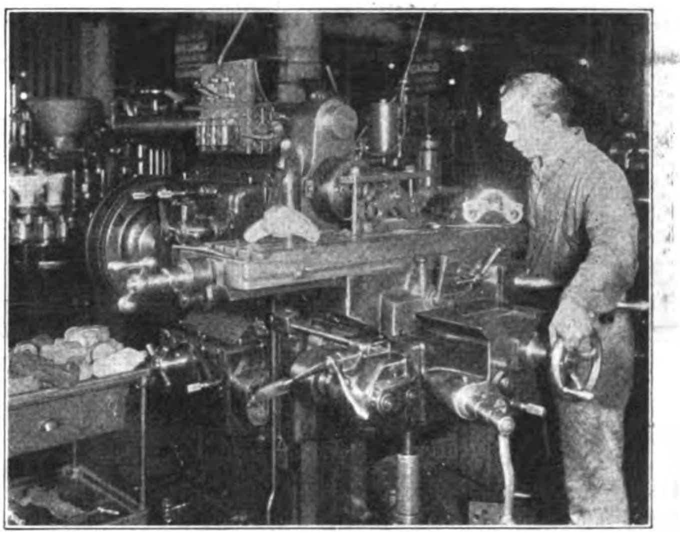


FIG. 1 FIG. 2. FIG. 3.

Drill, guide and cross-section of drill shank



DRILLING SQUARE HOLES IN ROCKER ARMS

Drills of two styles are manufactured, one producing a hole with rounded corners, and the other designed for die work and for squaring the ends of keyways, etc.

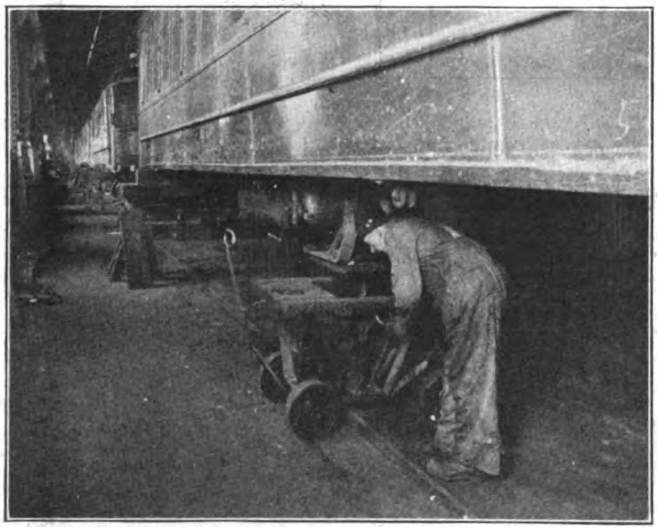
The heads or chucks are made in four sizes and two different styles. The range of drills is from ⅛ in. to 2 in. x $\frac{1}{16}$ in. steps for the type of drill which produces round corners and from ⅛ in. to 1¼ in. x $\frac{1}{16}$ in. sizes for the type producing sharp corners.

Compressor Overhauling Practice in Buffalo

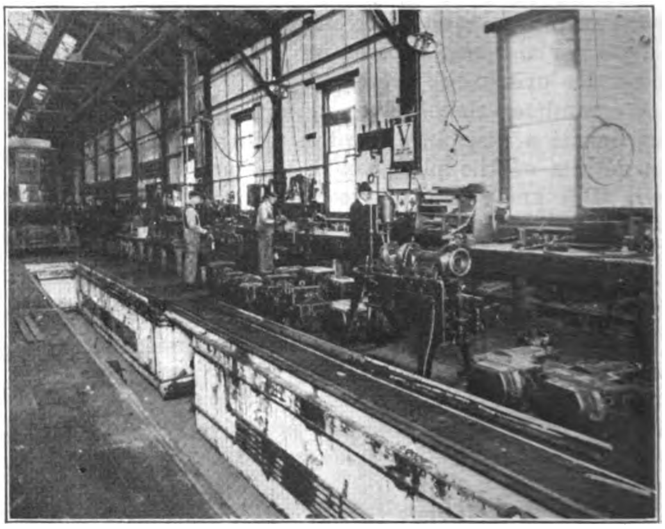
A Definite General Overhauling Schedule for Car Equipment Assists in Keeping Parts in the Best Operating Condition

BY J. W. HULME
Superintendent of Equipment International Railway, Buffalo, N. Y.

THE apparatus necessary for compressing, storing and regulating the pressure of air for electric cars is becoming more and more a vital consideration in the efficient operation of cars. When air compressors were first installed on electric cars, their sole purpose was to provide compressed air for use in the braking system in stopping the cars. From this beginning the use of air has extended to nearly all parts of the equipment, and when we look at the situation today we find compressed air used for operating the control equipment which starts and controls the car while it is running, for operating the braking system, for operating the entrance and exit door mechanism, for applying sand to the rails, and in some cases for raising and lowering the trolley poles. This increased use of air has materially reduced the manual labor necessary in operating the car and at the same time has increased the schedule speed for the line, reduced the length of stop, and also decreased to a great extent the number of boarding and alighting accidents.



REMOVING A COMPRESSOR FROM THE CAR



AIR DEPARTMENT OF THE INTERNATIONAL RAILWAY

The possibility of run-ins due to air failure has increased with this added use of the air parts, so that those responsible for the maintenance of this equipment have been forcibly impressed with the vital importance of equipping all cars with the best air-brake equipment obtainable and then keeping it in first-class operating condition by periodical inspection and general overhauling. To meet these conditions the International Railway has given particular attention to this phase of its equipment, and as now arranged a regular weekly inspection is provided for, with a definite overhauling schedule in addition. This overhauling schedule provides for the cleaning of brake cylinders every year, and the general overhauling of all electrical and mechanical parts of compressors, motormen's operating valves, governors, door devices and sand valves every two years.

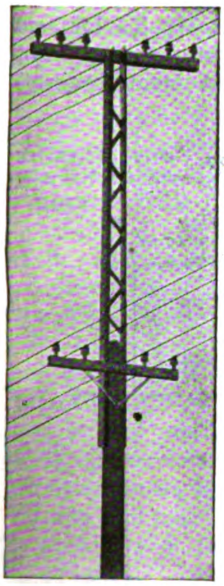
The overhauling of compressors requires their removal from the car, and the complete dismantling and cleaning of all parts, together with their renewal and reassembling with proper lubrication for the wearing parts. The compressor is removed from the car by means of a truck which has an adjustable height, as shown in an accompanying illustration. By the use of this truck one man can perform all the work necessary for removing the compressor and transporting it to the air room for thorough overhauling. In the air room, before any attempt is made to dismantle the parts, the compressor is thoroughly cleaned. For this purpose it is placed on a specially designed table 25 in. high x 36 in. wide and 96 in. long. This table is covered with No. 16 gage sheet iron. A solution of three parts of kerosene to one part gasoline is used to clean the outside casing of the compressor. After all dirt has been removed, the oil from the crank and gear case is drained out carefully and filtered for re-use as occasion demands.

After the compressor has been thoroughly cleaned on the outside, it is taken apart and the armatures, fields and brush-holders are sent to the electrical department for test and overhauling. The work in the electrical department comprises a thorough cleaning and any necessary tests to determine just what repairs are necessary. Of course, any grounds, short-circuits, or open circuited connections are repaired and then the fields and armatures are dipped in varnish and thoroughly baked.

On the overhauling bench in the air room, the mechanical parts of the compressor are thoroughly cleaned, the crank shafts and pistons are inspected and repaired, so that when they are again returned to service they will be in as good condition as when new. With all parts cleaned and repaired, the compressor is again assembled and tested. To provide for a careful running test, a testing rack has been fitted up to which the compressor is connected. During the test, careful attention is given to make certain that the operation of the compressor does not require more than the predetermined current. Also the air gage, which is connected to the storage tank into which air from the compressor is forced, is watched closely, and the hand of the gage must travel smoothly between the ranges of 80 lb. at which the governor cuts in to 100 lb. where the governor cuts out. After this test the pressure is reduced to 60 lb., and the time required to increase the pressure from this amount to the cutting-out point which has been previously determined is measured. Ordinarily, the compressor is run for fifteen minutes continuously to insure that the electrical equipment is in first-class condition. In case the piston cylinders have been bored out, and bushings with new piston rings have been installed, the compressor is run for five hours with the bleed cock open so that the governor will cut in every ten seconds. This test is made so as properly to "work in" the various parts.

The governors, gages, motormen's valves, safety valves and door devices receive an equally rigid overhauling as do the compressors. All air pipes on the car are blown out to clear them of scale and are carefully tested for leaks.

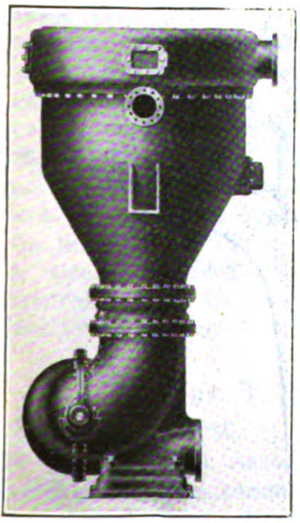
Extension for Short Poles


POLE EXTENSION

THE advancing cost of labor and materials has led to the development of an extension for poles. This is being marketed by S. W. Hull & Company, Cleveland, Ohio. Two main compression members constructed of steel angles reinforced by steel bars comprise the frame, which may be fastened to the top of a pole by three through bolts. The construction permits of a large number of cross arms being installed; thus one can be bolted at every intersection of the lace bars. The main compression members open and close to fit any size of wood pole top.

In addition to this extension being used where it is necessary to increase pole height, this has also proved advantageous where poles have become butt-decayed. The old pole can be cut off at the ground and reset by the addition of a Hull extension frame, so as to give the original height.

New Feature in Casing for Jet Condensers


VERTICALLY SPLIT CASING OF PUMP

A NEW feature in the vertically split casing of the tail-pump for vertical jet condensers, as manufactured by the Wheeler Condenser & Engineering Company, Carteret, N. J., has been brought out, and is illustrated herewith. This feature permits easy and quick removal of the pump rotor or other internal parts for inspection or repairs. The improvement is being added to two types of jet condensers manufactured by this company, the vertical jet condenser and the rectangular type counter-current condenser. Another feature is the use of an expansion joint between the pump and the condenser body. This joint is designed to take care of changes in length due to temperature variation.

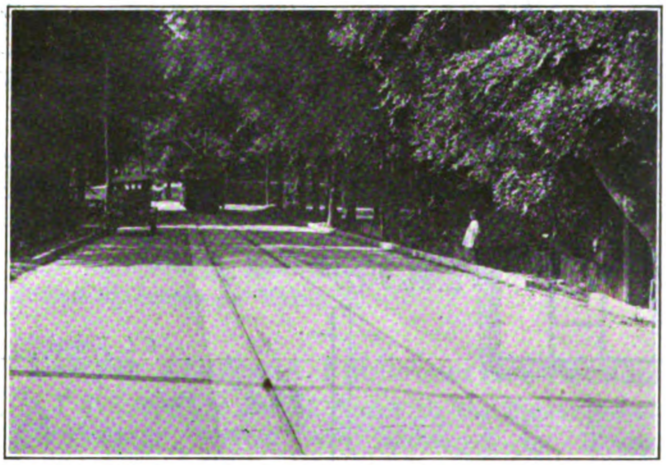
Concrete Stringer Tieless Track Construction

Southern Public Utilities Company Has Standardized on Unique Construction, Believing It to Be the Most Satisfactory Type of Rigid Track

A RIGID type of track construction with the rails set in concrete and anchored by means of long hook bolts and without the use of any cross-ties, has been made standard construction by the Southern Public Utilities Company, which operates the street railway systems Charlotte and Winston-Salem, N. C., and Greenville and Anderson, S. C. This construction was originated by E. F. Taylor, formerly general manager of the company, and is unique in many respects.

The most conspicuous feature of the construction is the absence of ties. The rails are fastened by Carnegie clips directly to ⅜-in. x 8-in. steel plates, and the bolt in every other clip extends down into a concrete beam and hooks around a ½-in. corrugated iron bar which is laid continuous. The complete construction details are shown in the accompanying drawing.

The rail used is 70-lb. standard A.S.C.E. section, and the longitudinal plates on which the rail bears are cut the same length as the rails and laid with the joints staggered so that they come at the center of the rail. The rail clips are spaced on 2-ft. centers except at the rail joints, where they are much closer together, as shown on the drawing. All clips at the joints are fastened with the long hooked bolts.


APPEARANCE OF THE SURFACE OF THE COMPLETED TRACK IN ANDERSON, S. C.

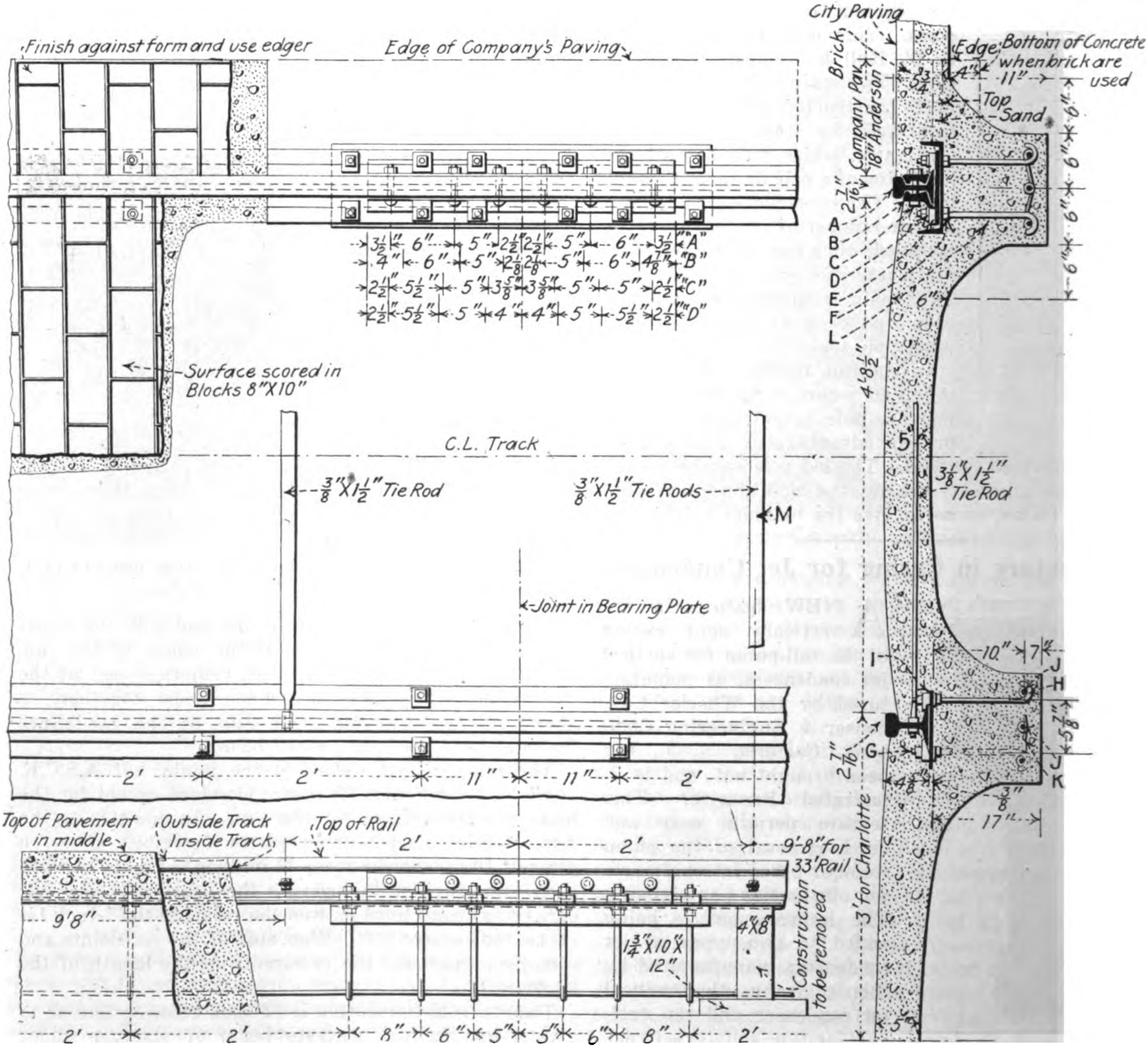
The rails are not welded at the joints, but A.S.C.E. angle bars are used. These are standard except for the holes and the notches for the clips. In addition to the ⅜-in. x 8-in. steel bearing plates described above, a piece of 10-in. channel iron, 42 in. long is placed beneath each joint further to increase the bearing area. The only cross connections betwen the rails are the ⅜-in. x 1½-in. tie rods spaced 2 ft. either side of the rail joints and 9 ft. 8 in. apart for the remainder of the length of the 33-ft. rail.

The concrete foundation is of such cross-section as to give a longitudinal concrete beam or stringer under each rail. This stringer is 17 in. deep and 12 in. wide. Between the rails and between the tracks the thickness of the concrete decreases to 5 in. at the center. An expansion joint is provided every 33 ft. and no trouble has been experienced from cracking between expansion joints. S. L. Duckett, engineer, states that extreme care must be used in placing concrete under the rail joints and the joints must be well grounded. It will be noted in connection with the joint construction that the channel iron is installed with the edges turned up in order to insure that the concrete shall be properly placed beneath it. The tie rods and a wire net reinforce the concrete between the rails.

Reinforcement in the longitudinal beam is secured by the use of three ½-in. corrugated bars under two of which the rail clip bolts hook. These three corrugated bars are tied together by a wire support which holds them suspended from the rail clip bolts during the pouring of the concrete. The top 2-in. surfacing of the concrete is in the proportion of one part sand to one part aggregate, while the remainder is a 1:2:4 mixture. The concrete is allowed to cure for twenty-eight days whenever practicable, as it has been found to wear better when given plenty of time to harden.

The company has approximately 12 miles of this type of construction in use, of which about 4 miles has been in service four years and the remainder for various shorter periods. The cars which have been operating over this track vary in weight from the light 13,000 lb. safety car to the heavier four-motor, double-truck 29,000-lb. cars.

A brief signed article by Mr. Taylor about this same type of construction, recently appeared in the *Concrete Highway Magazine* which is published by the Portland Cement Association. In that article Mr. Taylor stated that experience had shown this type of construction to be the most satisfactory of the three types of rigid construction which have been used by the company, namely, the type described here, the familiar 6-in. concrete base underwood ties, and a substitution of steel ties on 4-ft. centers for the wood ties. Mr. Taylor said further: "We have found that concrete is the most substantial of the various types of pavement, present-


Finish against form and use edger
Edge of Company's Paving
Surface scored in Blocks 8"X10"
C.L. Track
3/8"X1½" Tie Rod
3/8"X1½" Tie Rods
M
Joint in Bearing Plate
"A"
"B"
"C"
"D"
2'
11"
Top of Pavement in middle
Outside Track
Inside Track
Top of Rail
9'8"
9'-8" for 33' Rail
4"X8
1¾"X10"X12"
Construction to be removed
8"
6"
5"
City Paving
Brick
Company Pav. 18" Anderson
Edge
Bottom of Concrete when brick are used
11"
Top
Sand
6"
A
B
C
D
E
F
L
4'8½"
5
3⅛"X1½" Tie Rod
I
10"
J
H
G
K
17"
3' for Charlotte

FULL CONSTRUCTION DETAILS OF TIELESS CONCRETE BEAM TRACK

A—A.S.C.E. 70-lb. rail, 33 ft. long.
B—A.S.C.E. splice bars punched as shown and notched as shown for clips 1/16 in. clear.
C—Bolt, standard ⅞-in. track.
D—High-tension 3/16-in. washer for ⅞-in. bolt.
E—Carnegie rail clip No. 103. See detail.
F—Hardwood or fiber washer. See detail.
G—⅝-in. x 3-in. standard bolt.
H—⅝-in. anchor bolt. See detail.
I—⅜-in. x 8-in. continuous plate. See detail.
J—½-in. corrugated bars, continuous (20 ft.).
K—Wire support.
L—10 in. 15 lb. C. under joints.
M—⅜-in. x 1½-in. track tie rod.

ing a wearing quality in connection with railway work far superior to other types of pavement. When the concrete is properly installed there is no creeping of the rail, and practically no deflection is caused by the action of traffic over the rail because of the rigid contact throughout its length."

Association News

Delegates to Chamber of Commerce Meeting

THE American Electric Railway Association has appointed representatives to attend the annual meeting of the Chamber of Commerce of the United States to be held at Atlantic City, April 27-28-29. They consist of Lucius S. Storrs, who is a national councilor, and the following delegates: J. N. Shannahan, W. A. Draper, Britton I. Budd, P. J. Kealy, P. H. Gadsden and Charles L. Henry. If any officials of member companies of the association expect to attend this convention as delegates from their local chambers of commerce, they are urged to notify Secretary Burritt promptly of the fact.

A meeting of electric railway men in attendance at Atlantic City will be arranged to insure proper attention to any matters affecting the industry which may come up for consideration at the general meeting, and information as to representation of member companies, railway and manufacturer, who will be at Atlantic City, is necessary so that this meeting may be arranged for in advance.

Questionnaire on Curved Head Rails

SECRETARY E. B. BURRITT, on behalf of the committees on way matters and equipment of the Engineering Association, has sent to member companies, which have used curved-head rails a questionnaire designed to bring out the facts regarding the use of these rails. The list includes twenty-four questions relating to rail and wheel contours and to the results which have been secured with curved head rails, and the committee hopes to secure operating data which will permit correct deductions to be made. Inclosed with the questionnaire form was a blueprint showing a curved-head design as applied to the association standard 7-in. grooved girder rail. The contour shown in the print is one that has been in satisfactory service on a number of properties. The committees hope that returns will be in their hands not later than April 15 and preferably by April 1.

New T. & T. Committees

PRESIDENT W. H. COLLINS of the Transportation & Traffic Association has announced the membership of the committee on merchandising transportation. Some changes are also announced in the personnel of the committee on express and freight traffic facilities and costs as given in the issue of this paper for Jan. 31. The full personnel of these two committees is as follows:

Committee on Express and Freight Traffic Facilities and Costs: C. E. Thompson, Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., chairman; P. P. Crafts, Eastern Massachusetts Street Railway, Boston, Mass.; J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; E. W. Fowler, Illinois Traction Company, Peoria, Ill.; R. B. Hull, Conestoga Traction Company, Lancaster, Pa.; F. D. Norviel, Union Traction Company of Indiana, Anderson.

Committee on Merchandising Transportation: W. J. Flickinger, Connecticut Company, New Haven, chairman; J. H. Alexander, Cleveland (Ohio) Railway; J. S. Bleeker, New Orleans Railway & Light Company; W. H. Boyce, Beaver Valley Traction Company, New Brighton, Pa.; F. G. Buffe, Kansas City (Mo.) Railways; F. R. Coates, Toledo (Ohio) Railway & Light Company; M. B. Lambert Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; Richard Schaddelee, Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.

Coming American Committee Meetings

THE Convention Location Committee of the American Electric Railway Association is scheduled to hold a meeting at Atlantic City on March 24. The membership of the committee this year consists of Thomas W. Casey, National Pneumatic Company; H. Fort Flowers, Differential Car Company; John M. High, Pantasote Company; Martin Schreiber, Public Service Railway, and George Keegan, Interborough Rapid Transit Company.

The committee on national relations, of which Charles L. Henry is chairman, has scheduled a meeting in Washington for March 19.

F. R. Coates, chairman of the committee on company membership, has called a meeting of that committee in Toledo on March 30.

Lawyer Addresses Public Service Section

AT ITS meeting held on March 10, the Public Service company section was addressed by Howard MacSherry, of the company's counsel, on the topic: "Questions of the Hour." The speaker took up a rather unusual line of thought for such meetings, but it proved to be one very instructive and stimulating to the audience. He gave a general picture of the economic situation in this country, which has come about on account of the world war, which, he said, had not settled any of the great world problems. These problems, in the speaker's opinion, could not be settled by mass movements, but must come about by the regeneration of the individual, using this term in its broad meaning.

The causes of unrest, said Mr. MacSherry, may be classified as follows: First, there are political causes, which ultimately come down to selfishness; then there are economic causes, and finally there is the manifest desire to make people better by passing laws. While the picture painted by Mr. MacSherry was a somewhat gloomy one, he did not consider it a legitimate cause for discouragement but urged his hearers to help improve the situation by diligence in their work and loyalty to their employers. He sensed a changing attitude on the part of the public toward corporations, and in particular to the Public Service Corporation, as people appreciate more and more that it is only through union and co-operation that great things can be done.

Following Mr. MacSherry, H. H. Norris, ELECTRIC RAILWAY JOURNAL, gave a brief account of a recent visit to the Toledo section, where he found a fine spirit and evidences of close co-operation between the Toledo Railway & Light Company and the members of the section. For the membership committee, Mr. Shepard reported an increase of seventeen members during the past few months, with a determination to push toward the goal of 500. Chairman N. W. Bolen reminded the section of the slogan "A full house" and said that the next meeting would be "Past President's Night."

Rhode Island Company Section Active

AT THE Jan. 8 meeting of the Rhode Island section, the speaker was Zenas W. Bliss, one of the receivers of the company, who gave a talk on "The Relations Between the Street Railway and the Public."

Mr. Bliss first reviewed his twenty years of service in various municipal offices and his connection with the public along financial lines, and said that he was somewhat inclined to think that electric railway transportation had not kept up quite with the times in all cases. He pointed out that business is absolutely dependent upon transportation in these days, whereas this was not true some time ago. Now if there is an interruption of transportation service vast numbers of people cannot get to work and great suffering is the result. There is a mutual responsibility between the corporations and the public, and there must be some way of properly adjusting their relationship by a properly organized government tribunal. There is a difference between government ownership and government control.

Mr. Bliss expressed the belief that it is possible to get the benefit of private enterprise with entire ownership by the state, which should lease the property to individuals. He concluded with these words: "While this problem in which we are so greatly interested is a very big problem, it is not the only one that we have. If other problems which are confronting us are not properly solved, our own problem will not matter much. The very foundation of our government is at stake. The solution of these problems is good citizenship, and without it none of them can be solved."

In addition to the address by Mr. Bliss, the company of 100 persons was entertained with music, dancing and refreshments.

At the meeting held on Feb. 12 the speaker was George H. Martin, Westinghouse Traction Brake Company, Boston, Mass., who spoke on "The Mechanical Equipment of the Safety Car." This talk was illustrated by means of lantern slides, showing the construction and operation of the many parts that go to make up the safety devices on the newest type of car. The membership on this occasion was entertained by a local impersonator. A nominating committee was appointed to report at the next meeting.

According to the *National Safety News* in 1910 there were 400,000 automobiles in the United States and out of every 100,000 population during that year, two and one-third persons were killed by automobiles. In 1917 there were 3,000,000 automobiles and nine and one-sixth persons out of every 100,000 population were killed by automobiles. During 1920 9,000,000 automobiles and trucks will be in use. The *News* asks: "How many thousand persons will be killed?" The answer, it says, "depends on you."

Letter to the Editors

European Relief Through Food Drafts

AMERICAN RELIEF WAREHOUSES

NEW YORK, March 1, 1920.

TO THE EDITORS:

I am sure that my fellow engineers will welcome an opportunity to assist in practical support of the relief measure for the civil population of the larger cities in Eastern and Central Europe. We have inaugurated a simple method by which it is possible:

1. For an individual in America to supply a relative or friend in Europe with a food package on payment in dollars at any one of several thousand banks in America.
2. For anyone desirous of helping to give to the unfortunate without naming a particular relative or friend.

This is made possible by a "Food Draft" which can be bought here, mailed abroad, and is good for the equivalent in food when presented at any one of our five central warehouses in Europe. Some four millions of our people are foreign born or have close foreign affiliations. A large proportion of these people are operatives in our mines and large technical industries.

This is not a "charity" in the ordinary sense of the term because we give much more than the same number of dollars could possibly buy in Europe if remitted in money at the present rate of exchange. Further, if the transaction is not completed in ninety days the purchaser of the draft is entitled to a refund, less a small charge for handling. Profits which may be derived from these operations will be credited to the European Children's Fund for child feeding in the country where the draft is presented.

HERBERT HOOVER.

[Electric railway companies with any considerable number of foreign-born employees might very well call the attention of these employees to the ease which this plan affords of supplying food to designated individuals abroad. The American Relief Administration carries stocks of staple foods in Hamburg, Warsaw, Vienna, Prague and Budapest. Out of necessity, delieveries can be made only at these warehouses but further shipment can be arranged locally by the recipient.—EDS.]

VIENNA, March 1, 1920.

TO THE EDITORS:

The American Relief Administration has established an American Relief Warehouse in Vienna, Austria. It is possible to buy at any bank in the United States American Relief Warehouse food drafts and send them to us in Vienna. On presentation of these food drafts at the warehouse in Vienna, we can draw American food. We are in great need of food in Austria. Individual food parcels sent from America usually do not reach us. Money does us no good when there is no food to buy.

Help us in our distress by sending an American Relief Warehouse food draft—quickly.

ILLUSTRIERTE MONATSFACH,
ZEITSCHRIFT "DIE LOCOMOTIVE."

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Toledo Vote in June

Protest Against Delay Until August—City May Issue General Credit Bonds

The action of Council at Toledo, Ohio, in extending until Aug. 10 the time at which a franchise settlement of the railway controversy at Toledo is to be submitted to the voters has brought forth a storm of protest from the members of the commission which drafted the cost-of-service measure.

Judge John M. Killits has also suggested that the date for the submission of the ordinance be made as soon as possible. He suggests that the company return the ordinance with objections in writing not later than April 3 and that Council and the franchise commission go over the measure in an attempt to harmonize all parts of it with company suggestions within three weeks after that date.

This would provide for an election in June rather than on Aug. 10, the date of the county and state primaries. Council may be asked to reconsider its resolution adopted last Monday night.

Henry L. Doherty has offered to pay the expenses of a special election rather than have the proposition go to a vote at the presidential primaries on April 27, before he would have time to make corrections in the proposed ordinance. Mayor Cornell Schreiber and Federal Judge Killits oppose this proposition.

In a letter to the Toledo Railways & Light Company, Federal Judge Killits submitted a copy of the ordinance prepared by the cost-of-service commission, which was appointed as an agency of the court to help solve the railway problem after the cars were brought back under the joint auspices of the City Council and the federal court.

The letter to the company follows:

> By the consent of the city of Toledo I am submitting to you herewith copy of a service-at-cost street railway ordinance, the submission being under this condition: That you return the measure to me on or before April 3 with your comments thereon in writing, containing (a) a clear statement of the several objections of the company to the draft as now submitted, and (b) a draft of the several modifications the company deems necessary to meet its objections so stated above.
>
> Upon the receipt of the draft ordinance with your comments upon it within the lines above stated, I will refer the matters to the commission with the request that it give your stated position careful consideration, with a reasonably limited opportunity for oral discussion, and will request the commission to submit again the draft ordinance to me with such modifications of the present form as it may then deem advisable within three weeks after the final reference. It is my intention then immediately to transmit the commission's conclusions to the Council, without any consideration thereof by myself.
>
> You will kindly note that there is no obligation upon the company to consume all the time afforded it by this submission, and it will be very gratifying if the company is able to and will reduce the time of its consideration.

The commission appointed by Judge Killits to draft an ordinance providing for municipal ownership of the railway system has not held a meeting for several weeks. It has been waiting the decision of the Supreme Court on a test case involving the right of the city to issue bonds against the general credit of the city for the purpose of buying a street railway property.

The Ohio Supreme Court ruled on March 16 that the city of Toledo could issue bonds against the general credit of the municipality for the purchase of a public utility. This decision will allow the municipal ownership commission to proceed to draw up an ordinance providing for the purchase of the street railway property of the Toledo Railways & Light Company. The written opinion of the court will not be published for several days but Chief Justice Nichols gave out this statement:

> Municipalities of the State are empowered by constitutional provisions to acquire any public utility, the product or service of which is to be supplied to the municipality or its inhabitants and they may issue bonds to raise money for such purpose, pledging the general credit of the municipality to their payment within the limits prescribed by the Legislature as to the amount of indebtedness for local purposes.
>
> No legislative grant of power is essential. The issuance of such bonds may be limited or restricted by legislative act not as to purpose, but only as to amount of indebtedness the municipality may incur.

The city authorities will attempt to have both the cost-of-service and the municipal ownership ordinances ready to submit to the voters at one election. It is expected the date for election may be advanced to early in June.

Improvement Plan Precipitates Fight

The Dallas (Tex.) Railway is hampered in its program of betterments and improvements in Dallas by controversies among patrons as to the most desirable routes for proposed extensions. The company had announced its building program for 1920, this had been approved by the City Commission and requisitions covering the improvements had been issued. One of the extensions covered an addition in Oak Lawn. Residents of that section have become involved in a controversy as to the most desirable routing of the extension. As a result the court has granted an injunction against the company restraining it from carrying out the proposed extension. The company will take no further action toward building that extension until the injunction is dissolved and the action against the company dismissed. The material for the extension has been assembled, as it was the first new line to be built under the 1920 program. This material will now be used in other parts of the city.

Much Ado About Nothing

Kentucky Interests So Conflicting Nothing Is Expected to Come of Utility Legislation

There are three bills before the Kentucky Legislature looking toward the regulation of the public utilities of the State. One of these bills provides for the creation of a Public Utilities Commission, but in its present amended form the measure would apply only to the gas companies. The second bill would put the gas companies under the State Railroad Commission. The third bill proposes home rule. It appears likely, however, that nothing further will be done toward regulating the utilities than to place the gas companies under the jurisdiction of the Railroad Commission.

GOVERNOR PLEDGED TO ECONOMY

Governor Morrow was elected on a platform which promised that there would be no multiplication of state offices so that it is probable that the first bill mentioned above creating a new commission will not be passed. Moreover, if the proposed bill creating a public utilities commission is constitutional, then it would seem that the Railroad Commission might already be considered to have jurisdiction over the public utilities. There is the consideration also that such a bill, according to present statutes, would have to include jurisdiction over all municipally-owned utilities. This fact makes it highly improbable that the commission will be created, since none of the municipalities would tolerate the idea of having an outside body assume jurisdiction over local waterworks systems, for example.

OPINION NOT UNANIMOUS

The bill giving jurisdiction over utilities to the Railroad Commission may not be passed because neither the utilities men nor the members of the Legislature are agreed on what is or is not wanted, other than that the general object of all of the proposed bills is to provide some means of controlling the gas companies.

There is also believed to be little likelihood of the third bill passing because the cities already have adequate jurisdiction over their utilities along lines and procedures specified by law. To open the control to a free hand on the part of the cities would, of course, meet with opposition.

As regards the proposed bill to create a public utilities commission, there is some doubt as to the constitutionality of such measure. The sentiment of home rule is also very strong.

Railway Settlement on Business Basis

Kansas City Chamber of Commerce Proposes Service-at-Cost, With Remission of Paving and Other Charges

The business men of Kansas City, Mo., have a program in mind for the improvement of electric railway transportation in that city. This program provides among many other things for service at cost, the entire remission of any charges against the Kansas City Railways for paving, street cleaning and snow removal and also contains financial details largely of local interest.

The plan for future action is based on the recommendations contained in a report by the executive committee of the committee of one hundred of the Chamber of Commerce. The full committee of one hundred met on March 5 and approved the report and the board of directors of the full Chamber then approved the recommendations. The recommendations are summarized as follows:

That the franchise be amended so the service-at-cost principle will be included and providing for a variable fare and a variable rate of return on capital invested.

That charges such as licenses, paving costs, snow removal, street cleaning and sprinkling, and lighting, be remitted, since these only increase the fare and have no place in the operation costs of a railway.

That the section of the franchise requiring certain prescribed investments in extensions each year be repealed, and that only such extensions be required as the board of control deems necessary and believes will be self-sustaining.

That Kansas City, Mo., and Kansas City, Kan., co-operate in working out uniform franchises for both cities.

That new capital, so far as is possible, be in the form of stock investments instead of bonds, since the present financial structure is top heavy in that the proportion of borrowed money to the stockholders equity is too high.

Varying Rate of Return

That the rate of return provide for a minimum of 6 per cent on stockholders' equity, the normal return being 7 per cent with variations up and down in 0.5 per cent steps, varying inversely with the fares—the higher the fare the lower the return on capital.

That the city directors publish monthly or quarterly financial and operating statements in simple form for the information of the public.

That the franchise valuation, plus the additions that have been made by the board of control, be made the basis of the valuation for the "service-at-cost" plan. (It is not recommended that a re-valuation be made at this time, because such action could only result in a greatly increased capital value.)

That the company provide means of receiving and acting promptly on complaints and suggestions from the public.

That larger and better trailers be used on the lines where physical conditions will permit their operation.

That service in the outlying districts be adjusted to the actual demand, by turning back cars at suitable points instead of running all cars to the end of the line.

That the board of control be charged with the duty of providing good service, making frequent checks on traffic to provide the proper number and distribution of cars.

That the headway and speed of cars be improved.

That trainmen be required to exercise courtesy and forebearance toward the public.

That upon the adoption of the "service-at-cost" plan, the initial fare be fixed at a figure sufficient to pay the cost of operation plus a just return on capital invested.

That the flat fare with the universal transfer, as distinguished from the zone system, be continued.

That the present good feeling between the company and employees be fostered and continued as far as possible.

That a further study of traffic conditions and possible remedies for congestion be made.

That looping in the downtown congested district be discontinued.

That the city provide more traffic policemen.

That the company undertake an educational campaign to induce patrons to provide tickets or exact fare when boarding cars in the congested district.

That the chairman of the board of directors of the company be a Kansas City man.

The committee of one hundred was appointed on July 17, 1919, at the request of the Real Estate Board. The purpose in appointing the committee was to have an analysis of the local railway situation made by business men to determine what the troubles were that made service poor, and to see what solution of the problem could be found. The committee met and organized on July 25.

During the following two weeks a number of meetings and hearings were held by this committee, and on Aug. 5, a preliminary report was made to the committee of one hundred, in which it was recommended that because of the great amount of work necessary, various sub-committees be appointed to study special phases of the problem. For each sub-committee it was recommended that a member of the executive committee be chairman.

On recommendation of the executive committee, these sub-committees were appointed: Financial transactions, valuation, investigation in other cities, service and fares, economies and efficiency, franchise, labor, jitneys and other sources of traffic loss.

The work of these sub-committees in securing information and preparing reports, and the work of the executive committee in correlating and preparing the final report, were shown in the final report submitted to the committee at the meeting on March 5.

The final report is a 9-in. by 12-in. book of fifty printed pages. The first part of the report is given over to a summary of the findings and recommendations. Following these are the detailed data on which the final recommendations are based. The summary includes recommendations on valuation, financial transactions and financial condition, service and fares, franchise, jitneys and miscellaneous factors in railway operation.

The report and the investigations on which the committee's report is based comprise one of the most extensive pieces of work ever undertaken by the local Chamber of Commerce. The eight sub-committees and the executive committee worked for six months getting information. This was gathered not only in Kansas City, but from various other cities in the country. A sub-committee even made a trip to several of the large eastern cities, getting detailed data on their railway operation.

Atlanta Men Strike

Ignore Their Union and Tie Up City for Three Days—National Body Withdraws Support

The city and suburban traction lines at Atlanta, Ga., were paralyzed for almost three days during the week ended March 13 as the result of a strike of union carmen employed by the Georgia Railway & Power Company. The men left their posts shortly before 5 a.m. on March 10, and remained off duty until 5 p.m. on March 12. The decision to return to work was reached at a meeting on the morning of March 12, following a refusal of the national headquarters of the union to recognize the strike and an order stating that the men should return to work at once.

On Tuesday afternoon a board of arbitration, including Luther Z. Rosser for the company and Madison Bell for the men, with Judge John D. Humphries, acting as umpire, granted the men an increase of 15 per cent over the old scale of wages. The prevailing scale was 36, 38 and 40 cents an hour, and the increase raised this scale to 42, 44 and 46 cents an hour. This was not satisfactory to the men, and in spite of their previous agreement to abide by the decision of the board, they took a strike vote and left their posts. The vote was taken at a mass meeting called on Tuesday night which lasted until morning. The vote stood 499 to 149 in favor of the strike.

During the three days of the strike no cars operated. No disorder developed. The company had taken a stand which indicated that it would not give up this time to the demands of the men. Public opinion was decidedly in favor of the company. At first it appeared that the men were equally determined not to return to work until they were granted an increase in pay considerably greater than that awarded by the board of arbitration. Doubtless they would have remained out for an indefinite period but for the fact that the national headquarters of the union refused recognition of the strike on the grounds that the union permits the settlement of such disputes by a board of arbitration. Furthermore, the men realized that public opinon was against them.

In a large paid advertisement in Atlanta newspapers the Chamber of Commerce demanded that the men return to work. The chamber declared that the men had violated their solemn word in leaving their posts. The Rotary Club of Marietta, Ga., served by the interurban system, called upon the company to leave its cars in the carhouse until it was able to operate on an open-shop basis. All this had its effect upon the men and doubtless resulted in the early settlement of the strike.

It had been stated at hearings of the arbitration board that if increased salaries were granted this would necessarily mean an increase in fares, as the company is already operating at a loss. Whether the increase granted by the board, while it is only 15 per cent, will result in another raise in fares is still undetermined.

During the progress of the strike, retail business in the downtown district was seriously interfered with, and while means were found to bring employees to work and get them home, there was no satisfactory transportation for customers and downtown stores suffered as a result. The Atlanta Automobile Association had called upon auto owners to help out, but even so, thousands of people were compelled to walk. Railroads serving suburban towns that are also served by the electric traction lines of the Georgia Railway & Power Company put on more trains and this helped out to some extent.

It was late Saturday before the full schedules were in operation on all of Atlanta's city and suburban lines.

Railway Makes Counter Franchise Bid

Detroit Line Unalterably Opposed to Plan for Opposition System Built by City

A statement signed by President Frank W. Brooks of the Detroit (Mich.) United Railways brands Mayor Couzens' proposed piecemeal plan as "not only unfair but dishonest." The company signifies its intention to fight the Mayor's plan, and to endeavor by all legitimate means to prevent his policy from being imposed upon the company. It has also made a counter franchise proposal.

SETTLEMENT ORDINANCE OFFERED

The company's position was outlined and a plan of settlement proposed, based on the adoption of a working agreement between the company and the city. An ordinance outlining its plan has been prepared by the company, which will be immediately submitted for the consideration of the taxpayers and electors of the city of Detroit.

In his letter to the electors, Mr. Brooks states that no one appreciates more fully than the company's officials that the service they have been able to give is inadequate; that no one is as vitally interested in changing this situation and providing adequate service as they are, that the city authorities are responsible for the discomforts car riders are suffering and the inadequate service with which they are provided.

In justifying the statement that the company has availed itself of every resource at its command to improve conditions, it is pointed out that within the past ten years—and since most of the important franchises are claimed to have expired—the company has expended in betterments and extensions of tracks, equipment and facilities, upward of $13,000,000 in reliance upon the belief that in any final settlement of the railway situation, the company would be treated fairly, and its stockholders reasonably protected if the city should conclude to engage in municipal ownership and operation.

COMPANY WILLING TO SELL

To this end it is contended the company, in recognition of an alleged desire on the part of the taxpayers and electors of the city to engage in municipal ownership, co-operated with city representatives to enable them to do this by offering to sell to the city the entire railway system at its fair value, and on two occasions entered into formal agreement to that end.

Reviewing the details of the plan which the company assisted in giving the electors an opportunity to ratify, President Brooks stated that in the first instance it was agreed that the fair value of what was needed by the city should be fixed by three of the Wayne County Circuit Judges, and in the second instance a fixed price was agreed upon at least $10,000,000 below the investment of the company. Mr. Brooks adds:

> These plans having failed, Mayor Couzens now undertakes to force upon the people the so-called "piece-meal" plan of acquiring a railway system, and proposes to create a second railway to engage in competition with this company To accomplish this, the Mayor proposes to dismember and cripple our system and by coercion compel us to sell important parts of our system at less than the conceded value. For instance, he proclaims publicly that the cost of construction of our Woodward Avenue and Fort Street tracks is about $70,000 per mile (it is actually $100,000 per mile) and that he will force us to sell at $40,000 per mile.

Twenty million dollars is the estimate the company puts on the cost of needed extensions, cars and equipment, and this amount can only be secured by a reasonable grant of authority to operate the system under fair conditions.

CONDITIONS OF COUNTER PROPOSAL

The company filed with the Corporation Counsel a counter proposal to the Mayor's plan. This is in the form of an ordinance and provision is being made to permit the submission of the ordinance to the voters as soon as the City Council will authorize an election. This ordinance cannot go before the people at the election on April 5 as there is not sufficient time to fulfill the provisions of the city charter, and unless a special election is called, it cannot be voted on before the November election.

In the ordinance the company proposes to surrender all existing franchises and private right-of-way held by the company. Control of service will be vested in the City Council, giving the city the right to regulate the operation of the system with respect to maintenance of its tracks, frequency of service and routing, and operation of interurban cars within the city limits.

The ordinance obligates the company to begin immediately on the construction of 200 miles of extensions to the present line and to complete these extensions at the rate of 50 miles per year for four years.

Provision is also made for adding 350 new cars, comprising 200 new double-truck motor cars and 150 trailers within the first year, with 100 new motor cars and 100 new trailers to be added during each of the following three years. All obsolete cars are to be replaced with modern types.

A straight 5-cent fare with universal transfers is specified, to apply on all lines within the city, including lines now outside the single-fare zone, and is to be extended to include territory annexed to the city in the future.

The ordinance provides for the purchase or lease of the Detroit United Railway city system by the city of Detroit at any time during the life of the thirty-year agreement at a price to be fixed by the board of arbitration, the agreement to be terminated by the exercise of the city's option to purchase or by the failure of the company to carry out the program of extension.

Under the ordinance, the price for which the city shall purchase the lines or lease them at a rental of 6 per cent of the valuation, is to be decided upon by the appraisal of the board of arbitrators, this appraisal to be made immediately after the passage of the ordinance, and from year to year as long as the 6 per cent return is made.

Provision is made for the use of the Ford gas car or any other system of equipment adaptable to Detroit's needs, which can be operated more economically and efficiently than the present power system. Tracks and cars will be provided for a subway or elevated rapid-transit system when such system shall be built by the city.

A detailed description of the proposed extensions which the company shall be required to build under its terms, provided the ordinance is ratified, is attached to the ordinance.

The Detroit United Railway proposes to form a new company to take over the entire business of the city lines in order to differentiate between city and interurban accounts, the books of this proposed new company to be opened for inspection and examination at all times by city officials.

Promoters of Subways Must Explain

The street railway committee of the Council of Cleveland, Ohio, has decided to give the Cleveland, Akron & Canton Terminal Railway until April 10 to agree with the Law Director on certain changes to be made in its franchise. This company has been authorized to build a subway under East Fifty-fifth Street for the transfer of freight cars from the southern part of the city to the lake front. Law Director Fitzgerald desires so to change the franchise as to compel the company to build at a depth that will not interfere with the proposed municipal subway. The Hopkins interests were allowed one week to appear before the committee and show cause as to why their subway franchise should not be repealed.

City to Buy Buses

New York to Start With an Initial Outlay of $1,140,000 —Expects a Profit

The Board of Estimate of the city of New York has unanimously committed the city to an experimental municipal bus system. Strange as it may seem, the city voted an appropriation for buses on the same day that the receivers of the surface lines in Manhattan and Brooklyn withdrew their appeal for an increase in fare. In some quarters it is believed that buses will supplant all suspended trolley routes.

COMMISSIONER WHALEN IN CHARGE

The Department of Plant and Structures has been supervising the operation of privately owned buses over 5 routes in Manhattan since last September, in Brooklyn 7 routes since October, 1919, and in Staten Island 5 routes since Jan. 19, 1920. Through the efforts of Commissioner Whalen, of Plant and Structures, the Finance and Budget Committee of the Board of Estimate, recommended that his plan for the purchase of 200 buses be approved. On March 12, 1920, the Board of Estimate unanimously voted to issue $1,140,000 in tax notes to cover the cost of these buses. Commissioner Grover A. Whalen, who is the general manager of the municipal bus lines was directed to prepare contracts and specifications for competitive bidding for the buses, and to submit these forms together with a full description of the type, style and size of vehicles to the board as quickly as possible.

The routes on which the buses are to be operated has not yet been definitely settled, but Mayor Hylan has directed that some of the buses be sent to Staten Island for use along the routes on which the Staten Island Midland Railway suspended service last January. The motion of President La Guardia of the Board of Aldermen, however, for the city to take over the present bus route between St. George Ferry and the Army Base hospital at Fox Hills was adopted, thus overruling the contention of President Van Name of the Borough of Richmond at a recent hearing that the privilege was held by a private party who should be allowed to retain it. The route in question is approximately 3 miles long and the fare charged is 15 cents each way.

THE COMING REVOLUTION

In commenting on the action of the Board of Estimate Commissioner Whalen said:

> Their action was a great step along the line of progress. When the buses are placed in operation and the street cars and tracks eliminated from the roadways, it will completely revolutionize the city's traffic problems and will be a solution of the many difficulties occasioned by the present method of surface car transportation, which has been most aggravating to the people.
>
> The policy of the city in connection with the operation of the bus system will be one of courtesy and efficient service. It will also afford to the city an additional source of revenue which is very much needed. When the municipal bus operation becomes city wide it will relieve, in a measure, the great burden of taxation. It will also help largely to build up the sparsely occupied territory in the city.

It is estimated that the buses will cost $5,500 each, and that the operation of the 200 buses will net the city an annual profit of $275,064. Buses will seat twenty-seven passengers and operate on a 5-cent fare.

It is expected to have the buses in operation not later than May 15.

Rhode Island Legislation Probably Lost

An agreement with respect to the affairs of the Rhode Island Company, Providence, R. I., upon which legislative action can be taken at the present session seems remote. March 30 is the last day for the introduction of new business except by unanimous consent, and some of the Assembly leaders say there is no chance at this late day to take up such a big problem as is involved in connection with the affairs of the Rhode Island Company.

It will be recalled that on Feb. 24 the receivers of the Rhode Island Company presented to the Legislature a plan for state ownership and control with private operation for all lines of the company. The results which it was hoped to achieve under this plan were summarized in the ELECTRIC RAILWAY JOURNAL for Feb. 28, page 445.

Meanwhile bondholders of the United Traction & Electric Company and the Rhode Island Suburban Railway have agreed upon a plan of re-organization of the properties. The conditions of this reorganization were made public during the week ended March 13. Receivers of the Rhode Island Company have also been working on a reorganization plan. They made the details of their plan public early in the week ended March 20. Of course these respective plans are only tentative, but the terms of the plans are so different that the parties at interest would apper to be farther apart with respect to a settlement than before the plans were made public. Both plans provide for the reduction of the securities outstanding.

Contract Awarded for Power Improvements

The board of directors of the Monongahela Valley Traction Company, Fairmont, W. Va., has confirmed the action of the officials in signing a contract with the Fred T. Ley Company, contractors, for the installation of a 20,000 kw. turbine in the Rivesville power plant of the company. This addition, costing about $700,000, will make the local plant one of the largest in the South.

The turbine is now being assembled by the General Electric Company. It will be shipped to Fairmont in June. The necessary condenser equipment has been purchased from the Alberger Condenser Company. It is expected to have the new unit ready for operation by Oct. 1.

Trainmen Force Action

Binghamton Men Strike When Council Again Puts Off Granting Relief to Railway

Patience has ceased to be a virtue at Binghamton, N. Y. It took the trainmen in the employ of the Binghamton Railway some time to find this out, but when they did the men took things into their own hands and went out on strike. They didn't strike against the company. They struck against the Council, the members of which they helped to put into office. Binghamton walked while the Council talked. It walked for several days.

ROAD IN RECEIVER'S HANDS

The Binghamton Railway has had more than its share of trouble. It has been denied a square deal and is in hands of a receiver. On a 5-cent fare the company could not increase the pay of its men. It said so frankly. The men accepted the statement. The Council, however, paid no attention to the plea of the company. It persisted in watchful waiting. This policy of procrastination the men have brought to an end.

At the meeting of the Council on March 8 two ordinances were introduced, both of which aim to grant the company permission to petition the Public Service Commission to establish a 6-cent fare. Introducing a measure and passing it are two different things. The men had learned this by experience. They acted while the Council deliberated. The next morning all Binghamton walked. The men believe in a policy of live and let live. They announced they would take their chances with the company, but that they were through taking chances with the Council. They did, however, arrange to run cars at rush hours so that the working public might not be seriously inconvenienced.

At first some members of the Council were inclined to become belligerent. They threatened to withhold approval of the fare measure until the conductors and motormen returned to work. The Council soon found that in this game the trainmen held all the trumps. Only when the railway men were assured that the ordinance would be passed did they announce the cars would again be run. The present wage scale is 34 to 38 cents an hour. The new rate will probably be 41 cents to 45 cents an hour, although the men have made no fixed demands. This matter remains to be adjusted.

COMPANY PAYING THE LIMIT

There is a wage agreement in Binghamton. The company is now paying in excess of the rates prescribed, but it has gone the limit on the present fare. The men understood and appreciated this, but the Council did not. It was necessary to bring the facts home to them forcibly. The trainmen succeeded by direct action, where indirect appeal failed.

News Notes

City Petitioned to Take Over Railway.—M. J. Morley is conducting a campaign to induce the Mayor and Commissioners of Phoenix, Ariz., to take over the Phoenix Railway. More than 2,000 names already have been signed to the petitions now being circulated among residents and property owners.

May Retry Mr. Dempsey. — John J. Dempsey, former director, vice-president and transportation head of the New York Consolidated Railroad, Brooklyn, (N. Y.) Rapid Transit System, will probably be retried on a charge of second degree manslaughter in connection with the Malbone Street wreck. The jury in the first trial of Mr. Dempsey was unable to reach an agreement.

$1,376,341 Is Chicago's Share.—The share of the city of Chicago in the profits of the Chicago Surface Lines for the fiscal year ended Jan. 31, 1920, will be $1,376,341, according to estimates made on March 14 in the City Comptroller's office on the basis of the traction companies' monthly statements for the year. With this addition the traction fund in the possession of the city will be $27,431,841.

Union Wants Agreement Modified.—The members of the local division of the Amalgamated Association at Providence, R. I., have voted to notify the Rhode Island Company that they intend to reopen, for possible revision, the present working agreement with the railway. This agreement expires on May 31. The contract as it now stands requires ninety days' notice of a desire for its modification.

Co-operative Plan for Louisville.—Six representatives of the employees of the Louisville (Ky.) Railway and six officials of the company met recently to perfect a Co-operative Welfare Association seeking betterment of mutual interests and improvement of car service. Details of the Stotesbury-Mitten plan in operation in Philadelphia were studied and its principles adopted as the basis for the working plan of the organization.

Objection to One-Man Cars Withdrawn.—End of the opposition to the railway system in Muscatine, Ia., has come with the abrogation by the City Council of an ordinance demanding two-man car operation. The Clinton, Davenport & Muscatine Railway, operating the city lines, installed one-man cars some time ago. The city fought the one-man car bitterly at first, but has now repealed the ordinance and withdrawn its action from the State Supreme Court.

Carhouse Held Up. — More than $1,000 was taken from the Starr Avenue carhouse of the Toledo Railways & Light Company, Toledo, Ohio, when two armed bandits held up the dispatcher and receiver late Friday, March 12. The robbers came about an hour before the night run conductors turn in their funds. They unceremoniously kicked in the door and directed their guns at the men on hand, grabbed the money and whisked away in an automobile. The police have found no clues in connection with the hold-up.

Strike on Williamsville Line.—Electric railway service between Buffalo city line and Williamsville was suspended on March 3 when motormen and conductors employed by the Buffalo & Williamsville Electric Railway struck for higher wages. The men at present receive 35 cents an hour, it is said, and are seeking an increase to 50 cents. The strike does not involve more than a dozen men, but the walkout will greatly inconvenience commuters. Two cars are operated on the line during the day, and two or three more during the rush hours.

Seattle Elects New Mayor. — Hugh M. Caldwell, formerly Corporation Counsel of Seattle, Wash., has been elected Mayor of the city over James Duncan, the labor candidate, by a margin of 17,098 votes, the largest majority ever given a mayoralty candidate in the history of Seattle. Mr. Caldwell polled 50,875 votes while Mr. Duncan received only 33,777. Only 88 per cent of the city's registered strength participated in the election. Mr. Caldwell made the conduct of the Seattle Municipal Railway one of the points in his attack upon the existing city government.

Scranton Demands Refused. — The Scranton (Pa.) Railway, through Jilson J. Coleman, general manager of the company, has rejected the demands of its employees for an increase in wages of 20 cents an hour. Mr. Coleman, in refusing the increase, stated that the additional pay and the reduction in hours asked by the men would cost the company $450,000 annually. He pointed out that the company's net earnings for the year ended Dec. 31, 1919 amounted to $118,431. Wages were increased on Jan. 1, 1920, the present scale for trainmen being from 46 to 50 cents an hour.

Wage Advance in Reading. — The Reading Transit & Light Company, Reading, Pa., on March 5 announced an increase of 4 cents an hour in the wages of the 600 motormen and conductors employed over the entire system, comprising Reading, Lebanon, Norristown and Roxborough. This advance, which is the seventh to be made by the company in less than three years, increases the maximum wages of motormen and conductors from 46 to 50 cents an hour. The new scale will go into effect on March 16. Since fares were first advanced in January, 1918, the wages of the men have advanced a total of 22 cents an hour—from 28 cents to the present rate of 50 cents.

Court of Industrial Relations Suggested.—Senator White of Atlantic County has introduced a bill in the New Jersey Legislature to set up a Court of Industrial Relations to take the place of the Board of Public Utility Commissioners. The new body would be fashioned along the line of the recently created Kansas court and would handle utility and all transportation and industrial matters. The new organization is to be composed of three judges to be appointed by the Governor with the advice and consent of the Senate. The members of the court would hold office for three years. The salary would be $5,000 a year. Upon the court would be conferred the same powers that are now vested in the Public Utility Commission.

Newspaper Man Gives Live Facts.—Jonathan C. Dill has an interesting story "Are Trolley Cars Extinct?" in the Utica *Saturday Globe* for Feb. 28. It describes in a chatty way some of the things which the electric railways are "up against". One of these is not the automobile, according to an interview which Mr. Dill had with a local railway manager. In spite of the increase in the number of automobiles during the past eight years, the railway is carrying a constantly larger number of passengers. This proves that the electric railway is not obsolete or being seriously affected by automobile competition. It is only faced with the situation which every individual has had to meet, namely, increased expense. This is a serious matter when income does not go up in like ratio.

Program of Meeting

American Railroad Association

The American Railroad Association and the Railway Supply Manufacturers' Association have announced plans for the annual convention to be held in Atlantic City, June 9 to 16, inclusive. The reports of committees of Section III — Mechanical — investigating locomotive matters will be received and discussed on Wednesday, Thursday and Friday, June 9, 10 and 11, and reports of committees on car matters will be taken up on Monday, Tuesday and Wednesday of the next week. The sessions of the Mechanical Section will be held in the morning to give time for viewing the exhibits. The Purchases and Stores Section of the American Railroad Association will hold its annual meeting on June 14, 15 and 16, in the Hippodrome.

The Railway Supply Manufacturers' Association has arranged to have exhibits in the balcony over the main building on Young's pier, which will make the total exhibit space approximately 100,000 sq.ft., an increase of 6,500 sq. ft. over 1919. Applications have already been made for practically all the available booths and a large number of new companies will be represented. All entertainment features will be held on the pier, as was done in 1919.

Financial and Corporate

Net Income Increases

Dallas Interurban Company's Figures Show Prosperous Year—Some Divisions Operated at a Loss

The gross earnings of the Texas Electric Railway during 1919 amounted to $2,951,511, representing an increase of 23.9 per cent over 1918. Operating expenses and taxes increased $302,019.96, or 21 per cent over 1918.

The net income of the company after interest charges for 1919 was $735,454.68, or an amount available for dividends on preferred stock at the rate of 2.8 times the annual dividends on all preferred stock. The balance available for common stock was $476,454.68, virtually all of which has been used for increased working capital, made necessary by the higher prices of materials and for betterments and improvements of the property.

Dividends Paid

Regular dividends at the rate of 7 per cent were paid on the first and second preferred stock and an initial dividend at the rate of 0.5 per cent on the common stock for the quarter ending Dec. 31, 1919, has been declared payable March 1, 1920.

Of the six street railway systems operated by the Texas Electric Railway, Denison reported the only gain in income after depreciation values had been deducted. At that place the gross revenue was $34,647 for the year. Operating expenses and taxes were $22,286, and depreciation was assessed at $6,783, or an income after depreciation of $5.578. The gross revenue from the Waco street railway system was $341,518 for the year, with operating expenses and taxes placed at $287,404. Depreciation was given at $75,780, or a deficit in income of $21,666. The deficits at Waxahachie, Corsicana, McKinney and Sherman were given as $7,767, $6,820, $6,107 and $720, respectively.

Hudson Valley Operating at Deficit

Additional detailed evidence covering the operation of the Hudson Valley Railway, Glens Falls, N. Y., was presented to Public Service Commissioner Frank Irvine on March 12 on the company's petition for permission to charge a 7-cent fare in its different operating zones. The evidence was by D. C. Waters, auditor for the company. If no further hearing is desired the case will be closed for decision.

About fifteen statements were introduced by Mr. Waters. They covered the operation for 1914, 1918 and 1919 of the Troy-Waterford zone and the Glens Falls-Fort Edward zone, the latter divided between urban and interurban operation, and between Ballston Junction and Saratoga Springs, tolls paid over the Lansinburg-Waterford bridge, rate 2½ cents a car; rates for electric current furnished by the Mechanicville power plant and details of operation of the latter. There was an income account of the company's freight department for 1918 and 1919, and four months in 1917, the net income in 1919 being $17,565 and in 1918, $28,550.

An income statement for the last six months in 1919 showed: total revenue, transportation, $504,509; revenue from other railway operations, $33,596; total railway operating revenues, $538,105; total operating expenses, $440,931; net operating revenue, $97,173; taxes, $24,530; operating income, $72,643; non-operating income, $2,719; gross income, $75,362; deductions from gross income, $180,050. The deficit in net income available for dividends was $116,085.

Mr. Waters said operations for the first two months in 1920 showed a continuing deficit, the net deficit for January being $22,606 and for February, $31,407. There was charged for taxes in January $4,500, or one-twelfth of about $54,000.

If Providence Will Let Him

With the injunction to run the road for four months longer—"if Providence will let him"—Harrison B. Freeman, receiver for the Hartford & Springfield Street Railway, Warehouse Point, Conn., received some encouragement by Judge Lucien F. Burpee of the Superior Court of Hartford County on March 12 when the court granted the receiver permission to borrow $10,000 to meet extraordinary expenses that are being incurred by the road, the major part of the necessary money being accounted for in cost of coal and for removal of snow.

Francis R. Cooley, chairman of the bondholders' committee, supported the stand of Mr. Freeman, telling the court that the bondholders believed that the road could weather the financial storms if it got past the present trying weather.

The road has bills outstanding for the present winter of $8,023, one half of this sum being represented in coal, and it has no money to meet these obligations. The January receipts fell below expenditures by $3,671, and cost of snow removal in February pushed the operating deficit for that month to $6,840.

The railroad runs on both sides of the Connecticut, between the two cities whose names it bears and connects thirteen towns, many of which would be almost cut off from each other and the rest of the world if the trolley failed to run.

Receiver Discouraged

Forced to Suspend Operation Representative of Court Decides to Apply for Order of Sale

George Spalding, receiver of the Blue Hill Street Railway, has announced that the road will be sold for junk. The road was placed in operation on Nov. 3, 1899. It is the only route to Great Blue Hill from Mattapan Square, Boston. The road runs through Canton to Stoughton. It also connects with Sharon.

The road has never paid a dividend, but up to 1918 it was able to earn operating expenses. There are twenty-one cars, 12½ miles of track, a carhouse at Canton and a power house in the same place. The last car started over the road was reported recently to be half buried in the snow at Ponkapoag. It had been sent out on its regular run on Feb. 5.

The company shut down because of its inability to secure delivery of coal from the New York, New Haven & Hartford Railroad. The entire force of trainmen has been discharged.

Mr. Spalding was appointed receiver of the road in April, 1919. The company then had a deficit of $101,000. Despite the efforts of the receiver, he has been unable to reduce this. In fact the deficit at the present time is $110,000. The deficit in January was $7,000. There have been six zones with a 5-cent fare in each zone.

On account of its dependence on the Blue Hill Street Railway for power, the Norwood, Canton & Sharon Railway has also been obliged to close down. This little road was abandoned some time ago, but the tracks and wires were bought from a junk dealer by citizens who put the property in repair and obtained cars and power from the Blue Hill Street Railway.

Mr. Spalding says that he will apply for permission to foreclose the mortgage, but as the sale will have to be advertised four weeks before there is a decree, it will probably be some time in April before the road is finally put up at auction. If there are no bidders for the road Mr. Spalding will sell the property for junk.

F. A. Prince, a resident who helped in the purchase of the Norwood, Canton & Sharon Railway, is reported to have stated that steps will be taken to resume service on the Norwood, Canton & Sharon Railway and that the Blue Hill Railway will probably be rescued.

Cost of Cambridge Subway Declared

The cost of the Cambridge Subway has been declared by the Massachusetts Department of Public Utilities to be $7,868,000. Under the provisions of the Act of Legislature whereby the State is to buy the Cambridge Subway, $8,000,000 was set aside for purchase. Thirty days after the price certification of the subway by the State Department of Public Utilities, the tube is to become the property of the State.

Municipal Earnings Drop

San Francisco City-Owned Lines Face Difficulties Similar to Those Confronting Private Companies

The annual report of the Municipal Railway, San Francisco, Cal., for the fiscal year ended June 30, 1919, shows a gain in operating revenue over the previous year of only 1.07 per cent. But due to a 13.85 per cent increase in operating expenses, the net income for the year after deducting comparison charges required by its charter, showed a theoretical deficit of $116,000. Actually the balance was $88,965 as compared with $326,306 for the previous year. Which is equivalent to a decrease of $237,341 or 72.5 per cent in net income.

INCOME STATEMENT OF SAN FRANCISCO MUNICIPAL RAILWAY

(Includes all charges as required by charter)

Year Ended June 30	1919	1918	Per Cent Change, + Inc., — Dec.
Revenue from transportation	$2,391,176	$2,363,366	+ 1.176
Revenue from other railway operation	10,222	12,563	— 18.65
Total railway operating revenue	$2,401,398	$3,375,929	+ 1.072
Way and structures	$63,331	$49,337	+ 28.4
Equipment	147,446	95,460	+ 54.50
Power	327,687	284,433	+ 15.10
Conducting transportation	1,045,704	899,764	+ 16.28
Traffic	264	339	— 21.851
General and miscellaneous	70,612	68,305	+ 3.37
General and miscellaneous (comparison charges)	10,904	9,644	+ 13.08
Depreciation (14 per cent of passenger revenue)	334,867	330,736	+ 0.95
Accident reserve (4 per cent passenger revenue)	95,676	94,535	+ 1.21
Total operating expenses	$2,096,491	$1,832,553	+ 13.85
Net operating revenue	$304,907	$543,376	— 44.10
Taxes—(comparison changes required by charter)—			
State franchise (5.25 per cent operating revenue)	$126,155	$124,602	+ 1.248
Muncipal franchise (3 per cent passenger revenue)	71,757	70,878	+ 1.242
Muncipal car license ($15 per car)	2,955	2,955	....
Federal taxes (1 per cent net income)	....	10,640	—100.00
Total taxes	$200,867	$209,075	— 3.92
Operating income	104,040	334,301	— 68.80
Non-operating income	22,248	21,500	+ 3.48
Gross income	$126,288	$355,801	— 64.50
Bond interest	243,093	248,214	— 1.66
Net income transferred to profit and loss	* $116,805	$107,587	—208.80
Surplus at beginning of year	216,916	109,329	+ 98.20
Surplus at close of year	$100,111	$216,916	— 53.80

*Deficit.

STATISTICAL INFORMATION OF SAN FRANCISCO MUNICIPAL RAILWAY

Year Ended June 30	1919	1918	Per Cent Change, + Inc., — Dec.
Track owned and operated (miles)	58.23	56.28	+ 3.46
Track owned and operated co-jointly with United railroad (miles)	5.15	1.04	....
Car house tracks and sidings and unused spurs (miles)	3.95	3.95	....
Total (miles)	67.33	61.27	+ 9.90
Average total miles of single track operated at end of year	63.38	57.32	+ 10.60
Revenue car miles*	7,212,763	6,935,090	+ 5.45
Revenue car hours*	779,746	766,997	+ 1.66
Revenue passengers—			
Five-cent cash	47,524,125	46,874,775	+ 1.408
Five-cent Government ticket	69,262	110,303	— 37.32
Two and one-half cent school ticket	597,483	683,192	— 12.53
Two-cent revenue transfers	856,166	750,026	+ 14.18
Total revenue passengers	49,047,036	48,418,296	+ 1.298
Free transfer passengers	9,836,127	13,589,247	— 27.50
free passengers, employees, police, firemen, etc	458,090	388,493	+ 1.7 9
Total passengers	59,341,253	62,396,036	— 4.89

*Includes bus mileage and hours.

Passenger traffic as a whole fell off 4.89 per cent due to the fact that the number of free transfers collected decreased 27.50 per cent and revenue passenger traffic increased only 1.298 per cent. Schedules were also cut to some extent with this falling off in traffic and the speed of cars increased 2.66 per cent to fill the gap caused by pulling off cars.

The several comparison charges included cover services rendered by various city departments, insurance on cars, and city, state and federal taxes. The "true" net income, therefore, is greater than the comparison net income shown, by the amount of the comparison or so-called charter charges. In 1918 these charges amounted to $218,719 while in 1919 they had decreased 3.17 per cent to $211,771 due, to the fact that the net income of the company was a deficit and therefore no federal income taxes were payable.

The chief reason for the decrease in net operating revenue, as shown in the accompanying table, for the year 1919 is the increase in the cost of operation which is 13.85 per cent greater than in the previous year. This is attributed to the greater cost of labor and material and is especially reflected in the maintenance charges for equipment, which increased 54.5 per cent. Hourly platform labor charges have increased 12.5 per cent since April 16, 1919, due to an advance of 6.25 cents per hour in wages. For the year 1919, platform expense totaled $847,567, an increase of 17.18 per cent over the previous year. In reality for every revenue car-hour operated, platform service cost $1.09. The hourly wage paid is now 56.25 cents and eight hours constitutes a day's work.

Passenger revenue for 1919 increased but 1.17 per cent over 1918 due to the fact that the number of revenue passengers increased but 1.3 per cent. The average fare per revenue passenger also slightly increased because the loss in revenue from tickets used by the government and from the sale of school tickets was offset by a 14.18 per cent increase in the number of 2-cent transfer passengers and a 1.4 per cent increase in five cent cash passengers. The average fare of passengers lost was 3.3 cents as against 4.58 cents from those gained.

SOME OPERATING PERCENTAGES

A further analysis of operating expenses indicates that maintenance and depreciation took 22.7 per cent of the operating revenue in 1919 as against 20.02 per cent in 1918. About 25 per cent of the operating expenses go toward maintenance and depreciation. The amount set aside for depreciation represents 14 per cent of the passenger revenue, and is equivalent to more than 5 per cent of the road and equipment account.

Power cost takes 13.6 per cent of the operating revenue, while conducting transportion takes 43.5 per cent. In other words, the cost of operating the cars takes practically one-half of the total amount spent. General and miscellaneous expenses, when considering all comparison charges, consumed 7.38 per cent of the total operating revenue which is equivalent to practically 8.5 per cent of the total operating expenses.

The general balance sheet shows the plant and property to be worth $6,903,758, an increase of $404,278 over the previous year. This is because of three track extensions covering 6.06 miles of single track that were made in the early part of the year 1919.

Public Service Makes Common Payment

Quarterly dividends of 1 per cent on the common and 2 per cent on the preferred stock have been declared by the Public Service Corporation of New Jersey. According to President McCarter the electric company and the gas company now are functioning properly and making satisfactory earnings, while the railway has been allowed a rate sufficient to enable it to pay its operating expenses and fixed charges without yielding any substantial return upon the investment.

The company did not declare any dividend on the common stock for the quarter ended Dec. 31.

London Traffic Increasing

Cost of Operation of English Lines, However, Offsets Any Gain from Increased Traffic

A study of the operations for the year 1919 of the five companies, parties to the agreement under the so-called London Electric Railway Companies Facilities Act of 1915, discloses that although the traffic receipts increased £2,156,078 or 31.0 per cent the operating expenses in the same period jumped 47.8 per cent, with the result that the net income applicable for reserves, contingencies and dividends was 10.32 per cent or £115,303 less than at the close of the preceeding year. The fact that the London General Omnibus Company failed to earn its operating expenses is largely responsible for this loss in net income for the other four companies, namely the Metropolitan District Railway, the London Electric Railway, the City & South London Railway, and the Central London Railway, all earned a profit for dividend distribution.

The full effect of the increases in wages since the termination of the World War, and the extra cost of materials, fuel and other supplies was not felt in 1919. The working costs in 1920 will, therefore, be considerably higher and already the companies have appealed to Parliament for the right to increase their fares. Mention of this was made in the issue of ELECTRIC RAILWAY JOURNAL for Feb. 7, page 301.

The accompanying tables give an outline of the financial operations and of the traffic of the roads in the city of London for the year 1919.

INCOME STATEMENT OF ROADS IN LONDON FOR YEAR 1919

	Metropolitan District Railway	London Electric Railway	City and South London Railway	Central London Railway	London General Omnibus Company	Total
Traffic receipts	(a) £2,131,938	£1,538,707	£314,402	£449,493	£5,242,299	£9,676,839
Operating expenses	1,128,958	1,012,397	238,714	318,945	5,480,584	8,179,598
Net receipts	£1,002,980	£526,310	£75,688	£130,548	*£238,285	£1,497,2
Miscellaneous receipts (net)	160,020	109,887	26,673	59,356	207,694	563,630
Gross income	£1,163,000	£636,197	£102,361	£189,904	*£30,591	£2,060,871
Interest, rentals and other fixed charged	336,115	290,738	47,203	46,039	108,412	828,507
Net income	£826,885	£345,459	£55,158	£143,865	*£139,003	£1,232,364
Reserve for contingencies and renewals	45,000	45,000	25,000	20,000	285,000	420,000
Dividends on guaranteed and preference stocks	(b) £124,930	126,947	42,500	21,600	....	315,977
Total deductions	£169,930	£171,947	£67,500	£41,600	£285,000	£735,977
Surplus paid into or drawn from common fund	£656,955	£173,512	(c) £12,342	£102,265	(c) £425,003	£496,387
Amount received from common fund	£59,566	£148,916	£29,783	£99,278	£158,844	£496,387
Per cent of total	12	30	6	20	32	100
Add balance from last year's accounts	21,332	23,605	24,567	17,484	60,930	147,918
Total amount available for dividends and further reserves	£80,898	£172,521	£54,350	£116,762	£219,774	£644,305

(a) Including $566,370 from government compensation after providing for adjustments.
(b) Exclusive of dividend on second preference stock.
(c) Deficit drawn or met out of common fund.

STATISTICAL INFORMATION OF ROADS IN LONDON FOR YEAR 1919

	Metropolitan District Railway	London Electric Railway	City and South London Railway	Central London Railway	London General Omnibus Company	Total
Mileage—first track	27.825	41.03	7.325	6.825	....	....
second track	26.975	....	7.325	6.764	....	....
Total—all tracks	70.80	....	15.680	21.375	....	....
Average total miles operated	70.80	....	15.680	21.375	400	....
Train miles—active	4,700,398	....	1,345,305	1,523,237	....	....
idle	139,623	....	22,642	13,917	....	....
Total train miles operated	4,840,021	....	1,367,947	1,537,154	....	
Total car miles operated	16,868,610	25,225,196	6,726,508	6,725,389	75,431,534	130,977,237
Revenue passengers carried:						
Ordinary (cash)	(b) 94,946,736	120,848,798	28,240,792	39,500,855	673,159,709	956,696,890
Workmen	(b) 22,095,147	31,130,608	11,380,985	3,896,548	....	68,503,288
Season	(b) 25,401,190	15,604,260	2,282,436	4,904,484	....	48,192,370
Total passengers	(b) 142,443,073	167,583,666	41,904,213	48,301,887	673,159,709	1,073,392,548
Gross passenger revenue	£1,360,000	£1,538,707	£314,402	£449,493	£5,242,299	(b) £8,900,000
Average fare per passenger (pence)	2.29	2.19	1.8	2.2	1.87	1.99
Car-mile statistics:	s d	s d	s d	s d	s d	s d
Traffic receipts	2 6.12	1 1.47	0 11.24	1 16.03	1 4.68	1 5.76
Operating expenses	1 16.03	0 9.65	0 8.52	0 11.4	1 5.71	1 3.12
Net income	0 11.78	0 3.28	0 1.97	0 5.09	0 *4.43	0 2.26
Passenger traffic	8.48	6.6	6.23	6.25	8.92	8.22

(a) Operated by Electric Locomotive.
(b) Estimated.
* Deficit.

City Wins Tax Fight

The city of Parkersburg, W. Va., has been awarded a verdict in its suit against the Kanawha Traction & Electric Company arising out of the provision that the city shall receive a certain per cent of the earnings of the company. The company held that the city was not entitled to participate in any returns from lines running into the suburbs.

The case was previously decided by the Circuit Court in favor of the city. Appeal to the Supreme Court of the State was made by the company. The Supreme Court found an error in the judgment of the Circuit Court, but it proved one that could be corrected. The modification provides that the city's percentage of the earnings should date from Sept. 31, 1913, instead of Aug. 6, 1913, $262.78 being adjusted the city for this period.

The years 1914, 1915, 1916 were used in the case and the city will collect approximately $1,000 for the period. In addition to the amount for these years a settlement will be made for the years 1917, 1918, 1919. It is expected that this settlement will net the city several thousand dollars additional.

Carhouse and Cars Burned

Loss estimated at between $50,000 and $60,000 was caused by the burning of the carhouse of the Danbury & Bethel Street Railway in Danbury, Conn., on March 16. Nineteen cars were destroyed.

Financial News Notes

Would Sell Part of Road.—Receiver Robert W. Perkins has applied to the Superior Court at New London, Conn., for permission to sell so-called deadweight sections of the Shore Line Electric Railway.

Mr. McRoberts a Monongahela Director.—Samuel McRoberts, prominent New York banker, has been elected to the board of directors of the Monongahela Valley Traction Company, Fairmont, W. Va., to succeed the late Jere H. Wheelwright, who died in France last January.

To Extend Sales to Public.—Stone & Webster, Boston, Mass., have begun in some localities the offering of new issues of securities to the public served by the utility in question. It is planned to extend the scope of this work in the future as new capital requirements arise or other occasion warrants.

Notes to Cover Paving Cost.—Declaring that it is unable to pay $25,204.63 in cash for its share of the paving on Juniper Street in Atlanta, Ga., the Georgia Railway & Power Company has petitioned the Railroad Commission for approval of the execution and issuance of three promissory notes of approximately $6,301.16 each, dated on or about March 13, 1920, and payable to the city of Atlanta one, two and three years after date, with interest at 7 per cent.

Charter Amended. — An Amendment has been filed to the charter of the Louisville (Ky.) Railway. It provides that the affairs of the company shall in the future be managed by a board of directors of not less than five nor more than fifteen members. One member shall be the president and all members must be stockholders, under the amendments. This is in accordance with plans for charges in the personnel of the company referred to recently in the ELECTRIC RAILWAY JOURNAL.

Inventory Filed in Fare Case.—The Omaha & Council Bluffs Street Railway, Omaha, Neb., has filed with the State Railway Commission an inventory in compliance with the order of the commission. This inventory does not carry any valuations. The company is, however, working on a valuation which will be filed with the commission when completed. The inventory and the valuation are in connection with the 7-cent fare which was allowed the company last summer. The increase in fare went into effect about Aug. 10 of last year. It is still in force.

State Valuation Commission Suggested—Senator Collins B. Allen, of Salem, N. J., has introduced a bill in the New Jersey Legislature for the establishment of a commission composed of the Governor, Treasurer and Comptroller for the purpose of making an independent valuation of electric railway property. The measure carries with it an appropriation of $100,000 and permits the Commission to employ electrical and mechanical engineering firms to perform the work. It also empowers the commission to examine the books of the companies as a basis for rate making.

Ordered to Resume Service. — The Board of Public Utility Commissioners of New Jersey has issued an order directing the Public Service Railway, Newark, N. J., to improve the condition of the tracks and roadbed on Main Street, Moorestown, N. J. by June 30. The company is also directed to resume the same service it operated previous to discontinuing operation some time ago, owing to the condition of the tracks the railway last November discontinued operation and failed to provide for transportation of patrons upon cars of the Burlington County Transit Company.

San Francisco Reorganization Approved.—Announcement has been made that the California Railroad Commission has approved plan of reorganization for the United Railroads of San Francisco, submitted by the committee of holders of first mortgage four's, 1927. Under the plan of reorganization the new company will be called the Market Street Railway and the 4 per cent certificate holders will receive 15 per cent of par value in first mortgage bonds of reorganized company; 50 per cent in 6 per cent prior preference cumulative stock; 5 per cent in first preferred 6 per cent stock; 10 per cent second preferred stock; 20 per cent common.

New Trustee at Dallas.—The Dallas (Tex.) Railway announces that the Equitable Trust Company, New York, has been appointed trustee to fill the vacancy caused by the resignation of the Scandinavian Trust Company, appointed trustee under a mortgage and deed of trust given by the railway on June 15, 1918, securing an issue of notes issued by it and designated as its secured gold notes. These notes were issued in the refinancing of the company in connection with the carrying out of its program of improvements and betterments pledged under its service-at-cost franchise granted by the city of Dallas.

Dallas Doing Better. — The Dallas (Tex.) Railway shows a net return of 5¼ per cent on invested capital of $8,771,905, according to figures for February given out by Richard Meriwether, vice-president and general manager. Cars of the company in Dallas carried more than 4,500,000 people, of whom 639,362 or 13.4 per cent, were transfer passengers. Cars traveled a total of 575,530 car-miles, and trainmen worked a total of 62,872 car-hours. The average number of passengers carried per mile was 8.2, and the average miles traveled by each car was 9.1. Gross earnings for the month amounted to $218,725. The operating expenses were $180,628.

Abandonment Petition Allowed. — The Public Service Commission for the Second District of New York has granted the petition of the Chautauqua Traction Company approving a declaration of abandonment of its line from Westfield to Barcelona, about 1 mile long. The commission's order follows an investigation by Chairman Charles B. Hill, who in a memorandum, shows that the line has always run at a heavy loss in operation, the loss reaching several thousands of dollars each year. The objection was raised that because of certain provisions in consents by local authorities the company has no legal right to abandon under section 184 Railroad Law, and that the section, so far as it assumes to extend that power to the company, is unconstitutional. This is not sustained by the commission.

Seek to Have Service Restored.—At a hearing on March 15 before Deputy Public Service Commissioner Morgan T. Donnelly an attorney for the receiver of the New York Railways stated that the service had been discontinued on the Eighth and Fourteenth Street lines by direction of Federal Judge Mayer, but that the receiver would be willing to consider any reasonable suggestion which could be made for the operation of service, provided the service could be rendered at less than ruinous loss. The hearing was adjourned to March 22. In the meantime the commission will engage in negotiations to determine if it is not possible to work out a plan for resumption of service. The lines cut off on March 6 were the Eighth Street, Fourteenth Street, Fourteenth Street-Tenth Avenue and the Fourth and Madison Avenue Lines. Substitute service on two of the lines —the Eighth and Fourteenth Street routes—was furnished by motorbuses which are being supplied and operated by the city.

Rainier Line Rejects City's Appraisal.—Figures on which it is proposed to base negotiations for the purchase by the city of the Seattle & Rainier Valley Railway have been submitted to the utilities committee by Councilman W. H. Moore of the Council of Seattle, Wash. Mr. Moore's report, places a value of $765,760 on the property. This does not include a sum the company spent in raising the tracks and filling the right-of-way to the present grade. Councilman Moore said he considered it a legitimate item of the valuation and the report was accepted with the understanding the sum would be added as soon as it could be estimated. Councilman Moore was authorized by the Council to make an appraisal of the line after residents of Rainier Valley had filed a petition asking the city to purchase the property. The figures were telegraphed to E. W. Sampsell, president of the company, at Chicago and a reply stated emphatically they would not be considered.

Traffic and Transportation

Fare Petitions Withdrawn

Three New York Companies Give Up Hope of Aid from Board of Estimate —Inquiry to Continue

Despairing of obtaining financial relief at the hands of the municipal authorities, three of New York City's traction lines on March 12 withdrew their petitions to the Board of Estimate and Apportionment for an increase in fare. The companies thereby ceased to be voluntary participants in the boards inquiring into the city's transit system. Nevertheless, Corporation Counsel Burr announced on March 13 that the board would continue its investigation.

The notices of withdrawal of the applications were signed by Henry L. Stimson, counsel for Job E. Hedges, receiver of the New York Railways; James R. Sheffield, trustee of the Interborough Consolidated Corporation, the holding concern of the Interborough Rapid Transit Company and the New York Railways, and Lindley M. Garrison, receiver of the surface, elevated and subway lines of the Brooklyn Rapid Transit Company. No notice was served by the Interborough Company, because the inquiry into its affairs by the board is ended, and because it is not bankrupt. It was stated that if the board reopened its inquiry into this company that it also would notify the board that it was not seeking any financial help from the board.

JUDGE MAYER TAKES ACTION

In withdrawing the petitions for relief, the receivers acted upon instructions from Federal Judge Mayer, who has charge of the companies' affairs. Colonel Stimson sent the following letter to Mayor Hylan:

MAYOR JOHN F. HYLAN,
Chairman of the Board of Estimate:

Sir: By direction of Judge Mayer of the United States District Court, I beg to inform you that I shall not participate in any further hearings before your board upon the subject of the affairs of the New York Railways. By the same direction the petition filed with you on Jan. 7, 1920, by Mr. Hedges, as receiver of the company, is hereby withdrawn. Such further investigation into the affairs of that company as your board may desire to make will not be attended by counsel for the receiver.

HENRY L. STIMSON.

Two-and-one-half months have passed since Judge Mayer directed the receivers to apply to the board for a temporary fare increase. As yet the board has given no indication of an intention to aid the companies. Although numerous hearings have been held there has been little progress in the direction of fixing a valuation of the lines.

Representatives of the companies, in testifying at the traction inquiry, have frequently been taunted with unfairness and otherwise heckled by city officials, including the Mayor. It is believed that this badgering had much to do with Judge Mayer's decision.

The board at its session on March 19 decided definitely to continue the inquiry. Mr. Burr declared that he thought the city would have no trouble in proceeding with the investigation since, under a resolution of the board, he was empowered to issue subpoenas, if necessary. The Public Committee on Transportation presented a request that the board designate a committee to confer with representatives of the security holders with a view to arriving at a solution of the traction problem.

Corporation Counsel Burr on March 17 asked the Public Service Commission to notify the Interborough Rapid Transit Company that, unless it takes immediate steps to improve its service, the city will take steps to seize and operate the company's subway lines at the end of ninety days. The terms of the subway contract give the city the right "to enter upon and as agent of the lessee, to operate the railroad and equipment * * * at the rate of fare and in the manner provided in the lease for the remainder of the term." Mr. Burr charged that the quality of the service justified the city in carrying out this provision.

$6,000,000 Houston Value

Special Master Holds Texas Property Is Denied Fair Return Under Five-Cent Rate

The Houston (Tex.) Electric Company can not earn a fair return on its property valuation with the present fares at 5 cents for adults and 2½ cents for children. This is the finding of Otis K. Hamblin, special master, appointed by Federal Judge J. C. Hutcheson to hold hearings and fix the valuation of the company's property and report on the adequacy of the return earned by the company.

Judge Hamblin in his report submitted to Judge Hutcheson places the valuation of the company's property at $6,000,000. He further reports that the company is now earning only 1½ per cent on its property valuation over a depreciation of 4½ per cent, and concludes that this rate of return is inadequate and is in effect confiscatory. Judge Hamblin says the company should be allowed a return of 8 per cent on its valuation of $6,000,000.

MAYOR FAVORS 6-CENT FARE

Mayor A. E. Amerman said he believed that a 6-cent fare would provide a fair return, and that the fare litigation would probably be ended. The Mayor doubts, however, if the 6-cent fare will prove adequate if the city demands improvements in service and facilities.

Judge Hutcheson will review the findings of the master in chancery at an early date. It is expected he will approve the report. If he does this city authorities and officials of the company will confer and if possible reach agreement on improved service and facilities and also on a higher fare than 5 cents.

Luke C. Bradley, district manager for the Stone & Webster Company, which operates the property, said the people of Houston were not getting the service the city deserved because the 5-cent fare was inadequate and the company was being starved to death. The authorized earning of 8 per cent, as proposed in the report of Judge Hamblin, and future fares to be charged by the company depend much on the co-operation of the people of Houston and the company, he said.

CASE LONG IN COURTS

The litigation between the city and the company has been before both the State and Federal courts. The company in its original petition to the City Council to increase fares represented that fares then authorized were inadequate and would not afford a fair return to the company. After extended hearings, the City Council passed an ordinance authorizing fares of 6 cents for adults and 3 cents for children.

This ordinance was attacked by the organized labor interests of the city, and under the initiative and referendum provisions of the city charter, a petition to refer the ordinance to the people for ratification was circulated and the required number of signers secured. At the referendum election the ordinance was rejected. Thereupon the company appealed to the State courts, alleging that the repeal of the ordinance was accomplished through illegal means. The company lost this fight.

APPEALS TO FEDERAL COURT

The company next brought suit in the Federal District court, representing that its property was being confiscated by the low fares authorized by the city, and asking that the court fix valuation of its holdings to be used as a basis for fixing fares. Judge Hutcheson then appointed Judge Hamblin to hold hearings and fix a just valuation and a fair return.

Judge Hamblin explained that the valuation of $6,000,000 had been arrived at after exhaustive investigation in which representatives of the city, of the company, disinterested engineers and valuation experts had been heard.

In the hearings Lamar Lyndon, valuation expert, set the value of the company's properties at $5,300,000. The special master increased this figure by $700,000.

Parking Dead Line in Los Angeles

Ordinance Effective on April 10 Will Relieve Congestion in Business District—Three Zones Established

A "no-parking" ordinance will go into effect in the business district of Los Angeles, Cal., on April 10. Under it the parking of automobiles and other vehicles will be prohibited within certain areas, and within others will be restricted to a definite period of the day. The elimination of parking within the congested area will leave the streets clear for the operation of electric cars.

Adoption of some form of restriction on the operation of vehicular traffic is generally conceded to be the only hope of relieving the transportation system in Los Angeles. Portions of the Los Angeles business district are considered the most congested areas of the sort in the entire country. The Los Angeles Railway and the Pacific Electric Railway are physically unable, because of vehicular congestion, to operate their cars on schedule.

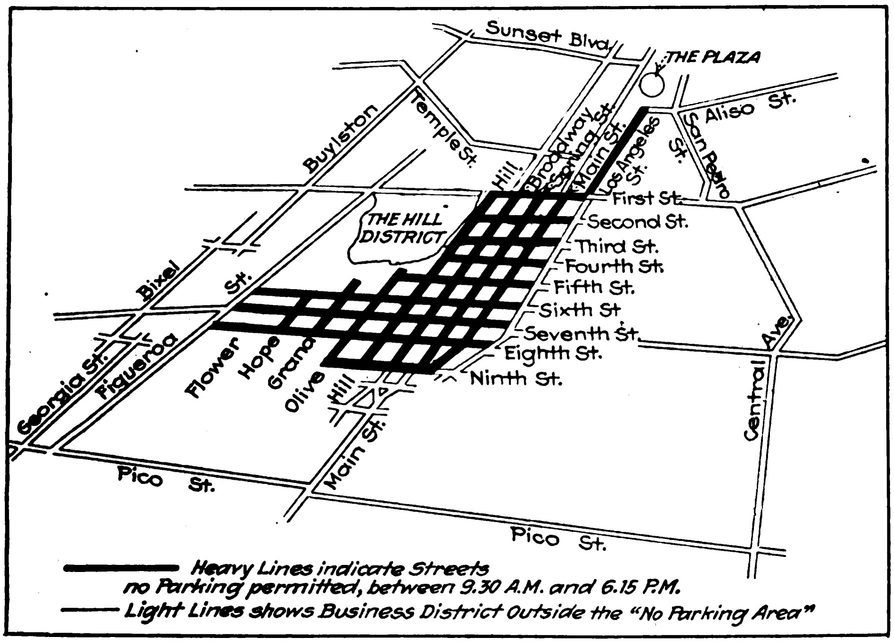


DIAGRAM OF LOS ANGELES PARKING PLAN

COMMISSION'S RECOMMENDATIONS

The State Railroad Commission, after an exhaustive study of traffic conditions in the city, recommended enactment of drastic anti-parking legislation and a general rerouting of cars. Acting on the commission's recommendations the City Council recently passed an ordinance, effective on April 10, under which the operation of vehicles within the business section will be controlled. The ordinance divides the business district into three zones, a "congested" or closed district, a semi-restricted section, and an unrestricted area.

Within the first of these the parking of automobiles is prohibited between the hours of 11 a.m. and 6.15 p.m. This district is bounded as indicated in the accompanying illustration. Certain street-sections in the hill region are exempted from the parking ban. Outside of this "congested" area, but still within the business district proper, is a section in which the automobilist may park his car for a period of two hours without interference from the police. This section is bounded on the north by Sunset Boulevard, on the east by San Pedro Street and Central Avenue, on the south by Pico Street and on the west by Georgia, Bixel and Buylston Streets.

Beyond these limits unrestricted parking will be permitted. The new ordinance also prohibits the use of the "left-hand turn" during the no-parking hours. Commercial deliveries are to be made from alleys whenever conditions permit.

The enforcement of these rules is expected to react on the electric railways in two ways. First, it will speed up operating schedules. At present 30,000 automobiles park in the congested district each day. Their elimination will remove the greatest obstruction to the fast operation of cars.

MORE RAILWAY RIDERS

Second, the prohibition of parking in the heart of the city will turn a considerable volume of traffic now taken care of in other ways to the Los Angeles Railway. The number of persons daily entering the congested district in automobiles is estimated at 82,000. Since these riders may not leave their machines in this district while they are attending to their business or pleasure, the vast majority of them will either seek other parking accommodations, such as garages, park their cars at the beginning of the closed section and walk in, or leave them at home. In any case great numbers of these autoists will use the trollies.

The company will thus be confronted with a daily increase in the number of riders of approximately 80,000. To meet the new conditions the railway plans to provide additional equipment. It will also be in better shape to carry the additional burden since it will be able to operate its cars on a faster schedule. In this connection it plans to reroute its cars and to make other operating changes proposed by the commission. These latter measures will become effective on May 1. It is estimated that when the new system is in full swing the company can operate its equipment with one-half the present headway.

REFERENDUM PROPOSED

The carrying out of the no-parking plan will in all probability alter the course of the city's development. It may lead to the growth of new shopping and theater districts to cater to automobilists. The plan has encountered considerable opposition at the hands of motorists. More than 15,000 persons have signed petitions for a referendum on the question of retaining the parking regulations.

Several large garages are being erected within the no-parking area. One of these has already been completed. Another is to be put up immediately at a cost of $650,000 and, when finished, will provide parking space for 1,032 vehicles.

Safety Bonus Plan Working Well

Results of the first month's trial of the safety bonus plan, recently adopted by the Dallas (Tex.) Railway as a means of encouraging efficiency and carefulness on the part of its employees, have proved most satisfactory. Richard Meriwether, vice-president and general manager of the company, reports that all but forty-two out of the total of 553 trainmen in the company's employ eligible to participate in the system, came through the month with perfect service records, and that 508 received the additional 2 cents an hour as bonus for perfect records.

Data on the bonus plan, as submitted by Charles Swenson, superintendent of transportation, to Mr. Meriwether, indicated that almost one-half of the trainmen who failed to receive the bonus, lost this extra pay through reporting late for duty. One motorman lost the bonus because he operated his car faster than the schedule called for. Seven trainmen were not awarded the bonus because of collisions, and one motorman lost the bonus because he turned back without orders and talked to a woman while on duty.

The safety bonus plan was announced by the company to take effect on Jan. 1. It will be continued for three months as a test. At the end of that time the company will probably announce the general results.

Seven Cents in Auburn

This Rate Will Prevail for Three Years —Commission Declares Six-Cent Fare Inadequate

The Public Service Commission for the Second District of New York on March 9 directed that for a period of three years, unless changed by order of the commission, a 7-cent fare shall be the maximum fare which may be charged by the Auburn & Syracuse Electric Railroad on cars within its Auburn, N. Y., zone, including all lines within the city and between Auburn and Owasco Lake and between Auburn and Soule Cemetery. The new fare becomes effective on three days' notice.

The company has been operating under a 6-cent fare since Dec. 31, 1918, and on Jan. 13 the city waived fare restriction in certain franchises so as to permit further investigation and a fare not to exceed 7 cents.

Commissioner Frank Irvine, in a memorandum accompanying the order, reviews the evidence on the hearing. He says:

> This shows a deficit from railroad operation under the 6-cent fare of $1,929, a deficit after paying taxes of $11,598 and of income applicable to capital investment of $6,932. Interest on bonds is not deducted. On the face of this showing no inquiry into value of the property is necessary. The city system is of very considerable extent and the equipment seems adequate and in good condition. It is certainly entitled to earn some return and more than can be hoped under present conditions even from the proposed increase in fare.

The city's waiver provides that the city within three years may make application for a reduction in the rate. Commissioner Irvine in conclusion says:

> It may not be amiss to repeat an admonition given already to some other companies under similar conditions; that is, that as there seems now to be no prospect of early return to conditions formerly considered normal in finance and prices,, the best efforts of the company should be given to devising means of reducing expenses without impairment of service. Not that the commission deems the present expenses excessive as compared with other systems operating under present methods; they are not so; but because it is felt that some improvements in the methods themselves are imperatively necessary.

Important Freight Interchange

The Northwestern Elevated Railroad, Chicago, has purchased two new 50-ton electric locomotives which will be equipped with Westinghouse 567 motors. These are the same type motors which were specified for part of the last all-steel cars bought by the Elevated Lines.

The two locomotives will be used in connection with the interchange of freight between the Chicago, North Shore & Milwaukee Railroad and the Chicago, Milwaukee & St. Paul Railroad. North-bound freight received from the steam road at the interchange yard which lies between Irving Park Boulevard and Wilson Avenue will be hauled over the elevated structure from this point to Evanston and sent north over the North Shore Line.

Three steam locomotives are now kept busy in hauling this freight over the elevated structure paralleling the Northwestern "L" to the present interchange point in Evanston. The Elevated company will take over the handling of this interchange freight between Wilson Avenue and Evanston on Oct. 1.

Many Routing Changes Suggested

The executive committee of the Louisville (Ky.) Railway is being flooded with petitions of merchants for changes in present routings, and also of residents of certain sections of the city. Merchants are anxious to reroute some of the East and West lines and one or two North and South lines around a downtown loop. It is held that this would eliminate many transfers and give better service. However, a similar plan of a few years ago did not prove satisfactory, and the new plan would call for building some three or four blocks of additional line in the business district, as well as connections in other sections of the city. F. A. Sager, who has been employed by the railway to aid it in solving various problems, has taken all of these suggestions under advisement. The company is not likely, however, to go to the expense of building additional trackage which would probably further slow up traffic.

New York Transfer Charge Upheld

The attempt of the City of New York to restore free transfers on the lines of the New York Railways by abolishing the 2-cent charge allowed by Public Service Commissioner Lewis Nixon, was defeated on March 16, when Justice Greenbaum of the Supreme Court granted the motion of Terence Farley, counsel to the commission, to quash the writ of certiorari obtained by Corporation Counsel Burr.

The action of the court was an answer to statements made by Mayor Hylan, Mr. Burr and other representatives of the city government that Mr. Nixon exceeded his authority in permitting the transfer charge, and that it was in effect an increase of fare which the Court of Appeals had decided could not be allowed by the commission without the consent of the Board of Estimate.

Justice Greenbaum explained at length the rights retained and granted by the city under the franchises of the company, and in reference to the order of the commission said:

> It is plain from the reading of the order that in permitting a 2-cent charge for transfers no rights of the city are affected thereby.

The opinion refers to various valuations of the railway to show the need the company had of an increased income, and referred to the fact that the city had conceded the right of the commission to grant the company the privilege of charging for transfers at fourteen out of the ninety-nine points where a charge was allowed.

The privilege of the company to charge for transfers at ninety-nine of the 113 transfer points is to run only for one year, when the commission will decide whether to extend the time or restore the free transfers.

Transportation News Notes

Would Abolish Freight Service.—The West Virginia Traction & Electric Company, Wheeling, W. Va., has applied to the State Public Service Commission for permission to discontinue freight service on its line between Wheeling and West Alexander. The company asserts that to continue such service it would require additional equipment.

Must Segregate Negroes.—The South Carolina Railroad Commission has ordered the Augusta-Aiken Railway & Electric Corporation of South Carolina, Augusta, Ga., to install separate compartments in its cars for the accommodation of negroes. The commission directs the company not to operate its cars in South Carolina without segregating the races.

Seven Cents in New Castle.—The Pennsylvania Public Service Commission has authorized the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, formerly the Mahoning & Shenango Railway & Light Company, to charge 7-cent cash fares on its New Castle (Pa.) city lines. The company is ordered to sell six tickets for 40 cents and twenty school tickets for $1. Under the order the new rates became effective on March 14.

Increase on Fall River Line. — The Massachusetts Department of Public Utilities has authorized the Union Street Railway, New Bedford, to increase the fare between New Bedford and Fall River from 20 cents to 25 cents. The company, which operates over the tracks of the Eastern Massachusetts Street Railway in Fall River, had temporarily discontinued service within the limits of the latter city because of the demand of the Eastern Massachusetts Street Railway management that it charge 10-cent fares in Fall River.

Six-Cent Fare Stands.—The Memphis (Tenn.) Street Railway has reached an agreement with the City of Memphis whereby it will continue to charge a 6-cent fare for three months from April 1. If at the end of that time the company is still in need of additional revenue the fare will automatically advance to 7 cents. The State Railroad & Public Utilities Commission, which has had the company's application for a rate increase under consideration, has approved the agreement.

Rerouting in Pittsburgh.—In an effort to improve spacing between cars using Forbes Street, the Pittsburgh (Pa.) Railways has announced new routing for several of its lines. In a statement explaining the changes, the company declares that since the number of riders has been increased the matter of spacing is much more important now than it has been in the past. This is the most important route change made by the Pittsburgh Railways in many years. It is expected to go a long ways toward helping to solve Pittsburgh's trolley transportation problem.

Interurban Increase Protested. — Mayors Morris of New Albany, and Myers, of Jeffersonville, have filed protests with the Interstate Commerce Commission against an increase of cash fares from 7 cents to 10 cents between Louisville and New Albany over the line of the Louisville & Northern Railway & Lighting Company. The company has arranged to sell ticket books at the rate of 7 cents a fare, with cash fares 10 cents. The increase becomes effective on April 3, unless the schedule filed is suspended within thirty days by the Interstate Commerce Commission.

Surplus Accident Fund Divided.—An average of about $50 a man for those who were in the company's service all of 1919 was paid recently by the San Diego (Cal.) Electric Railway when the surplus in the accident fund for 1919 was distributed. There was $10,369 in the fund after all claims for injury or damage to property had been paid. This was distributed to the men pro rata, based upon the number of hours worked. The policy of distributing this fund each year was adopted by the company several years ago to make the men careful to avoid accidents. It has accomplished this result, according to the officials. Most of the accidents that did occur were caused by automobiles, it was stated.

Demand for Service Improvements.—A demand that the Public Utilities Commission of Illinois take immediate action to improve service on the Chicago Surface Lines was made in a public statement issued by Attorney General Brundage on March 10. The State officials urged the extensions of "turnback" service on some of the lines which now use loops in the congested district; the installation of trailers to add to seating capacity, and the use of all available cars in the rush and nonrush hours. The commission replied with a statement to the effect that all these suggestions had already been presented to that body and were being considered.

Changes in Albany Southern Tariff.—The Albany Southern Railroad, Hudson, N. Y., under changes in its tariff, filed with the Public Service Commission for the Second District, proposes as effective on April 5 these changes: Local one-way fares increased from 8 to 11 cents from Prospect Heights to East Greenbush; reduced from 33 cents to 30 cents from Schodack Center to North Chatham; increased from 36 cents to 39 cents from Merchants to Albany. Rules relating to commutation tickets will provide that in case the sale price of a ticket is lawfully changed before expiration, the ticket will not be honored for transportation but the unused portion will be redeemed.

Municipal Operation for Staten Island.—Grover A. Whalen, Commissioner of Plant & Structures of New York City, has announced that the city authorities will take over and operate the lines of the Staten Island Midland Railway, Richmond Borough. The company suspended operation last January following the refusal of the Board of Estimate to grant it an increase in fare. Commissioner Whalen stated on March 13 that, acting under instructions from Mayor Hylan, he had practically completed arrangements for the purchase of twenty cars from the Emergency Fleet Corporation for use on the Midland Company's tracks, the latter company having transferred its own rolling stock to the lines of the Richmond Light & Power Company. The Richmond County Grand Jury is at present investigating the situation.

More Safety Cars for Terre Haute.—The Terre Haute Traction & Light Company, Terre Haute, Ind., has placed an order for ten additional safety cars for use in Terre Haute. This brings the total number of safety cars purchased by the company up to sixty-six and will provide for 100 per cent safety-car operation, including rush-hour service. All sixty-six cars are of identical design and equipment, this fact being of great importance from the viewpoint of low maintenance costs because of the complete standardization. The purchase of the last ten cars was financed in Terre Haute. Three local bankers were induced to purchase the cars, the company obligating itself with five-year 6½ per cent equipment notes. The bankers will pay for the cars when delivered and will give the company a bill-of-sale for them when it has met its obligations. The attitude of the public and the newspapers on the one-man cars in Terre Haute was the subject of an article in the ELECTRIC RAILWAY JOURNAL for March 6, page 495.

Favor Higher Tube Fare.—Resolutions favoring an increased fare on the lines of the Hudson & Manhattan Railroad, New York, N. Y., have been adopted by the directors of the Chamber of Commerce of Jersey City, N. J. The company, which operates the tubes under the Hudson River, has notified the Interstate Commerce Commission of its intention to raise fares to 8 cents on April 4. The 8-cent fare is expected to yield additional revenue to the amount of $1,000,000 per year. On the basis of the 1919 figures, which showed a deficit of $1,301,753 in the net available income to meet interest on bonds, the company still would not be meeting this item in full. Oren Root, president of the company, recently announced that although the gross revenue of the road had increased 64.82 per cent in the years from 1915 to 1919, the cost of maintenance and operation had risen in the same period 155.20 per cent. The cost of operation per car-mile increased from 18.21 cents in 1914 to 37 cents in 1919.

New Publications

McGraw Electric Railway List

For February, 1920, 284 pages, published by the McGraw-Hill Company, Inc., New York.

The issue for February of this well-known semi-annual list has just been published. As usual, it contains the names of all operating electric railway companies and municipal lines in the United States and its insular possessions, also in Canada, Mexico and the West Indies. A list of officers and a brief enumeration of the equipment are included. In this edition, which has been completely revised, are represented approximately: 1,450 changes in personnel, 650 changes in power plant and substation equipment, 500 changes in mileage and rolling stock, 500 additional miscellaneous changes, 44 receiverships, 15 re-organizations and other valuable statistics on the industry.

Commercial Research: An Outline of Working Principles

By C. S. Duncan, Ph.D. The MacMillan Company, New York, N. Y., 385 pages. Price $2.25.

It is sometimes easier to accomplish progress by warning people of impending danger of falling behind in the race than by appealing constructively to man's better nature. As Mr. Steinmetz prophetically said during the progress of the war: "Whichever side emerges victorious, all nations must of necessity adopt better standards of business and scientific organization as a matter of self-preservation."

As Mr. Duncan says, trade persists through multifarious social and political changes. The new age, like the old, will be built on a foundation of commerce. What this commerce is to be, what rules of the game are to be adopted, what organization for trade will result, what prevailing spirit will animate it, are points of vital interest.

"Commercial Research" contains a discussion of scientific principles for the solving of commercial problems, and is a guide to their application. In everyday, untechnical language there are stated the devices by means of which the manager may most quickly and accurately visualize his problems; the need for research; character of commercial research; sources of business facts; methods of collecting them; their nature, analysis, presentation, interpretation, and organization for research.

All this material is intended for education and especially for the self-education of those already in the midst of the game. There is to be found here a discussion of principles and not of historical development. The book is written for the business man; for his use and not for his entertainment.

Personal Mention

J. C. Nelson in Command

Made Head of Empire State Railroad, Succeeding the Late H. S. Holden —L. L. Odell Promoted

J. C. Nelson, vice-president and general manager of the Empire State Railroad, Syracuse, N. Y., was elected president of the company at the meeting of the board of directors on March 9. Mr. Nelson succeeds the late H. S. Holden. At the same time L. L. Odell was elected assistant general manager. Mr. Odell will continue in his capacity as treasurer.

Mr. Nelson has been in charge of the company's affairs since the death of Mr. Holden in November, 1918. Since that time the office of president has been vacant. The Empire State Railroad, which took over part of the system of the Empire United Railways, sold under foreclosure, operates 80 miles of track in the central part of New York State, including an interurban line connecting Syracuse and Oswego and the city lines in Oswego and Auburn.

J. C. NELSON

Mr. Nelson was graduated from the University of Alabama with the degree of civil engineer, later taking a special engineering course at Cornell University. In the year 1902 he became connected with the engineering firm of Ford, Bacon & Davis, New York, with which he was associated for a number of years. He was at first employed in the construction department in connection with the development of the firm's properties in the South, and was later transferred to the New York office, where he was engaged on construction and valuation work. He also made several investigations of public utility operation.

He was appointed general manager of the Gary & Interurban Railroad, Gary, Ind., in 1916. From Gary he was transferred, in the following year, to Syracuse, as general manager of the Empire United Railways. When this company was reorganized in October, 1917, Mr. Nelson became vice-president and general manager of the Empire State Railroad, its successor. In March of last year he was elected vice-president and general manager of the Ithaca (N. Y.) Traction Company, continuing his connection with the Syracuse company.

Municipal Railway Head Quits After Election

Thomas F. Murphine, director of public utilities of Seattle, Wash., and superintendent of the Seattle Municipal Street Railway, resigned on March 16. R. M. O'Brien, assistant superintendent, has been placed in charge of the public utilities department, while D. W. Henderson, superintendent of transportation, has been given temporary direction of the municipal railway.

Mr. Murphine became the active head of Seattle's extended municipal railway system, with its trackage of more than 225 miles, in April, 1919, when the city completed the purchase of the railway lines of the Puget Sound Traction, Light & Power Company. He was formerly superintendent of the 18-mile municipal railway line which the city had installed. He was graduated from the University of Washington in 1898 with the degree of A.B., and from the School of Law of the same institution in 1907. He was a member of the 1913 and 1915 sessions of the State Legislature, where he was a leader of the Progressive and municipal ownership forces. In 1918 he was appointed superintendent of public utilities by Ole Hanson, then Mayor of Seattle, during whose administration the transfer of the railway to the city was arranged.

David W. Henderson, who has been placed in charge of the municipal lines, has been superintendent of transportation since April, 1919. Until that time he was head of the transportation department of the Puget Sound Traction, Light & Power Company. He had been connected with the latter company for seventeen years.

The recent municipal elections resulted in the choice of Hugh M. Caldwell as Mayor of Seattle. During the campaign Mr. Caldwell condemned the public utilities department and municipal railway. He was elected by an overwhelming majority. The new executive is reported to be preparing to separate the municipal railway from the public utilities department and to place the former in charge of a superintendent of transportation.

R. I. Todd Honored

Chosen President of Central Electric Railway Association—His Career as Railway Operator

Robert I. Todd, president and general manager of the Indianapolis (Ind.) Street Railway and the Terre Haute, Indianapolis & Eastern Traction Company, was chosen president of the Central Electric Railway Association at the annual meeting of that body at Louisville, Ky., on March 10 and 11. Mr. Todd's election was noted in the ELECTRIC RAILWAY JOURNAL for March 13. Mr. Todd has been associated with the work of the Central Association for many years and has already served as first vice-president, but could not be induced to accept the presidency until this year. He has now taken the office reluctantly, but has pledged himself sincerely to do his utmost in promoting the interest of the member companies.

Mr. Todd was born on Nov. 29, 1869, at Lakewood, N. J. He received the degree of electrical engineer from Johns Hopkins University in 1893. His connection with the railway field began while he was still a student at the university, his summers being spent in the employ of the traction company at Raleigh, N. C., one of the earliest electric lines in the country. Subsequently he became connected with the Washington, Eckington & Soldiers' Home Railway, Washington, D. C., which was later consolidated into the City & Suburban Railway, and still later into the Washington Railway & Electric Company, serving as superintendent and electrical engineer.

R. I. TODD

He left this position in 1899 to become connected with the Compressed Air Company as chief engineer, this company having undertaken the development of compressed air motors for the Metropolitan Street Railway, New York City. Later he became more directly connected with the latter road, doing engineering work for Mr. Starrett, who was then chief engineer of this company. In 1900 he went to Pittsburgh as mechanical engineer in charge of shops and power houses of the Pittsburgh Consolidated Street Railway, now included in the system of the Pittsburgh Railways.

In the latter part of 1901 Mr. Todd was chosen vice-president and general manager of the Cincinnati Traction Company, leaving this position early in 1903 to assume general supervision of the engineering work of the electric railway properties of the United Gas & Improvement Company, Philadelphia, Pa. In the following year he was appointed general manager of the Rhode Island Company, Providence, R. I., serving in this capacity until 1906, when he went to Indianapolis to become vice-president and general manager of the Indianapolis Traction & Terminal Company and the Terre Haute, Indianapolis & Eastern Traction Company.

Upon the death of Hugh J. McGowan in 1911, Mr. Todd was elected president of these two companies, the former now being known as the Indianapolis Street Railway. Mr. Todd served a term as president of the American Electric Railway Transportation & Traffic Association in 1912. He is now the fourth vice-president of the parent Association. He is a member of the American Society of Mechanical Engineers and an associate member of the American Institute of Electrical Engineers.

George J. Smith, who resigned on Feb. 1 as superintendent of equipment of the Kansas City (Mo.) Railways, was recently tendered a dinner by officials of the company at the Hotel Muehlebach, Kansas City. On this occasion Mr. Smith's former associates presented him with a gold watch and chain. Arrangements have been made whereby Mr. Smith, who is now engaged in the automobile business in Kansas City, will act for the company in an advisory capacity.

E. T. Goslin, electrical engineer to the Glasgow Corporation Tramways Department, Glasgow, Scotland, has been appointed general manager of the Clyde Valley Electrical Power Company, to succeed Archibald Page, who has been appointed a technical member of the Commission under the Ministry of Transport for the control of the electrical supply of the kingdom. Mr. Goslin began his career in London with Messrs. Crompton & Company, Ltd., the well known electrical engineers. Thence he went to the Hove Electric Lighting Company, after which he was in the service of the County of London Electric Lighting Company. Mr. Goslin entered the Glasgow Corporation Tramways Department twenty years ago, and during eighteen of these he has been the chief electrical engineer. He is a member of the American Institute of Electrical Engineers. During the war he was lent to the Coal Controller, and was afterwards appointed to the Ministry of National Service as Deputy Director of Labour. Mr. Goslin held the rank of Major in the City of Glasgow Royal Engineers.

L. J. Drake, President

Head of Galena Company at Thirty-Nine —An Authority on Oil and Lubrication

Lauren J. Drake, who has just been elected president of the Galena Signal Oil Company, as mentioned in the last issue of this paper, comes from a family which has been prominent in the oil business, his father, for whom he is named, having been president of the Standard Oil Company of Indiana at the time of his death.

The present Lauren J. Drake is a young man to head such a large organization as the Galena Company, being only thirty-nine on his last birthday. That he should have been selected speaks volumes for the executive ability which he has displayed and the work accomplished during his fifteen years' connection with the company.

His record can be breifly summarized. Born in Keokuk, Iowa, on Aug. 27, 1880, he attended the public schools in Omaha and Chicago, and was graduated from the Shattuck Military School in 1899. After six years' service with several important oil companies, where he acquired a general and broad knowledge of the oil business, he joined the Galena Company in 1905 as representative in the Middle West. His election as vice-president and director, with headquarters in New York, occurred in 1916, and as president of the company on Feb. 24 of this year. Mr. Drake is also president of the branches of the Galena Company in France, England and Brazil. The outstanding characteristics which have led to his business success are his resourcefulness, untiring energy and personality.

L. J. DRAKE

Mr. Drake is a member of the Railroad Club and Whitehall Club of New York City, the North Hempstead Country Club of Long Island, the Franklin Club of Franklin, Pa., and the Wandango Country Club of Reno, Pa.

H. D. Anderson of Philadelphia, Pa., has been appointed secretary and treasurer of the Wilmington & Philadelphia Traction Company, Wilmington, Del. Mr. Anderson succeeds Charles N. Ryan, resigned.

Charles M. Kemp has been appointed general freight and passenger agent of the Fort Wayne & Northwestern Railway, Kendallville, Ind. Mr. Kemp was formerly station agent at Kendallville.

G. B. Cade, secretary and treasurer of the Atlantic Coast Electric Railway, Asbury Park, N. J., has been appointed assistant to S. F. Hazelrigg, president of the company. Mr. Cade has been connected with the road for more than twenty years.

Obituary

J. R. Harrigan Dead

J. R. Harrigan, vice-president and general manager of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., died on March 16 at his home in Kansas City after an illness of ten days. Mr. Harrigan, who took an active interest in the life of Kansas City, was also president of the Kansas City Interurban Freight Terminal Company.

Mr. Harrigan entered street railway work in 1886 following his graduation from the high school at Eau Claire, Wis. For two years he served as manager of the Eau Claire Street Railroad, operating a horse-car line. He then went into other business, but returned to Eau Claire in 1897 to assist in the electrification of the street railroad property and to act for four years as general manager of the new line, the Chippewa Valley Electric Railway. In 1901 he was appointed general superintendent of the Dayton, Springfield & Urbana Railway, Springfield, Ohio. In the following year he became general manager of the Columbus, Buckeye Lake & Newark Traction Company and the Columbus, Newark & Zanesville Railway, in which capacity he continued until the purchase of the roads by the so-called Widener-Elkins syndicate several years later, when he resigned.

In 1906 Mr. Harrigan assumed the management of the Canton-Akron Railroad, of which he was in charge until its absorption by the Northern Ohio Traction & Light Company, when he went to Buffalo, N. Y., as assistant general manager of the Buffalo & Lake Erie Traction Company. In 1908 he was appointed general manager of the Columbus, Delaware & Marion Railway, Columbus, Ohio. He resigned this position in 1910 to become vice-president and general manager of the Des Moines (Iowa) City Railway. In July, 1912, he resigned to assume the duties of general manager of the Kansas City, Clay County & St. Joseph Railway. He became vice-president of the company five years later, continuing to serve as general manager.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Wood-Pole Market Improving

White Cedar Poles Advance 10 Per Cent —Increase in Chestnut Pole Prices Expected

Wood-pole sales are improving. Business is encouraging and as soon as the railroads recover from the effects of the storm conditions over the country, deliveries will be much better than for some months past.

Although cutting operations have been difficult during the present season, the work is pretty well along, and were it possible to get transportation at the present time, the distributing yards of the different pole companies would be full to overflowing. As it is the poles have been cut and are on the ground waiting to be shipped. Car shortage is the greatest menace, although in some instances pole interests have built their own flat cars for moving poles to the main line of the railroads. Some stocks already have been received, and a large amount of poles are now loaded or en route.

Prices on red cedar poles have not advanced since the first of the year, when a general increase was made averaging from 10 to 15 per cent. White cedar, however, has advanced 10 per cent during the past week. There is a large demand in the East and South for both Northern and Western red cedar and also for Northern white cedar. In the West the greatest demand is for Western red cedar, which is cut in the off season and is in reality a local product obtainable on short notice at almost any time of the year.

Chestnut poles have not advanced since last year, but an increase is now looked for and may be announced at any time. Some of the best grades grown in parts of Virginia and Pennsylvania have been destroyed by blight although there is a considerable supply south of these distircts which will be available.

Grounding Device Sales Picking Up

Sales of grounding devices for a year past have been rather spotty among various manufacturers. Where labor conditions have permitted operators to work their plants at full capacity an increase in business has been shown for the year. Where labor conditions hindered production, inquiries received by the manufacturers indicate that the business of the year just closing would otherwise have been above that of the year previous. Ability to furnish the grounds has been a big factor in the sale, in addition to more settled conditions and more liberal buying in this country and, particularly, the demand that has been growing abroad.

Current sales show an increase. Since the time to manufacture these devices is small, shipments can be made promptly, or up to three weeks. In some cases, however, labor conditions are drawing out this time considerably.

Railways now coming into the market can get deliveries in ample time to do their spring work and at prices that are in all probability much better than those which will obtain at a later period.

Heavy Sales Recorded for Track Maintenance and Reconstruction

Girder and T-Rail, Special Work, Track Accessories, Steel Ties and Other Substitutes for Wooden Ties Have Prosperous First Quarter

Sales of rail, ties and other materials for track maintenance and reconstruction work for the past three months have been better than for any corresponding period during the past three years. As the representative of a large special-work manufacturer expressed it, the volume of business has shown a considerable improvement over pre-war sales. Sales of one of the largest manufacturers of special track work for the month of February in one central district were larger than sales for the whole year of 1919. In the New England district, railways bought heavily of all kinds of track equipment and supplies. Much high T-rail was contracted for although the volume of orders for girder rail was considerably greater.

Buying Is General

Standard sections are requiring much mill space and manufacturers agree that the buying on the part of the railways has been very satisfactory. It is known, however, that the railways are in need of large quantities of track supplies and are confident that an enormous volume of business will be placed during the year although it is believed that the buying during the second quarter will not be as large in volume or as well distributed as during the first quarter.

No further increases in rail prices are announced with the exception of a slight advance in prices on complicated layouts of special work.

Mills are in shape to accept further orders on both standard and on special sections although deliveries are subject to certain conditions. Double track crossings and similar pieces can be obtained in four to five weeks. For standard sections, conditions depend largely on the quantity ordered and arrangements necessary at the mill to commence the rolling. Orders are pooled with the result that a number of railway companies have their requirements for new rails supplied from a single rolling.

Track spikes, bolts and nuts, splice bars and miscellaneous equipment have been very active for the past two months. Owing to heavy purchasing by the steam road, deliveries have lengthened considerably, sixty to ninety days now being quoted.

Demands for steel ties and other substitutes for wooden ties have been particularly active, in fact, it is believed that the principal factor now is to obtain raw material enough to cope with the steady demand for this class of goods.

Insurance for Employees

Commencing March 1, an insurance policy for the sum of $500 will be given without cost to every employee of the Westinghouse Electric & Manufacturing Company who has been in the service of the company for a period of six months or more. In addition, the employees, after April 1, may increase the value of their policies to amounts varying from $1,000 to $2,000, depending upon their length of service and continuity of savings. All employees who have been in the company's service for six months or longer and who deposit a sum each pay day in the employees' savings fund equal to 2 per cent or more of their earnings will not only receive 4½ per cent interest compounded semi-annually on such deposits but in addition will automatically have their insurance increased to amounts up to $2,000, depending on the length of time they have been with the company.

After an employee has maintained the required deposits for a period of five years he may discontinue or withdraw his deposits from the savings fund without in any way affecting the value of his insurance policy.

Lightning Arrester Deliveries Good

Heavy Demands for Oxide Film Type and Increased Production Enable Manufacturer To Decrease Price

Manufacturers are better able to deliver lightning arresters than almost any other kind of equipment. Although sales have been fairly heavy, greatly increased production has enabled manufacturers to get some stock ahead. This, however, it is expected, will be swallowed up by the first rush of orders. As the heavy buying of the year takes place during the spring months, production of arresters is being pushed to the limit in an attempt to keep ahead of orders placed.

Distribution lightning arresters, both of the compression-chamber, multi-gap type and of the aluminum-cell type for 2,300-volt service, are in fair demand. Ample stocks of each kind are held ready for shipment. In the larger sizes of compression-chamber, multi-gap arresters, deliveries are four, eight and ten weeks respectively on voltages of 5,000, 7,500 and 15,000. Arresters of special design require four to six weeks additional.

In the high-voltage transmission field, deliveries on both aluminum-cell and oxide-film arresters range from two to eight weeks, depending upon size and type.

Direct-current, aluminum-cell arresters, such as are mounted on electric cars, can be delivered in quantity from stock on certain sizes, while for the remainder, two to three weeks is required. Magnetic blowout arresters for cars can be delivered in fairly large quantities from stock. The maximum delivery, however, being four weeks.

Prices have not changed since last fall with the exception of a small increase on compression-type arresters. The oxide-film arresters, however, have been decreased in price, on an average 5 per cent. According to the manufacturer, the decrease was made because of greater production and increased sales.

Nineteen Cars Destroyed by Fire

Nineteen cars were consumed in a fire that destroyed one of the buildings of the Danbury & Bethel Street Railway, Danbury, Conn., on March 16, causing a loss estimated at between $50,000 and $60,000.

The fire destroyed all but one of the company's summer cars. Orders will be placed immediately for new rolling stock.

The fire department succeeded in saving the other buildings of the railway and thus prevented the complete crippling of the road by the destruction of its entire rolling stock. The closed cars in use at present were in one of the neighboring buildings and escaped damage.

The eleven single-truck open cars destroyed were purchased many years ago, but were still in excellent condition. Their loss will be felt severely, especially if difficulty is experienced in procuring new rolling stock before warm weather arrives.

Transformer Prices Advanced 10 Per Cent

One of the largest manufacturers has advanced prices on all transformers approximately 10 per cent, on account of increased costs of raw material. Deliveries for distribution type range from delivery out of stock up to four weeks. High-tension transformer deliveries are quoted from ten to twenty weeks, depending on size. Two of the largest manufacturing companies report a good supply of standard stock sizes coming through the factories which will be available for delivery as soon as rail shipments improve.

Factory conditions are good as far as labor is concerned but delays in getting raw material has held up important work.

General Electric Leases War Plant

Announcement has just been made that the General Electric Company has leased, with option to purchase, the forty-acre war plant of the Remington Arms Company at Bridgeport, Conn. This transaction provides the company with 1,500,000 square feet of floor space, available almost immediately, for the production of light rather than heavy apparatus. The plant consists of thirteen identical unit buildings easily accessible and conveniently interconnected. According to the present condition of business, the company could utilize this space for virtually any kind of apparatus, the need for space is so great. It is expected that between four and five thousand employees will be required to man the plant.

Pole-Line Material Prices Materially Higher

An increasing demand is felt for pole-line material with the approach of the spring construction season. Generally speaking, stocks are in fair shape—much better, in fact, than stocks on other electrical materials.

Prices have advanced on almost all line material except wire. White cedar poles are up 10 per cent, cross-arms 8 per cent, insulators 10 per cent, hardware 10 per cent, and locust pins 25 per cent.

Cross-arms appear to be short east of the Rockies. It is reported that the Pacific Coast yards are piled high with cross-arms, but owing to a local shortage of rolling stock it takes from three to six weeks to make a shipment.

St. Louis Car Sells Direct

Effective March 20, the St. Louis Car Company will sell safety cars direct to the railways. Edwin B. Meissner, vice-president who is authority for this statement says that the company has now established its own safety car sales organization and that its engineers and entire sales force will be at the disposal of railway executives to assist in solving traffic problems.

Necessary changes in shop facilities have been made and arrangments completed at the St. Louis works for a greatly increased production of standard safety cars. At the present time, the schedule calls for a production of five standard safety cars per working day, but the company is prepared to increase its output if the occasion demands. Previous to this time, safety cars manufactured by the company have been sold entirely through agents.

Rolling Stock

Boston (Mass.) Elevated Railway is in the market for seventy-five center-entrance motor cars in addition to the 100 cars recently purchased.

Lake Shore Electric Company, Sandusky, Ohio, has purchased sixteen safety cars for use on the Sandusky city lines, from the National Safety Car & Equipment Company.

New Orleans Railway & Light Company, New Orleans, La., has placed an order for forty safety cars with the National Safety Car & Equipment Company.

Interstate Public Service Company, Indianapolis, Ind., is reported to be in the market for two combination dining and parlor cars for use in connection with its limited trains running between Indianapolis and Louisville.

Terre Haute Traction & Light Company, Terre Haute, Ind., placed an order on March 4 with the American Car Company, St. Louis, Mo., for ten additional safety cars. This will bring the total number of safety cars purchased by the Terre Haute company up to sixty-six, all of which are of absolutely identical design and construction.

United Railways & Electric Company, Baltimore, Md., noted in the Feb. 21 issue of the ELECTRIC RAILWAY JOURNAL as placing an order with the J. G. Brill Company for thirty-three safety cars and for 100 center-entrance trailers, has specified the following details for this equipment.

Number	33
Date of order	Feb. 13, 1920
Date of delivery	April 15, 1920
Type	Safety
Seating capacity	32
Weight, total	Approx., 16,000 lb.
Length over all	28 ft. 0½ in.
Truck wheelbase	8 ft. 0 in.
Width over all	7 ft. 10⅝ in.
Rail to trolley base	10 ft. 8 in.
Body	All steel
Interior trim	Cherry
Roof	Arch
Air brakes	Safety Car Devices Co.
Armature bearings	Sleeve
Car signal system	Faraday
Car trimmings	Bronze
Control	West. & G. E.
Fixtures	Curtain Supply & National Lock Washer
Curtain material	Pantasote
Designation signs	Hunter signs
Door mechanism	National Pneumatic
Fare boxes	Johnson DM-2
Wheelguards	HB
Gears and pinions	Standard

Hand brakes	Ackley Adjustable
Heaters	Consolidated
Headlights	Dayton No. 1583 A
Lightning arresters	G. E. M. aluminum cell
Motors	West. 508 and G. E. 264 inside hung
Varnish or enamel	Enamel
Registers	International Single Ry.
Sanders	Ohio Brass
Sash fixtures	Brill
Seats	Brill
Seating material	Slat cherry seats
Slack adjuster	Gould
Springs	Brill
Step treads	Universal
Trolley catchers	Q. P.
Trolley base	U. S. No. 6
Trolley wheels	Kalamazoo Stock 5-in. wheel
Trucks	Brill
Ventilators	Brill
Wheels	26-in. Rolled Steel

Specifications for the trailers are given below:

Number	100
Date of order	Feb. 13, 1920
Date of delivery	Sept. 1, 1920
Type	Double end centre entrance trailer
Seating capacity	62
Weight, total	25,000 lb.
Bolster centers, length	24 ft. 0 in.
Length over all	48 ft. 2½ in.
Truck wheelbase	5 ft. 0 in.
Width over all	8 ft. 4½ in.
Height	10 ft. 11¾ in.
Interior trim	Cherry
Roof	Monitor
Air brakes	Westinghouse trailer
Bumpers	Angle iron with Anti climbers
Car signal system	Faraday
Car trimmings	Bronze
Center and side bearings	Brill
Couplers	Ohio Brass Tomlinson No. 8
Curtain fixtures	Curtain Supply No. 88
Curtain material	Pantasote
Designation signs	Hunter
Door mechanism	Manual pneumatic National Pneumatic
Fare boxes	Johnson DM-2
Hand brakes	Ackley Adjustable
Heater equipment	Consolidated
Paint, varnish or enamel	R. F. Johnson Co.
Registers	International Single R-7
Sash fixtures	Brill
Seats	Brill
Seating material	Cherry Slab
Slack adjuster	Gould
Springs	Brill
Step treads	Universal
Trucks	Archbar
Ventilators	Brill Ventilator openings
Wheels	26-in. Rolled Steel

Trade Notes

The Johnson Fare Box Company, Chicago, has received an order from the United Railway & Electric Company, Baltimore, Md., for 133 registering fare boxes, and from the Memphis Street Railway for 100 additional boxes.

Wagner Electric Manufacturing Company, St. Louis, Mo., has removed its Buffalo office to 16 Carlton street. Alfred W. Baldwin, who has been connected with the company for a number of years, is in charge as branch manager.

Wheeler Condenser & Engineering Company, Carteret, N. J., has recently designed a vertically split casing of the tail pump for vertical jet and rectangular type counter-current condensers. The feature permits quick removal or inspection of the pump rotor or other internal part.

George Cutter Company, South Bend, Ind., announces the acquisition by the Westinghouse Electric & Manufacturing Company of a financial interest in that company. The management and the commercial policies will remain unchanged, but advantage will be taken of the Westinghouse engineering and other facilities to expand the Cutter Company's activities and develop its lines to enable it to more effectively serve its customers and the industry. The Westinghouse Company will operate as sole distributors for the Cutter Company's products.

Ohio Brass Company, Mansfield, Ohio, has accepted the resignation of A. L. Wilkinson as vice president of the company. Mr. Wilkinson came with the company in 1894 and during the twenty-five years since that date served as salesman, general sales manager, secretary and vice president, having been elected to the latter office in February, 1919. The resignation was accepted by the directors only after Mr. Wilkinson had urged them to release him. For some time he has felt the need of a complete rest for the benefit of his health and he desired freedom from all responsibility.

Franchises

Los Angeles (Cal.) Railway: The Los Angeles has received a franchise from the Los Angeles City Council for extension of a line from Pico Street to Tenth Street.

Los Angeles (Cal.) Railway.—The City Council of Los Angeles has passed a franchise ordinance authorizing the Los Angeles Railway to install an electric line in Broadway between Tenth and Pico Streets, Los Angeles.

Santa Fe, N. Mex.—L. Britt, representing eastern capitalists, has applied to the Santa Fe City Council for a franchise to lay car tracks and build a power-plant in the city. If the franchise is issued work will be begun within the next few months.

Power Houses, Shops and Buildings

Pennsylvania - Ohio Electric Company, Youngstown, Ohio.—The Pennsylvania-Ohio Electric Company, formerly the Mahoning & Shenango Railway & Light Company, will shortly begin the construction of a new power plant in which the initial installation will include two 30,000-kw. turbo-generator units. This plant will probably be laid out for an ultimate capacity of 100,000 kw., which it is estimated will be needed to care for the company's business within ten years.

Track and Roadway

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway will equip its Washington Street tunnel line with a system of three-position colored light signals and automatic stops. Altogether, 1.14 miles of double track, comprising thirty-three blocks, will be equipped. The system will be run by operating current, with the exception of the automatic stops, which will be of the pneumatic type.

Portland Railway, Light & Power Company, Portland, Ore.—The Oregon Public Service Commission has refused the application of the city of Portland for the extension of a line of the Portland Railway, Light & Power Company from the city of St. Johns to the St. Johns terminal. The city's application was based upon an agreement with the company made in October, 1919.

Dallas (Tex.) Railway.—The Dallas Railway has been ordered by the Dallas City Commission to rebuild its tracks on South Lamar Street from Wood to Alexander Street.

Texas Electric Railway, Dallas, Tex.—This company has opened a passenger and freight station at McKinney, Tex.

Seattle (Wash.) Municipal Street Railway.—Mayor Fitzgerald of Seattle has refused to approve an ordinance authorizing an extension of the Ravenna Street line of the Seattle Municipal Street Railway, because the terms of the ordinance do not conform to the provisions of the bond ordinance appropriating funds for the extension.

Pacific Electric Railway, Los Angeles, Cal.—This company will lay new tracks on East Colorado Street, Pasadena. Work will begin on April 1.

Public Service Railway, Newark, N. J.—The State Board of Public Utility Commissioners has directed the Public Service Railway to improve the condition of the tracks and roadway in Main Street, Moorestown, and to resume service of a safe, adequate and proper nature by June 30.

New Advertising Literature

Sangamo Electric Company, Springfield, Ill.: Bulletin 45. Description of the various types of ampere-hour meters made by this company.

Electric Service Supplies Company, Philadelphia, Pa. A pamphlet on genuine Shelby seamless cold-drawn steel trolley poles.

Link-Belt Company, Chicago, Ill. A pamphlet on the Pratt ballast cleaner which screens all dirt out of stone ballast between tracks, giving effective drainage that reduces rotting of ties.

Templeton, Kenly & Company, Ltd., Chicago, Ill. Bulletin 9020, "Track Maintenance. A Problem and Its Solution" presenting recommendations for railway maintenance with demonstrated economies. Details of construction of No. 101 simplex track jacks with considerable data also are given.

General Electric Company, Schenectady, N. Y. Bulletin 44470 on its GE-264 light-weight railway motor the hourly rating of which is 25 hp. on 600 volts with input of 37 amp. Details of construction are given and illustrations shown of armature, pressed steel gear case, brush holders, exciting and commutating field coils in addition to data concerning weights, trucks, etc. Characteristic curves for different conditions of operation also are included.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 55 New York, Saturday, March 27, 1920 *Number* 13

An Ounce of Prevention Would Be Worth Several Pounds of Cure in This Case

THE severe snowstorms which visited the eastern part of the country last month gave a trying test to the snow-fighting methods and facilities of the electric railways. In the main the railways met the contingency with gratifying success. Only in New York City, and to be exact only in the Borough of Manhattan, have we heard of any serious difficulty in keeping lines open during one of the most peculiar snowstorms with which railway men have ever had to contend. And in Manhattan it was the underground conduit, always susceptible to sleet storms, which caused the trouble.

The interest in snow-fighting methods has naturally been aroused and we have endeavored by correspondence with engineers on several properties to find out what methods or improvements therein have been adopted. From the replies received to our inquiries we believe that there have been practically no changes in method, although considerable improvement in details of apparatus has been noted.

The essential factor in snow fighting, as expressed by our correspondents, is preparedness—preparedness through having a sufficient amount of adequate equipment together with a definite program for handling it upon the road when the storms come.

It has been impressed upon us that the success of our snow-fighting methods is primarily due to the prevention of accumulation of snow, which is accomplished by the snowplows and sweepers. But this sort of prevention is much more costly in the end than would be some form of prevention which could be applied to the lateral accumulation of large mounds of snow alongside the tracks. The removal of such huge snowbanks is a tedious and expensive process, while the damage to equipment and delays to schedules through stalled vehicular traffic upon the track area add costs substantially equal to those involved in the removal of the snow. Surely there is need for the concentration of our thought upon the problem of how best to prevent secondary accumulation in the roadways.

There May Be Heavy Snowstorms Next Winter

IT will be easier now than later to secure tentative appropriations for next summer's work and purchases in the line of snow-fighting equipment. That transportation superintendent is a wise one who utilizes the still vivid impression of last month's experiences to "nail" a reasonable allowance in the current budget for this purpose. To this end the ELECTRIC RAILWAY JOURNAL is publishing this week a number of articles which represent a comprehensive study of the snow-fighting game. One or two more will follow promptly.

It might seem that the appropriate season for consideration of snow-handling equipment and processes would be the fall, just prior to the season when machines and men must be prepared for the fray. Just the reverse, however, is the case, for time slips by apace and it is none too early now to plan and scheme. As soon as the winter's cripples are out of the shop the snow machines might well come in for attention. At any rate the subject can have some thought now, with a view to storing up information which later may be urgently needed.

In many fields, even though it were possible, it would not necessarily be the most efficient practice always to be prepared to cope with any contingency which could arise. The cost of being prepared might more than offset the savings resulting when the actual contingency did, if ever, occur. In the matter of snow handling, however, every railway should be sufficiently well equipped and prepared to cope with the worst storm which might reasonably be expected to occur in its particular locality.

Progress in Design of Curved Heads for Grooved Girder Rails

INTEREST has been renewed of late in the subject of curved-head rails through the assignment of the subject to the committee on way matters, jointly with the committee on equipment. While the thought was expressed, when this subject first came up, that there was a possibility that a suitable curved-head design might eliminate corrugation, the principal claims made for the design were more along lines of the possibilities of securing greater life both of rails and wheels through the lessening of the rates of wear.

It is now well established that corrugation is not prevented by this change in design. It has been observed, however, that where these rails have been in service, the length of time within which corrugation first appears has been extended from the few days or weeks formerly experienced to a period of about two years. Perhaps this observation may be construed as indicative of a greatly lessened rate of wear. In any event, it is of sufficient moment to warrant the adoption of the curved head as a principle of design. Meanwhile, in its report last year the way committee presented several other good reasons in support of the correctness of the curved-head principle.

Having accepted the view that the principle is correct, there remains the question of detailed application to the existing standard grooved girder rails of the association. The problem thus resolves itself into a determination of the proper contour which will be suitable to wide application, since the standard rail is intended for use throughout the country. An examination of existing designs of curved heads discloses the tendency, on widely separated properties, toward the use of a contour which takes the form of a compound curve, having an initial radius of 12 in. starting at or near the back of the head, an intermediate radius of about 1½ in. and a final radius at the gage-line fillet of ⅝ in. This is in substantial agreement with British designs which have been in service for some years. There is every reason to believe that the average contours of both worn rails and worn wheels are so nearly alike upon different properties that the committee should be able to settle upon a design which will approximate the average wear so closely that it may be readily accepted, and we are inclined to the view that the form of contour substantially as above outlined should be selected.

It's Bus or Bust for New York!

IN OUR March 20 issue we adverted briefly to the decision taken by the Board of Estimate in New York on Friday, March 12, to invest $1,140,000 in motor buses and to engage actively in the transportation business with them in New York. Perhaps it is the privilege of youthful industries to see the future as through a glass lightly rather than darkly. Only on this assumption can we account for the rose-tinted canvases of bus promoters, whether they be of the private broker or public official tribe! Here is New York's Commissioner of Plant and Structure, who is to manage the bus department, telling the newspapers that the city actually expects to increase rather than decrease its revenues by running buses at 5 cents up to distances of 8 miles. Beyond that Alpine 8 miles, Commissioner Whalen concedes, lies trouble.

We certainly have no quarrel with the installation of one-man, 27 to 30-seat motor buses as a successor to two-men, 24-seat storage battery cars on the old interferry routes of downtown New York. We do not believe that it would have ever paid to electrify these routes on the costly conduit system demanded by the city. Permission to operate the battery cars with one man would have staved off disaster a bit longer, but after all the conditions for track operation of any kind were not particularly favorable because of the speed limitations of such cars and the congestion of the highways. For these streets, therefore, even a jitney service has proved preferable from the viewpoint of the rider. On the other hand, we see no reason for instituting direct competition with 5-cent large-car and train service, as in Brooklyn.

This is not the place to enter into another mathematical analysis of the city's futile expectation of profit from a 5-cent universal fare as we did Dec. 27, 1919. Let us, however, point out this significant fact: Of the existing jitney-bus routes in Manhattan or Brooklyn Boroughs not one comes anywhere near the 8 miles named by Mr. Whalen. With the exception of the Flatbush Avenue line, all routes now operated are 4 miles or less in length. The Flatbush Avenue line is rather exceptional in that most of the passengers ride only as far as the terminus of the Interborough and New York Municipal subways at Atlantic Avenue (less than 4 miles), and furthermore the last down-town mile of this route serves the local business and shopping district in which a certain amount of short-haul, pick-up traffic can be developed. We may conclude, then, that the economic limit of the present 5-cent motor-bus operation is 4 miles; a deduction confirmed by the fact that no operator has undertaken to give service on Route No. 8, which is about 5 miles long, although the invitation has been out since November, 1919.

A little thought should convince anybody that if subsidized individual operators will not venture beyond 4 miles for 5 cents there is no prospect whatever that an organization, whether private or public, will be able to do even as well and break even. The present operators are at a disadvantage in comparison with an organization in such matters as the purchase of supplies, but in everything else they are at an enormous advantage. If this were not the case such great jitney businesses as those of Bridgeport, Conn., and Newark, N. J., would long ago have evolved to company form. Let us see why this is so:

The individual busman pays 2 or 3 cents more a gallon for gasoline, but his fuel cost per mile is sure to be less than that of a hired man because he has a strong personal reason to use fuel, as well as lubricant, economically. The same degree of personal interest applies to the vital items of tire wear and general upkeep. Furthermore, many busmen are practical repairmen who are capable of doing their own tinkering during spare moments. Where the busman is not a mechanic his membership in a co-operative association assures a reasonable repair bill. So much, then, for fuel and maintenance.

Now take the items of gross revenue. The individual operator picks up many a fare that would be ignored by an employee busman, for the former knows that he is working upon a pretty narrow margin at best. Any one who rides around with these men for a few hours will never question the fact that they are genuine transportation salesmen. Besides picking up more customers than an employee busman, a working owner has the satisfaction of getting every fare tendered. There are no leaks, and the number of passengers who would cheat an individual is far less than the number who think it good sport to "welch" on a corporation—yea, even a municipal corporation. Again, the individual operator cannot be compelled to work during thin hours or on thin routes. An organized bus company necessarily will average a smaller intake per bus-mile because it seeks to give a definite service, rain or shine, and is willing to stick through a period of development on promising routes. In New York the individual busmen have bluntly refused to do development work.

The organization is also at a disadvantage with regard to wages. It cannot get men to work for more than eight to ten hours a day and must pay a minimum guarantee to spare men, whereas the individual operator takes no account of the flight of time. If he divided his earnings by the number of hours actually worked he would find that he had little enough velvet after paying his bills and storing up coin for a new car, but the genus busman prefers twelve hours' self-employment to eight hours under a master. Finally, in the case of New York, the present operators are spared the cost of a supervisory staff, of printing destination and fare signs and of accident insurance. The public also puts up with conditions of crowding, cleanliness and shabbiness that it would not tolerate from an organization.

When the effect of all these disadvantages is duly weighed one needs no detailed tabulation to see the unlikelihood of a profit from unlimited-ride, free-transfer 5-cent buses. As we have said before, when a municipality enters the transportation field it may obtain auxiliary benefits, such as higher land-tax values, which may more than offset the operating losses of the transportation project. Had the New York Administration taken up the motorbus from that standpoint this comment would be superfluous, but inasmuch as the city officials are treating this project as if it were a straightaway transportation undertaking we must protest against assumptions that never can be realized and that can only cause incalculable harm to the one sane method of urban motor-bus development, *to wit:* the operation of non-competitive motor buses at special fares for special services by the local organization—the electric railway—already best acquainted with the transit needs of the community.

The Principal Activities of the A. R. E. A. Convention

AMONG the many transactions accomplished at the Chicago convention of the American Railway Engineering Association last week the adoption of a standard specification for rails, another for iron and steel structures and another for cross ties perhaps stand out as the most important. The rail specifications and the one covering iron and steel structures have been in process of compilation and revision for several years and have been studied by several committees, discussed at conventions and referred back to a new committee, so that it would now seem that the specification adopted must represent the consensus of thought and experience of the railroad engineers.

The specifications for ties came into being in a different way. During the war the United States Railroad Administration drew up a standard specification for ties and directed that it be used on all railroads. The question considered, therefore, by the committee on ties and by the convention was not so much the details of the specification as it was whether this specification, representing a single standard actually in use on all roads for two years, should be continued or whether there should be a return to the several recommended practices of the association formerly in force and the resulting multitude of standards observed by the individual roads. The committee reached the decision that it would be better to continue the single standard, and the convention confirmed this recommendation, giving the association a definite standard for cross ties.

The convention also adopted standards for a steel cut track spike, a screw track spike, for steel, wrought iron and malleable iron tie plates, for manganese steel pointed switches; a standard specification for electric light, power supply and trolley line crossings with steam roads, which was drawn up by a joint committee on which there were three representatives of the American Electric Railway Association; new specifications for creosote treatment of wood and a standard approach warning sign for railroad crossings. This list will indicate the immense amount of work accomplished in the three-day session of the association. Some of the details of interest to the electric railway field are presented in summary on other pages in this issue. Others will follow in an early issue.

One of the most interesting pieces of work undertaken by the American Railway Engineering Association is that embodied in the duties assigned to the committee on standardization, which was only recently created. This is of particular interest to the electric railway field, since it reflects a weakness in the functioning of the railroad association similar to that experienced in the American Electric Railway Association and suggests a remedy which the latter may well consider. To this committee was assigned the dual function by the board of direction of sponsoring new standards of practices, equipment and tools and of bringing about the general use of standards by the member companies. More recently the board of direction instructed this committee to confine its duties for the present to the work of securing the use of the standards already set up by the association.

This committee had not been in existence long enough at the time of the recent convention to make any very definite report, but the importance of the work of the committee was appreciated. The real benefits to be gained through the use of standards in an industry are indeed great, but these advantages cannot be realized unless the standards are generally adopted. The A. E. R. A., like the A. R. E. A., has found that many member companies were exceedingly slow about adopting standards or loath to adopt them at all. Perhaps it would be a very fortunate move for the former to create such a committee, which might act as a "selling" organization to put into practice the standards developed through the efforts of the association. We are not unmindful of the efforts of the A. E. R. A. through its committee on standards to promulgate its own standards. Special emphasis was laid upon this subject at the 1919 convention at Atlantic City. There the committee had an interesting exhibit and distributed a pamphlet containing convincing arguments for standards adoption. However, the task is a large one, and much can be gained by co-operation between the two great railway engineering societies along this line.

C. E. R. A. Looks to Economies

THE Central Electric Railway Association has made it a habit to occupy its time at conventions with papers and committee work which are of vital interest to the member companies in connection with their every-day operating practices. This habit prevailed again at the Louisville meeting last week. The attention of the members was first directed to a study of rail bonding as developed in a paper by Ralph H. Rice, which, with the discussion which followed, treated constructively every phase of the subject save one—how to prevent bonds from being stolen. Having discussed the perfection of the return system as one means of conserving power, the convention took up the savings possible in that portion of the total energy which is consumed directly by the cars. Through the able paper of Professor Ewing and some of the constructive discussion which followed, the members were much impressed by the significant economies pointed out as readily obtainable. Mr. Rice's paper was abstracted last week. Abstracts of the economy papers are given in this issue.

The Louisville meeting of the Central Association was thus true to form in providing the members with the knowledge and the impetus for better operating practices. This association has repeatedly demonstrated its great value to the electric railway industry of the Middle West states, yet its opportunities for further and greater service have in no wise been diminished. The study which is now being made looking toward the establishment of a pick-up and delivery express business over all of the interurban lines comprised in the association territory is an example of the big things which remain to be done in the future.

"Maintenance Account No. 12—Removal of Snow, Ice and Sand"

The Vital Thing Is to Prevent Accumulation of Snow—Delay in Attack Causes More Failures Than Anything Except Inadequate Equipment

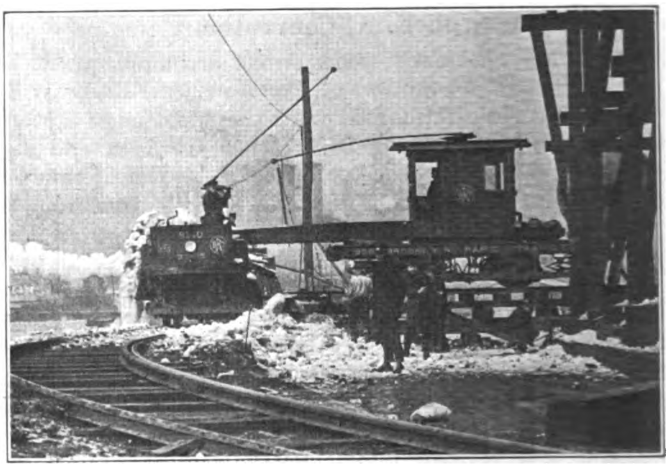
By R. C. CRAM
Engineer Surface Roadway Brooklyn Rapid Transit System

THE month of February, 1920, will long remain a milestone in the memories of operating and maintenance men. In several respects the snow and sleet storm which began on Feb. 4 and continued until the morning of Feb. 7 was one which beat the record of the famous blizzard of March, 1888. While less snow fell this year than in that memorable storm, this year's affair had a moisture content of 4½ in. as compared with 2½ in. for the 1888 record. In New York, during the three days of almost constant storm, there were five periods of rain, four periods of sleet and three periods of snow, with only one lull of about 3½ hours' duration. In consequence there is little wonder that the storm has served again to concentrate interest upon the prevailing methods of "fighting" and handling snow. Not only the railway men, in cities at least, but also the civic officials charged with street cleaning have had good reason to think seriously upon the snow removal problem.

It is worth while to note that practically all of our efforts toward the solution of the snow problem have been concerned with the matter of removal and, as one newspaper writer has put it, nearly every scheme has been tried, except possibly that of tempting Providence, to try to prevent snow from falling. However, any analysis of the problem which may be made soon develops the fact that the troubles created by a snowstorm are not due primarily to the snow itself. It is the accumulation of snow which causes the difficulties, just as it is the accumulation of water from a rainstorm. Hence it seems to be rational to suggest that more attention should be directed toward the prevention of accumulation if we are ever to get out of the trenches.

As a matter of fact, the electric railways have concentrated upon this very thing in their adoption and use of snowplows, sweepers, rotaries and special apparatus attached to heavy service cars and these prevent accumulation upon the track area. To these pieces of apparatus more than to any other agencies the railways owed the comparative success of their efforts to keep cars in operation during the first week of last February. Such appliances, combined with frequent car operation, prevented the accumulation of snow upon the track area, which otherwise would have stopped car operation entirely.

While this was the result to be sought, we must acknowledge that the net result of all such efforts was merely the transference of the accumulation from the track space to the cramped roadway areas between the tracks and the curbs. The latter areas thus received more than their share of the accumulation, for in addition these areas are also the places of deposit for all the snow from the adjacent sidewalks, diligently cleaned by the weary property owners. Thus, a further accumulation results, so that a roadway space perhaps 12 ft. wide becomes the recipient of the additional snow which has fallen over a space 17 ft. or more in width. With a 2-ft. snowfall, the 12-ft. space on each side of the car tracks, instead of receiving say 24 cu.ft. per linear foot, thus receives 62 cu.ft. per linear foot of street. These great mounds of snow confine vehicular traffic to the tracks, seriously impairing car service, and when the snow melts cause the track spaces to be literally "young canals," carrying several inches of water, through which cars must try to operate.


PUSHER USED IN BROOKLYN FOR UNLOADING SNOW FROM FLAT CARS

In cities somebody has to take this accumulation of snow away. In many of them this duty devolves upon the railway companies to a large degree wherever their tracks are found. Having once removed the snow from the tracks they are required again to remove it from the street. With a 3 or 5-in. fall of snow this may not be so much of a job, because the accumulation is not excessive, and the sun and rain probably will assist in the removal work. When the fall reaches 12 in. or more, or whenever the lesser falls drift badly, the burden upon the railways becomes almost unbearable, not only in the difficulty and cost for removal but also in traffic delays and damage to car equipment. Another source of cost lies in the excessive amount of power which is required to propel cars during such periods of weather. Surely there is good reason for further attempts to discover some method of preventing the secondary accumulation upon the roadways which is now the result of the comparatively successful methods of preventing primary accumulation upon the track area.

In spite of all the trouble which it caused, the recent storm has accomplished one good purpose. It has served to bring the fact home to the people that the electric railways are really most efficient snow-fighting machines which are constantly available and always on the job.

In the vicinity of New York, at least, it has been proved beyond cavil that without the aid of the highly organized snow-fighting apparatus of the electric railways our great cities would often be snowbound for weeks, instead of merely being inconvenienced for the few hours or days required to clear the arteries traversed by electric railway tracks.

SNOW FIGHTING IS REGULAR WARFARE

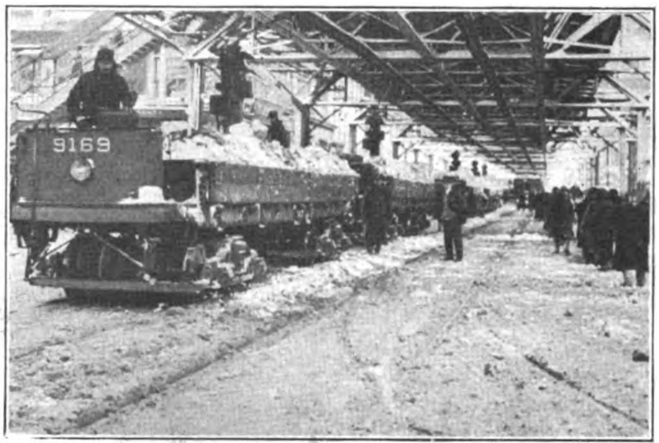
There are three distinct phases in a fight with a heavy snowfall, namely, the attack, the battle and the clean-up. Perhaps the most essential phase is that of the attack. How many of us remember saying: "Next time we'll get those plows and sweepers out as soon as a flake of snow begins to fall." More snow battles have been lost on account of delay in attack than for any other reason, except the lack of adequate apparatus with which to make the fight.

One of the most essential features of the snow-fighting problem lies in the preparation which is made for the attack. In other words, it must all be planned out ahead of time, at least six months in advance. We can never foretell what kind of a storm will come nor can the depth of the fall, the wind velocity, or the moisture content of the snow be predetermined. Consequently, preparations should always be made for the worst kind of a storm even though it involves seemingly excessive and useless expense. It is far better to be over-equipped with snow-fighting apparatus for three seasons than to be even slightly under-equipped in the fourth season. The losses of the latter will far outweigh those of the former.

SAFETY CAR DOES MAN-SIZED JOB AT 10 DEG. BELOW AND IN 40-MILE WIND IN LEVIS, QUEBEC

On suburban and interurban properties the way department assists in preparation for the attack by the preventive measure involved in the erection of temporary and permanent snow fences, set out along the right of way at places on the windward side of cuts where snow is likely to accumulate in the form of drifts. It has been found worth while in these cases to follow steam road practice closely even to the payment of money to adjacent owners who may require this for the use of their land.

It has repeatedly been demonstrated that the chief dependence for efficient snow fighting must be placed upon snowplows, rotaries and sweepers, operated by the transportation department. The amount and character of the equipment necessarily will vary with each property and the most careful planning along this line is required. Inquiry has developed the information that most roads have at least one snowplow or sweeper for each five miles of track. Next in importance is the actual working of the apparatus thus provided during the period of the snowstorm. Here, again, planning and efficient direction of operation are the price of success in keeping the lines clear.



TRAIN OF FLATS LOADED WITH SNOW IN BROOKLYN

The work of the way department is subordinate to that of the transportation department during the storm period, but the closest co-operation is needed. Men must be furnished to go along with plows and sweepers to keep switches clear and to pay particular attention to keeping tracks at car storage yards and depots free from snow accumulation. The liberal use of salt in switches in streets provides the surest means of keeping them in working condition.

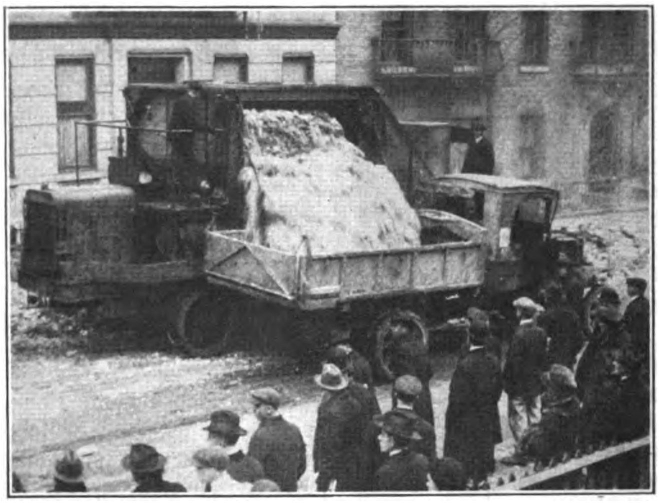
The work of keeping switches clear has been greatly aided in recent years through the development and use of gasoline or oil-burning torches for melting snow and preventing ice formation, particularly in open yards at split switches, which are very susceptible to clogging by snow and ice. Several of the steam roads have used electric heater unit installations of the Boardman type at split switches for preventing accumulation, with a fair degree of success. (See ELECTRIC RAILWAY JOURNAL for Nov. 16, 1918.) These may become ineffective mainly when high winds prevail and the snow is blown along in a direction parallel with the tracks. So far as the writer is aware, no electric railway company has ever tried the Boardman device. Steam roads have also tried the method of equipping the switches with steam coils in yards where a supply of steam is available, but the use of this scheme is not very extensive and it is practically out of the question for most electric railways.

The way department takes up its real snow-fighting job when it begins to remove the accumulated snow after the storm has ceased. On roads having large mileages within city limits the task is not one to be classed as a "cinch," to say the least.

For instance, as the result of the February storm, the writer estimates that the quantity of snow which was piled up in the areas from which the railway companies in Brooklyn had to remove it amounted to 1,400,000 cu.yd. or 46,666 carloads, allowing 30 cu.yd. per car. The weight of such a quantity of snow may be of some interest. The Weather Bureau indicated a moisture content of 4½ in. for the 17.5 in. of snow in the Feb. 4 storm. This gives an equivalent weight of nearly 24 lb. per cubic feet of snow. On this basis the 46,666 carloads of snow weighed about 465,000 tons. As an engineering problem in handling material this must be considered a man-sized job. Very fortunately the sun and rain assist in the task to a degree which renders it possible for us to cope with it with a fair degree of success.

In meeting such a problem the railways have so far depended largely upon manual labor for loading the cars or trucks. It has always been a custom to arrange for feeding the men, not only of the way department but also of the transportation department, during their work on snow, particularly in the night seasons. Usually arrangements are made with restaurants for furnishing hot food and coffee. It has also been found advisable to set a minimum wage rate for snow work, which is considerably above the regular minimum rate for track laborers. This has the effect of getting the men out and tends to prevent their seeking snow work in other quarters.

Within the last year or two there has been an increase in the use of steam or electric shovels for loading snow whenever there was a sufficient accumulation. Their use is somewhat limited by street widths. Labor shortage and cost have forced the attention toward a study of machines designed specifically to handle snow. Until this winter there has been none developed beyond the "promise" stage, in spite of all the machinery which is available for handling other materials.



THE FRIEDMAN MACHINE HAS DONE SOME MARVELOUS WORK IN NEW YORK CITY

The intermittent periods of snowfall, the changing character of the snow and until recently the comparatively reasonable price of labor for manual handling have all tended to prevent experiment and expense necessary to develop the proper machine. Nevertheless, the company with which the writer is connected has spent about $7,000 upon the development of a snow-handling or loading machine which has so far failed to work with much success. It is believed that with the expenditure of several thousand dollars more the apparatus could be made to give results.

Meanwhile, the persevering Dr. Samuel Friedman of New York has developed, at his own expense and after about fourteen years of effort, a snow-loading machine which is successful to a marked degree. It will not only pick up all kinds of snow and load it into waiting trucks or cars but it will also handle ice in large chunks, after it has been loosened from the pavement and piled ahead of the path of the machine. The problem with Dr. Friedman's machine seems to be one of finding enough trucks to keep up with the loading capacity of the device.

Attempts to melt snow by means of asphalt surface heaters and other forms of apparatus depending upon heat in some form have failed dismally. The capacity is very limited and the cost unduly high. The cost for melting snow with such a device amounted to $7.33 per cubic yard and for melting ice ran up to $19.80 per cubic yard according to recent tests made in New York.

The use of sewers for snow removal and disposal has proceeded apace, so that today most large cities permit the railroad companies to use the sewer system to the greatest possible extent. The chief disadvantage often lies in the small capacity of the sewers in territory where there is most need for their use. In addition the manholes are soldom of a size which will permit of rapid disposal without much shoveling. There has been some development of special dumping manholes designed to overcome this trouble. These have so far taken the form of special openings in bridge floors.

Lack of sufficient flow or volume of sewage is also an occasional hindrance, but this can be remedied, first by flushing by means of fire hose with water from adjacent fire hydrants and second, as suggested by the New York Street Cleaning Commission, by providing special connections from hydrants to sewers underground, by means of which the needed additional flow may be more readily provided. In Brooklyn the use of the sewers has cut the cost of removal about in half through the elimination of the work-car haulage service. Some costs for various methods of snow removal in Brooklyn were given in the ELECTRIC RAILWAY JOURNAL for Feb. 21, 1920. In connection with the use of sewers, it will be found desirable to prepare small pocket maps showing the locations of available manholes, so that they may be found readily when covered with several feet of snow.

There have been practically no new developments in methods for opening up blockaded lines where service has been suspended. If the plows and sweepers have failed to keep them open there is nothing to do but "go at it" with pick and shovel. Fortunately, such blockades are becoming more and more rare. They are now most likely to occur through the occasional breakdown of equipment or derailment thereof, which prevents the frequent passage of snow-fighting apparatus over the line and allows time for the accumulation of snow and the formation of ice.

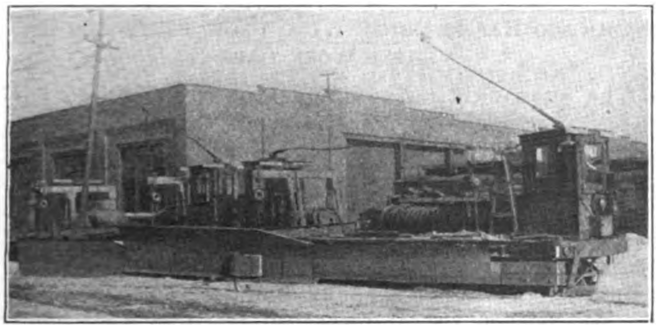
Motor Buses in New York State

At the close of the fiscal year ended Jan. 31, 1919, the Secretary of State revealed that in New York State there were 22,572 motor buses. In New York City alone there were 9,136. The number of buses registered in the State increased 24 per cent over the year 1918, an indication of their growing popularity for passenger traffic. The ratio of buses to the total number of pleasure vehicles in the State is approximately 5.05 per cent.

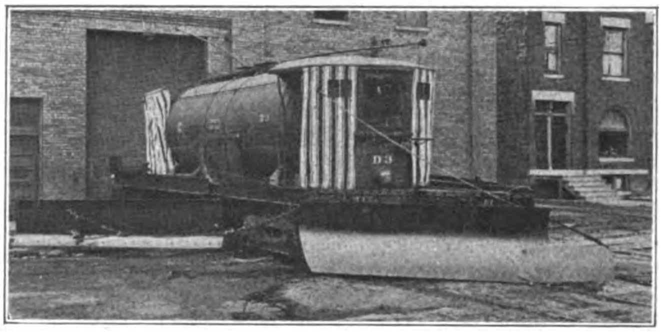
What is said to be the largest jet condenser yet built was recently completed by the Westinghouse Electric & Manufacturing Company, for the Alabama Power Company. It is capable of passing 13,000,000 lb. of water per hour.

Snow-Handling Practice East and West

Résumé of Methods Used on Various Systems Outlined from Answers to Recent Questionnaire



CHICAGO'S IMMENSE WING PLOW PROPELLED BY THREE WORK CARS



FRONT AND SIDE WING PLOWS ATTACHED TO SPRINKLER CAR IN CHICAGO

AS A RESULT of the severe storms of February last, many electric railway companies found themselves unprepared to cope with a storm of real magnitude and one which might reasonably be expected to occur during the course of any winter. While the effects of this storm, or series of storms, are still fresh in mind, many companies are casting about to see what steps may be taken as a safeguard against interruptions of a similar nature in the future. In this connection, and at the instance of R. C. Cram, author of the preceding article, a questionnaire was sent out to several electric railway companies to find out how they were prepared to deal with severe storms, and what methods they used to handle the snow after it had accumulated on the tracks. The questionnaire included seven questions as follows:

SOME QUESTIONS AS TO SNOW REMOVAL METHODS

1. In snow removal work, what other equipment do you use besides snowplows and sweepers?
2. What advantages either in reduction of cost or increased facilities of removal of snow have been obtained by use of sewer manholes for disposal?
3. Can you give any costs on a cubic yard or other basis of snow removal?
4. Have you developed any new or special apparatus for snow removal work? Have you used steam or electric shovels for loading snow? If so, what is the cost per cubic yard as compared with hand loading upon cars?
5. What are your obligations as to area of snow to be removed? Do you have any special arrangement with the city whereby you consolidate your obligation area into definite acreas, including the whole street between house lines in business districts, as an equivalent for your more unimportant outlying·areas?
6. Do you contract for snow removal by carts, etc.? If so, what is the basis of payment?
7. Give an outline of your snow-removal program. How soon after snow begins to fall do you begin its removal?

Four of the replies received to the questionnaire give a resumé of the methods used on systems located in the East, Middle West and West.

In Denver in addition to the usual complement of snow plows and sweepers the Denver Tramway company uses work cars and autos to carry trackmen to salt the switches, and if the storm is so severe that operation has to cease, work cars and flat cars are used upon which to load the snow for removal from the streets. Wing boards are used on flat cars to push the snow farther away from the track.

When the snow is removed from the streets by flat cars, the special mechanical pusher built by the company and described in the issue of the ELECTRIC RAILWAY JOURNAL for May 10, 1919, page 924, is used. A few years ago, at the time of a heavy snowfall, three men with this pusher were able to perform the work which otherwise would have required a gang of fifteen shovelers. Flat cars containing from 10 to 14 cu.yd. of snow were loaded at an average rate of 6 min. per car. The pusher running day and night at a cost of $9 per shift for labor was able to unload more snow than was handled off flat cars by the city at Sixth Avenue with a cost of more than $80 per shift.

The Denver Tramway has no obligations or arrangements with the city in regard to snow removal, nor is any contract made with outside firms for this work. As soon as the snow begins to fall sweeper crews are ordered to report for duty. The removal work depends upon the weather conditions, the hour of day with reference to peak load, the kind and amount of snowfall, the time of year and the reports of car crews and inspectors as to whether or not the two-motor car lines are beginning to drag. In the event of a complete tie-up of traffic, due to an abnormal snowfall, the method of procedure is outlined in a standing order covering the work in detail. This standing order is corrected each fall to cover any changes in organization, routes, etc., which seem of value as a result of the experience of the preceding year. This organization work was outlined in an article in the ELECTRIC RAILWAY JOURNAL for Feb. 17, 1917, p. 304.

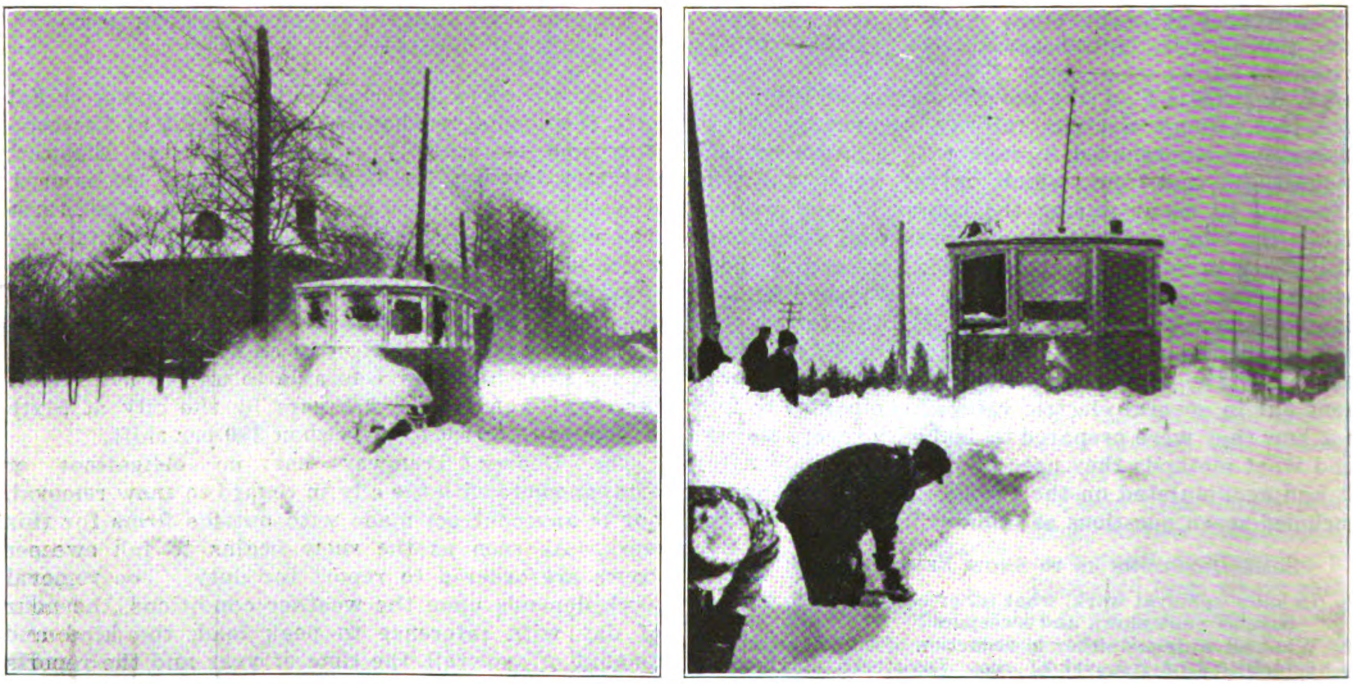
INTERNATIONAL RAILWAY HAS AGREEMENT WITH CITY FOR SNOW REMOVAL

The snow-fighting equipment of the International Railway, Buffalo, N. Y., consists of sweepers, snowplows and rotaries, and only in case the line becomes blocked and it is impossible to open it up with any other equipment is shoveling resorted to. This company seldom removes any snow from the streets by carting away or otherwise, as an agreement for this work is in effect with the city, and the company is assessed a fixed portion of the cost. The railway company does, however, remove all snow from the tracks, in which work it is unassisted by the city.

The snow-fighting equipment is placed in operation very quickly after snow begins to fall and before 2 in. has actually accumulated.

In addition to its snow plows and sweepers, the Rochester lines of the New York State Railways use two snow-scraper cars and a car with an ice-cutting attachment, which cuts the ice and snow from between the rails. This company has an agreement with the city by which each pays 50 per cent of the cost of removing snow on streets where car tracks are located and each has a definite area to clean. The company removes the snow from the main street intersections in the center of the city and the city removes the snow between these intersections from curb to curb.

The New York State Railways do not contract for snow removal, but when necessary teams are sometimes hired by the day. Sewer manholes are used for the disposal of snow, and this method results in much shorter hauls. In some cases manholes are located at the spot where removal of snow is necessary, thereby decreasing the time of snow removal and reducing the cost of hauling.



HEAVY WORK FOR THE SWEEPER ON THE SAULT STE. MARIE TRACTION LINES

The city of Rochester is mapped out in routes for the snow sweepers and plows to follow and these are classified as Routes 1, 2, 3, and so forth. This information is posted in each snow equipment for the information of the trainmen so that each crew will know just what streets to follow and clean, and it, in turn, reports back to the dispatcher's office by telephone at the end of each route or line. A record is kept in the dispatcher's office of each equipment location and of streets cleaned, so that at any time during the storm the superintendent and his assistants know where each sweeper and plow is located.

As soon as the equipment is called out, this depending on the density of fall, the location (city, suburban and interurban lines) and what amount of snow is previously on the ground, salters and switch cleaners are dispatched to the main sections of the city, while two trucks are loaded with salt and men are sent to the outskirts to clean and salt the switches. Each truck has its own route to cover. About twenty salt boxes are distributed at principal locations about the city where there is a large amount of special work.

The railway company has a private telephone dispatching system operated from a central office in the main office building with a telephone at the end of each car line and at other principal locations. This has proved invaluable in carrying out the snow-fighting program.

CHICAGO HAS IMMENSE WING PLOW PROPELLED BY THREE WORK CARS

The snow-fighting equipment of the Chicago Surface Lines consists of ninety-six sweepers, eleven power plows, eighty-one drag plows, forty-nine wing plows, and seven large sprinkler cars converted into wing plows. During the heavy snowfall of two years ago the heaviest drifts were successfully cleared from the tracks and from an area wide enough for other traffic outside the tracks by the use of an immense wing plow attached to a work car. Sufficient power to operate this equipment against the heavy drifts was derived by coupling three heavily motored and weighted work cars together. A signal system was connected between cabs so that all three motormen could simultaneously turn on their controllers. This combination appeared to be capable of moving anything, and it was these equipments which made it possible to cope with the unprecedented snowfall without suspension of service.

The practice in Chicago is to clean not only the 16-ft. area over the track, but also, by means of the various wing plows, to push the snow back toward the curbs in order to clear a roadway for trucks and automobiles. This is the only way such vehicles can be persuaded to stay off the tracks. The organization to handle this work is so perfected that upon occasion an army of employees can be called from their homes and put into action in less than an hour's time. Each man knows by prearranged plan just where he is to report and what he is to do if he is called and given the command "snow." The men are fed on the job by the company, so that there is no stopping of the snow-fighting work through desertion in search of food and warmth.

A liberal use of salt at all switches and special work locations at the beginning of a storm is considered one of the secrets of keeping the cars moving. A very close contact with the Weather Department is another, serving as it does as a means of anticipating what preparations may be necessary.

The Efficiency Mileometer*

This Device Records the Difference Between Power-On and Power-Off Privilege, as Well as Total Mileage

BY C. H. KOEHLER
Efficiency Mileage Recorder Company, Louisville, Ky.

THERE has always been a need for a mileage recorder for electric railway cars. Nearly all important statistics of operation in the electric railway industry depend upon the mileage factor for their significance. Revenue, power, life of equipment and maintenance are all determined on a car-mile basis. A speedometer and odometer is considered standard equipment for practically every gasoline-propelled vehicle manufactured today. The need of a mileage recorder for the electric railway car, which covers yearly from 30,000 to 50,000 miles, and represents a far greater investment than the average gasoline car, seems even more logical.

The railway property of today estimates its mileage from dispatcher's train sheets or from conductor's way bills or trip sheets. This work is done by clerks, with resultant clerical errors and attendant clerical expense. Particularly on city properties this mileage is both difficult and expensive to obtain accurately. Where individual car-mileage records are kept, as for inspection purposes and the like, this work becomes even more expensive and less accurate. The advantage and saving in clerical expense of a mileage recorder that automatically corrects for turn-backs, pull-ins and other lost or additional mileage are apparent.

In the past, mileage recorders of two types, mechanically driven and electrically operated, have been tried out. Mechanically operated mileage recorders of almost every conceivable design have been applied to electric railway cars, with generally unsuccessful results. The severe service to which a car is subjected and the fact that a considerable length of flexible shafting is needed properly to locate the register have rendered the everyday speedometer and odometer unadaptable.

As far back as 1900, J. R. Cravath was granted a patent on an electrically operated wheel-revolution counter. Probably due to the fact that in those days electrical contact mechanisms had not been developed to the state they are at present, no commercially successful device resulted.

However, in recent years the cam-actuated electrical contact has been developed to a high degree by manufacturers of magnetos and ignition apparatus. Electrical counting mechanisms and relays have also been used as standard apparatus by many industries with satisfactory results. The application of modern magneto and ignition practice and of modern telephone and telegraph practice have resulted in the development of a simple and satisfactory electrically operated mileage recorder, or "efficiency mileometer," as it is called, which will be briefly described.

Instead of merely registering total mileage, both total mileage and "power-off" or "coasting" mileage are registered, thus giving means of determining the motorman's car-operation efficiency. Even the layman realizes that the more miles a car coasts or runs with power shut off the less power is used. This relation between per cent coasting mileage and the kilowatt-hour consumption per car-mile has been proved by extensive tests. In fact, it is possible, after a characteristic curve for a given type of car has been plotted, accurately to determine the energy used per car-mile from the per cent coasting mileage. Another important feature of the device is the efficiency indicator, which tells the motorman at a glance what his operating efficiency is, just as a speedometer tells at a glance the speed.

The complete efficiency mileometer consists of three units—the circuit maker, the register and the resistance box. The circuit maker is an iron-clad make-and-break cam-operated contact device, somewhat similar in operation to a magneto interrupter. It is fastened to the end of the journal in the journal box, and makes one contact per wheel revolution. It is accessible and easily replaced, and interferes in no manner with the packing or removal of the brasses. Due to the use of a wipe type of contact, oil does not affect its operation. Tests over a six months' period tend to bear out the claim that it needs attention only every 40,000 or 50,000 miles, or about yearly, and then only for cleaning. Since the device "floats," secures plenty of lubrication and operates at relatively low speed (300 r.p.m. maximum for city cars), there is practically no mechanical wear.

CONSTRUCTION AND OPERATING DETAILS

The register consists of a magnet coil in series with the circuit maker, actuating the mileage counter and efficiency indicator through a driving pawl, ratchet and train of gears. An electro-magnetic brake operates a planetary transmission, throwing the coasting register out of gear when power is applied. The main or counting magnet coil operates on 30 volts and 0.06 amp., or about 2 watts, by means of a scheme of bridging resistances. There are no high-potential wires in either the register or circuit maker, as the voltage of 600 is mainly impressed on the two enameled resistors comprising the resistance box. There is only one contact in the entire system. The efficiency indicator is merely a lettered wheel rotating in one direction for power-on miles, and in the opposite direction for power-off miles. The cumulative sum of the power-on and power-off miles puts a good man in class AA or A. A poor man, unless he coasts over 50 per cent of the total miles, is always in class C or D.

Voltage variation in no way affects the accuracy of registration. The circuit maker can be timed accurately to register on either an interurban car operating at 90 m.p.h., or a city car at 25 m.p.h., with voltage varying from 600 to 250.

Errors due to wheel diameter variation are corrected for in the following manner: For use on say a 34-in. wheel, the efficiency mileometer is calibrated to read correctly in miles on the average diameter through the life of the wheel, or approximately 32.5 in. For the individual car, when the wheel is new, the mileage records will be approximately 96 per cent of the true mileage, while on an old wheel of 31 in., the records will be approximately 105 per cent of the true mileage. The aggregate average wheel diameter of any ten cars with normally new 34-in. wheels will be very near to 32.5 in. Thus the law of averages on a number of cars, or even on one car for say 40,000 or 50,000 miles, eliminates the error due to wheel diameter. Where a system is equipped, corrections for wheel-diameters can thus be neglected.

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*Abstract of discussion of paper by D. D. Ewing, read before Central Electric Railway Association at Louisville, Ky., March 11, 1920, by W. Shaw for the author.

The per cent coasting-mileage figure is unaffected by wheel diameter variations, as the same error is present in both numerator and denominator.

Wheel slippage has been found to be a negligible factor. In fact, the efficiency mileometer inherently discourages wheel slippage. Wheel slippage means more power-miles. Locking of wheels or skidding in braking is also discouraged, since wheel skidding means less coasting mileage.

SUMMARY OF ADVANTAGES

Summing up, the advantages of the efficiency mileometer might be listed as follows: (1) It gives accurate records. (2) It records the complete efficiency ratio, both numerator and denominator. (3) It tells the motorman at a glance, by means of the efficiency indicator, his class of operating efficiency. (4) It gives a coasting percentage figure that can be used without additional calculation, to determine the slack in schedules. (5) It gives a coasting percentage figure that can, by means of a characteristic curve for given equipment, be used accurately to determine the energy consumption per car-mile.

Claim Records in San Francisco

THE San Francisco Municipal Railway has made public the following figures of its claim department for the years ended Dec. 31, 1918 and 1919:

(GENERAL STATISTICS)

	1919	1918
Total passengers carried during the year	63,966,470	55,994,844
Car-miles operated (cars 7,122,005; buses 260,324)	7,382,329	7,070,359.63
Number of passengers to mile	9	8
Number of accident reports filed*	1,916	2,172
Number of accidents fatal	9	10
Number of accidents—personal injuries	656	754
Number of claims presented	431	487
Number of claims adjusted	125	114
Number of suits instituted	23	12
Number of suits pending	42	22
Number of passengers carried per accident report	33,334	25,7 0
Number of passengers carried per personal injury report	97,510	74,264
Number of passengers carried per fatal accident	7,107,385	5,599,484
Number of fatal accidents to passengers	4	None

CLASSIFICATION

Car collisions	123	206
Auto and wagon collisions	1,134	1,128
Boarding moving car	156	195
Leaving moving car	111	120
Miscellaneous	392	523
Total	1,916	2,172

	1919	1918
Percentage of accidents to passengers carried	0.000029	0.000039
Total receipts	$2,646,682.81	$2,232,000.29
Total amount paid accident claims, office and miscellaneous expense	32,655.40	28,997.15
Ratio to operating revenue	0.0123	0.0129

* "Number of accident reports filed" also includes reports of accident shappening near the cars in which the railway was not involved.

RECAPITULATION OF AMOUNTS PAID IN 1919

Personal damages	$18,739.58
Property damages	3,766.00
Expenses of office in adjustment of claims	10,149.82
Total	$32,655.40

RECAPITULATION OF AMOUNTS PAID IN 1918

69 Personal damages	$26,771.15
21 Automobile damages	1,759.50
3 Wagons and vehicles	21.90
13 Damaged wearing apparel	124.35
3 Miscellaneous	320.25
Total	$28,997.15

Automatic Train Control Discussed

Problem Is to Increase Rather Than to Sacrifice Track Capacity

AT A meeting of the New York Railroad Club held on Friday, March 19, the subject of discussion was "The Automatic Train-Control Problem." A paper on this subject was presented by H. S. Balliet, signal engineer electric division New York Central Railroad. Some of the salient points in the paper were as follows:

The earliest record of an effort to undertake communication with moving trains dates back to 1859. Since that time there have been several experiments but, as the automatic airbrake was not invented until 1872, the use of automatic train-control devices in connection with the brake system was not possible until after that date. There are at the present time seventeen devices for this purpose, comprising five types of automatic train control.

It is not difficult to apply devices to stop a train, but if this only is done track is sacrificed. Automatic train control with speed control must maintain existing operating requirements and, if possible, increase track capacity. Very little progress has been made in meeting the requirements of speed control.

The development of automatic train-control devices and their use to supplement existing automatic block signals are highly desirable. The apparatus must be suitable to operate efficiently on trains at the highest permissible speed and must bring the train safely to a stop without endangering the controlled train or trains on adjacent tracks. Such automatic control devices must be expected to prevent only such accidents as are due to the failure of employees to observe, understand and obey signal indications.

The automatic train-control problem is to provide an appliance which will furnish protection against accidents when employees disregard signal indications or when signals improperly indicate "proceed." The two general classes of control devices are "contact" and "non-contact." The former depends for its operation on the physical contact of an element carried on the train with an element at a fixed location on the roadside. The second depends for its operation on electrical or magnetic impulse without physical contact between the roadside and train elements. There are many important factors entering into this problem such as reliability in operation; inspection, maintenance and tests to insure efficiency; clearance; capacity; interchangeability as between different devices on track used by railroads jointly and co-relation with track-circuit controlled block signaling and airbrake apparatus.

The cost of an automatic train-control system is an undetermined item involving not only the original expense of installation, but also the cost of maintenance and the effect of its operation on the capacity of existing facilities.

The special Libraries Association is taking a census of the special library collections of the country. Information is wanted of all special libraries, subjects covered, name of owner and of librarian, and clientele served. It should be sent to W. F. Jacob, Chairman Library Census Committee, General Electric Company, Schenectady, N. Y., who will be glad to answer any questions relating thereto.

Economical Use of Energy for Car Purposes*

The Author Analyzes the Ways in Which Energy Is Consumed on the Car and Suggests Ways in Which the Consumption Can Be Reduced

BY D. D. EWING
Professor of Electric Railway Engineering, Purdue University, Lafayette, Ind.

ACCORDING to the 1917 report of the Bureau of the Census electric railways were then generating seven and a quarter billion kilowatt-hours of electrical energy and purchasing an additional five billion annually. If, of this total, 80 per cent is used for traction purposes then ten billion kilowatt-hours are used in moving our cars to the extent of two and one-eighth million car-miles. This is an average energy consumption of 4¾ kw.hr. per car-mile measured at the power-plant switchboard. At 3½ lb. of coal per kilowatt-hour the total consumption is seventeen and one-half million tons or about 3½ per cent of the annual coal production. If, by the proper selection of equipment and by the proper operation of this after it is selected, it would be possible to cut the coal consumption in half, the saving at $3 per ton would be $26,250,000 per year. Of the 4¾ kw.hr. only about 60 per cent gets to the cars, the balance being "lost in transit." Possibly the transmission losses are as important as those on the cars, especially since it is easier to control the former than the latter.

On the car energy is lost in the friction between trolley wheels and trolley wires, in the friction at the wheel bearing, in the arcing at the wheel wire contact, in the resistance of both the wheel wire and harp wheel contact, and greatest of all, in the main motor circuits. Certain losses occur in the motors themselves, the starting resistance grids take a part, the gears too take their toll, passing on the balance in the form of mechanical energy to the car itself. Another set of circuits, namely, those supplying energy for lamps, heaters, compressors, etc., also add to the energy consumption.

When a man really wants to save money he keeps books; he lists his income and outgo and then analyzes the account. In the accompanying tables are some accounts with the "power bank" for three types of cars. In table I the data for the interurban and the 14-ton city cars are for the most part from actual tests, the segregation of the energy supplied to the main motor circuits, only, being estimated. The figures for the Birney car were estimated. The data were all taken during cold weather, and the lights were on about one-half the time. Carbon lamps were used in the two cars tested, and Mazda lamps were figured on in the Birney car data. The schedule speed for the interurban was 24 m.p.h., and the stops were at the rate of one every two miles. For the other cars the figures are for six stops per mile and a schedule speed of 9 m.p.h. It is understood that the energy and power requirements of electric cars depend upon many different factors, but the data here presented are sufficiently representative for the purpose of the present discussion.

As indicative of the power supply to different parts of a car, while it is operating at balancing speed on straight level track, the data in table II are presented. The figures are for the same cars, and were arrived at in the same manner as those in table I. The figures apply for the conditions prevailing when all circuits are energized.

Some of the figures in table I look small, but a better appreciation of their significance arises when one remembers that the work which a kilowatt-hour will do is equivalent to raising a ton to a height of one-fourth mile.

MAIN-MOTOR-CIRCUIT ENERGY CONSUMPTION

The tabulated values show that the percentages of energy used in the main motor circuits range from 60 to 95. The items which make up this part of the car's energy consumption are interdependent, a change in one affecting the others. As a general proposition savings may be effected by using improved equipment, by improved operation, or by a combination of both.

As a rule, economical car operation involves (1) rapid acceleration, (2) high braking rate, (3) high coasting percentages, (4) short stops and (5) few stops per mile. These factors may in some cases be incompatible with traffic requirements. The first three are at least partly within the control of the motorman. The duration of stop is partly within the control of the car crew, is partly dependent upon the design of the car and is largely dependent upon the character of the traffic. The number of stops per mile is fixed either by legal or traffic requirements and is largely beyond control.

The energy required for car propulsion, as shown by table I, ranges from 40 to 66 per cent of the total. On some roads the energy required to pull the cars up hills constitutes an important element. The amount required can be reduced by eliminating grades and reducing weight of cars. Curve resistance is not ordinarily an important energy consumer, but on the average road a reduction of 50 per cent in energy consumption due to this item seems possible through control of track curvature, super-elevation of outer rail, shape of rail head and wheel contour, weight of car, and state of maintenance of cars and track structures.

Rolling friction is a minimum with a well-aligned and firm yet elastic roadway. Railhead and wheel-tread shapes and car weights affect it. The energy consumption due to this item could probably be cut in half by proper way construction and maintenance and by the use of cars of lighter weight. Bearing friction also depends on the weight of the car, the kind of lubricant and the method of lubrication. Anti-friction bearings will reduce this friction to a very low figure.

Air resistance, as shown in table II, is important only at the highest speed. Care in designing body shape should result in a reduction of the energy consumption in overcoming this resistance.

Some brake loss is necessary to secure proper car control, and it is a loss partly within the control of the car crew. On many roads it is excessive even where

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*Abstract of paper read at annual meeting of the Central Electric Railway Association, Louisville, Ky., March 11, 1920.

TABLE I—SEGREGATION OF ENERGY CONSUMPTION IN DIFFERENT ITEMS OF CAR OPERATION

(*a*) Interurban Car. Weight 40 tons.

Item	Kilowatt-Hour per car mile		Percentages	
Car propulsion	1.865		66.2	
Motor losses	0.396		14.1	
Grid losses	0.259		9.2	
Gear losses	0.070		2.5	
Total, main motor circuit		2.590		92.0
Headlight	0.070		2.5	
Car lights	0.079		2.8	
Air compressor	0.031		1.1	
Control circuit	0.030		1.0	
Total, auxiliary circuits		0.210		7.4
Trolley wheel losses		0.017		0.6
Grand total		2.817		100.0

(*b*) Single Truck City Car. Weight 14 Tons.

Item	Kilowatt-Hour per car-mile		Percentages	
Car propulsion	1.402		48.5	
Motor losses	0.262		9.0	
Grid losses	0.438		15.0	
Gear losses	0.087		3.0	
Total, main motor circuit		2.190		75.5
Heaters	0.666		1.3	
Lights	0.033		1.2	
Total, auxiliary circuit		0.699		24.2
Trolley wheel losses		0.010		0.3
Grand total		2.933		100.0

(*c*) Birney Car. Weight 7½ tons.

Item	Kilowatt-Hour per car-mile		Percentages	
Car propulsion	0.80		40.6	
Motor losses	0.15		7.6	
Grid losses	0.25		12.7	
Gear losses	0.05		2.5	
Total, main motor circuit		1.25		63.5
Heaters	0.666		33.8	
Lights	0.015		0.7	
Air compressor	0.030		1.5	
Total, auxiliary circuits		0.711		35.0
Trolley wheel losses		0.010		0.5
Grand Total		1.971		100.0

TABLE II—ANALYSIS OF POWER CONSUMPTION IN SEVERAL TYPES OF CARS

(*a*) Interurban Car. Weight 40 Tons.

Item	Kilowatts		Percentages	
Rolling and bearing friction	37.6		26.7	
Air resistance	60.0		42.5	
Motor losses	30.5		21.7	
Gear losses	3.9		2.7	
Total, main motor circuit		132.0		93.5
Headlight	2.6		1.9	
Car lights	1.0		0.7	
Air compressor	4.5		3.2	
Control circuit	0.3		0.2	
Total, auxiliary circuits		8.4		6.0
Trolley wheel losses		0.7		0.5
Grand total		141.1		100.0

(*b*) Single Truck City Car. Weight 14 Tons.

Item	Kilowatts		Percentages	
Rolling and bearing friction	7.8		32.1	
Air resistance	3.4		14.0	
Motor losses	4.8		19.7	
Gear losses	1.5		1.0	
Total, main motor circuits		17.5		72.0
Heaters	6.0		24.8	
Lights	0.6		2.5	
Total, auxiliary circuits		6.6		27.3
Trolley wheel losses		0.16		0.7
Grand Total		24.26		100.0

(*c*) Birney Car. Weight 7½ Tons.

Item	Kilowatts		Percentages	
Rolling and bearing friction	4.2		19.2	
Air resistance	2.7		12.3	
Motor losses	4.6		21.0	
Gear losses	1.0		4.5	
Total, main motor circuit		12.5		57.0
Heaters	6.0		27.4	
Headlight	0.3		1.4	
Air compressor	3.0		13.7	
Total, auxiliary circuits		9.3		42.5
Trolley wheel losses		0.121		0.5
Grand Total		21.92		100.0

the brakeshoes are properly adjusted and maintained. Stopping a 40-ton car from a speed of 50 m.p.h. at the rate of 2 m.p.h.p.s. by means of the brakes requires an energy consumption by the brakes of about 2.2 kw.-hr. This loss is decreased by increasing the amount of coasting, while regenerative braking offers some possibilities but as yet has not been worked out in a form practicable for street cars.

Motor losses are dependent upon the design of the motor, the size of the motor (and therefore indirectly upon the weight of the car), the motor speed, the gear ratio, and the operating methods and conditions. As a general rule these losses are reduced by reducing the car weights, increasing the coasting and using slow-speed motors geared to minimum reduction. The motor losses for the Birney car as given in table I could be decreased not to exceed 10 per cent. A greater reduction is possible for the other cars. These reductions are predicated on a decrease in car weight and the proper application of the motor and control equipment. In some cases the reduction might amount to not less than 30 per cent.

Grid loss is always an important loss in city service. It is affected by operating methods and conditions and motor and control design. On the average road this loss could be very likely reduced 50 per cent by proper operation and the use of properly applied motors and control systems.

Gear loss is never a very large item if the gears are well maintained. Except as it is affected by reduction of car weight, there is possibility of but little reduction in the energy consumption of this item, at least not until the time comes when herringbone gears running in oil can be used.

The data in table I indicate that from 5 to 40 per cent of the energy consumption of a car may occur in what might be called the "frills of the car." In lightweight cars it is especially important that the consumption in these circuits be kept low. A few suggestions along this line are given below.

Heater loss depends on the climate, type of car and method of heater control, as well as upon the number of passengers in the car. Between four and five watt-hours per cubic foot of car volume will be required in a lightly loaded car. As ten persons radiate about as much heat as a 1-kw. heater, the amount necessary on a loaded car is less. Thermostatic control of the heater would seem to be the best reducing agency here, savings ranging from 15 to 40 per cent of the energy required for heating having been reported. A possibility that offers much promise is the utilization of the heat dissipated in the grids. For average winter conditions this grid loss on the heavier city cars now in service is but slightly less than the heater requirements.

The use of Mazda lamps for the interior lighting and the headlight reduces considerably the energy required for this purpose, as compared with the use of carbon lamps and arc headlights.

The air compressor runs intermittently, and its energy requirements depend on operating conditions and methods and upon the mechanical condition of the compressor and pressure piping system. A slight leak in the piping may easily double the energy consumption of the compressor, as may also careless handling of the brakes and other air-using devices.

Cars equipped with remote control require a certain amount of energy for the operation of the switch groups. In some of the modern electro-pneumatic control systems the energy required directly for control operation is only about 20 per cent of that in some of the earlier systems. The demand on the air compressors, however, is increased. A decrease in the time that power is used for propulsion purposes decreases this loss in direct proportion. The loss at its worst, however, is a small one.

Trolley fed signals also require a small amount of energy, but there is little reduction in consumption possible with well designed circuits.

CURRENT-COLLECTING DEVICES

The amount of energy lost at the trolley wheel is small and is of interest chiefly because it is, to a certain extent, a measure of the life of the wheel and wire. Recent tests show that for a city car collecting 50 amp. at 20 m.p.h. with 20 lb. trolley tension, the mechanical loss due to the wheel wire and rotation section is about 30 watts; the electrical loss at the wheel-wire contact, 110 watts, and the electrical loss at the bushing contact, 20 watts. The aggregate is 160 watts. For an interurban car collecting 200 amp. at 50 m.p.h. with 30 lb. trolley tension, the losses are about as follows: mechanical, 110 watts; electrical, at wheel wire contact, 400 watts; electrical, at bushing, 180 watts; total, 690 watts.

Briefly summarized, the greatest possibilities in the way of energy saving lie in the use of lighter cars. of proper operating methods and of equipment properly applied to the service which it is to perform. If these possibilities were used to their fullest extent on all the railways of the country, I firmly believe that while we might not be able to save the 50 per cent of the coal mentioned in the introduction to this paper, we should be able to save at least 50 per cent of the 50 per cent now charged against the cars. We should not attempt to save electrical energy at the expense of something else more costly, as such saving is likely to prove to be "saving at the spigot, while wasting at the bung." A saving to be justified must be one considered from the standpoint of the business as a whole. It never pays to spend $10 in one department to save 10 cents in another.

Track Swings Simplified

By Use of Simple Formula, Track Swings Can Be Properly Constructed by Any Foreman

By W. T. ROSSELL
Superintendent Track and Buildings, South Covington & Cincinnati Street Railway, Covington, Ky.

IT IS often necessary, for the sake of car clearance or in order to meet old work, to swing track to a parallel line. The offset may vary from a fraction of an inch to one or more feet and the length of this reverse curve is often left to the judgment of the assistant engineer or even the foreman. This means that at one point the length of the swing may be 20 ft. and at another 30 ft. for the same offset distance. Often paving must be removed and replaced. The swing should be of ample length to secure easy curves and yet should not be one foot too long. There is no reason why the swing should not be standardized. The complete form is a curve, a short tangent and a curve as shown in an accompanying illustration.

In order to determine all of the functions of this swing with certain conditions fixed or values known, referring to the illustration:

Let a = Offset, center line
R = Radius of curves
T = Tangent between curves
D = Over-all length of swing.

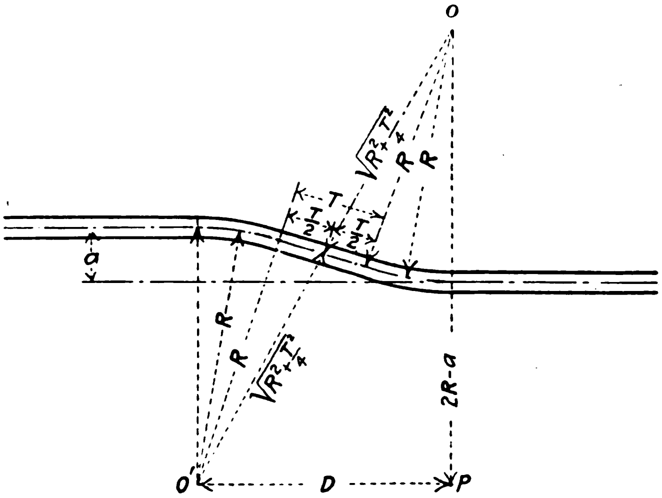
Connect the centers of the curves OO'

Draw OP perpendicular to and $O'P$ parallel to the center line of the track.

Then the solution is evident from the right triangle OPO'

$$D^2 = \left(2\sqrt{R^2 + \frac{T^2}{4}}\right)^2 - (2R - a)^2$$
$$D^2 = 4R^2 + T^2 + 4R^2 - 4aR - a^2$$
$$D^2 = T^2 + 4aR - a^2$$
$$D = \sqrt{T^2 + 4aR - a^2}$$

Standard values may be selected for T and R and the equation solved for D. If desired T is made zero and vanishes.



ASSUME VALUES FOR T, R AND A, AND SOLVE FOR D

Below is shown a table with T equal to 25 ft., R equal to 500, 1,000, 1,500 and 2,000 ft. respectively and a varying from 1 in. to 3 ft. Intermediate values are interpolated.

$$D = \sqrt{T^2 - 4aR - a^2}$$

R a (inches)	500 feet D (feet)	1,000 feet D (feet)	1,500 feet D (feet)	2,000 feet D (feet)
1	28.1	30.9	33.6	35.9
2	30.9	35.9	40.3	44.3
3	33.6	40.3	46.1	51.2
4	35.9	44.3	51.2	57.4
5	38.2	47.9	55.9	62.9
6	40.3	51.2	60.2	68.0
7	42.3	54.4	64.2	72.8
8	44.3	57.4	68.0	77.2
9	46.1	60.2	71.6	81.4
10	47.9	62.9	75.0	85.4
11	49.6	65.5	78.3	89.2
12	51.2	68.0	81.4	92.9
15	55.9	75.0	90.1	103.0
18	60.2	81.4	98.1	112.4
21	64.2	87.3	105.4	120.9
24	68.0	92.9	112.4	128.9
30	75.0	103.0	125.0	143.6
36	81.4	112.4	136.5	156.9

It is difficult to make many foremen place the tangent between the two curves. However, when once they see it properly laid out they are so well pleased with the appearance that they take pride in always doing it right.

A newspaper dispatch from Chamonix, Switzerland, states that French and Italian engineers are making preliminary studies for a tunnel under Mont Blanc, which will give a direct connection between France and Italy.

How Meters Induce Car-Energy Savings*

In Discussing the Paper by D. D. Ewing, the Author Elaborates That Phase of the Subject Which Relates to the Province of the Motorman

BY L. E. GOULD
President Economy Electric Devices Company, Chicago

PROFESSOR Ewing has presented an able analysis of the car-energy consumption factors and has shown the proportionate subdivisions of each unit of energy used, not only in useful work but in the various losses between the trolley wheel and the rail. A similar analysis should be found to be most helpful when studying how car propulsion energy can be conserved. Such a study should have for its objective the determination of those losses which can, through better engineering practice and better operating practice, be made to net the largest consistent savings with the least outlay and least hazard. That, perhaps, is a rough definition of our subject, "economy."

Professor Ewing's paper points out that, generally speaking, energy savings may be effected by use of improved equipment, by improved operation or by a combination of the two. My discussion will relate largely to what I think Professor Ewing means by the words "improved operation." For example, consider that road which has paid much attention to effecting economies in power generation, distribution and the return circuit. Likewise it has highly efficient motive-power equipment on cars of consistent weight operated on carefully planned schedules. A road so equipped still affords full opportunity for conservation of car energy.

Substantial savings can be made through better handling of the controller and brakes; that is, through training the men to have in mind conservation of energy in addition to safety and service. And the road with the most highly trained men can still show a very worth-while economy in energy consumption if it will give its motormen an energy-checking device for use as a tool to help them to keep check on their individual improvement.

It is true that motormen are taught to handle their trains most efficiently, and on many roads this part of their service is regularly supervised. Yet we have learned by tests on many properties and by actual installations on nearly fifty roads in the United States that the use of an energy-metering device will so improve the saving accomplished that sufficient net savings are available to wipe off the cost of the installation of the device early in the first year of its use.

The average well-meaning motorman who runs on schedule, but who wastes energy, does this simply because he does not understand how to utilize car energy efficiently; or, perhaps more specifically, because there is no stimulus for him to keep "on his toes" all the time. So far as power saving goes he has no incentive for operating economically. But give this man a power-saving device which will show him how much energy his car uses for his run, for a trip, for a part of a trip, or even for as small an amount as the energy consumed in climbing a long grade, and the motorman's interest immediately is stimulated to more efficient operation. Then follow substantial energy savings and many other worth-while economies.

With a watt-hour meter on his car the motorman can actually determine for himself some of the important factors set forth in Professor Ewing's paper. He can see just how much saving he makes by proper acceleration. He can see that coasting normally will save energy, and that fanning the air brakes wastes energy. With a meter on his car the motorman can see the power-consuming effect of unnecessary stops and slowdowns when climbing grades, and he can note from watching his meter the relative amount of energy that is being taken when operating on series, on the resistance notches and at free running or balancing speed. In other words, the kilowatt-hour meter on the car gives the motorman, and oftentimes the management, a new view of car operation and therefore increases interest in the work.

The motorman has faith in his meter because, through its open face and its easily read and understandable dials, he can prove to himself which method of operation gives him a low record and which a high record in energy consumption. This is the psychology underlying the success which the Economy meter has had in obtaining sustained records of low energy consumption.

Briefly, the Economy meter is a simple, rugged, energy-measuring device, designed particularly for use on electric railway passenger and freight cars and locomotives. It shows the motorman and the management in clear figures the actual car energy consumption. It is usually connected to measure only the energy consumed in the car motor circuit. It checks the performance of motormen and, in addition, is a constant inspector of the condition of the equipment. It gives all the power-saving results obtainable with other checking devices and in addition affords engineering data of high value.

The watt-hour meter functions while energy is being used, and its rate of functioning is in proportion to the product of the amperes and volts in the circuit at any instant. It registers the actual energy consumption, no matter what operating conditions may be encountered. It is the only rating device which actually and directly compares men on the basis of their relative energy consumption. A motorman may ascertain at any time what progress he is making just as easily as he can read the mileage recorder on an automobile.

The meter checks the motorman directly in terms of the unit he is asked to save; namely, the kilowatt-hour. If an instructor tells an inefficient motorman to operate this way or that way in order to reduce his power consumption, the motorman is inspired with more confidence when he actually tries his own way and then the instructor's way and, by means of the immediate information which the meter gives, finds out that the instructor's way actually does require less energy.

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*Abstract of discussion of paper read by D. D. Ewing at annual meeting of Central Electric Railway Association, Louisville, Ky., March 11, 1920.

The so-called "power-saving devices" are all monitors to show the management whether the motormen have operated their cars efficiently. These devices stimulate correct operation and thus lower energy consumption, but only to the extent that motormen believe they are being rated and compared fairly. Sustained energy saving will be highest with that device which, under all conditions of operation, most fairly rates the relative operating efficiencies of motormen.

WHAT CAN BE ACCOMPLISHED BY METERING THE CAR ENERGY

The Economy meter measures a man directly in power units. A motorman is asked to save energy and, when rated by a watt-hour meter, he knows absolutely—trip by trip—whether or not his efforts result in actual reductions in energy consumption. With no other devices does the motorman know directly whether power has been saved or wasted. Metering the energy properly credits a man for taking advantage of every opportunity to save power.

One of the simple ways to stimulate energy-saving efforts is to post the number of kilowatt-hours required by the average man for a round trip on a given line. This is a bogie for all men to work against and the meter will plainly show any man how much energy his car has actually consumed as compared with the average trip of the average man.

In considering, for power-saving purposes, the use of the watt-hour meter as compared with devices which measure a time element and not energy consumption, there are several important factors that should be noted carefully.

First. the meter neither introduces a hazard into car operation nor puts any premium on any practice which is contrary to safety first.

Second, the kilowatt-hour is the only unit which gives a motorman full credit for all that he may do to reduce energy consumption while keeping his car on schedule.

Third, the meter gives a motorman credit for consistently fast, smooth feeding, but does not put a premium on so-called "cannon ball" acceleration.

In 1915 J. F. Layng of the General Electric Company presented energy consumption curves which showed the influence of various factors, such as number and length of stops and rates of feeding and braking on the watt-hours per ton-mile for typical cars in typical service. The energy curves for acceleration and retardation have about the same shape. They show that faster feeding and faster braking, up to a certain good rate, will bring about a substantial reduction in energy consumption, but feeding or braking beyond this rate does not proportionately reduce the energy consumption. It does, however, shorten the power-on time and consequently increase the possible coasting time. But these quantities have not the same value in equivalent energy reduction as they have in the parts of the curve represented by slower feeding and braking.

When watt-hour meters are used to measure power savings on the cars, the motormen get credit for pausing on the full series notch if the condition of operation is such that a pause will save energy. Measuring only the time of power on, brakes on, or coasting, puts a heavy penalty on pausing on the full-series notch.

The meter gives due credit for running on full series in congested districts or, with an interurban car, over slow-speed track, such as through small towns. F. E. Wynne, Westinghouse Electric & Manufacturing Company, has shown speed-time and current curves for a quarter-mile run with an interurban car with the controller on series, as compared with full multiple operation and more coasting. Both running times were the same. Mr. Wynne's study showed that series running under slow-speed requirements meant a saving in the case cited of 18.25 per cent in energy consumption.

Any motorman who has operated a car equipped with an Economy meter will tell you that on slow-order track he can keep his car on time and save considerable energy by running on full series rather than on multiple and coasting. In a test recently conducted on a fifty-car line in Chicago one motorman who had made an extremely low power record for the day, when asked how he operated in order to get such a good record, replied, "By feeding up my controller quickly, by coasting a lot in the outlying sections, and by considerable series running downtown where it's crowded."

A large number of roads in the British Isles—even more than 75 per cent—have their cars equipped with meters and therefore the power-saving instructions, based on many years of experience, are of particular interest. Note this rule of the Aberdeen Corporation Tramways:

> Get off the resistance notches, as quickly as possible without rushing the notches, onto full series or parallel. Never run on parallel unless you can take full advantage of the last notch. It is simply wasting power to throw off on the first or second parallel notches. The resistances have used up the most of it; the motors have only gotten a fraction of the power consumed. The same work could have been done with series at half the cost.

Meters give motormen full credit for operating on full series and on full multiple position. They penalize them for running on resistance notches.

No interurban road can boast of never having low voltage, and necessarily this condition should be taken into consideration in the choice of a power-saving device. Low voltage will materially increase the power-on time if a car or train is to be kept on schedule. And the lengthened power-on time directly lowers a man's rating, through no fault of his own, if he is rated by a power-saving time device. A watt-hour meter measures the actual energy consumption at the lower voltage, and this is not materially greater than at normal voltage—what increase there is being due to the slightly decreased efficiency at which the motor operates on low voltage. Therefore, when line voltage is low the watt-hour meter assures a motorman a fairer standing when compared with other men who did not operate under low voltage conditions.

BY-PRODUCT SAVINGS OF THE METER

Referring to Professor Ewing's mention of equipment savings, there are, in addition to a direct reduction in energy consumption, numerous other economies which follow the installation of watt-hour meters on cars and locomotives. For example, if rehabilitation is in order, the sum of the meter readings averaged for any comparative period will assist in the determination of the most efficient types of equipment. For instance, one large user of Economy meters was able, through a change in wheel size, to reduce the average consumption of a substantial number of cars from 123 to 105 watt-hours per ton-mile. Without meters this possible economy could not easily have been discovered.

Meter readings will show the relative power cost for giving service with different combinations of train make-up. The Chicago, North Shore & Milwaukee Railroad has every motor car equipped with a meter. This road operates every variety of train, from safety cars to heavy five-car, high-speed trains, each car equipped with four 160-hp. motors. The meter records readily show the actual power cost of operating each type of train—a substantial advantage when rearranging schedules and service.

All power-saving devices bring about a reduction in brakeshoe and wheel wear; and because less energy is used there is also a substantial reduction in the roasting of coils and grids.

With watt-hour meters on cars both the transportation and the mechanical departments can at once realize the high cost of binding brakes, tight side and center bearings, nosing trucks and similar defects which come about from natural causes and which should have prompt repair. Often, however, for various reasons, such repairs are deferred. But when their cost is directly shown by the high energy consumption which they bring about, there is a natural tendency to make repairs, and it is easy to justify expenditures with which to do so promptly. In other words, the use of the car-energy meters serves as a strong influence to keep defective cars off the line, and this in itself will result in a substantial power saving.

Economy on the car itself and long life to the electrical equipment, as well as good service, demand a good average line voltage. Therefore, the amount of loss between the substation direct-current feeder switch and the car motors is a most interesting subject for study. On several tests conducted during the past two years we have been able to obtain accurate readings of the direct-current send-out and compare these with the sum of the Economy meter readings on the cars. The difference between the two values shows the line loss, the rail return loss and the miscellaneous consumption of energy along the right of way and on the car. We have obtained figures on this direct-current loss plus miscellaneous use, varying from 9 per cent on a trunk-line city route to 30 per cent on typical interurban lines in Indiana. With such figures available the engineers of a property can easily and accurately look for the weakest points in their distribution systems and thus remedy them and conserve substantial losses of energy.

Another desirable benefit which follows from the installation of energy-saving devices is that the distribution system is relieved of part of its load and thereby the average car operates at higher average voltage and can more easily maintain its schedule.

Another by-product of the Economy meter installation which is not strictly power saving on the car but is closely allied to it and results in money savings of such amount as to warrant the installation for this purpose alone is that of utilizing the meter to tell when the car should be inspected. One road equipped with 1,300 meters has been on the kilowatt-hour car inspection basis since November, 1918, and reports savings which would more than wipe off the cost of the meters the first year. This property is the Eastern Massachusetts Street Railway, known as the "Bay State System." We are also manufacturing, or have on order, meters with the special car inspection dials for the Union Traction Company of Indiana, the Atlantic City & Shore Railroad, the Seattle Municipal Railway, the Philadelphia Rapid Transit Company and others.

The use of the meter to determine when cars should be inspected is based on the fact that kilowatt-hour consumption between car inspections is the safest, most efficient and most readily available measure of the work done by the essential parts that wear and need inspecting. The kilowatt-hour is a measure of the work done. Mileage run, or the total power-on time, the elapsed coasting time, or the braking time, are none of them so accurate a measure of the work done as is the kilowatt-hour, and with an Economy meter on the car the total kilowatt-hours are easily available for determining that a car has done sufficient work to need inspection.

By providing a simple means for accurately and automatically showing when inspection is needed, the inspection-dial meter also shows at a glance how much work a car can do before inspection is needed. Or, in the case of a road failure, how much work has been done previous 150. And yet the factor of safety has not been as to whether an inspection has been missed. All this is had without any clerical labor. The result is that more thorough inspection is maintained for the same labor cost; or the previous standard of inspection is maintained for reduced labor cost. For example, on the Bay State System, from one carhouse there are operated twenty-one cars, five in regular service and the others during rush hours. Under the previous method of inspection each car was inspected every four days—a total of 150 inspections per month. Under the kilowatt-hour basis of inspection the average inspection period is a little over twenty days, or a total of thirty-two inspections per month compared with the previous 150. And yet the factor of safety has not been changed for those cars which did the most service. The average time necessary to make an inspection is about two hours and the resulting saving of 236 hours thus represents a saving in inspection time of about ten hours per car per month, which may either be absorbed in more thorough inspection or in a reduction of the inspection force.

The savings which will accrue to a large city property from inspection of equipment on the kilowatt-hour basis of work done are great. One metropolitan system which has studied this method for nearly a year estimates that car inspection by this method will bring about a reduction of more than $75,000 a year in the inspection cost.

A Way to Get Rid of High Ice Centers

IN ORDER to attack the high ice centers which sometimes form between rails in snowy winter weather, the Pittsburgh Railway Company constructed an ice cutting machine. This machine is simple in nature, as it consists merely of applying some specially cut old gears to the axles of wheels on a flat car.

Some well worn 24-in. gears were selected, and two out of every three teeth were cut from the gear, leaving only every third tooth on the spider. These teeth in the well worn gear were already fairly sharp and were sharpened still more. Several of these gears so treated were then pressed onto one of the axles of a flat car having 23-in. wheels. The platform of the flat car was heavily loaded and when the flat car was pushed ahead of a motor car the gear teeth cut into the ice of the high center and chipped the top of the ice so that it could be easily swept away by following machinery.

There was at first some trouble keeping the flat car on the track, but this was soon conquered and the mechanism worked very satisfactorily.

Saving Electrical Energy on the Car*

The Author, Who Was Until Recently Master Mechanic of the Indianapolis Traction & Terminal Company, Comments Item by Item Upon the Points Raised by Professor Ewing

BY L. M. CLARK
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IN A discussion at this time of the economical use of energy for car purposes it appears advisable to consider the three phases of generation, transmission and utilization. Speaking broadly as to the first phase, a gradual but marked increase in the efficiency of generation has been attained, until now most of the electrical energy used by railway cars is being produced at a point approaching maximum efficiency. But the efficiency of transmission has not kept pace with that of generation. There remains considerable to be accomplished in the way of increasing the efficiency of direct-current negative returns and reducing the costs of conversion from alternating to direct current. The question of utilization is extensive and complex, due not only to the wide limitations of car and equipment design, operating schedules and the use of auxiliary devices, but to the human equation, the all-important factor with which we have at the present time to deal.

In reality, the problem of the economical use of energy for car purposes can be regarded as commencing with the contact of the current-collecting device with the trolley wire or third rail, terminating with the car wheels on the track rails, and taking into account the translation of a given amount of electrical energy in accomplishing useful work and overcoming attendant losses.

Car weight constitutes one of the principal contributing factors in the amount of energy required for propulsion. Not until recent years has such consideration been given to designs of minimum weight commensurate with safety in operation and durability in maintenance, weight reduction having been made possible by the substitution of steel for wood construction. The safety car has been steadily growing in favor and has well established the advantages of weight reduction from the standpoint of power economy.

SCHEDULE SPEED AND ENERGY ECONOMY

The next contributing factor, one of far greater importance because it is sufficiently flexible to permit economical adjustment, is schedule speed. This, with given weights of cars and loads, governs the capacities of motor equipments and the gear ratios required, very materially affecting the energy required for car propulsion. With present car equipments, taking into consideration light and loaded weights, motor capacities and characteristics, rates of acceleration and braking, number and length of stops, and roadway and power conditions, the most economical speed can be determined from the calculation of fixed charges and platform expenses per car-mile as compared with the power input and equipment maintenance expenses set up on a similar basis.

While it not infrequently becomes necessary to deviate from the employment of maximum economical speeds in order to expedite the handling of traffic, or to give service of a definite character, opportunities exist on many properties for furthering the economy of energy consumption by readjustments of schedules, taking into account the varying traffic conditions throughout the daily period of operation and any irregularities in the proper equalization of time between timing points.

In the attainment of maximum power economy the question of gear ratios should not be overlooked, particularly with the older equipments. The writer knows of material reductions in power consumption by the change of a single tooth in gearing under severe operating conditions, coincident with decrease in motor maintenance and increase in the ability of the equipment to maintain schedules. On larger systems, where a variety of equipments are operated, it is frequently possible to increase efficiency in energy consumption by redistribution of the various types of equipments, assigning them to the different lines consistent with their ability most efficiently to meet the service conditions.

The correct grading of motor resistors between the different points of the control affords a means of saving energy by making possible more rapid acceleration without excessive current peaks, which would otherwise result in slipping wheels, damage to the equipment and rough handling of cars.

Train resistance is an element which greatly reduces the efficiency of energy translation into useful work. It is composed of a number of factors varying widely according to the conditions of operation and that of the track and equipment. In cutting down resistance losses bearings of the anti-friction type offer one means, but their efficiency from a maintenance standpoint has not been satisfactorily determined. Coincident with the foregoing are reductions in losses resulting from friction between the car wheels and brakeshoes, caused by improper suspension or adjustment. With some of the older types of trucks, as well as those which have been in service for several years, the question is quite complex with regard to the brakeshoe adjustment that will promote the greatest economy in energy consumption. For example, with trucks which have become unduly worn in the journal boxes, pedestal bearings, bolster wear-plates and center bearings an adjustment of the brakeshoes which minimizes free-running friction will oft-times decrease the efficiency of braking to such an extent as considerably to increase the power consumption required to maintain a given schedule. Thus a closer adjustment, incurring greater free-running friction, might more than compensate for the increase in braking efficiency.

However, the real solution of the problem lies in the proper maintenance of trucks, as a result of which correct brakeshoe adjustments may be maintained, particularly by the employment of automatic slack adjusters. These in conjunction with the use of proper braking pressures will reduce friction losses to a minimum and effect a means of maintaining maximum braking efficiencies.

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*Abstract of discussion of paper read by D. D. Ewing at annual meeting of Central Electric Railway Association, Louisville, Ky., March 11, 1920.

Coming now to the energy required for the operation of auxiliary devices, among these electric heaters consume the most power, the amount as compared with traction power varying considerably with the type of equipments and climatic conditions. Thermostatic control affords a means of conserving energy consumption at this point to a degree which appears to warrant consideration. The use of combustion heaters largely reduces, or entirely eliminates, the item of energy required for heating, but with the increase in the cost of attendance labor, as compared with power, it becomes questionable if the electric heater is not the more economical to operate, particularly on city cars where the results of power interruption would not be serious from the heating standpoint.

In the illumination of cars a considerable saving in energy can be secured. Attention should be given to minimizing the hours of burning, not only in carhouses and yards, but during periods of service operation.

Further economies can be effected by looking after the operation of motor-driven compressors, maintaining them in good condition, keeping the brakes as well as other pneumatically operated devices on cars properly adjusted, and eliminating air leaks in the equipment and pipe connections. The proper operation of the brakes also helps in attaining this objective.

WHERE THE MOTORMAN COMES IN

Having discussed the subject in a general way with regard to the factors involved in the car equipment and schedule speeds, let us now take up the element of utilization which affords a direct and profitable means of attaining increased efficiency, namely, the motorman.

With all the progress that has been made in the other lines touched upon in this paper, comparatively little has been accomplished in the way of increasing the efficiency of power utilization in so far as the motorman is concerned. Of the three fundamental factors of car operation quoted in order of their relative importance, namely, safety, time and economy, the attention of operating departments has been concentrated on the first-named two. The relative efficiency of motormen has been judged largely by their ability to operate cars with a minimum number of accidents and adherence to schedules, little consideration being given to the question of energy economy.

This condition existed in the absence of any available means for determining the comparative status of the motorman with regard to the degree of efficiency with which he utilizes the energy consumed in propelling a car over a given schedule, with such number of stops and length of standing time as are incurred by operating conditions.

In most cases, a student motorman is put through a schedule of instruction, supplemented by a number of trips on a car under the tuition of an instructor-motorman, and afterward he is examined with regard to his knowledge of the equipment and its operation before being put to work. Failure on the part of the motorman to attain normal efficiency is largely attributable to inability to know, from trip to trip or from day to day, what he is accomplishing other than possibly the fact that he is keeping out of trouble and on schedule time.

By the provision of a checking device, correct in principle, dependable in action and expressing its units of measurement not only on a basis of true comparison but in a manner most appealing to his sense of judgment, the average motorman is influenced to increase his personal efficiency, comparable not only with his previous records but also with those of his fellow motormen.

The efficiency of a motorman is based upon his ability to utilize the stored-up energy in the moving car in propelling it, and the unit of measurement which takes this factor into account directly indicates his true efficiency in a manner least affected by operating factors not under his control.

STANDING TIME SHOULD BE CONSERVED

Of the several operating factors entering into the energy input required for car propulsion, it may be pointed out that most of them are fixed in so far as the motorman is concerned, so that there remain only the factors of acceleration, retardation and standing time, by the correct utilization of which he is able to economize in the use of power. Of these three factors the one by which the greatest economies can be secured is the conservation of standing time. This can be conserved not only at stops in loading and unloading passengers, but at terminals as well by elimination of all lay-over time not called for by schedules.

Next in importance is the act of retardation, in which economies in energy consumption are attained through the employment of one-application stops, involving braking pressures commensurate with car speeds, and by the avoidance of the so-termed "fanning" of the brakes, which is usually the outgrowth of habit or of erroneous ideas on the part of motormen.

Last comes acceleration, which offers means of decreasing energy consumption by eliminating running on resistance points and all unnecessary series operation. Although with a certain number of motormen further economies can be effected by the employment of more rapid acceleration, by the time the "fast feeders" are brought down to the point of consistency the net gain here is comparatively small.

Increasing the efficiency of a motorman is in reality a study of human nature combined with psychology. The interjection of technical principles or arguments beyond the scope of his judgment only tends to complicate the matter and promote retardation in progress. A direct appeal to his sense of reasoning and the establishment of environment tending to create and maintain his interest will inevitably secure his co-operation, the key-note in the attainment of successful results.

In conclusion, the writer has endeavored to bring out in a general way the more important elements entering into the subject under discussion, but from a standpoint of investment returns, he believes that no greater opportunities await the electric railway industry for economizing in the use of power and increasing the efficiency of operation than through an educational campaign among the motormen, supplemented by the use of checking devices and a follow-up system of instruction, in order to insure results of a permanent character.

Do Power-Saving Devices Actually Save Power?*

These Devices Are Merely "Measuring Sticks," Designed to Provoke a Spirit of Emulation Among the Car Operators

By William Arthur
President Arthur Power-Saving Recorder Company,
New Haven, Conn.

NEVER in the history of the electric railway industry has there been such need for rigid economy as now. The rising cost of everything that the street railway uses, the competition of the jitneys, the difficulties of obtaining increased fares, all make it an absolute necessity for economy in operation. There is, therefore, no need at this time to attempt to prove that the subject of saving power on street railways is of the greatest possible importance, and one which every progressive railway man has, or ought to have, in his mind. In studying this matter one of the first questions we are likely to ask ourselves is whether power-saving devices actually do save power?

The answer to this question is, emphatically, No! Power-saving devices do not save anything at all, and this thought cannot be brought out too clearly. Power-saving devices are a means to an end. They are measuring sticks. Their purpose is to induce a spirit of friendly rivalry between motormen who operate electric cars under the same general conditions, but it is the motorman who saves. The whole power-saving situation may be summed up by saying that what we are trying to do is to get the motormen to vie with each other and, as it were, to run a race. The power-saving device merely tells who wins the race and the order in which the contestants pass the winning post.

The question at once naturally arises, cannot this spirit of rivalry be brought about without the need of power-saving devices? This experiment has been repeatedly tried and it has always been found that although something could be done to work up the motorman's interest by instruction, circularizing and other such means, yet the improvement disappeared just as soon as the first enthusiasm had passed. What is needed, if a power-saving campaign is to be effective, is something on the car which will at all times indicate whether or not the motorman has operated his car efficiently, and thereby permit of suitable comparisons being made between men. Even if a good power-saving device is used, however, very doubtful results will be obtained unless the power-saving campaign is carefully planned and the follow-up work consistently carried out.

Granting then that economy is needed, and that power-saving devices are necessary to effect any substantial economy in power consumption, the question naturally arises, how much power can be saved? To answer this question, careful and exhaustive experiments have been made in many parts of this country, and in other countries. The results of the experiments and the experience of those who have gone into the matter most thoroughly show that there is approximately a two to one ratio between a good motorman and a poor motorman; that is, between a motorman who would be considered one of the best on a property and a motorman who would be considered one of the worst. This ratio of two to one means that the poor motorman is using just about twice the power for the same service that a good motorman is using. For instance, if on a property the average power consumption is 3.5 kw.-hr. per car-mile, then the first-class motorman is probably making his run with a power consumption of a little less than 2½ kw.-hr., whereas, the careless motorman, on the same run, is using from 4½ to 4¾ kw-hr.

Recently, on a large property, and before a power-saving campaign was started, a car containing fifteen chief motormen was operated over a given route under test conditions, these conditions being that each motorman should operate the car in his own way, making stops at specified points and running at a given schedule. The power consumption per car-mile was measured. The car was then operated over the same route, making the same schedule and the same stops but operated by an expert engineer, and again the power consumption was measured. The saving made by the engineer was 35 per cent.

It is the writer's belief, based upon close study of this whole matter, that as a whole on a large property the motormen waste about 40 per cent of the total power drawn from the overhead wire. This does not mean that 40 per cent can be saved as a general proposition on any property, for the reason that all motormen are not operating as carelessly as the worst to begin with, nor can all of them be trained or worked up to the point where they are all as good as the best man.

In any large power-saving campaign the most that can be hoped for as a practicable thing and without spending too much money for the follow-up work is from 15 per cent to 20 per cent, and although this is only about half of the total amount wasted, yet it represents a worth-while saving.

It is interesting to study just the value of the energy used on a trolley car each day. A car in ordinary service runs about 150 miles a day, with an average consumption of 3.5 kw.-hr. per car-mile, and the cost for energy at 1½ cents per kilowatt-hour gives a total of $7.87 as the cost of the power used per car per day. Taking 15 per cent as a reasonable figure as to the amount which can be saved by a well-organized and well-followed-up power-saving campaign, the saving per day per car works out at $1.18. Deducting for the cost of clerical work, following up the records, instruction, maintenance, stationery and other incidental expenses, there is left a saving of approximately $1 per day per car.

In conclusion I would point out that our country, which usually is the leader in progressive means and in methods of organization and efficiency, is in this matter of power saving very much behind. In England 98 per cent of the cars are equipped with some form or other of power-saving device, and as a former English railway manager recently expressed it, when visiting over here, "English street railway men would as soon think of operating their trolley cars without wheels as without something on the car to check the motormen and prohibit the excessive and wasteful use of power." In our country fewer than 10 per cent of the cars so far are equipped. I believe, however, that we are right now confronted with the situation which makes it imperative for us to use not only this means of economy, but every other means, if our street railways are ever to get into that prosperous condition again which we should all like to see and help to bring about in so far as this lies in our power.

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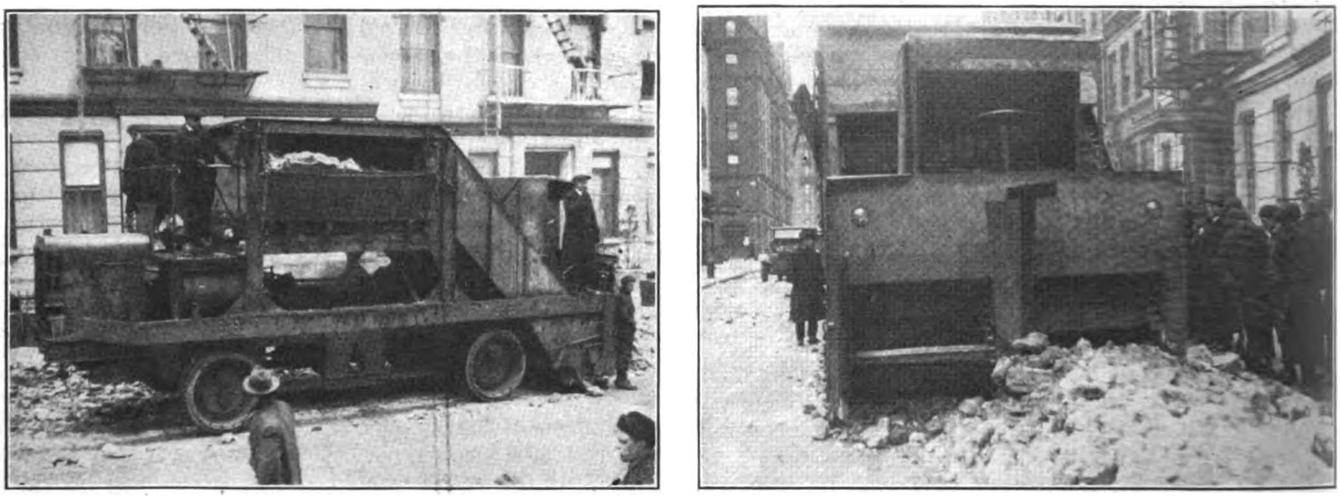
*Abstract of discussion of paper by D. D. Ewing, read before Central Electric Railway Association at Louisville, Ky., March 11, 1920, by W. Shaw for the author.

Snow-Removal "Tank" With Possibilities

Device Which Has Undergone Severe Tests in New York City Gives Promise of Furnishing a Snow-Handling Solution

A LARGE conveyor equipment which has been developed by Dr. S. Friedman of New York City for the removal of snow from city streets, country roads and car tracks has recently come much into the limelight through tests which have been conducted in New York. The machine is called a "snow tank." It is motor operated with four speeds ahead and one reverse and has a speed of 2 to 10 m.p.h. The dimensions are: Length 26 ft., width 9 ft. 6 in., height 12 ft. 6 in., and the weight of the "tank" complete is 22 tons. The motor is a 150-hp. Sterling Marine and the drive is Christie four-wheel.

As is shown in an accompanying illustration of a front view of the tank the snow is picked up by shovels attached to an endless chain conveyor. These shovels cut into the snow or ice as the machine moves forward and convey the material to a hopper at the top of the "tank." The bottom of this hopper is a movable platform operating in a horizontal transverse direction to the first conveyor. The hopper conveyor can be kept in simultaneous operation with the machine, thus depositing a steady stream of material into a flat car or truck or at the side of the road, or the hopper may be filled and then dumped in one spot. The capacity of the hopper is 10 cu.yd.



AT LEFT, ON DEMONSTRATION THIS SNOW "TANK" LOADED FIVE TRUCKS IN THREE MINUTES. AT RIGHT, THE "TANK" DIGS INTO A SNOW BANK WITH SHOVELS ON AN ENDLESS CHAIN CONVEYOR

It is claimed that the machine will pick up material and fill a 10-cu.yd. truck in one minute. Under demonstration for a distance of one block this was actually accomplished in an average of three-quarters of a minute per truck. Other claims made for the machine, which seem to have been verified under test, are these: It will fill a flat car with soft snow at the rate of 30 to 50 cu.yd. per minute or with frozen snow at the rate of 10 to 20 cu.yd. per minute. It will clear a path in a 6-in. snowfall at the rate of 8 m.p.h., in an 8-in. snowfall at 7 m.p.h., in a 12-in. fall at 5 m.p.h., and so on up to a 24 in. fall at 2 m.p.h. The machine is said to accomplish the work of 750 to 1,200 men.

In some comparisons of costs of loading an 8-cu.yd. truck with snow by "tank" and by hand compiled by Dr. Friedman as a result of tests, it is stated that the hand-loading costs $6.12, while the "tank"-loading costs 64 cents, a difference of $5.48. This includes wear-and-tear and overhead in the case of the "tank." Allowing two hours daily for rest, filling the machine with "gas" and oil and making adjustments, it is estimated that 1,300 loads per day can be removed at a saving of $7,000 per machine per day.

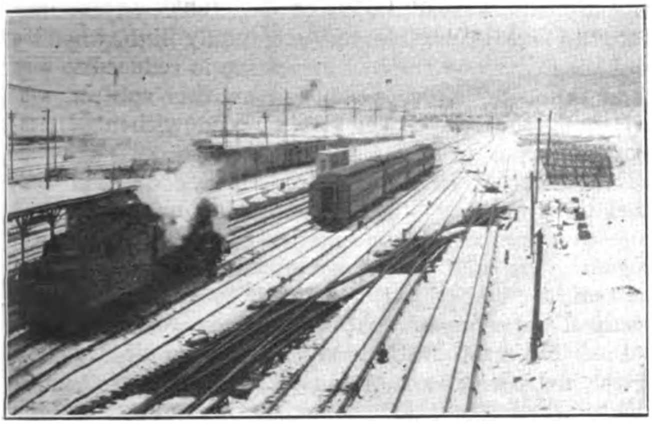
Electric Snow Melters Stand the Test of Severe Storms

Snow Melters in Use on New York Central Electrified Division Keep Switch Points Clear During Most Severe Weather in February

THE snowstorms of February, 1920, will long be remembered for their severity. Not only did a greater quantity of snow fall than during an equal period for many a previous year, but in addition the snow this year had a moisture content much greater than that of earlier memorable storms. For these reasons the past winter has been a most excellent test period for various snow-melting and snow-handling devices.

In the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 16, 1918, page 881, the electric snow melters developed under the direction of Francis Boardman, division engineer, New York Central R.R., were described. During last February when snowstorms, especially in the eastern parts of the country, seriously tied up and delayed transportation, switches on the electric division of the New York Central, where the snow melters were installed, were kept clear for prompt operation of passenger trains. The efficiency of these melters was one of the important reasons which permitted suburban service to operate substantially on time during the storms. The electric heaters placed just under the rail prevent snow from accumulating between the switch points and the track rails, or around the switch connections to switch stands or interlocking machines.

The Boardman melter was originally designed in an effort to find the most economical way to dispose of snow around switches. This year, however, it has been not only a question of economy, but one of necessity, for it has been literally impossible to secure enough men to shovel or sweep snow away during a storm, and thus



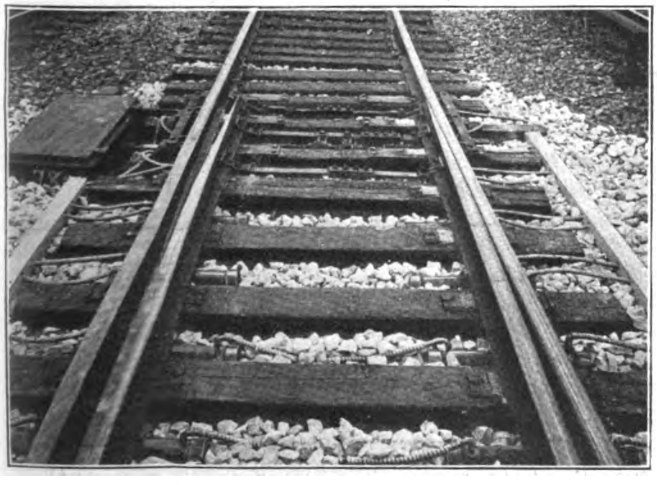
THIS ILLUSTRATES THE EFFECTIVENESS OF THE HEATERS AT HARMON, N. Y.

permit anywhere near normal switch operation. This was particularly true when the storms occurred at night and during the early morning hours.

On the New York Central lines one of the most difficult places to keep clear of snow has been the interchange point between steam and electric power at Harmon, some 32 miles from New York City. This is along the Hudson River and it is exposed to high winds. The location cannot be protected in any way by snow fences. Approximately 191 trains a day pass through this point, of which eighty-three change from steam to electric power or *vice versa,* the time allowed for this change being only four minutes, including the switching change necessary and a considerable number of switch movements.

During the heavy storms of last February this plant, through the use of electric snow melters, was kept open with no delay to trains. A foreman and from eight to fifteen laborers ordinarily handle the work at this point, but during the worst of the storm there were only eight laborers available, and some of their time was spent in keeping clear the hand-thrown switches adjacent to the main line.

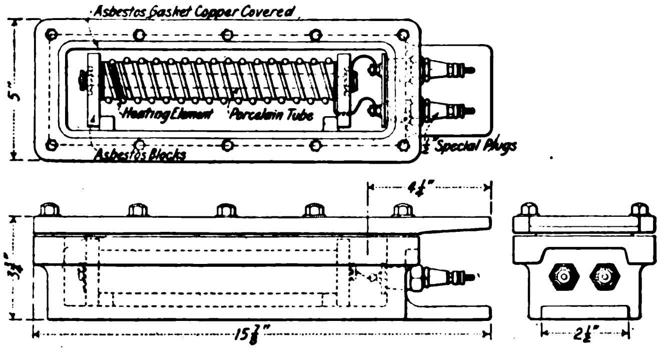
Another vulnerable point on the system is the junction between the Harlem and the Hudson divisions at Mott Haven. Here 508 trains pass daily, and over three-fourths of this number make some detouring movement by a turnout from one track to another. This location was kept clear during the worst of the storms by the use of the snow melters, together with a foreman and three laborers.



THE ELECTRIC SNOW MELTERS ARE INSTALLED AT SWITCH POINTS IN THE BALLAST UNDER THE RAIL

The snow melters were first used on the electric division where the propulsion circuit was available. They have since been developed commercially into 110-volt units so that by proper wiring they can now be applied to any electric circuit which is in common use for lighting and similar purposes. That the device has also been simplified is shown by the drawing below. The wiring connections can now be made through a spark plug and this wire connection is easy to make even though the operator is not skilled in the work.

The heating units are inclosed in a cast-iron box, the over-all dimensions of which are 15⅞ in. x 3¾ in. x 5 in. The box is water-tight and can be allowed to remain in water or melted snow without danger of injury. The melters are designed for use with either alternating or direct current and at 110 volts consume 5.2 amp. This gives a power consumption per unit of something less than 600 watts. Under extreme weather conditions about sixteen of these units are necessary to keep turnouts clear of snow where the switch points are 15 ft. to 16½ ft. long. This results in a power consumption of approximately 9 kw. for each turnout.



DETAILS OF IMPROVED ELECTRIC SNOW MELTERS

The installation of the melters is very simple if the wiring can be brought near the turnout as a trunk line as the heaters are laid loosely in the ballast just under the rail. The cost of operation is the cost of the energy consumed during a storm and depends upon the price paid for such energy. If this price is 2 cents per kilowatt-hour, the cost per hour for keeping the turnout clear would amount to approximately 18 cents. If the cost of the current were 8 cents per kilowatt-hour, the cost of keeping the turnout clear during the storm would amount to approximately 72 cents, etc. The expense continues only during a storm, when it is necessary to keep the snow from accumulating. The current can be turned on and off by a switch placed at some convenient point along the line or near the turnout, and this operation can be accomplished without any difficulty whatever by any employee who is on duty. As soon as the storm is over, the current can be turned off and there is no further expense involved. The illustration above indicates certain changes which have been made in this melter since it was previously described.

Electrification for England's Suburban Lines

AT THE recent annual meeting of the shareholders of the Great Eastern Railway, Great Britain, the general manager was instructed to prepare, in consultation with other experts, a scheme of electrification for its suburban lines. It was felt that such electrification would be profitable on account of traffic density.

A.R.E.A. Holds Active Convention

Engineering Association Meeting in Chicago Approves Rail Specifications and Discusses Screw Spikes and Substitute Ties

DEFINITE progress in important technical matters was accomplished at the annual convention of the American Railway Engineering Association held in Chicago last week. The convention lasted three days and during each session reports of considerable importance were presented and acted upon. The actual progress made in the adoption of specifications and recommendations indicates that the members present were there for business and that the railroads are entering upon their new era of private operation with a determination which is promising of wonderful accomplishment.

In his annual address, delivered at the opening session, President Earl Stimson dwelt upon the membership drive conducted during the past year. This brought into the association 180 new members, making a total of 270 since the last convention. The total membership is now 1,639. He also discussed co-operation with the American Railroad Association and explained how the A. R. E. A. had acted as the construction and maintenance division of the engineering section of that body. The problems immediately ahead of the association now, he said, are maintenance rather than construction problems.

The new officers elected for the ensuing year were: President, H. R. Safford; vice-president, L. A. Downs; treasurer, G. H. Bremner, and secretary, E. H. Fritch. The directors elected were: Edwin B. Katté, J. M. R. Fairbairn and F. E. Turneaure.

Some of the reports which contain material of particular interest to electric railway men are abstracted very briefly in the following paragraphs. Abstracts of the remaining papers of interest will appear later.

REPORTS OF INTEREST TO ELECTRIC RAILWAY MEN

Roadway—The two subjects which received chief consideration in this report were subsidence under embankments and shrinkage of embankments. In the former investigation subsidence of soil under weight of railway fills was found to be a general condition, existing to some extent under all such fills. Not only was grading material found to have subsided but also quantities of cribbing, mattress work and timbers. The subsidence appears to average 1 per cent per foot of height of fill. In the matter of shrinkage the committee found 10 per cent to be the average figure for earth and a swell of 25 per cent for solid rock.

Ballast—The report of this committee included information as to the proper depth of ballast, standardization of ballast tools, instructions for ballasting on an operated line, specifications for stone ballast and the use of reinforced concrete slabs to assist the ballast in distributing the load on soft roadbeds. The larger part of the report was devoted to the last-named subject.

The reinforced concrete slab construction has been tried with success by several roads and includes two distinct types, one having the ordinary ballasted track laid upon a slab, while in the other the rails are carried by wood blocks or stringers laid directly upon the concrete. The practice of, and results obtained on, nine different roads was described in considerable detail. The committee stated that it was satisfied that the use of these types of reinforced concrete construction will solve the difficulty experienced over "soft spots." The expense was stated to be considerable, but not unduly high, when the traffic is heavy and the cost of upkeep is reduced to very small proportions. A resolution on this subject, submitted by the committee, was adopted without discussion.

Economics of Railway Labor—This committee confined its work to a study of methods for training and educating engineering and maintenance department employees. The gist of the committee's report was that the training and education of railway engineers in the practical and economic features of their work is without method on most railways, with the result that the development of the individual is almost wholly that which comes from his being thrown upon his own resources. Systematic training and organization methods are urged as necessary for the production of an efficient engineering staff. The committee makes definite suggestions for carrying out this work.

Rail—The report of the committee on rail included statistics on rail failures. These were abstracted in the issue of the ELECTRIC RAILWAY JOURNAL of March 6, 1919, page 468. In regard to the intensity of pressure due to wheel loads the committee says that experiments indicate that moderate unit pressures may be expected where rail and wheel conform, but where this is not the case very severe kneading of the steel in the head of the rail may be expected. Specifications for carbon steel rails were submitted and recommendations were made for standardizing the drilling of rails. Both the specifications and the recommendations were adopted after some discussion.

Track—The committee on track presented specifications for (1) steel cut track spikes, (2) steel tie plates, (3) steel screw track spikes, (4) wrought iron tie plates and (5) malleable iron tie plates. Sixty plans were also submitted for turnouts, crossovers, slip switches and double crossovers, with details including such incidentals as tie plates, rail braces, riser plates, etc. Specifications were submitted for the various uses of relayer rail. Specifications 1 and 2 were referred back to the committee for further consideration.

Ties—On the subject of screw spikes this committee made recommendations as to good practice, stating that as an advantage in quick repair work and as beneficial in treating four holes should be bored in each plate-bearing area even though only two spikes were used. The committee believes it difficult accurately to measure the damage done to a tie by a screw spike until some of the modern installations have been longer in service, because as longer tie life is obtained by preserving there is more chance of spike killing being a limiting factor.

In reporting on the best methods for controlling tie renewals the committee believes that either (1) yearly field inspection by section foremen or their immediate superiors or (2) yearly field inspection by special inspectors will bring safe and economical results. On the matter of substitute ties, the committee made an extensive report on the use of some fifteen to twenty substitutes and stated that while a substitute tie, satisfactory for use in high-speed heavy-traffic main tracks has not been fully developed, there are several substitutes which have given service satisfactory enough to warrant further extensive tests. A recommendation for the continuance of the tie specifications formulated by the United States Railroad Administration was adopted.

Wood Preservation — This committee submitted specifications for treatment with zinc chloride, with creosote oil (full-cell process), with zinc chloride and creosote oil, with creosote oil (empty cell process with final vacuum) and with creosote oil (empty-cell process with initial air and final vacuum). These specifications were adopted. Service test records were presented covering results obtained on the Delaware, Lackawanna & Western Railroad and the committee urged that all roads keep such records.

A special report was made on the treatment of Douglas fir. This described the perforating process which the committee recommended for cross ties. The committee described and gave directions for the use of the iodine-potassium, ferrocyanide-starch color reaction test for determining zinc chloride penetration. A demarcation line following approximately the 100-deg. line of latitude was submitted by the committee indicating where it is regarded as safe to differentiate between the use of zinc chloride and creosote. It was stated that even in the territory west of this line, designated for use with zinc chloride, if creosote is available its use is desirable.

Tie Treating and Handling

American Wood Preservers' Association Discusses These and Allied Subjects, Submitting Figures on Service Tests

IN HIS annual address before the recent convention of the American Wood Preservers' Association President J. B. Card stated that the wood preserving industry is in a better position today than ever before in its history. He emphasized the necessity of giving more attention to the wood-block branch of the industry without delay. This represents a sum amounting to millions of dollars and is "running wild with little attention after deliveries are made." Specifications have been prepared, but very few cities have changed over from the old method of laying the blocks on a sand cushion. President Card stated that if the association does not act soon to correct this fault the end of the wood block paving business is not far off. The association, he said, cannot afford to have failures in any branch of its business.

During the report and discussion on tie service tests, J. H. Waterman presented statistics covering ten years of service with treated ties on the Chicago, Burlington & Quincy Railroad. Of beech ties, treated with creosote, 0.2 per cent had been removed in ten years; of those treated by the Card process (zinc creosote) 2 per cent had been removed; of those treated with zinc chloride 5.8 per cent had been removed; and of untreated ties 96.1 per cent had been removed.

With hard maple ties 0.8 per cent of those treated with creosote and 1 per cent of those treated with the Card process had been removed in ten years, while with this tie untreated 98 per cent had been removed in that time. No creosoted red oak ties had been removed during ten years of service, while 0.6 per cent of those treated by the Card process had been removed, as likewise had 1.9 per cent of those treated with zinc chloride. Of the untreated red oak ties 93.7 per cent had been removed at the end of ten years.

The report of the committee on plant operation covered the subject of mechanical handling of treated material, dividing the devices into seven classes as follows: (1) Stationary stiff-legged derrick with movable boom; (2) cable-ways; (3) stationary crane with electric hoist; (4) movable electric hoist, gantry type; (5) movable electric hoist, monorail type; (6) locomotive crane; (7) miscellaneous. Tests made with these various mechanical devices resulted as follows:

RESULTS OF TESTS

(1) With this equipment whether hand or power operated ties can be loaded into open top cars in tram-car lots for about 1½ cent each. (2) This device is of only limited usefulness. (3) This equipment capable of lifting a tramload of ties is operated by two laborers. On a test 138 ties per man-hour were handled. (4) Three men are required to operate this hoist. On a test 194 ties per man-hour were handled. (5) The steel framework of this crane is erected longitudinally over a standard-gage track and the crane slings of the gantry crane are replaced by a pair of grapple hooks large enough to handle a tramload of ties at one time. Two men are required to operate this crane. On a test, 276 ties per man-hour were handled. (6) With an eight-wheel M. C. B. truck-type crane, with a boom having an effective working radius of 10 to 35 ft. and a maximum lifting effort of 15 to 20 tons at the minimum radius, two or three men besides the crane man are required. On a test ties were loaded into coal cars at the rate of 360 ties per man-hour. (7) Under this heading the Angier tie loader was considered. This is a device for loading treated ties into closed cars, saving much of the heavy lifting incident to hand labor. It is operated by day laborers or piece workers and effects savings of about ⅛ to ¼ cent per tie on the piece work basis.

OTHER SUBJECTS DISCUSSED

In a paper on "Rapid Deterioration of Sap Pine Ties," the conclusions reached were that pine cross ties should reach the treating plant as quickly as possible and be treated at the proper time. Many plants estimate the age of cross ties when arriving at the plant and add to this age the customary time allotted for the proper seasoning, treating the ties at the expiration of this time. This system should be corrected by the use of the dating hammer as soon as it can be applied.

In a discussion on the effect of preliminary steaming in the treatment of air-seasoned ties, it was stated that tests showed that due to the use of preliminary steam, the net absorption in the treatment of red oak ties was increased 12.6 per cent and the net absorption in the treatment of sap pine ties was increased 52.2 per cent.

The iodine-potassium, ferrocyanide-starch color reaction tests for determining the penetration of zinc chloride in cross ties was described. It was stated to be evident that in treating wood with water-soluble salts some indicator is necessary to determine the penetration of the colorless solution into the wood. The iodine method for determining zinc-chloride penetration is based on the principle that zinc ferrocyanide liberates free iodine, and free iodine in turn gives a dark blue stain with starch solution, thus making the depth of penetration clearly visible.

The fact that duration of employment is a factor in accident reduction was brought out recently in an investigation made by the Ford Motor Company. An inspection of the last twenty-five accident cases occurring before the report showed that of the employees involved, twelve had been in the company's employ less than six months and only one more than a year.

Applying the Automatic Substation*

General Principles Are Stated and Illustrated by Details of a Proposed Installation on an Interurban Line in the East

BY C. A. BUTCHER
Westinghouse Electric & Manufacturing Company,
East Pittsburgh, Pa.

IT IS estimated that there are 15,000 railway and lighting substations in the United States and that 40,000 men are required to operate them. If half of these men can be released for other work they will help to meet the crying need of today for increased production. This can be done by making the stations automatic.

An illustration of what can be saved by automatic control is furnished by the following summary of a report recently made on an Eastern property operating a double-track line between two cities of approximately 200,000 population each and 80 miles apart. Its schedule is essentially one car each way every 40 min. Local cars are operated on a schedule speed of 23 m.p.h. and limited trains at 30 m.p.h. Power is supplied to the line from duplicate three-phase, 25-cycle, 33,000-volt high-tension lines which parallel the right-of-way. The trolley wire is fed at 600 volts from eight substations spaced approximately ten miles apart and which may be switched to either high-tension line. There is a No. 0000 trolley wire over each track, and in addition two 500,000-circ.mil feeders run the entire length of the line. Rails are 70 and 90 lb. per yard, all well bonded. A number of the substations are each equipped with a spare machine and transformers.

BALANCE SHEET FOR PROPOSED INSTALLATION OF AUTOMATIC CONTROL ON INTERURBAN LINE

Investment Required:		
Seven new substation buildings		$20,000
Eleven automatic switching equipments (including oil circuit breakers, lightning arresters, automatic high-tension transfer switching and auxiliaries)		125,400
Freight		575
Installation of switching equipment and moving old rotaries and transformers		16,300
Total		$162,275
Replacing 18.52 miles 500,000-circ.mil copper messenger with 7-16′ in. galvanized messenger at $325 per mile		$6,030
Taking down and reeling 66.58 miles 500,000-circ.mil copper feeder at $50 per mile		3,330
Extension of transmission line		4,350
Gross investment		$175,985
Credits:		
85.1 miles 500,000-circ. mil copper feeder at 18 cents per pound (scrap value)	$123,000	
Salvage other material	6,000	
Total	$129,000	
Net investment		$46,985
Annual savings:		
Operators' wages eliminated		$22,330
Power saved		2,860
Coal saved (substation heating)		200
Total		$25,390
Annual charges:		
Inspectors' wages	$4,725	
Fixed charges (except interest) on net investment	4,230	
Total	$8,955	
Net annual saving		$16,435
Return on investment (including 6 per cent interest),		34.9
Return on investment (less interest), per cent		28.9
Total investment would therefore be returned in approximately 3¼ years		

It is proposed to retain five of the present substations and to equip each of them with automatic control and high-tension oil circuit breakers to replace the present stick-type breakers. Four of the present substations are to be moved to new locations and there will be four additional substations made up of equipment now used as spare apparatus in other stations. This will make a total of seven new buildings and eleven automatic control equipments, together with high-tension switching for each station.

Alternate stations will be connected to either transmission line. In addition to manual sectionalizing of both lines at the power plant located near the center of the line, four substations will be equipped with automatic high-tension transfer switches so that in case of trouble on one line the station will immediately and automatically transfer to the other. After the trouble has been cleared and the line returned to normal service the station will immediately and automatically transfer itself back to the line to which it is regularly connected. This transfer switching requires an additional high-tension breaker for each of the four substations, together with necessary control and potential transformers with relays, etc., for testing out the line preliminary to the switching operation. With this scheme of operation but one station will be thrown out of service in case of trouble on either line.

It is planned to make the above changes in four steps and in such a way that the salvage value of copper taken down may be made available for carrying on the work. The accompanying table shows the whole thing in a nutshell.

The labor saving shown in the table is based on two 12-hr. shifts of one man each per substation. An 8-hr. shift will soon be demanded, so that it is safe to assume that the item of labor will soon be increased by a third. Under this condition the net annual saving would be increased to $23,878, thus making the return, including interest, 50.8 per cent, or a net return of 44.8 per cent. Thus the investment would be returned in approximately two and a quarter years.

At the present time this railroad has an enviable record for a high percentage of trains on time and it is believed that very little improvement in that line is possible. However, by the new arrangement, the average trolley voltage at the car will be increased by 20, thus making possible the above tabulated annual energy saving. In addition the improved trolley voltage will give greater leeway in the schedule because of the increase in running speed thus made possible. With one substation out of service the average voltage drop between stations on either side of the one that is idle will be 109 volts, compared to the present normal average drop of 74.5 volts. However, even with one station out of service, under the new arrangement the average over the entire line will be increased by 13 volts over the present normal average voltage.

In conclusion it may be well to say that automatic operation is not an economy in every proposition and in others it is not to be recommended. But by far the greater number of substations can be operated automatically with economy and improved service.

New substations automatically operated offer an economical and very satisfactory solution of the problem where increased capacity is required.

To insure continuity of operation, many substations contain spare equipment. In some cases new buildings can be erected at intermediate points and the spare apparatus when moved can be made automatic. The whole cost of this might be covered by the salvage value of the feeder copper removed.

Each proposition is a study in itself, so that here, in only a general way, has the attempt been made to point out the advantages and the savings that are to be had.

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*Abstract of paper read at meeting of Wisconsin Electrical Association, Milwaukee, March 25, 1920.

Tie Rod Specifications Assist in Reducing Failures

The Specifications for Tie Rods Used by the Public Service Railway of New Jersey Are Given with Comments on Their Essential Features

By HOWARD H. GEORGE
Assistant Engineer Public Service Railway, Newark, N. J.

TWO preceding articles on truck material specifications have covered spikes and bolts. The present one deals with specifications for tie rods. Failures of tie rods are not uncommon, especially where they have been installed in old track for the purpose of regaging. The original base of the rail may have been comparatively narrow or it may have been reduced by rusting or other causes so as to leave the rail base in an unstable condition. This condition is generally more noticeable where old and partly decayed ties are allowed to remain in the track, and it is likely to occur more frequently in track constructed with 9-in. than 7-in. rails. Failures also occur more often where rails are located so that the center of the wheel bearing does not coincide with the center of the rail web. In this case there is a tendency for the rail to tilt outward and the load is distributed unequally over the base of the rail to the tie. The unit compressive stresses in the wood fibers are thus much greater along the outer edge of the rail base than along the inner edge. Consequently the rail cuts the tie much more quickly and produces excessive play of the rail, a loosening of the spike fastenings and wide gage of the tracks. The function of the tie rod is to prevent the spreading of the rails and, since this action is more severe on curves, it is very desirable to install both tie rods and either rail braces or brace tie plates on them.

It has been found that a spacing of tie rods on 6-ft. centers has given very satisfactory results in most cases, although some engineers recommend a spacing as low as 5 ft. Tie rods should be located as near the head of the rail as possible in order to be of the greatest value. The vertical play of the rails develops bending stresses in the tie rod in addition to the direct tensile stresses caused by the spreading action. The greatest bending occurs just outside the inside nut, and it is believed that most of the failures of tie rods occur at this point or somewhere between it and the point where the section changes from flat to round, although some breaks have been known to occur between the two nuts. It is believed, however, that in the latter instances failure has been caused by loosening of the nuts sufficiently to permit play between them. It is because of these bending stresses that it is essential that a certain ductility in the material be provided for in the specifications.

Several years ago the Board of Supervising Engineers, Chicago Traction, made some tests on tie rods of various descriptions to determine the actual tensile strength of each.* Three types were tested, the first made by welding a round terminal to a flat bar, the second made by reducing the flat portion and upsetting to make the round terminals, and the third made by turning over the ends of the flat portion and upsetting to make the round terminals. The second method was followed in the manufacture of the tie rod shown herewith. In every case the rods made by the first two methods failed at the junction of the round and flat sections, each type developing practically the same tensile strength. Those made by the last method failed in the threaded terminal, but developed a higher tensile strength than the specimens made by the first two methods.

Still another method of manufacture which has been tried is by rolling the flat section from 1-in. round bars. This has never been very extensively adopted, probably on account of the difficulties and increased cost of manufacture. Some railway companies have also used tie rods of a circular section throughout. The advantage of course lies in the fact that they can be readily made in any machine shop, since commercial sizes of round bars are readily obtainable from stock and facilities for threading are generally close at hand. However, while these may answer admirably in open track or where the paving is macadam, there are too many objections to their general use to warrant very serious consideration. The principal objection to the round tie rods is that their diameter, which cannot well be made less than ⅞ in. and will more often be 1 in., is such that entirely too wide a joint is produced in the paving. The round rod also offers practically no resistance to turning as does the flat rod, and this element might tend to cause the nuts to loosen. Another advantage of the flat rod is that it lends itself more easily to installation on account of its greater flexibility, this feature being especially desirable on those roads which have been using tie rods with threads of equal length on the two ends.

Attention is called to a feature of the design of the tie rod reproduced in connection with these specifications which, while not entirely peculiar to our own property, is still far from being in general use throughout the country and is decidedly advantageous. A length of 3 in. has been threaded on one end and one of 6 in. on the other to eliminate the necessity of trackmen bending the rods in order to get them through the holes in the rail webs. As a further aid to the trackmen in making the installation, the specifications provide that all nuts must be fitted to turn by hand. If a nut can be turned all the way back on the threads by hand, the trackman will do this and the rod can then be placed without bending, but if a nut turns hard he is very apt to bend the rod rather than turn the nut back with a wrench.

In determining the length of the threaded section on each end of the rod for any particular property, consideration must be given to the thickness of the webs of all the rail sections in actual use, together with

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*See second annual report, page 189.

Steel and Iron Tie Rods

1. Material:

If steel, it shall be made by the open hearth or other approved process. If necessary, heat treatment may be used to secure the desired physical properties.

If of iron, the iron shall be double refined, tough and fibrous and uniform in character and quality throughout. It shall be thoroughly welded in rolling and be free from cracks, flaws, blisters and other surface defects. If necessary, heat treatment may also be used to secure the desired physical properties.

2. Chemical Composition:

The steel in the finished tie rod shall conform to the following chemical analysis:

Carbon — from 0.20 per cent to 0.35 per cent.

. Manganese — from 0.60 per cent to 0.90 per cent.

Phosphorus — not more than 0.04 per cent.

Sulphur — not more than 0.07 per cent.

Silicon — from 0.10 per cent to 0.20 per cent.

3. Physical Properties and Tests:

The steel shall conform to the following physical requirements:

(*a*) Elastic limit not less than 30,000 lb. per square inch.

(*b*) Elongation not less than 20 per cent in 8 in.

(*c*) Reduction of area not less than 40 per cent.

(*d*) Elastic limit shall in no case be less than 50 per cent of the ultimate strength.

(*e*) The ductility of the steel in the rods shall be determined by the cold bend test, which requires that the material used in the rods shall bend cold through 180 deg. and flatten itself without fracture on the outside of the bent portion. The bend shall be made on the unthreaded portion of a finished rod. It is not necessary that the rod shall bend double in the threaded portion.

The iron shall conform to the following requirements:

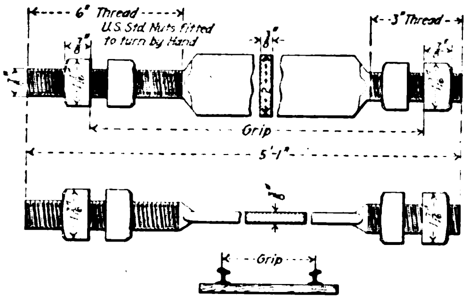
(*a*) Ultimate strength, not less than 50,000 lb. per square inch.

(*b*) Elastic limit, not less than 50 per cent of the ultimate strength.

(*c*) Elongation, not less than 18 per cent in 2 in., with the fracture wholly fibrous.

(*d*) Reduction of area not less than 25 per cent.

(*e*) The finished tie rod, when bent back on itself through 180 deg. and hammered down, shall show no signs of fracture on the outside of the bent portion. The bend shall be made on the unthreaded portion of a finished rod.



SECTION	GRIP	SECTION	GRIP
200 - 9 in. Tram	4'-9½"	406 - 9 in. Guard	4'-9 9/16"
208 - " Guard	4'-9⅝"	407 - " "	4'-9 9/16"
273 - " Trilby	4'-10 7/16"	445 - " "	4'-10½"
234 - 7 in. Guard	4'-9½"	443 - 7 in. "	4'-10½"
212 - " "	4'-9½"	398 - " "	4'-9⅜"
243 - " Trilby	4'-9⅜"	434 " Trilby	4'-10½"
206 - " T	4'-11 3/32"	357 " "	4'-9⅜"

TIE ROD FOR 4 FT. 8½-IN. GAGE

In either case, a sufficient number of tests shall be made to satisfy the railway company's inspector that the material meets the specifications in every respect, and he shall have the privilege of selecting the specimens to be tested.

4. Workmanship and Finish:

The form and dimensions of both the steel and iron tie rod shall conform to the drawings submitted by the railway company and forming a part of these specifications, subject to the following permissible variations from the dimensions shown on the drawings.

(*a*) The length shall not be more than ⅛ in. shorter, nor more than ¼ in. longer, than that shown in the drawing.

(*b*) The diameter of the threaded portion or terminal shall not vary more than 1/64 in. from the diameter shown on the drawing.

(*c*) The length of the threaded portions or terminals of the rod shall not vary more than ⅛ in. from those shown on the drawing. The threaded ends of the rod shall conform to the U. S. standard cut thread.

(*d*) The outside dimensions of the nuts shall not vary more than 1/32 in. from those shown on the drawing. Each terminal shall be fitted with two hot pressed square nuts, four nuts to each rod. Each nut must be fitted to turn by hand.

(*e*) The width of the flat portion of the rod shall not vary more than 1/16 in. from that shown on the drawing.

(*f*) The thickness of the flat portion of the rod shall not vary more than 1/32 in. from that shown on the drawing.

5. Inspection:

When required, the manufacturer shall furnish samples of rods from a preliminary rolling before proceeding with the filling of the order and shall give sufficient notice in advance of the date when they will be ready for inspection.

The railway company's inspector shall have a free entry at all times, while the work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered.

The inspection shall be made at the mill and the manufacturer shall afford the railway company's inspector, free of cost, all reasonable facilities to satisfy himself that the rods are being furnished in accordance with these specifications. The tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

Three test specimens shall be selected at random from each 100 of the finished rods by the railway company's inspector. If two of them meet the requirements of the specifications the lot will be accepted, but if two fail the lot will be rejected.

If, after shipment, any rods are found to be defective, due to poor material or bad manufacture, they may be rejected.

6. Marking and Shipping:

When the rods are shipped, they shall have the nuts applied for at least the length of the nut and shall be properly oiled to prevent rusting. They shall be securely wired together in bundles of five rods each, and each bundle must be plainly marked as to material, name of manufacturer, length of rods, and name and shipping address of consignee.

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the maximum and minimum amounts by which the gage lines are offset from the webs, so as to permit the determination of the maximum and minimum grip that must be provided for. The total length of the rod and the length of the longest thread which will be required to permit installation of the rod when one nut is threaded back as far as it will go, without bending the rod, can then be figured. On some properties like our own, where it is necessary to operate over more than one gage of track, rods of suitable lengths must be provided for the several gages.

It was shown in preceding articles that the cost of inspecting track spikes and bolts is very low and the same is true in the case of tie rods. Inspection can be made at present at the rate of about $1.60 per net ton. Since the average weight of the tie rod shown is approximately 13.5 lb. the cost of inspection amounts to about 1 cent each. As to the cost of the tie rods themselves, this of course will vary considerably, but will probably be somewhere between 65 and 80 cents each at present, so that the percentage increase in unit cost is so small due to inspection as to be practically negligible.

Co-operation Between Traction Company and Farmer

Express Department of Connecticut Company Has Practical Plan for Cutting the "H.C.L."

By V. S. Curtis

General Traffic Agent the Connecticut Company,
New Haven, Conn.

DURING the week of Feb. 9 to 14 the Connecticut Company's express department maintained an exhibit in the agricultural and manufacturers' display, conducted in the State armory in Hartford, for the purpose of showing the utility of the company's service in transporting produce from the farms directly to consumers in the cities.

Some three years ago an effort was made to introduce the "home hamper" idea which had been successfully operated by the Long Island Railroad, but the plan was interrupted by the war. Recently the project was taken up again and by the aid of the farm bureau and the city market experts the active co-operation of a group of progressive farmers was enlisted. The State Grange, through its master, has taken an interest in the proposition and the officials of the State Agricultural College at Storrs have encouraged the trolley management.

EXPRESS DEPARTMENT
DAVID A. CLARK

EXHIBIT OF CONNECTICUT COMPANY AT AGRICULTURAL AND MANUFACTURERS' DISPLAY

The State farmers produce only about 16 per cent of the farm products consumed in the State, and they are keenly alive to the business opportunity presented by the plan of the Connecticut Company. A reference to the straight-line map seen in the exhibit will show the territory served by the express department.* At the principal cities wagon service is maintained. The company is prepared to secure lists of persons of assured credit in the cities and by correspondence or otherwise introduces them to reliable farmers vouched for by the Grange Farm Bureau or market reporting service. The consumers will be advised of the kind of products of the farm that each farmer can supply and orders will be placed with the farmers. Crates or hampers have been planned which hold six 2-qt. baskets each. These will be packed by the farmer in a careful and attractive manner and taken by him to the point on the electric line nearest to his farm. They will be picked up by the crews of the express cars and delivery will be effected by the regular express wagons of the company, the consignee paying the transportation charges by check.

At the exhibit two hampers prepared by David A. Clark of Milford, for customers in New Haven, were shown. One hamper contained a home-cured and smoked ham, a fine chicken, potatoes, carrots and turnips. Its value was not stated by the shipper but it was appraised at about $9 by the city market expert and on consultation with the shipper it was found that the expert had exceeded Mr. Clark's estimate by about twenty cents. This fact is mentioned because it is proposed to follow closely the fluctuations of market prices, and differences of opinion as to fairness of prices that may arise between shippers and consignees will be arbitrated by the city market experts. These gentlemen and the Farm Bureau and Grange experts will also pass on the quality of goods sent, and any tendency to unload low-grade goods or defective products will be checked. The plan generally will result in the consumer getting high-quality goods direct from the farm at a low retail price and the farmer will receive something better than a high wholesale price. The consumer will be sure that the corn from the farm has not been aged sufficiently to turn to starch nor handled and re-handled by team or motor-truck from farm to city market, to huckster, to retailer and thence to him. The tomatoes and peas will have no chance of being bruised and heated. The lettuce will be fresh and crisp, not wilted and crushed.

The slight publicity accorded the exhibit by the daily press has resulted in many inquiries from hopeful consumers, and the problem confronting the sponsors of the scheme is to find the farmers. It may be necessary to plan community or neighborhood effort in rotating crops, and in this the granges locally and the country Farm Bureaus will assist.

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*Details of the work of this department were given in an article in the issue of this paper for Nov. 3, 1917, page 802.

Douglas Fir for Ties

ACCORDING to a statement in the *Railway Maintenance Engineer* a test of Douglas fir cross ties installed in the main line of the Great Western Railway of England resulted in only twenty-three out of 616 ties originally laid being removed after seventeen and a half years of service under heavy traffic.

The original ties upon which records were kept consisted of high-grade Douglas fir timber, sawn to size, 10 in. x 5 in. x 9 ft. The ties were comparatively dry when received, and were kept in stock only nine weeks to finish the seasoning process before they were subjected to the preservative process. The method of preserving consisted of impregnating the ties with a creosote oil, the total amount of absorption averaging about 0.8 gal. per cubic foot of timber treated.

The ties were placed in service May 1, 1898, in main-line track where the maximum grade was 0.06 per cent, descending on a 4 deg. curve. The subgrade at this point was an embankment composed of marl and gravel, and the ballast used was crushed rock. The track construction consisted of standard 45-ft. rails, of bullhead cross-section and weighing 92 lb. per yard, supported by chairs. Upon inspection all ties were found in serviceable condition until October, 1915, when twenty-three were removed on account of decay.

The National Safety Council has, through its educational committee, just secured the co-operation of the national organization of Boy Scouts.

Letters to the Editors

Anent Standard Track Spirals

SOUTH COVINGTON & CINCINNATI STREET RAILWAY COMPANY, INC.

COVINGTON, KY., Feb. 23, 1920.

To the Editors:

I am pleased to see that the sub-committee on standard track spirals of the committee on way matters has gathered and submitted data. It will be of great value to both the manufacturer and the street railway to have standard spirals. However, any system of spirals that may be adopted must, to secure general use, be as good as any now employed and should be flexible enough to meet any condition that may arise in ordinary track work.

The method of numbering and developing the suggested spirals is excellent, but there is some criticism of the particular spirals selected. Compare the proposed spiral No. 5.3 with the Lorain spiral No. 2-A. The initial radius of Lorain spiral No. 2-A is 560 ft. while that of the proposed standard spiral No. 5.3 is 304 ft. Spiral No. 2-A is, however, shorter and I believe is better suited to street railway work, because of the shorter arc length and smaller initial angle.

I suggest that the initial angle and angular change be made twenty minutes rather than 1 deg. This would result in shorter arc lengths and a better and more flexible spiral. Numbering as in the proposed standards, a spiral number denoting the length of arc of that spiral in feet and tenths, I would suggest spirals No. 1, 2, 2.5, 3, 4, 5, 7.5 and 10. It seems to me that the standard spirals proposed by the committee are not correctly proportioned to the radii of the curves with which they are to be compounded.

No spirals should be adopted by the association as standard without the widest possible discussion.

W. T. ROSSELL,
Superintendent of Track and Buildings.

[NOTE.—Upon receipt of the communication from Mr. Rossell the editors referred it to E. M. T. Ryder of the committee on way matters in order that a reply to the suggestions might appear in the same issue with the original communication. Mr. Ryder's reply is printed below.—EDITORS.]

THIRD AVENUE RAILWAY SYSTEM

NEW YORK, N. Y., March 10, 1920.

To the Editors:

Such comment on standard track spirals as is made by W. T. Rossell, superintendent of track and buildings, South Covington & Cincinnati Street Railway, in his letter of Feb. 23 to the JOURNAL is of interest in bringing out particular points in regard to the standards proposed by the committee on way matters of the American Electric Railway Engineering Association.

Mr. Rossell brings up the question of arc length and length of initial radius, and compares proposed spiral 5.3 with the Lorain spiral 2-A, calling attention to the fact that the "initial radius of Lorain spiral 2-A is 560 ft. while that of the proposed standard spiral 5.3 is 304 ft." He evidently regards the longer initial radius as of advantage and also suggests the use of shorter arc lengths with correspondingly smaller initial angles.

Theoretically the length of initial radius of the spiral can be increased any desired extent by shortening the arc lengths. For practical purposes, however, with any spiral of the Searles type, which has a uniformly increasing rate of curvature, the one really important function is the total length of the spiral. This total length may be obtained in a spiral of four chords or eight chords or sixteen chords, with no particular difference as regards the riding qualities of the curve provided the chords are not so long as to give an angular change abrupt enough to give a shock in the same way, although in less degree, as is experienced in changing abruptly from a tangent to a circular curve. The difference between Searles or similar spirals of the same total length and with various arc lengths is astonishingly small.

I happen to have before me a blueprint of a drawing prepared many years ago by Wm. Wharton Jr. & Company, Inc., comparing a spiral of eight arcs with one of four arcs, holding the same extreme tangent points and total angle. The differences between the two sets of ordinates from the tangent to the compounding points of the curves, the figures being decimals of a foot, are: At the first compounding point, — 0.0061, second — 0.0067, third + 0.0078, fourth + 0.0024, fifth — 0.0050, sixth — 0.0010, seventh + 0.0054.

There is on the other hand a practical objection to having very short arc lengths in that it increases the cost of manufacture both on account of increased expense in the engineering department and in the shop. In the spirals proposed by the way committee the length of arc for those spirals which will be in most common use does not differ greatly from the gage of the track and the total variation of those spirals which it is proposed to use for branch-offs is from an arc length of 4 ft. to an arc length of 8 ft. 6 in.

Mr. Rossell's comment that "no spirals should be adopted by the association as standard without the widest possible discussion" is very sound and it is to be hoped that other engineers will follow his example and give the way committee the benefit of their ideas on this subject.

E. M. T. RYDER,
Engineer, Maintenance of Way.

Beam Type Track Weak in Tie Between Rails and Short on Bearing Area

THE KANSAS CITY RAILWAYS

KANSAS CITY, MO., March 23, 1920.

To the Editors:

The type of construction which provides for the laying of concrete paving in one mass with the concrete that is used in the track foundation is undoubtedly good, but in the type that is described in the article on page 609 of ELECTRIC RAILWAY JOURNAL, issue of March 20, 1920, I see some structural weaknesses that are bound sooner or later to cause trouble. It is stated that this track and pavement have given satisfactory service over a term of about four years. I do not question but that such results may be obtained on track so constructed under light traffic, under favorable soil conditions and in mild climate, but one should not be led to use a construction of this type under any and all conditions, particularly in wet clay soils and in climate where the frost penetrates far below the surface.

In the construction described the heavily reinforced beam is undoubtedly of sufficient strength to give the effect of very deep rail and longitudinally the construction is sound; but the two rails are only bound together by a light tie bar and a 5-in. concrete pavement. This is not a sufficient bond between the two rails and the settlement of one beam more than the other will cause longitudinal cracks in the concrete. Failure of the pavement inside or outside of the rails will result in change in gage that will be aggravated from day to day under traffic and it will result eventually in corrugation and the general breaking up of the structure. To guard against matters of this kind it is essential that the rails be bound together at some point below their base by means of ties of steel or wood or a mass of concrete, so that with any pressure from frost or any settlement of the track the two rails are bound together and move as one. The fact that one rail can settle independently of the other has been the principal factor in the failure of the beam type of construction.

I am not advised of the unit cost of this construction, which is a matter of vital importance, but I am of the opinion from the comparison of the amount of material required and the estimated amount of labor, as based on our local conditions, that this track would cost 25 per cent more than track with a similar rail section with white oak or steel ties constructed upon a solid slab of concrete. I judge from the cross section of the track described that there would be a great deal of difficulty in the placing and maintaining of the rails to the proper surface and line while the work of concreting is in progress and that the handling and placing of so many separate parts would result in excessive labor costs.

It is also pointed out that only the area of the bottom of the beam on the soil can be depended on to carry the load to the subgrade, an area of 2 sq.ft. per lineal foot of track; whereas with ties on ballast or concrete the area in practically every other type of construction is 9 sq.ft. per foot of track.

The theory of the beam type of construction is unsound and the use of this form of construction has almost invariably resulted in failure and will only give satisfactory results temporarily and under favorable conditions.

A. E. HARVEY,
Chief Engineer.

Illinois Committee Appointments

At a joint meeting of the executive committees of the Illinois State Electric Association and Illinois Electric Railways Association and the board of directors of the Illinois Gas Association two joint committees were appointed, one to be known as the Joint Public Policy Committee, composed as follows: For the electric railways, E. C. Faber, chairman; Britton I. Budd and J. R. Blackhall; for the electric lighting companies, Frank J. Baker, R. S. Wallace and H. E. Chubbuck; for the gas companies, W. M. Willett, A. D. Mackie, Bernard J. Mullaney and R. V. Prather. The second committee will be known as the Relations to Educational Institutions Committee and will be composed as follows: R. V. Prather, chairman; for the electric railways, H. E. Chubbuck and E. C. Faber; for the electric lighting companies, B. J. Denman and Frank J. Baker; for the gas companies, H. H. Clark and A. D. Mackie. This is another progressive step by these associations in line with the work of the committee on public utility information.

Association News

Mr. Henry Before I. C. C.

Argues That Electric Railways Should Not Be Included in Properties Covered by Transportation Act

AN INTERPRETATION of the transportation act as it applies to interurban electric railways was asked of the Interstate Commerce Commission on March 22 by Charles L. Henry, chairman of the committee on national relations of the American Electric Railway Association. He explained that there is uncertainty among the operators of interurban lines as to the application that will be made of the clause in the bill which excludes from the operation of the law such interurban electric railways as are not "engaged in the general transportation of freight." Mr. Henry urged that the commission interpret the clause so as to exclude at least all interurban lines whose freight receipts do not exceed one-half of their entire revenue.

Mr. Henry told the commission that it would be very unfair to include interurban lines under the act, thereby grouping them with the steam railroads and subjecting them to the provisions of the law covering valuation and the fixing of rates so as to yield 5½ per cent on the capital invested. While such a return might be fair to the well-established steam roads, it would in no way be an adequate return to the interurban lines, since the steam roads are in a position to get money much cheaper than are the interurban companies. It would be necessary to increase the percentage to seven or eight in order to be fair with the interurban lines, Mr. Henry declared. If the commission should interpret the act so as to bring any considerable number of the interurban lines under the transportation act, Mr. Henry declared that it would serve to check the development of the industry.

No one of the commissioners asked questions during Mr. Henry's presentation, and as a result there was no indication as to what ideas the commissioners may have in the matter. Mr. Henry expressed the personal opinion that it would be so economically wrong and so manifestly unnatural to bring the interurban lines under the purview of the transportation statute that he feels certain that no effort will be made to claim jurisdiction over any interurban lines excepting those which receive more than one-half of revenue from the transportation of freight.

Mr. Henry has recently taken over the management of the Washington office of the American Electric Railway Association and is making plans to render a complete Washington service to the member companies of the organization. An outline of his plans was given in the issues of this paper for March 6, page 483, and March 13, page 546.

On March 19 a meeting of the committee on national relations of the association was held at Mr. Henry's office in Washington. In addition to Mr. Henry those in attendance were: A. W. Brady, Anderson, Ind.; L. S. Storrs, New Haven; C. L. S. Tingley, Philadelphia; Frederick S. Pratt, Boston; C. E. Thompson, Chicago, and E. B. Burritt, secretary of the association.

Equipment Committee Meets

A MEETING of the Engineering Association committee on equipment was held in New York City on March 18 and 19. Those in attendance were: vice-chairman H. A. Johnson, Metropolitan West Side Elevated Railway, Chicago; W. S. Adams, the J. G. Brill Company; H. A. Benedict, Public Service Railway; E. D. Priest, General Electric Company; F. W. Sargent, American Brake Shoe & Foundry Company; C. W. Squier, ELECTRIC RAILWAY JOURNAL, and J. W. Welsh, special engineer of the association.

The large amount of material which was presented by the various subcommittees for consideration showed the activity and interest that was being manifest in the work. A form of questionnaire for obtaining information on the life of wearing parts was approved, and this will be sent to various railways soon.

An additional subject, that of obtaining information of value in fighting snow and safeguarding equipment under extreme weather conditions, was assigned.

New England Street Railway Club

Noted Speakers Address Five Hundred Members and Guests at Twentieth Annual Banquet

ABOUT 500 members and guests attended the annual banquet of the New England Street Railway Club held at the Copley Plaza Hotel, Boston, on the evening of March 25. After the dinner I. A. May, comptroller the Connecticut Company, the newly elected president, expressed his appreciation of the honor of his election and then introduced as toastmaster for the evening Hon. Samuel L. Powers, one of the State trustees of the Boston Elevated Railway. Mr. Powers acted most acceptably in introducing the four scheduled speakers. Hon. Calvin Coolidge, Governor of Massachusetts, made the first address and expressed a plea for the collection, not the dissipation, of capital. If its production is secured its distribution follows. He also urged the building up and strengthening of the transportation utilities as of benefit to the public.

Mayor Andrew J. Peters of Boston, who followed Governor Coolidge, described the railways as an essential part of the public life and advocated a close co-operation between them and the public.

Governor William C. Sproul of Pennsylvania, the third speaker, discussed principally the necessity of all citizens taking an active interest in political affairs and insisting upon the administration of national and state undertakings on a business basis. He also stressed the importance of good transportation to the nation's prosperity.

Matthew C. Brush, now president American International Shipbuilding Company, the final speaker, congratulated the club that speakers of such prominence had addressed them and expressed such opinions on the necessity of fair treatment of the railways. He urged team work and support of both the club and the American Association. Railway men should not be required to apologize for asking for the things they need to give good transportation service. They should also take an active interest in the selection of authorities who will give a business administration. Mr. Brush then gave an extended account of the work of the American International Shipbuilding Corporation at Hog Island.

The entertainment of the evening concluded with an exhibition of moving pictures of the Hog Island ship yards, with explanations by Mr. Brush.

At the annual election in the afternoon the following officers were chosen: President, I. A. May, comptroller the Connecticut Company, New Haven, Conn.; Vice-President, John Lindall, superintendent of rolling stock and shops, Boston Elevated Railway; Joseph S. Goodwin, manager Bridgeport division, the Connecticut Company; T. H. Kendrigan, superintendent and claim agent, Manchester & Derry Street Railway, Manchester, N. H.; S. S. Nicholson, vice-president Rutland Railway, Light & Power Company; Alfred Sweeney, general manager, the Androscoggin & Kennebec Railway, Lewiston, Maine, and Walter C. Slade, superintendent of power and lines, the Rhode Island Company, Providence; secretary, John W. Belling, Boston, Mass.; treasurer, Fred F. Stockwell, Cambridge, Mass.

Comparison of Costs of Heating Rivets

THE Berwick Electric Rivet Heater Company has given out some costs for heating rivets by various means which were compiled from tests made in its own plant. The company states that from 12 to 14 gal. of fuel oil is required to heat 100 lb. of rivets. At a cost of fuel oil of 6 cents a gallon delivered in the plant tanks, the cost of heating is from 72 cents to 84 cents per 100 lb. of rivets. To this must be added the maintenance cost of three furnaces, rebricking, etc., amounting to 2 cents per 100 lb. Where coke is used for fuel, it requires approximately 135 lb. of coke to heat 100 lb. of rivets. With coke at $7.80 per ton delivered, the fuel cost is 45 cents per 100 lb. of rivets, to which must be added 25 cents for carrying the coke to the furnace and removing the ashes, plus also a 2-cent maintenance charge. The total heating cost is 72 cents per 100 lb. of heated rivets. The cost of heating rivets with coal is approximately the same as that with coke.

HEATING RIVETS IN AN ELECTRIC HEATER

It requires approximately 432 cu.ft. of gas to heat 100 lb. of rivets, so that with gas at 70 cents per 1,000 cu.ft. plus a maintenance charge of 4 cents there is a total of 34 cents per 100 lb. of heated rivets.

For heating rivets by electricity approximately 20 kw.-hr. is required to heat 100 lb. With electrical energy at 1¼ cents per kilowatt-hour the cost is 25 cents per 100 lb. of heated rivets. The maintenance cost of an electric heater, as judged by the experience of the company over a period of five years, is very small, consisting only of wear on the copper electrodes and contacts.

The accompanying illustration shows the type of electric rivet heater which has been placed on the market by this company. The heaters are constructed with several types of electrodes to meet various conditions.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Labor Not a Commodity

Report of Industrial Conference Reflects Increased Respect in Which Labor is Now Held

The President's Industrial Conference has reported. It proposed to the President and to Congress a national system for dealing with industrial disputes based on three cardinal principles which were recognized by the conference in forming its conclusions. These are:

WORKERS HAVE RIGHT TO STRIKE

1. That labor is not a commodity, but a human relation which must be adequately organized.
2. That workers have a right to strike. In recognition of this, the conference refused to recommend legal prohibition of strikes.
3. That adjustment of the grievances of any group must be made in co-operation with the other party to the dispute. This principle is recognized in all the machinery recommended by the conference.

The report is a document of 20,000 words. It goes into every phase of labor relations and conditions of employment. Its most significant recommendations are for:

1. Establishment of employee representation in shops or plants.
2. Acceptance of the principle of collective bargaining.
3. Creation of machinery for settlement of all industrial disputes.
4. A new system of food marketing and development of co-operative buying and selling of food products to stop speculation and profiteering.
5. Fixing of a minimum wage to give reasonable living conditions and protect community and individual from the ill effects of lack of competence.
6. Extension of Government machinery to investigate living costs.
7. Establishment of "gain-sharing" as opposed to profit-sharing.
8. Promotion of the insurance principle and for converting Liberty loan savings into some form of annuities.
9. Fixing hours of labor on a weekly basis, with preferably forty-eight hours a week and a Saturday half holiday.
10. Final determination of hours of labor on the basis of studies of fatigue and the effect of work in a particular calling on the one hand and studies of hours that will give maximum production on the other.
11. Prevention of child labor and enforced schooling and physical upbuilding.
12. Special safeguards for women in industry as to hours and conditions of work, and equal pay for equal skill and production.
13. Better housing.
14. Prevention of labor turnover.
15. Relief from present economic conditions for Government workers and school teachers.

PROFIT SHARING NO PANACEA

The report opposes:

1. Profit sharing as a panacea for labor ills.
2. Restriction of production by labor.
3. Strike by United States employees or public servants, such as police and firemen.
4. Affiliation of policemen and firemen with organizations that use the strike weapon.
5. Encouragement of overtime work.

As applied to public utilities other than railroads under the Esch-Cummins act, the report provides that a regional board shall have only one panel member on each side, while two members shall be appointed by the Government authority or commission authorized to regulate the utility in which the dispute arises. The unanimous findings of such a board are morally binding upon both parties to the dispute unless disaffirmed in writing within specified periods. Appeals to the national board in utilities cases are to be decided by majority vote (including one of the public members). Mr. Gregory and Mr. Stuart, of the conference, were in favor of making strikes in essential industries unlawful, but the majority were unwilling to go so far.

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10 Per Cent Wage Increase in Pittsburgh

All employees of the Pittsburgh (Pa.) Railways working on an hourly basis are to get a wage increase of 10 per cent, effective on April 1. Charles A. Fagan, S. L. Tone and W. D. George, the receivers, made this announcement on March 18. About 7,000 men, chiefly manual workers, are affected. The increase will cost the railway about $1,000,000 additional annually.

Patrick J. McGrath, secretary of the union, declared that the receivers' 10 per cent increase will have no effect upon the demands about to be made by the motormen and conductors for more wages. These demands, he declared, will be pushed. He said:

> We received notice of the 10 per cent increase and it was read at the meetings of the men last night and to-day. No action was taken on it, of course. We were informed the receivers intended to put the increase into effect and we have no objections to their plans. Our agreement with the receivers expires on April 30. Under that agreement each side must give notice of changes desired a month before the expiration of the agreement. We will give such notice about April 1, unless the receivers ask an earlier meeting. We will not announce publicly what we are going to ask for until we have first submitted it to the receivers.

Changes in certain working conditions also will be demanded by the men. The 10 per cent wage increase will give them a minimum pay of 58.3 cents an hour and a maximum of 62.7, against 53 and 57 as at present. It is understood that the men will demand 15 per cent more.

Last April, when the receivers failed to meet the demands of the men, a strike resulted, paralyzing the entire electric transportation system of Greater Pittsburgh for three days and causing a loss to mercantile and other interests of upward of $10,000,000.

Elsewhere in this issue extended reference is made to the report of the Public Service Commission with respect to fares in Pittsburgh and to the value of the property as found by the commission.

Will Discontinue Park

Company at Fort Wayne Finds Automobile Keen Competitor and Operating Cost Prohibitive

Robison Park, for a quarter of a century the recreation point for citizens of Fort Wayne, Ind., is to be closed. This has just been announced by the Indiana Public Service Corporation, owner of the property. Last year was the biggest the park has ever had in point of attendance and receipts.

Robert M. Feustel, president of the corporation, in announcing the intention to sell the buildings and ground and junk the 7-mile double-track line to the park, declared that the park had never paid and that it is out of the question for the corporation to continue the operation of the resort. Mr. Feustel said:

> The railway has had no real choice in the matter. The company's open cars are no longer in condition to operate. The company feels that real protection to its patrons is the first consideration and so does not care to risk the lives of patrons on the old open cars. Regarding the earnings side of the matter the story at Fort Wayne has been the same as with all other electric railway parks over the country where a long haul was made over a route which was not used all the year round in regular service. These parks have never paid. Last year the total receipts from the car operation were $28,498, which was about 18 cents per car mile of operation. This cost barely paid the wages of trainmen and actual power costs. It left nothing for car or track maintenance and other miscellaneous expenses.

SOME TRAFFIC FIGURES

During the past six years the earnings of the park line together with number of passengers carried have been as follows:

Car Miles Operated—1914, 137,546; 1915, 111,359; 1916, 139,134; 1917, 120,044; 1918, 135,523; 1919, 153,788.

Passengers Carried on Cars—1914, 178,472; 1915, 120,391; 1916, 170,909; 1917, 167,284; 1918, 162,322; 1919, 197,232; Total, 996,610; average per year, 166,102.

Total Earnings—1914, $24,765; 1915, $16,644; 1916, $22,158; 1917, $22,461; 1918, $24,910; 1919, $28,498.

To Park in Automobiles—1914, 20,861; 1915, 22,133; 1916, 34,187; 1917, 46,796; 1918, 44,218; 1919, 57,491.

Total at Park—1914, 199,330; 1915, 142,524; 1916, 205,096; 1917, 214,080; 1918, 206,540; 1919, 254,723. Grand total, 1,222,296; average per year, 203,716.

It is estimated that the replacement value of the thirty or more buildings at the park, the double-track line, etc., is close to $500,000.

Fort Wayne will not be without an amusement park during the coming summer, as George F. Trier, who conducted the dancing pavilion at Robison Park, has organized a $200,000 company to erect and operate an amusement park just beyond Foster Park at the edge of the southern city limits and within a short walking distance of the Broadway line of the Indiana Public Service Corporation.

Mr. Doherty Ready to Sell to City

Will Accept $11,000,000 for Railway Property at Toledo, With Discount for All Cash

The commission appointed by Federal Judge Killits to draw up an ordinance providing for the municipal ownership of the railway system of Toledo, Ohio, has been busy making preliminary inquiries. The members asked Henry L. Doherty what his price would be on the lines, asked for legal aid from the city law director and Mayor Schreiber, and solicited the co-operation of a subcommittee of the Council.

OFFER TO SELL WAS TELEGRAPHED

Mr. Doherty wired from New York that his engineers determined the value of the property at $16,000,000, but that he would take $11,000,000, 20 per cent cash and the remainder in first mortgage bonds. He also indicated that he might discount this sum for a total cash purchase price. The city's valuation figures were $7,111,000. Mr. Doherty's answer to Mayor Schreiber's question directed by the commission was as follows:

> I have discussed with my associates a sale price for the railway properties. We feel that under the federal decisions we are entitled to present value of the inventory property. This, according to our engineers, would be approximately $16,000,000, which we can substantiate by competent and reputable experts in this line. According to the Goodwillie commission the property showed a value in excess of $12,000,000.
>
> Your telegram does not say in just what manner you purpose to make payment, but as you had previously expressed the desire not to use the entire debt power of the city I assume you will want to pay about 20 per cent in cash and the balance in bonds.
>
> To secure a settlement of the matter we would be willing to take $11,000,000, but would, of course, prefer to have cash and would discount the above if the city should desire to make entire payment.

READY TO ACCEPT $2,200,000 CASH

Mr. Doherty has not yet given an answer to the Mayor on what his discounted price would be.

The appraisal of the property by Service Director Goodwillie, Prof. Riggs of Ann Arbor and Frederick W. Ballard of Cleveland, which was accepted by the service-at-cost commission and which some of the municipal ownership commissioners believe is too high, can be successfully defended in court, the experts declare.

Mr. Doherty's price of $11,000,000 would indicate that he regards the price of $7,111,000 as below what might be secured on the bonds in the open market. He proposes to accept a cash payment of $2,200,000 and first mortgage bonds for the balance of $8,800,000. These bonds then would have the railway property as their only security.

The commissioners have proposed condemnation through court proceedings since the receipt of Mr. Doherty's price. The Mayor and legal experts are preparing the plan of operation for the commissioners to carry out. They have made little progress thus far on account of the fact that there is no precedent in Ohio for the condemnation of a railway property and very little precedent anywhere for condemnation of public utilities.

The commissioners have indicated that they might not wish to recommend the purchase of the entire system, but that some of the lines ought to be abandoned and others re-routed, supplemented, possibly, by a bus system.

"If the city was dealing with a man for any other property and he made a reply like Mr. Doherty has sent, I am sure the city would cease to negotiate and proceed to condemn," declared Henry W. Ashley, chairman of the municipal ownership commission.

The city has been asked to look into the matter of "damages" to which the company would be entitled if not all the lines were bought by the city.

Chairman Ashley declared in a meeting of the commission that he had secured legal advice that the company would have no claim to damages if the city took only parts of the present system.

While the municipal ownership commission is battling to draft an ordinance to submit to the people at the same time that the cost-of-service measure is up for ratification, the cost-of-service commission is waiting the written objections and suggestions for improvement of their document from Henry L. Doherty and the company.

It is thought that both measures may be ready to submit to the people at one election about June 15.

The Worst Is Over

Stone & Webster Look for Continued Betterment of Conditions Affecting the Public Utilities

Stone & Webster have prepared an analysis of conditions in the public utility field which sounds one of the first optimistic notes heard since the beginning of the war. They summarize general conditions as follows:

1. Electric light, power and gas companies have demonstrated an ability to readjust rates and operating conditions to offset increases in operating expenses and continue a satisfactory return on the investment.
2. Street railways are gradually but more slowly readjusting rates and methods of operation, and promise ultimately as satisfactory results as those which have been obtained by electric light and power and gas companies.
3. Present indications all point to the conclusion that operating costs in 1919 reached approximately the highest point to which they will be carried by war conditions.
4. Improved methods of operation are introducing economies which will at least partially offset increases in costs of labor and materials.
5. There is a constantly increasing demand for public utility service of all kinds, including the service of street railways. This is reflected by constantly increasing gross earnings.
6. Improved operating conditions existing or in prospect have not yet been reflected in security values.

RECENT PUBLIC UTILITY FINANCING

The engineers state that more money was raised for public utilities last year than in the six years since 1913, and present the following table to show what proportion of the financing was done through the medium of bonds, notes and stocks in that period:

	Bonds	Notes	Stocks
1914	$196,000,000	$107,000,000	$43,500,000
1915	149,000,000	137,000,000	38,000,000
1916	383,000	114,000,000	43,000,000
1917	148,498,200	145,645,600	69,069,470
1918	167,395,000	261,563,900	22,044,750
1919	272,335,300	252,408,500	66,108,890

The analysis also says that figures showing what proportion of this financing was for purposes of refunding and what for new construction were not available, but that "it is certain that the demand for increased service and consequent additions to plant is constant and of large volume."

With regard to the street railways Stone & Webster say in part:

> Street railways obviously have suffered more than other public utilities from conditions brought about by the war. In most cases the problems involved do not, however, differ fundamentally from those of other utilities; they are simply more difficult and require longer to work out because of the long established precedent of the 5-cent fare.

THE STREET RAILWAYS

> The exhaustive investigation and study given to the street railway industry during the past two years is making it constantly clearer that the question involved in most cases is solely the need for an equitable readjustment in the rate of fare to offset the decreased value and purchasing power of the nickel. In most cases the railway is not asking an increase in fare in terms of commodities. Its needs will be fully met by receipt of a fare having a purchasing power in other commodities equal to that formerly possessed by the nickel.
>
> When the nominal rate of fare is increased, there is usually some reduction in volume of riding. This is due in part to a feeling of misunderstanding toward the railway and in part to a natural but mistaken feeling on the part of the rider that the car fare in relation to his income has increased and that he cannot afford to pay this increase; that this reduction in riding is temporary and will gradually disappear as the situation is better understood is already evident. In cities where an increase in fare has been in effect for a reasonable period, the riding per capita is gradually returning to its normal pre-war basis.
>
> As will be shown in figures later in this statement, much progress already has been made in bringing about a flexible and adequate fare system, and when the readjustment of fares now in progress is completed we may expect financial results as satisfactory as those which have already been brought about in other branches of the public utility industry. As this takes place street railway securities should gradually increase in value and again be recognized as one of the most desirable forms of investment.

RAILWAY SERVICE ESSENTIAL

> A complete and unified system of transportation is an essential of urban life without which the business and other activities of the communities must cease. That such a system, to give adequate and satisfactory service, must depend primarily upon the use of tracks in public streets, on elevated structures or in subways, we firmly believe. On this obvious need for service and on the material progress which has already been made toward readjustment of the fare system we base our optimism for the future of this business.
>
> During the year a most complete investigation of the street railway industry has been made by the Federal Electric Railways Commission appointed by President Wilson. The report of this commission has not yet been made, but its broad activities in accumulating information and in holding hearings has been very helpful

in securing recognition of the need for a general fare readjustment to enable the industry adequately to serve the public.

Progress in Fare Increases

We give below statistics indicating growth in recent months in the number of cities in the United States in which higher railway fares have become effective:

	May 1 1919	Jan. 1 1920
No. of cities in U. S. paying 10-cent fare	29	59
No. of cities in U. S. paying 9-cent fare	0	1
No. of cities in U. S. paying 8-cent fare	19	21
No. of cities in U. S. paying 7-cent fare	100	147
No. of cities in U. S. paying 6-cent fare	164	185
	312	413

These figures mean that a population amounting to more than 33,000,000 is paying higher fares. The total population served by the street railways of the country, including the interurbans, is approximately 45,000,000. In other words, about 70 per cent of the people in the United States served by such railways are now paying higher fares.

Street-car Riding Constantly Increasing

There is an impression on the part of some people that the street railway business has been seriously affected by the automobile. Although this may be true in the case of some street railway mileage serving scattered communities, an analysis of companies under the management of our organization operating in cities, widely distributed geographically, indicates that while the population of the cities served increased from 1,247,800 in 1909 to 1,776,300 in 1919, or 42.3 per cent, the actual riding has increased approximately 77 per cent, or an increase in per capita riding of 24.3 per cent. In other words, each person in 1909 averaged 108.6 rides per annum and each person of the larger population in 1919 averaged 135 rides per annum. This undoubtedly can be taken as a fair index of the street railway industry as a whole, and shows that along with the growth in the use of the automobile there has been a steadily increasing demand for street railway service during the last ten years. The street car, in short, is more than ever the people's vehicle.

The One-Man Safety Car

The use of this type of car has proved to be most important in reducing expenses which helps to offset the unavoidable increase in the cost of labor and material.

While the safety car alone is not a cure-all, it comes near being such when taken in connection with recognition of the economic need of higher fares, and it will be of great benefit both to the public and the companies.

Operating Expenses

Present indications all point to the conclusion that operating costs in 1919 reached approximately the highest point to which they will be carried by war conditions. During the latter months of the year, especially, the wage situation was less acute, as evidenced by fewer strikes in the industry as a whole; moreover, the cost of materials, except for articles made up of wood, showed a tendency either to remain stationary or advance only slightly.

Stone & Webster feel confident that the public utility field at this time, after making due allowance for the present market rates for money, offers an unusual opportunity to purchase at exceptionally low prices securities of many companies which have weathered successfully the difficulties of the war period, and that the companies which have suffered most from the effects of the war will gradually readjust their affairs on a sounder basis than ever before.

The opinion of Stone & Webster in this connection is confirmed by circulars and other matter issued from other sources pointing out wherein the outlook for the industry as a whole is much improved and citing specific instances where the particular property is doing very well.

Atlanta Wage Contract Signed

The contract between the union carmen and the Georgia Railway & Power Company, Atlanta, Ga., for 1920, covering wages and working conditions, has been formally signed. It provides that the wage scale recently decided upon by a board of arbitration shall be retroactive to Jan. 1, 1920. The new scale grants a 15 per cent increase in wages. Dissatisfaction with the terms that have now been accepted resulted in the recent strike.

Additional terms of the contract give the company the privilege of maintaining an open shop, though it is agreed that any of the motormen or conductors may join the union if they so desire, and that there shall be no discrimination on the part of the company for or against any employee because he may be a member of the union. It is also provided by the 1920 contract that any disputes which may arise between the company and the men shall be settled by a board of arbitration and that the decision of this board shall be final.

In the current issue of *Two Bells*, a weekly paper published by the company, it is pointed out that the increase of 15 per cent granted the carmen provides annual salaries ranging from about $1,550 to about $2,015, while the average pay of Atlanta policemen and firemen is only $1,380 a year. Last year the railway employees received from $1,350 to $1,750. It is further pointed out for the edification of the general public that the lowest paid motormen and conductors under the old scale of pay received about as much as the average firemen and policemen of the city, while under the increase that has been granted the railway men will receive considerably more than the classes of public servants which have been mentioned.

The average pay of motormen and conductors who worked twelve hours per day last year was $1,680. This year the average for the same hours will be $1,872.

As this average is slightly in excess of $35 weekly, the company points out in the current issue of *Two Bells* that motormen and conductors have no cause for complaint. Public opinion in that respect is with the company.

Danbury Road Hard Hit by Fire

The Danbury & Bethel Street Railway, Danbury, Conn., has been hard hit by the fire which destroyed its carhouse. So far as the building and several of the cars are concerned the company's loss was small, but the loss of eleven open summer cars is severe. These cars were income producers during the summer season and came in very handy during the week of the Danbury Fair. They were old cars, but they answered the purpose of the company. J. Moss Ives, the receiver, has already ordered six safety cars. The company was insured, but it is doubtful if it can get present-day valuations for its rolling stock; that is, replacement value. These cars were not worth much on the market, but they were worth a great deal to the company. It is said that the receiver will make an effort to secure some second-hand open cars from the Connecticut Company, as that company cannot use open cars to advantage with its new zone system.

Wages Increased in Los Angeles

The Pacific Electric Railway and the Los Angeles Railway Corporation announce substantial increases in pay of trainmen, effective on April 1. The increases on the Los Angeles Railway Corporation's Los Angeles city lines apply to motormen and conductors. On the Pacific Electric Railway's city and interurban lines the increase in pay will affect motormen, conductors, brakemen, switchmen, trolleymen and yard foremen. The raise schedule for the Los Angeles Railway Lines is as follows:

First three months' service, new rate of pay 44 cents per hour; next nine months, 46 cents per hour; second year, 47 cents per hour; third year and thereafter, 49 cents per hour. Additional wages for one-man car operators are scheduled in addition to the above raises and are as follows:

On Main Line cars, 4 cents per hour additional wages are given above the rates of pay so increased in the general service. On shuttle cars, 2 cents per hour additional wages.

The rates of pay of motormen and conductors in train service on the Pacific Electric Railway are as follows:

Street Car Service

First three months..............	44	cents an hour
Next nine months..............	45	cents an hour
Second year....................	46	cents an hour
Third year......................	47	cents an hour
Fourth year and thereafter.......	48	cents an hour

Interurban Service

First three months..............	46½	cents an hour
Next nine months..............	47½	cents an hour
Second year....................	48½	cents an hour
Third year......................	49½	cents an hour
Fourth year and thereafter.......	50½	cents an hour

On Single Track Interurban Lines

First three months..............	49	cents an hour
Next nine months..............	50	cents an hour
Second year....................	51	cents an hour
Third year......................	52	cents an hour
Fourth year and thereafter.......	53	cents an hour

Freight and Work Train Service

Motormen..........	(Flat rate)	57	cents an hour
Conductors..........	(flat rate)	57	cents an hour
Brakemen and switchmen........	(flat rate)	52	cents an hour
Trolleymen.........	(flat rate)	47	cents an hour
Yard foremen.......	(flat rate)	57	cents an hour

On the Pacific Electric Lines the above rates will apply, and in addition thereto the annual twelve days' vacation with full pay will be continued, no option being allowed with reference to this vacation.

In addition, the granting of passes for meritorious service and other pass concessions will continue in effect as covered by the company's "Rules Governing Transportation." Furthermore, passes will be issued to employees who may live on the lines of the Pacific Electric, for travel to and from their work, as has been the practice since June, 1919.

This increase alone on Pacific Electric Lines will amount to approximately $170,000 additional per annum.

The two companies operate 1,480 miles of electric railway.

Participating Profit Certificates for Employees

Railway President Announces Profit-Sharing Plan Different from Most Proposals of the Kind

David I. McCahill, Pittsburgh's young lawyer-traction official, plans to distribute $1,000,000 of common stock among the 400 or more employees of his Pittsburgh, Butler & Harmony Consolidated Railway & Power Company and its subsidiaries and to give them representation on the board of directors. Mr. McCahill believes that by making his employees a "part of the works," he is improving their financial and social condition, and at the same time making more money for his company. Aside from taking his employees into the company, Mr. McCahill has provided many other benefits for them, such as old-age pension and sick and death funds.

SIX TRAINMEN BECOME DIRECTORS

The election of six trainmen to the board of directors will likely take place next week. Three men will represent the so-called Harmony road and three the Mars road. Mr. McCahill suggested that the men nominated be indorsed by at least twenty other employees and requested that the names be placed in the hands of the superintendent of the company not later than April 1.

Announcement of his intention to do these things was made by Mr. McCahill. H. E. Etheridge, vice-president in Butler, Pa., the Northern terminus of the line. He arranged two get-together dinners—one at 11 o'clock in the morning for the night shift, and the other at 7 o'clock in the evening for the day shift. Mayor Heineman of Butler presided at the meetings. Judge Reiber, of the Common Pleas Court of Butler County, praised the plan and told the trainmen they ought to be very thankful to have the opportunity that was being provided them by Mr. McCahill. H. E. Etheridge, vice-president and general manager of the traction interests, also was one of the speakers.

PROFIT PLAN OUTLINED

The plan suggested for allowing the employees to share in the net profits of the properties was outlined by Mr. McCahill as follows:

> A block of the common stock of the holding company, approximately $1,000,000, face amount, will be set aside under a trust agreement with some bank or trust company, such stock to be held in trust by such depository and any dividends declared thereon to be distributed to the employees in accordance with profit certificates which would be issued to each employee who has been in the service of the company for a period of at least a year. The fund which would result from dividends being declared on the common stock so held in trust would be divided equally between all the employees entitled to share therein as above mentioned, so that each employee would be interested in holding down the number of employees to as few as possible, because the greater the number of employees, the less amount each would receive, as his proportionate equal share of the dividends declared into this fund.
>
> The certificates would entitle the holder to his proportionate share of the dividends during the time he remained in the employ of the company, but if at any time he should leave the employ of the company, either voluntarily or upon request, the certificate would be forfeited, and his rights thereto would cease.
>
> In case an employee died while in the service of the company, his widow, during her lifetime, and after her death any minor children he might have, would be entitled to his share in the fund. Upon the death of such minor children, or, if there be no minor children, upon the death of the widow, or, if there be no minor children nor widow upon his death, the certificate would be cancelled and his interest would lapse.
>
> The right to vote the common stock so held in trust would remain with Mr. McCahill and his associate, Mr. Etheridge.
>
> In order that the employees might have representation even greater than that which they would have if they had full voting power on the common stock, not less than three employees would be elected to the board of directors of the Harmony Road and the Mars Road, these directors to be selected by the men themselves, according to such rules as they may adopt, subject to the approval of Mr. McCahill and Mr. Etheridge, as to fairness. As directors these men will have full voting power on such boards. This will give a greater representation on the board of directors of each of these roads than could be secured by voting the common stock which would be placed in trust direct by the employees.

Mr. McCahill proposes to make the plan effective for a trial period of five years. Every employee will be entitled to share in the plan.

DETAILS OF SECURITIES OUTSTANDING

The Pittsburgh, Butler & Harmony Consolidated Railway & Power Company has issued and outstanding $1,800,000, par value, of 6 per cent cumulative preferred stock and $4,500,000, par value, of common stock. It owns $2,745,000, par value, of common stock of the Pittsburgh, Harmony, Butler & New Castle Railway, out of a total of $3,000,000, par value, of stock issued and outstanding. This company is known as the Harmony Road. The Harmony Road owns all of the $25,000, par value, of the common capital stock of the Harmony Electric Company, issued and outstanding. The Harmony Road also owns all of the capital stock of the Ellwood Koppel Bridge Company.

The holding company also owns $95,500, par value, of the capital stock of the North Pittsburgh Realty Company, out of a total of $164,250, par value, of stock issued and outstanding. The holding company also owns $999,500, par value, of the capital stock of the Pittsburgh, Mars & Butler Railway, out of a total of $1,000,000, par value, of stock issued and outstanding by that company. This company is known as the Mars Road. The total indebtedness other than debts for current operating expenses is as follows:

The Harmony Road, $2,900,000 first mortgage 5 per cent bonds, due 1936; $176,000, face amount, demand notes.

Ellwood Koppel Bridge Company, $150,000 first mortgage 5 per cent bonds due 1943.

Mars Road, $900,000 first mortgage 6 per cent bonds due 1946.

North Pittsburgh Realty Company, approximately $100,000, face amount, demand notes in addition to certain purchase money mortgages secured by mortgage on the respective parcels of land purchased.

A conservative estimate of the present value of the property of the entire system owned by the various companies above mentioned is between $8,000,000 and $8,500,000.

Large Detroit Registration

Municipal Ownership Issue Stirs All Detroit to Action—Lively Campaign in Progress

The number of voters registered in Detroit, Mich., up to the closing date on March 20 indicates that a large ballot will be cast on the proposal of the city to spend $15,000,000 in starting a municipal railway. From the large registration, it appears that the people intend to follow out Mayor Couzens' admonition to vote. The Mayor, on several occasions, stated that the small vote cast on former occasions was a great disappointment to him.

The settlement ordinance containing the counter proposal of the Detroit United Railway for extensions was returned to the company by Corporation Counsel Wilcox, who stated his reasons for not approving the ordinance as to form.

Among the reasons enumerated was the claim that the title of the ordinance was misleading in that it did not state that the instrument was a thirty-year franchise, which the Corporation Counsel believes it to be. Failure on the part of the company to list in detail all the lines which it now operates, failure to state whether the company was a corporation, a partnership or an individual, lack of definition of terms as to what were to constitute operating expenses, maintenance items, depreciation and other lawful expenses, and lack of stipulation of a penalty to be imposed on the company for failure to operate city built subways and elevated lines, were enumerated as flaws in the ordinance.

Mandamus proceedings were instituted by the Detroit United Railways to compel the Corporation Counsel to approve the company's initiatory ordinance. A hearing on the mandamus action will probably be held before a court of three circuit judges. In the meantime petitions are being circulated among the proponents of the company's plan to obtain the required number of signatures.

A committee of citizens has been organized who are opposed to municipal ownership to endeavor to defeat the Mayor's plan.

Mayor Couzens maintains that the Detroit United Railway will be forced into a transfer agreement when the city lines are in operation, but the company states that it will not be possible for the people to avoid paying two or more fares with two systems operating, whereas one fare would be charged under a unified system.

Abner E. Larned, Sydney D. Waldon, and Francis McMath, former members of the Street Railway Commission, state that 7 to 10 cent fares will be necessary if the piece-meal plan is carried out. They also state that even if the

Detroit United Railway is forced in the end to grant concessions, the surrender will come after a "siege of litigation," during which there will be no transfer interchange.

In regard to the assertion that the city can prevent interurban cars coming into Detroit until the Detroit United Railway grants the transfer privilege, it is asserted that aside from the ability of the Detroit United Railway management to dodge trouble through use of trackage still within its control, the business of the city would be impeded and action would be taken by the Michigan Railway Commission in case the municipal government interfered with the free play of intrastate commerce.

John C. Frost, general manager of the Detroit Elevated Corporation, announced to the City Council his willingness to build a trial crosstown elevated line on approval. No action, however, was taken on this proposal.

Electrification Rumor Unfounded

There is no basis in fact for the report from Pittsburgh that the Pennsylvania Railroad is taking preliminary steps at this time looking toward the electrification of the Pittsburgh, Fort Wayne & Chicago division, although the railroad, for a number of years, has realized that ultimately it will be advisable to install electricity at a number of points on the system in addition to those where such power has already been adopted. As is well known the road out of New York is electrified between the Pennsylvania Station in New York City and Manhattan Transfer, just outside of Newark. This stretch takes in the Hudson Tubes. The company has also electrified the suburban portion of the main line between Broad Street Station, Philadelphia, and Paoli, and between Broad Street Station and Chestnut Hill. These are two sections of extremely heavy commutation travel.

It is realized that it would be desirable in a similar way to electrify the suburban zone around Pittsburgh, also to electrify between Philadelphia and Wilmington, through the tunnels at Baltimore and over the mountain grades just west of Altoona. A further development would complete the electrification from New York to Philadelphia, and Philadelphia to Washington. All of these matters have been talked about for a number of years. There is nothing new to report regarding them at this time. The company is not prepared to go ahead at present or in the near future with any of these projects, and there is no likelihood that the work near Pittsburgh will be executed soon.

Capital Traction Increases Wages

The Capital Traction Company, Washington, D. C., on March 19 granted its motormen and conductors an increase of 5 cents an hour and a 10 per cent increase in pay to all other employees, effective on March 31.

The new wages of the trainmen will be: For the first three months of service, 51 cents an hour; for the next nine months, 54 cents, and after a year, 56 cents. The men asked for 65 cents an hour. The present rates are: For the first three months, 46 cents; for the next nine months, 49 cents, and after a year, 51 cents.

The new wage rates are part of a new agreement entered into between the company and Division No. 689 of the Amalgamated Association. The new agreeement is to remain in force until March 30, 1923, with the provision that either side may move to change the wage scale at the end of each year upon giving thirty days' notice.

In the new agreement the District Commissioners no longer are designated as arbitrators of disputes which the company and the men cannot settle in conference. Under the new plan there will be a board of arbitration composed of three men—one chosen by the union, one by the company and the third selected by these two to represent the public. If after five days the first two arbitrators have failed to name a third to represent the public the Commissioners will be empowered to name him.

News Notes

Wage Offer Rejected. — After two hours of discussion on March 3 the trainmen in the employ of the Dubuque (Ia.) Electric Company refused to heed the plea of their president, C. C. Mead, to accept a temporary compromise wage offer, and taking the situation in their own hands called a walkout.

Twelve Per Cent Wage Increase.—The Harrisburg (Pa.) Railways has increased the wages of its trainmen and other employees. The increase will total $70,000. It became effective March 15. The new scale for trainmen is 48 cents an hour the first year, 49 cents an hour the second year and 50 cents an hour the third year and thereafter. The increase is approximately 12 per cent over the scale that has been in effect.

Want Wage Increase in Winnipeg.—A sub-committee of the union of employees of the Winnipeg (Man.) Electric Railway has been working for some time on a proposed revision of wages. It is said that an increase from 60 to 80 cents an hour will be asked. The present rates are from 39 to 55 cents an hour. Better working conditions and shorter hours are also among the concessions to be asked. The program as thus outlined is of course subject to approval by the entire union.

Wage Demands Threaten Life of Suburban Line.—The employees of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., have presented demands for a wage increase of 25 per cent to take effect by April 1. Gaylord Thompson, general manager of the company, has issued a statement to the effect that if the new wage scale is insisted upon the company will be forced out of business. In the new contract the men ask $1 an hour for operating one-man cars; 60 cents for motormen and conductors and double pay for Sundays and holidays.

New Franchise Proposed in Lima.—Prospects appear to be good for negotiations to commence soon for a new franchise for the Ohio Electric Railway in Lima, Ohio. Attorneys for the joint committee of citizens have prepared a tentative franchise. This has been presented to the City Council. It is said that except for a few minor changes the proposed new grant will be presented to the railway just as received from the committee. The Council is said to be opposed to one-man cars. James B. Dugan, resident manager of the railway, says the company is ready to proceed with the negotiations.

Trial Operation by City Suggested.—Elton S. Wilde, vice-president and general manager of the Union Street Railway, New Bedford, Mass., told a councilmanic committee recently that the six months' agreement under which the company is maintaining service between Lunds corner and Sassaquin is about to expire and when it does the company will be willing to furnish power and the cars and let the city operate the line. Under the present arrangement the city pays $200 a month to the Eastern Massachusetts Street Railway for the rental of the tracks and whatever revenue there is goes to the Union Street Railway.

Back to Private Life. — F. H. La-Guardia, president of the Board of Aldermen of New York, in an address to the New York Board of Trade and Transportation, said in regard to the local transit matter: "No matter how this question is decided, the men who decide are politically dead. I expect to go back to law practice in two years. We don't need any legislation. What we need is management, and above all we need a higher code of ethics, a better realization of duty to the public that is served. The whole trouble has been one of management, and to put it mildly the management has been rotten."

Program of Meeting

National Immigration Conference

A national immigration conference will be held on April 7 in New York City in the Engineering Societies Building, 29 West Thirty-ninth Street. National leaders in American industry and finance will discuss the shortage of foreign-born labor and the loss of production due to unrest among the workers, and measures will be taken for united action to relieve this condition. Further details may be secured by addressing Coleman du Pont, chairman of the board, the Inter-racial Council, 120 Broadway, New York.

Financial and Corporate

Two Reorganization Plans

Drastic Cuts in Fixed Charges Are Proposed in Tentative Rhode Island Proposals

Two plans have been presented for the reorganization of the electric railways in Rhode Island controlled by the Rhode Island Company. One plan represents the ideas of the receivers of the United Traction & Electric Company and the Rhode Island Suburban Railway. The other plan represents the ideas of the committees acting for the bondholders of these companies. Both plans call for a material reduction in the fixed charges of the companies. The plans differ in their essentials, however, and it is said that little hope exists of the differences being ironed out. This is purely a matter of unofficial information.

PROPOSALS ONLY TENTATIVE

As for the plans themselves there would appear to be little reason at this time to go into the proposed basis of the exchange of securities. The proposals are only tentative. Moreover the likelihood of the failure of the present Legislature to enact favorable permissive measures may alter the situation materially.

The plan outlined by the receivers is addressed to Governor Beeckman. The purpose of this plan is to assure a comprehensive system of transportation under one company, which shall operate all of the properties heretofore operated by the Rhode Island Company. The plan contemplates private management under state supervision. It recognizes the necessity for fixing the capitalization of the new company on a conservative basis, and for making provisions for present financial needs and future development of the properties. It calls for $2,000,000 in new money for rehabilitation.

REVENUE REQUIREMENTS SMALL

The fixed charges to be paid out of annual revenue are reduced to a minimum. To accomplish this result the plan provides that all accrued interest on present securities be forfeited; that 4 per cent bonds be issued in exchange for the existing 5 per cent bonds of United Traction & Electric Company; that the Rhode Island Suburban Railway bondholders take stock in exchange for $500,000 of their present bonds, and that the United Traction & Electric Company stockholders receive $7,000,000 par value stock in exchange for their existing $8,000,000 stock of the Traction Company.

It is the opinion of the receivers that the lower revenue requirements provided by this plan constitute an element of safety and go far to insure the success of the reorganization. The plan seeks by this means to avoid the necessity of raising fares in the future.

The receivers are in accord with the views heretofore expressed by the Governor that relief from taxation should only be granted as part of a plan which provides for contribution by the holders of existing stock and bonds. It is for this reason, as well as to insure the success of the reorganization, that they have provided for the material contributions on the part of holders of existing stock and bonds. The plan is conditioned upon the passage of the remedial legislation for which it provides. It is pointed out that without such legislation it is not possible under present revenue conditions for a reorganization to succeed.

The plan advanced by the security holders also provides that representatives of the various classes of security holders and of the public are to be associated in the management of the company. There will be a single new company with $22,600,000 of securities outstanding. The success of the whole structure is presaged on the company obtaining suitable legislation.

PLEA FOR BONDHOLDERS' PLAN

Stephen O. Metcalf of the committee representing the bondholders of the United Traction & Electric Company said for this plan that the generous scaling down of the securities of each class and the greatly reduced fixed charges over any other plan yet submitted should recommend it to the public. That the plan in this respect is drastic is instanced by the provision that the holders of the United Traction & Electric Company and the Rhode Island Suburban Railway shall forego the defaulted interest on their bonds to the amount of $1,200,000. In addition to this, to cite another example, the holders of the bonds cut their principal $1,400,000 and receive $1,400,000 in common stock. Under the plan of this committee the reorganized company would obtain $1,000,000 in new money.

Preferred Dividend Passed

Owing to the expense entailed by the severe storms and the extremely cold weather of the past winter, the New Brunswick Power Company, St. John, N. B., has been compelled to pass the dividend on its preferred stock. The heavy February storms completely interrupted the railway service for several days, and also damaged the electric light and power distributing systems. The total loss will aggregate $40,000. The narrow margin afforded by the rates allowed prevent the company from accumulating a surplus adequate for such contingencies.

Financing Plan Changed

$4,000,000 Loan Renewed — Dividends Passed Will Be Applied to Its Liquidation

The directors of the Northern Ohio Electric Corporation, Akron, Ohio, have decided that the amount and number of subscriptions received to Class A 8 per cent first preferred stock were insufficient to justify their acceptance and that the plan for the readjustment of the finances of the company referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 24, page 215, be abandoned. This action was taken after conference with and approval of the bankers holding the $4,000,000 loan which it was sought to retire.

LOAN WILL BE EXTENDED

It is announced that the company has arranged with the banks for an extension of the loan for one year and has agreed with them that dividends will be deferred until such time as financial conditions will permit the sale of securities to retire the loan. The company will apply the equivalent amount of such dividends to the reduction of the principal.

The directors felt that under the circumstances the best interest of all the stockholders was being conserved by this course. The preferred stock dividends are cumulative and the directors have every confidence that the accumulations will be paid in full. It is explained that every dollar applied to the liquidation of the loan places the stock in that much stronger position. The sum of $100,000 has been paid on account of the note and like payments will be made quarterly. This amount is approximately the equivalent of the 6 per cent dividend on the preferred stock.

The loan of $4,000,000 made by the Northern Ohio Electric Corporation became due on Feb. 1. It was proposed to liquify the loan through the issue of $4,000,000 of Class A 8 per cent first preferred stock. The present 6 per cent preferred stock was to have been exchanged for new Class B 7 per cent preferred stock, providing the holder subscribed for 66⅔ per cent of Class A preferred at par and also paid $10 per share held for the privilege of the exchange.

The loan which it was proposed to take up was made at the time of the original financing of the company in 1916. At that time the issuance of $6,000,000 of preferred stock, 75,000 shares of common stock without par value and a $4,000,000 one-year loan provided for the purchase of approximately $9,000,000 of common stock of the Northern Ohio Traction & Light Company and also furnished about $900,000 of working capital. This one-year loan was secured by a pledge of the Northern Ohio Traction & Light Company common stock purchased. It has been renewed from year to year owing to the unfavorable financial condition attributable to the war.

Norfolk Adopts Broad Policy Toward Public Utilities

City Council and City Public Utilities Commission Unanimously Agree to Safeguard Capital Both as to Principal and Return

In what will probably prove a noteworthy example, and an outstanding leading case, the City of Norfolk, Va., acting first through its Public Utilities Commission and second through its Council, has adopted a definite policy of encouraging public utility development in that city. The platform or principle is that "Capital legitimately invested in public utility properties must be safeguarded and protected by municipalities, both as to principal and as to a just and inviting return thereon after reimbursement to the company for expenses incurred in providing service."

CITY ADVOCATES SQUARE DEAL

This was unanimously adopted by both bodies. In other words, the city has definitely gone on record that it believes in dealing in a business-like manner with those business undertakings which are known as public utilities. It guarantees safety and an adequate return to money invested in developing public utilities and thus hopes to encourage capital to undertake that development and benefit therefrom.

The particular case which caused this action is one in which the City Gas Company of Norfolk, included in the system of the Virginia Railway & Power Company, petitioned for an increase of gas rates from a base rate of $1.20 per thousand cubic feet to $1.60. Norfolk is fortunate in that the five men who compose its City Council are apparently foresighted, broad-gage business men who deal with the city's interests in a business and not political manner. The same type of men are on its Public Utilities Commission.

The commissioners frankly admitted their own lack of familiarity or expertness in the public utility business, and in order to secure data upon which they could give a fair judgment they called in A. Merritt Taylor as a person mutually satisfactory to the city and the company. Mr. Taylor's former experience as Transit Commissioner of Philadelphia, as manager of the Division of Passenger Transportation and Housing of the Emergency Fleet Corporation during the war and as a public utility builder and operator encouraged them to believe he could advise intelligently with the various interests involved.

VALUATION SCALED DOWN

With his associate, Charles B. Cook, Mr. Taylor made a valuation of the gas property, scaling down from an apparent book value of $3,603,203, the company's valuation, to $2,383,908, a figure finally agreed upon by the Public Utilities Commission, the gas company and Mr. Taylor.

In 1896 the two gas companies then in Norfolk merged into the present company, the valuation at that time being placed at $971,621. Since about $500,000 of this amount represented stock for which no cash or equivalent had been advanced, other data tending to show that the actual fairly invested capital in 1896 was just under $500,000, that figure was adopted as a base.

HISTORICAL INVESTMENT $1,421,690

Actual additions, subsequent to 1896, were established and a total historical investment of $1,421,690 was arrived at for the property as of January, 1920. This basis was used in contradistinction to the company's contention for present-day high prices. This figure does not include going concern, land increments and working capital. The final valuation was arrived at as shown by the following figures:

Total historical cash investment, January, 1920	$1,421,690
Going concern value (15 per cent of above item)	213,000
Increment in land value as determined by appraisal committee appointed by city and company	488,660
Total property value, Jan., 1920	$2,123,350
Working capital	130,000
Additional investment now being made	130,558
Total value for rate base...	$2,383,908

Upon this base, a return of 8 per cent cumulative was set up and adopted as a part of the city policy of guarantee to the company. This means 34.6 cents per thousand cubic feet of gas. A detailed analysis of the cost of producing gas showed $1.294 per thousand, thus making a price of $1.640 legitimate. The company's request of $1.60 was thus substantiated and allowed by the city. However, it was agreed by the city and company that variations in price of oil used in gas manufacture would cause corresponding variations in the price of gas to the consumer.

NO FIGURES IN REFUTATION

From the reports of the various steps in the proceedings, the Council and Public Utilities Commission maintained an attitude of fairness to the utility, at the same time conserving the city's interests in the broadest possible manner. There was some objection at times by some members of the Chamber of Commerce, but the Public Utilities Commission took the attitude that the Chamber's representatives were very tardy in presenting their views, not appearing until a vote was to be taken. No figures were presented to refute the conclusions of the commission, Council and Mr. Taylor.

The company was criticised for the dirty and rundown condition of portions of its plant, but this condition was found to be due in part to causes beyond the company's control and the company promised immediate attention to the plant to put it in first class order, showing evidence of much already done in that line.

While there are many more details of the situation of special interest from the gas standpoint, the chief interest to all public utilities lies in the fundamental principle adopted by the city as to its attitude toward such business. Whether this attitude will be recognized and sustained by the State Corporation Commission remains to be seen. The City Council has authorized the chairman of the city's Public Utilities Commission, the city attorney and Mr. Taylor to submit a copy of Mr. Taylor's report to the State Corporation Commission when it hears the case on March 29. They are also authorized to present the city's resolution upholding the report with its platform and valuation as representing the viewpoint of the city and the manner in which the city desires to treat and deal with public utilities within its borders.

VALUATIONS UNDER WAY

Valuations are now being conducted of the railway properties of the company in Norfolk. It is expected that the data in connection with these cases will be ready for presentation within sixty days. In this instance also Mr. Taylor has been retained by the City of Norfolk.

Receiver for Chicago Ten-Cent Bus Line

United States Judge K. M. Landis has appointed the Central Trust Company of Illinois receiver for the Chicago Motor Bus Company following the filing of the bill of complaint by New York holders of $150,000 of bonds of the company. Counsel for the petitioners said that the bonds were due in January, 1920, but were not taken up by the company at that time. The Chicago Motor Bus Company has been operating a 10-cent motor bus service on the north side of Chicago along the Lake Shore and through Lincoln Park.

In spite of the rosy predictions of those who financed the company, hearings held before the Public Utilities Commission of Illinois in May, 1919, revealed that the company was having difficulties in making bare operating expenses. The facts were developed in the competition for motor bus franchises on the south side between the Chicago Motor Bus Company and the Chicago Stage Company. In a decision handed down Jan. 20, 1920, the commission criticized the methods of the Chicago Motor Bus Company and granted the desired franchises to the Chicago Stage Company. In the hearings in May, 1919, it was contended that high maintenance expenses, which were responsible for deficits, would be reduced sufficiently to permit operation at a profit if the company could operate additional buses on the south side. The commission, however, was not satisfied with the method of financing the company or the design of the coach proposed.

Mr. Mitten Increases Net

Philadelphia Rapid Transit, With Its Nickel Fare and Three-Cent Transfer Does Increased Business

That the methods employed by the Philadelphia (Pa.) Rapid Transit Company in conducting its business have proved beneficial not only to its investors but to its patrons is reflected in the annual report just issued covering the year ended Dec. 31, 1919.

Passenger revenue for the year increased 13.64 per cent over the previous year and represented 96.5 per cent of the gross earnings. The number of passengers transported to give this revenue was 723,610,228. Operating expenses, however, increased 22.82 per cent, due to the increased wages paid in the transportation department, so that the increase in net operating revenue was only 1.108 per cent. Maintenance and renewals amounted to $5,766,322, equivalent to 16.32 per cent of the railway operating revenue. In other words, this charge was more than $10,000 per annum for each mile of route now in operation. Deferred maintenance of the war-time period has largely been caught up by the use of reserves established for this purpose. The increase of 6.97 per cent in general expense is due mainly to settlements for the larger number of accidents occurring during the war-time period.

Deductions from gross income increased $106,098. These deductions now represent 27.55 per cent of the total railway operating revenue. This increase is caused mostly by the payment of interest on passenger cars secured by lease from the United States Government. The net corporate income increased slightly, being 11.79 per cent over the previous year, and is equivalent to a 5.72 per cent return on the $29,991,660 of outstanding capital stock, as against 5.12 per cent in 1918. Two semi-annual 2.5 per cent dividends were paid during the year.

Rentals paid for leased lines were 1.875 per cent greater than in 1919 and were equivalent to 15.2 per cent over the total funded debt of $57,073,425 of the twenty-eight leased lines. Taken as a whole the capitalization of the Philadelphia Rapid Transit System amounts to $86,453,040 in stock and $42,653,867 in bonds. The total rentals, dividends, interest, etc., paid on these securities represents a return of 8.6 per cent on the $129,106,907 of securities outstanding.

The accompanying tables give in detail the income account and statistical information concerning the traffic handled.

INCOME STATEMENT OF THE PHILADELPHIA RAPID TRANSIT COMPANY

Year ended Dec. 31	1919	1918	Per Cent Change + Inc.—Dec.
Gross passenger revenue	$34,739,589	$30,568,788	+ 13.64
Other operating revenue	618,882	515,025	+ 20.17
Total railway operating revenue	$35,358,471	$31,083,813	+ 13.75
Way and structures and equipment — maintenance and renewals	$4,707,012	$3,780,800	+ 24.47
Power—maintenance and operation	3,450,486	3,319,199	+ 3.96
Conducting transportation	11,387,653	8.923,021	+ 27.62
General	2,697,091	2,088,218	+ 6.97
Total railway operating expenses	$22,242,242	$18,111,238	+ 22.82
Net operating revenue	$13,116,229	$12,972,575	+ 1.108
Taxes including paving tax	$2,345,750	$2,428,819	— 3.42
Operating income	$10,770,479	$10,543,756	+ 2.15
Non-operating income	$681,049	$620,614	+ 9.74
Gross income	$11,451,528	$11,164,370	+ 2.57
Interest	$927,926	$981,652	— 5.38
Rentals	8,687,725	8,527,902	+ 1.875
Sinking fund—city contract	120,000	120,000	....
Total deductions	$9,735,651	$9,629,554	+ 1.102
Net corporate income	$1,715,877	$1,534,816	+ 11.79

STATISTICAL INFORMATION OF THE PHILADELPHIA RAPID TRANSIT COMPANY

	1919	1918	
Average total miles operated	671.42	661.45	+ 1.51
Surface	648.09	638.12	+ 1.56
Elevated	16.71	16.71	....
Subway	6.62	6.62	....
Revenue car miles to car hours—speed in M.P.H.	9.07	8.77	+ 3.42
Revenue passengers, at 5 cents	672,021,657	593,494,427	+ 13.25
Revenue exchange passengers, at 3 cents	51,588,571	43,791,710	+ 15.12
Total revenue, passengers	743,610,228	637,286,137	+ 13.52
Free transfer passengers	149,145,171	130,472,269	+ 14.35
Total passengers handled	872,755,398	767,758,406	+ 63.64
Gross passenger revenue	$34,739,589	$30,568,788	+ 13.64
Average fare:			
Per revenue passenger (cents)	4.81	4.79	+ 0.417
Per total passenger (cents)	3.98	3.98	....
Revenue per mile of track	$51,800	$46,200	12.10
Operating revenue — per cent	63.0	58.2	....
Taxes — per cent of gross revenue	6.52	7.67	....

Common Dividend Resumed

New Jersey Company Votes 1 Per Cent for First Quarter of New Year—Railway Doing Better

The directors of the Public Service Corporation of New Jersey, Newark, N. J., have authorized the payment of $500,000 in dividends on common and preferred stock for the first three months of 1920. Although a return has been paid regularly in the past on preferred, the 1 per cent declaration voted on common stock is a resumption of payment after the passing of the dividend for the last three months of 1919.

LOWEST RATE SINCE 1909

Two per cent for the quarter year will be paid on the $10,000,000 of preferred stock outstanding and 1 per cent is authorized on the $30,000,000 common stock.

The payment of a 1 per cent dividend, or at the rate of 4 per cent for the year on common stock, while a resumption of payment, is at the lowest rate the company has paid since 1909. Last year, with three quarterly payments, the total for the year was 4½ per cent. Dividends have been paid since 1907.

The first increase over 4 per cent was in September, 1909, when the rate was made 1½ per cent quarterly. The following year 6 per cent was paid and in 1915 another quarter per cent was added to the annual return. In 1916 7¾ per cent was paid, followed in 1917 by 8 per cent. In 1918 the yearly return dropped to 6 per cent.

After the meeting Thomas N. McCarter, president of the company, issued the following statement:

> After full consideration of all the circumstances of the corporation's affairs the board of directors of the corporation felt it to be proper to resume the payment of dividends to the extent of a quarterly declaration of 1 per cent upon the common stock of the corporation.
>
> The electric company and the gas company are now functioning properly and making satisfactory earnings. The railway company, as is well known, has been allowed a rate sufficient to keep it going: that is to say, to enable it to pay its operating expenses and fixed charges. The rate does not provide sufficient revenue to yield any substantial return upon the investment of the corporation in the railway's stocks.
>
> This situation, it is expected, will be cured during the next few months. The railway company, too, has suffered from excessive operating expenses caused by the abnormal weather conditions of the present winter.
>
> #### OUTLOOK GROWING BETTER
>
> The early months of the year are relatively lean months in the public utility business, the larger profits being made in the latter part of the year. The showing, however, of the corporation, as a whole, for so much of the year as has elapsed is so satisfactory and the estimate of the earnings for the year is so promising that the directors felt justified in taking the action above set forth.
>
> The pending quarter will be only the second time in the history of the corporation that a dividend declared at this season of the year will have been earned by the corporation in the specific quarter to which the dividend is applicable.

It is expected that the detailed report of operation of the company for the year will be available for publication soon.

Wheeling Lines Foreclosed

The West Virginia Traction & Electric Company, Wheeling, W. Va., and all its holdings were bought in by the first mortgage holders of the concern at public auction at Wheeling on March 15. G. H. Walbridge, representing the bondholders' protective committee of New York, was the only bidder. He paid $760,000 for the property.

The property was first offered for sale as a whole. The bid was $750,000. The property was then divided in parcels and each sold singly. The Morgantown property was first offered. Mr. Walbridge bid $700,000. The next parcel was the holdings in Wheeling, for which the same bidder offered $50,000. The third bid was $10,000 for the 495 outstanding shares of the City & Suburban Gas Company.

A reorganization is probable and new corporations will be formed to conduct the business. The bondholders were represented by G. H. Walbridge and Attorney Gerrard Glenn. Receiver Whittemore and Attorney J. J. Coniff looked after the company's interests.

Snow Cleaning Cost $221,000

For the period ended with Feb. 20, 1920, the cost of snow removal for the entire system of the Eastern Massachusetts Street Railway, comprising about 780 miles of track, the expenditure for labor alone was $221,000, or an average of about $333 per mile. The highest cost per mile was $568, for the Salem district. The lowest cost per mile is $181 for the Taunton district.

The additional cost of rehabilitation of the rolling stock together with maintenance will bring the total for this period up to about $500,000.

The crippling of traffic due to the fall of snow, more than 35 in. for the Massachusetts district, reached an acute stage. On March 1 only two lines of the entire system were running 100 per cent service. These lines were the Lynn and Lawrence divisions.

The conditions early in March were so bad that it was expected it would take some weeks before normal service could be resumed.

Rainier Valley Value $765,760

W. H. Moore, a Councilman of Seattle, Wash., appointed by the City Council to investigate the value of the Seattle & Rainier Valley Railway, has submitted a report to the utilities committee. He has placed a value of $765,760 on the properties. This does not include a sum the company spent in raising tracks and filling right-of-way to the present grade. This sum will be added as soon as it has been estimated.

It is uncertain whether the report by Mr. Moore brings the matter of the purchase of the lines by the city any nearer to consummation, as E. W. Sampsell, president of the company, has refused to negotiate on the basis of the report. An appraisal of the property made in 1913, when the city contemplated the purchase of the road, fixed the value at $1,264,072. In 1918 Mr. Sampsell offered to sell the Rainier Valley lines to the city for $1,600,000. Shortly after the city of Seattle purchased the railway lines of the Puget Sound Traction, Light & Power Company the Seattle & Rainier Valley line secured permission from the State Public Service Commission to raise its rates to 7 cents. This resulted in a movement on the part of residents of the Valley to induce the city to purchase the system.

Wants Bridge Traffic Restored

Deputy Public Service Commissioner Morgan T. Donnelly of the First District is making an effort to get surface line traffic restored across the Williamsburg Bridge. He has held hearings relating to this subject and has also conferred with representatives of the New York Railways and the Fourth & Madison Avenue Railroad for the purpose of learning what is the attitude of the operators of those lines toward the resumption of service across the bridge. The so-called green car lines carried about 20,000 passengers daily in rush hours to and fro across the Williamsburg Bridge previous to the elimination of the service. The Brooklyn Rapid Transit surface lines operating across the bridge carried about 16,000 persons daily in the rush hours previous to the elimination of green car service, and have carried about 15 per cent additional since that time, while there has been a large diversion of traffic to the Brooklyn Rapid Transit elevated and subway lines which run over the bridge. The hearings will be resumed and Commissioner Donnelly will endeavor to determine what actual steps can be taken to restore service.

Charlotte Suburban Line Sold

The Charlotte (N. C.) Rapid Transit Company, which went into the hands of a receiver in 1918, has recently had its last effects sold at auction. These consisted of 2 miles of track and trolley, with some additional poles, ballast material and other supplies. The property mentioned was bid in by Paul Chatham, former president of the company, at $10,000.

The Charlotte Rapid Transit Company was organized ten years ago with a capital of $75,000. It began operation in 1911 of a storage battery car from the end of a line of the Southern Public Utilities Company, which operates the railway in Charlotte, to the country club. The storage battery service was not a success and in May, 1913, the Southern Public Utilities Company began the operation of cars over the Rapid Transit line under a contract with the latter company. This service was discontinued on May 19, 1918, because the owners of the suburban line were not able to meet the deficit incurred through the operation of cars over the line.

For the past two years a considerable residence addition at Chatham Estates and Chantilly has been without railway service. It is reported that residents of that section will endeavor shortly to take over the effects of the defunct company from Mr. Chatham and enter into a new contract with the Southern Public Utilities Company for the operation of cars over the line. The latter company is now using one-man safety cars on some of its lines in Charlotte, and it is believed that through the operation of such cars and with increased patronage there will be little if any deficit on the line now abandoned.

Financial News Notes

Increase in Chicago City Dividend.—The Chicago (Ill.) City Railway has declared a quarterly dividend of 1½ per cent, payable on March 31 to stock of record March 25, thus placing the stock on a 6 per cent basis. The former basis was 5 per cent.

Two New Directors Elected.—Stockholders of the Dallas (Tex.) Railway met recently for the annual election of officers. J. T. Owens and Sam P. Cochran, both of Dallas, were elected directors to fill vacancies caused by the resignations of F. B. Bissell and LaMonte Daniels.

Suspension of Service in Weymouth.—The Eastern Massachusetts Street Railway has suspended indefinitely all service in the town of Weymouth, Mass., in consequence of the refusal of the town authorities to furnish financial aid in meeting the expense of maintenance and operation.

Service Suspended.—The Albany (Ga.) Transit Company has reduced service to a single car. Complete suspension and the junking of the line are threatened. It is said that the principal owners will sell for $45,000. The suggestion has been made that the city take over the road and operate it.

Abandonment Threatened. — The Bridgeton & Millville Traction Company, Bridgeton, N. J., has threatened to abandon the road and tear up the tracks if forced by Common Council to pay a share of an extensive street paving program. Members of the Council will confer with the traction officials in an effort to adjust the matter.

Fights for Present Worth Ruling.—The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has petitioned for an injunction in the United States Court to restrain the Missouri Public Service Commission from basing the valuation of the railway properties on the initial cost instead of on present worth in determining a basis for establishing equitable rates. The company states that its properties are now worth $11,000,000, as compared with a valuation of approximately $5,500,000 fixed by the commission.

Appraisal for Nashville.—Prof. Albert S. Richey of Worcester, Mass., has been retained by the Tennessee Railroad & Public Utilities Commission to represent it in an appraisal of the property of the Nashville Railway & Light Company. Robert M. Feustel, consulting engineer, Fort Wayne, Ind., has been retained by the company as its representative. The city of Nashville has not yet indicated whether it will appoint an engineer to represent it in the appraisal. The order of the commission makes it optional with the city as to whether it will or will not join in the work.

Long Island Line Ordered to Resume.—Deputy Public Service Commissioner Alfred M. Barrett of the First District has directed the New York & North Shore Traction Company, operating in the northern portion of Queens, to resume service immediately. The company shut down several weeks ago, when its tracks were blocked with snow and ice, and it became impossible for the company to obtain funds to clear them sufficiently to resume operation. The company has replied that it is now endeavoring to obtain $20,000, which it believes will be a sum sufficient to put its tracks and equipment in proper shape to restore service.

Public Utilities Doing Well.—Continued progress is reported by the utility companies included in the Cities Service Company, New York, N. Y., these properties not only reporting the largest gross revenues in their history but also showing improvement in net revenues. From present indications 1920 will be the greatest year from the viewpoint of net earnings in the history of the public service division. The demand for central station electric power at all properties controlled by Cities Service Company continues unabated and if these demands are to be met much additional generating equipment must be installed at the central station properties.

Interest Payments Authorized.—Interest amounting to $190,200, due on April 1, 1920, on the company's general mortgage 4½ per cent refunding bonds will be paid by Lee C. Bradley, receiver for the Birmingham Railway, Light & Power Company and the Birmingham Tidewater Railway. Judge William I. Grubb, of the United States District Court, rendered a decree March 18 authorizing the receiver to pay the interest due on April 1 and authorized him to pay such instalments of the company's Federal income tax as are due. The receiver was also authorized to extend for a period of not more than six months receivers' certificates when they become due and payable.

Hyde Park Line to Discontinue.—Corporation Counsel Arthur D. Hill and Assistant Corporation Counsel Joseph P. Lyons, representing the city of Boston, have informed the trustees of the Eastern Massachusetts Street Railway that the city does not intend to aid the road financially so that its lines in Hyde Park can continue operating. As a result of the disclosure of the city of Boston's position, the trustees say that it will be necessary to discontinue all service in Hyde Park on April 1. The State Department of Public Utilities has recommended that the Boston Elevated Railway take over the lines which the Eastern Massachusetts Street Railway has announced it will abandon.

Short-Term Notes Offered.—Ames, Emerich & Company, New York, N. Y., are offering for subscription at 98½ and interest, yielding 7.80 per cent $850,000 of two-year 7 per cent secured gold notes of the Richland Public Service Company. The company is a subsidiary of Cities Service Company. It owns or controls and operates the only electric light, power and street railway system in Mansfield, Ohio, the interurban railway between Mansfield and Shelby and one of the two gas distribution systems supplying natural gas, principally for domestic use, in Mansfield, and is also furnishing electric current to the local company at Ashland for distribution by it. The notes are dated March 15, 1920.

Representatives of Bankers in Charge.—Charles Day and John E. Zimmerman, Philadelphia, Pa., will become managers of the Ohio Electric Railway on April 1, according to announcement made by F. A. Healy, secretary and treasurer of the company. Mr. Healy said no change will be made in the personnel of officers and employees of the company. H. Gordon Gilpin will retain his position as general manager and Mr. Healy will remain as secretary and treasurer. Mr. Healy said that the bankers and bondholders' protective committees have agreed with President W. Kesley Schoepf that the company should be turned over to Messrs. Day and Zimmerman, to be managed by them as the bankers' representatives.

Pittsburgh Doing Better.—An investment banking circular reviewing the affairs of the Philadelphia Company, which controls the Pittsburgh Railways, says: "The ownership of the Pittsburgh Railways, heretofore treated by the company as a non-revenue producer, has great possibilities of developing into a source of income, as cash fares have been increased from 5 cents to 10 cents. The company sells tickets also at the rate of four for 30 cents. The gross receipts have thus increased from about $32,201 a day in 1914 to about $53,700 a day in 1919. The company now is understood to be earning all of its fixed charges. The valuation placed upon the transit system by appraisers indicates that the time is not far distant when under the caption of 'Other Income' will be listed the revenues from the Pittsburgh Railways."

Two New Directors in Philadelphia.—William J. Montgomery and William Y. Tripple have been elected directors of the Philadelphia (Pa.) Rapid Transit Company to succeed C. E. Ingersoll and J. J. Sullivan, Jr. Messrs. Montgomery and Tripple are Philadelphia Rapid Transit Company stockholders of many years' standing. They were elected as direct representatives of the stockholders, following the dissolution of the voting trust, which was made effective on Feb. 12. Mr. Stotesbury was re-elected chairman of the board and Mr. Mitten chairman of the executive committee and president. The election of W. C. Dunbar as vice-president in charge of accounting and finance and G. A. Richardson as vice-president in charge of operation was made in order that they might with greater authority assist President Mitten in the management of the property.

Bond Extension Arranged.—The Cleveland, Southwestern & Columbus Railway has arranged for the extension until Feb. 1, 1923, of the $110,000 of twenty-year first mortgage bonds of the Norwalk Gas & Electric Company, due on April 1, which issue it has assumed to pay by agreement of consolidation. The company found it was practically impossible at the present time to refund the bonds in the ordinary way and that the only course available was to provide for a short extension. The bonds will accordingly be extended until Feb. 1, 1923, at the same rate of interest, namely 6 per cent. In consideration of this extension the company proposes to make an immediate cash payment of $14.17 on each $500 bond. Thus the bonds during the period of extension will net the holder slightly more than 7 per cent annually. The company hopes that with the continued improvement in its earnings, the most satisfactory in its entire history, and with the termination of the present stringency in the money market it will have no difficulty in paying the bonds promptly at the extended maturity date.

Referendum on Dividend Increase.—Councilman H. C. Gahn, Cleveland, Ohio, stated on March 26 that he and associates will soon file more than 6,000 additional names asking for a referendum vote on the ordinance increasing the rate of dividend on Cleveland Railway stock from 6 per cent to 7 per cent. The Tayler service-at-cost ordinance fixed the rate of return at 6 per cent, but when the trainmen were granted an increase in wages some time ago the company asked for an increase in dividends on the basis that stockholders are entitled to an additional income just as much as are the employees. Two or three weeks ago Judge Dan B. Cull held that the original petitions were not sufficient. The fifteen-day limit claimed by Mr. Gahn for securing additional names expired on March 24. City Clerk Benkoski will be asked to certify the petitions, after which Council will be requested to order the question placed on the ballots at the next election. The decision of the arbitrators permitting the increase in the rate of dividend was reviewed at length in the ELECTRIC RAILWAY JOURNAL of Jan. 3, page 71. The decision of the city to arbitrate was reached last July.

Traffic and Transportation

May Order Zone System

Washington Company's Case Before Commission—Must Have More Revenue

A zone-fare system may be introduced in Washington, D. C., as a solution of the financial difficulties of the Washington Railway & Electric Company. That such a system might be established in the national capital became evident on March 23 when the Public Utilities Commission of the District of Columbia opened hearings on the company's application for relief further than that afforded by the present 7-cent cash fare with a ticket rate of 6¼ cents.

The company now asks a flat 7-cent fare with a 2-cent charge for transfers. The application for the increase was filed with the commission early in January. At that time it was stated that the company must secure additional revenue. W. F. Ham, president of the road, informed the commission at the hearing on March 23 that during the past twenty months the company had failed to meet expenses by more than $1,000,000.

THOROUGH INVESTIGATION PROMISED

The commission announced that it would go thoroughly into the company's condition with a view to working out a satisfactory plan of operation. In this connection Commissioner Kutz stated that the board would make a study of the zone plan in order that, if found advisable, it might order its adoption by the company. He instructed President Ham, for the Washington Railway & Electric Company, and Vice-President Hanna, for the Capital Traction Company, to prepare suggestions of a specific nature regarding the possible results of the installation of a zone system.

The 7-cent cash fare with four tickets for 25 cents, has been in effect since Nov. 1, 1919. The Capital Traction Company is also charging 7-cent cash fares, but is asking no further relief. The latter company is, however, a party to the present proceedings by order of the commission.

COMPANY'S PLIGHT GRAVE

Mr. Ham informed the commission that his company could not long continue to provide the present standard of service unless it were granted further relief. He went over the road's financial condition in detail and presented figures to show that during the past twenty months the company had furnished service at a loss of $1,147,960. During the fourteen months previous to Nov. 1 the road rendered service at $936,565 less than cost. Mr. Ham called the commission's attention to the fact that the company had passed both its common and preferred stock dividends, and that its 6 per cent bonds were now on a 12½ per cent basis. He stated that the company was facing default on the mortgage bonds of the City & Suburban Railway and that the officials had almost reached the limit of their ability to keep the system together.

President Ham then presented figures of the company showing a comparison of earnings for the company immediately prior to and immediately following the last raise in rate, on Nov. 1. He said that following Nov. 1, the average earning was slightly more than $14,000 per day, whereas during October the average earning of the company was slightly less than $12,800 per day.

FALLING OFF IN CAR RIDERS

He presented a mass of detailed figures showing the combined averages of the Capital Traction Company and the Washington Railway & Electric Company with regard to pay passengers and transfers, tending to show the falling off of gain in passenger traffic following the raise in rates.

One of the strongest points presented by the company was a table of statistics showing the operations of the Washington Railway & Electric Company for four months ending Feb. 29. The total operating income for the system, including subsidiaries, was placed at $1,779,404, and the operating expenses, taxes and miscellaneous items were figured at $1,594,413, leaving a balance of $184,990 available for the return upon investment, without payment of interest on bonds or dividends upon common or preferred stock.

Commission Hearing on Railroad Crossing Protection

The Railroad Commission of Wisconsin will hold a hearing in Madison, Wis., on April 9, for the purpose of determining whether or not it should issue an order prescribing trolley guards and other protective devices at all grade crossings of steam and electric railroads. The commission has received a number of informal complaints about the absence of trolley guards at such crossings and the question has been emphasized by several accidents occurring during the past year.

The commission's staff has studied the matter and has come to the conclusion that conditions warrant the establishment of a general rule in this connection. It will be the purpose of this hearing to afford an opportunity to the public, electric railways and steam roads to present their views on the subject.

Higher Fare Certain

Federal Court Authorizes Binghamton Receiver to Apply to Commission for Six-Cent Rate

Higher fares for the Binghamton (N. Y.) Railway are assured. Judge George W. Ray of the United States District Court on March 17 issued an order granting W. G. Phelps, receiver for the road, permission to apply to the Public Service Commission for the Second District for authority to raise the rate from 5 cents to 6 cents. The Binghamton City Council had previously passed an ordinance authorizing the increase, following the refusal of the company's carmen to return to work until the municipal government had acted favorably on Mr. Phelps' application for a fare increase.

Since the City Council has already sanctioned the 6-cent fare, the Public Service Commission is expected to give its assent to the increase without further delay. Mr. Phelps has announced that as soon as the commission has issued its formal order, he will begin carrying out the terms of the ordinance passed by the City Council.

WILL RAISE WAGES

These call for the purchase of additional equipment, including fifteen new cars, and for other improvements in service. They also provide for an increase in wages as demanded by the men. It is believed that the additional revenue to be derived from the 6-cent fare will prove adequate to meet the expense to be incurred by the company in making the contemplated changes.

The company has been endeavoring to secure an increase in fare for many months. The City Council refused to pass an ordinance suspending for the duration of the war and for two years thereafter the franchise provision limiting the fare to 5 cents. Receiver Phelps then applied to the Federal District Court, alleging that there was in existence no contract between the company and the city limiting the rate of fare which might be charged by the former. The city objected to the jurisdiction of the court to determine this question. The court sustained the city's contention and refused to intervene.

HARD FIGHT FOR INCREASE

The company then sought the aid of the State Courts in an effort to secure a fare increase from the Public Service Commission. Justice Charles E. Nichols of the New York Supreme Court handed down an order last November restraining the commission from granting the company a higher fare on the ground of lack of jurisdiction growing out of the fare provision of the road's franchise. The company then turned once more to the City Council. Affairs were brought to a crisis by the demands of the men for an advance in wages. Mr. Phelps announced that under the present fare the company could grant no further wage increase. The men struck when the City Council seemed unwilling to help the company.

Ten-Cent Fare Upheld

Pittsburgh Valuation Fixed at $62,500,000—This Is Less Than Company Asked, but More Than City Would Admit

In an opinion handed down on March 23 the Pennsylvania Public Service Commission upholds as "fair and reasonable" the present "basis" carfare of 10 cents charged by the Pittsburgh Railways. The valuation of the company's properties was fixed at $62,500,000. This is $14,500,000 greater than the $48,000,000 valuation contended for by the city of Pittsburgh and $7,500,000 less than the $70,000,000 figure urged by the company. The company is capitalized at a total of $156,000,000.

FINANCIAL REORGANIZATION NECESSARY

A complete financial reorganization of the company is declared necessary by the commission. Ten million dollars is set as the sum necessary for rehabilitation of the lines and rolling stock.

A physical valuation of the railways company properties, in order to determine a fair valuation, and therefore fix a fair rate of fare, was ordered by the commission, through Chairman Ainey, a little more than two years ago. In charge of an engineering board of five members, headed by Dr. F. Herbert Snow, chief engineer of the commission, as chairman, and including J. A. Emery and Morris Knowles, representing the traction interests, and Robert M. Feustel and George W. Fuller, representing Pittsburgh and surrounding municipalities traversed by the lines of the Pittsburgh Railways, the valuation was completed late last year, and submitted to the commission. The commission said:

The complainants (Pittsburgh and other municipalities) urged a valuation of $48,000,000, while respondent (the Pittsburgh Railways and Philadelphia companies) contended for $70,000,000.

The commission is convinced under all the testimony that even if the evidence would warrant it, a valuation of $48,000,000 would defeat the very purpose which the city and other complainants have in view, to wit, the rehabilitation of respondent's property upon a new and better financial basis, and the improvement and extension of its service to properly care for the present and future needs of the city and surrounding territory.

Upon such a valuation, the receivership would no doubt continue until foreclosures of mortgages disintegrated the unified system and left the city and vicinity with a number of separately operated street railway companies, each charging fares, to care for the public. This is unthinkable, and, by this report, we believe that we have laid the foundation for all that the complainants desire, or the public may require.

TRANSIT IMPROVEMENTS ESSENTIAL

At the risk or redundancy, but with a view of retaining the emphasis of our former statements, the commission again avers to the fact that the most important question now affecting the city of Pittsburgh, with respect to its transit problems, is improvement in street railway service; that improvement cannot be secured except by the expenditure of a large amount of money, a part of which, at least, would represent new capital requirements and a portion to be devoted to replacements of tracks, acquiring new equipment to take the place of some that must be superseded. In reaching its conclusion, the commission has at all times had these matters in mind, and its final determination is made with that end in view. It recognized the difficulties in the way of accomplishment, and that conditions which arose in former years are not easily overcome or set aside.

A program by which the amount required might be so divided that a part would be chargeable to capital and the balance amortized over a course of years would furnish a solution. Under all the evidence of the case, and taking into consideration all the measures of value set forth in the Public Service Company law, the commission finds that the fair value of respondent's property considered as a going concern is $62,500,000.

An order will be issued dismissing all complaints in so far as they relate to the rate of fare.

Upholding the 7½-cent fare, the commission's order kills all value in rebate slips given riders under earlier changes in fare. Also the commission, noting a previous decision upheld in the courts, reiterates its right to ignore municipal franchises with the railways in which the rate of fare, usually 5 cents, was fixed in the franchises, and such franchises, where affecting the railways company, are set aside.

On the fare question, the commission, after reciting increases in fare preceding fixing of the present 7½-cent fare says:

None of the tariff changes, except perhaps the last, gave to the respondent company the gross revenue it anticipated.

The last increase in wages (not the recent one announced for April 1) of respondent's employees, made under the direction of the War Labor Board, increased the gross operating expenses of respondent by approximately $1,000,000 a year. Neither in the testimony, nor by argument, was it seriously contended by complainant that the gross revenue obtained under the last tariff, which was filed by the receivers, was more than the respondent was entitled to receive.

The engineering conference unanimously determined upon careful estimates that the operating costs, including taxes for 1920, would be $14,086,000. This estimate did not take into consideration the item for increased wages above referred to, calling for an additional expenditure of approximately $1,000,000. This amount must be added to the estimate of the valuation board.

The lowest valuation for rate making purposes advocated by any of the experts called by the complainant was $48,000,000 (the city's proposed valuation), and we fairly assume therefrom, and from all the testimony in the case, that a valuation less than that amount would be, in result, a confiscation of the respondent's property. If a 7 per cent return were allowed on that amount it would entitle the respondent to $3,360,000.

Adding this to the estimated operating expenses would make $18,446,000 as the practically conceded annual revenue requirements of the respondent. Measure against this amount is the uncontradicted testimony of witnesses as to the probable gross income of respondent from all sources during the year 1920. This amount is estimated at $17,642,601, showing a deficit in operating account on the assumed basis.

It was argued with some force that high rates of fare did not tend to increase the number of passengers carried, and that, therefore, the respondent company might make up a portion of its required revenue by stimulating the riding habit in the territory served if lower rates were charged.

While the respondent has put into effect a basic rate of 10 cents, a very large part of its patrons buy tickets (metal tokens) entitling them to ride for 7½ cents, which, therefore, is the controlling rate in the present instance.

The commission cannot say that such rate is prohibitive per se.

It would not, therefore, be justified under all the circumstances disclosed by the evidence in interfering with the discretion of the receivers appointed by the Federal Court to operate this property, as long as these rates will not provide a gross revenue larger than the respondent is entitled to receive.

The sequence of events in order to bring respondent's service to the standard of efficiency necessary to meet the public needs in the city of Pittsburgh and adjoining territory, must be (a) the rehabilitation and readjustment of the company's financial relationship both with the holding company and with the underlying companies upon a basis of fair value; (b) the securing of additional moneys with which to make these improvements, to care for deferred maintenance and provide additional equipment; (c) a readjustment of some of the franchise obligations whereby the operating company may be relieved from unnecessary burdens of maintaining tracks which are not now used or which might, with propriety, be abandoned; (d) the granting by ordinance of certain privileges which would permit a better routing of cars, more expeditious and less crowded service, and all leading to economics in operation which would be reflected in reduced operating expenses and no doubt in an increase in the number of passengers carried.

To accomplish these improvements will require thoughtful and broad-minded co-operation between the municipalities and the railways company.

It was unanimously agreed in the engineering valuation board that the rate of return on its investment to be allowed the railways company would be 7 per cent.

The city of Pittsburgh will ask an immediate rehearing before the Public Service Commission of its decision fixing the valuation of the Pittsburgh railways at $62,500,000. It was announced by Mayor E. V. Babcock that if necessary the valuation will be appealed from the commission to the highest courts in the state. It is predicted that a flat 10-cent car fare will succeed the present 7½ cent fare.

Anti-Jitney Publicity

The Danbury & Bethel Street Railway, Danbury, Conn., has been publishing some excellent talks on jitney operation and competition. The following statements are from a recent advertisement in one of the Danbury newspapers:

We hear a great deal nowadays about the "trackless trolley" and how it will soon supersede the street car which runs on a track. Much of this talk is being fostered by motor bus and tire manufacturers in order to induce people to go into the jitney bus business and buy their wares. This is not the opinion of trained and experienced men who have given a life study to problems of urban transportation. It is now generally conceded by men who know what they are talking about and are not interested merely in advancing the sale of their products but in solving in a very real way the problem of transporting people through the streets of our cities by the cheapest and best method possible, that the only practicable and satisfactory method is the use of tracks.

Even Henry Ford, who a few months ago preached a funeral sermon over the trolley, has changed his mind and has become convinced that the street car on a track is an absolute necessity. His latest invention, the "gasolene street car," *runs on a track.*

Not one of the 114 experts, publicists, public officials or traction men who testified before the Federal Commission, seriously proposed a return to the independently operated stages or buses of pre-horse-car days, moving at will over the entire surface of the streets, taking their chances among other vehicles and making hopelessly unmanageable addition to the already over-congested traffic.

Do not be deceived by the half-baked and ill-considered opinions of men who tell you that in a few years there will be no street railway tracks in any of our cities If the tracks are taken up in Danbury and Bethel it will not be because they have become obsolete as a method of transportation and supplanted by a better method, but because the people have given their support to the jitneys instead of to the trolley for the time being and compelled the receiver to discontinue service, dismantle this valuable property and sell it for junk. If the people of Danbury and Bethel are short-sighted enough to refuse to support the trolley and save it for the future, in a very short time they will regret the course they took when they realize that in other towns and cities the trolley has survived the jitney and that the people of these other communities are enjoying facilities which are denied to the people of Danbury and Bethel. Think this over.

Kalamazoo Will Vote on Seven-Cent Fare

The local railway problem in Kalamazoo, Mich., appears to be in a fair way toward settlement. An agreement has been entered into between the City Commission and the Michigan Railway which provides briefly for the suspension of the rate of fare fixed in the company's franchise and for the making of certain improvements by the railway.

To give the contract effect the matter will be submitted to the citizens on April 5 for a vote. It is proposed to permit the railway to charge a 7-cent fare, the company agreeing in consideration of this rate to create an improvement fund to be made up of 1 cent from every fare collected. Improvements amounting to $200,000 will be made. The improvement work will not, however, await the accumulation of the fund. The company will arrange to start the work immediately, financing it by obtaining a loan if necessary. The City Commission agrees to act substantially as follows:

Submit to the electors next April a proposition empowering the City Commission to suspend clauses in existing agreements with the Michigan Railway having to do with the rate of fare to be charged and to permit the company to charge a straight 7-cent fare entitling passengers to transfer privileges.

Designate two members of the City Commission to act on board of trustees, whose business shall be the establishment of trust fund to be made up of 1 cent from every fare for the making of improvements in the railway service.

Pass on construction program of company excepting so far as the Portage Street improvements are concerned, the latter being specified in the agreement.

Exercise the privilege of purchasing the company's lines, if the Commissioners see fit so to do, within a five-year period.

Terminate the agreement with the passing out of the original franchise in 1923.

The company agrees substantially as follows:

Devote 1 cent of every fare collected toward the establishment of a fund to be kept in the bank designated by the city for making of stipulated improvements.

Borrow money on the strength of the new agreement so that the improvements may be made and thirty-six new cars obtained at once, and liquidate the debt incurred out of the foregoing fund, bearing interest charges out of its own revenue.

Appoint one trustee to manage the trust fund with the two trustees designated by the city.

Proceed with construction work in Oakland Drive to the extent of $36,000, and or Portage Street to the extent of $96,000, and buy thirty-six new cars, the total program calling for an expenditure of $192,000.

Agree to sell, should the city decide to buy the lines, within five years.

The city retained Delos F. Wilcox, New York, as its consultant to advise on the railway matter.

New York Bus Rights Before Court

Federal Judge Julius M. Mayer on March 19 ordered Job E. Hedges, receiver for the New York (N. Y.) Railways, to institute legal proceedings to prohibit the operation of privately owned buses in competition with the company's lines. The company will ask that the buses be barred on the ground that they have no franchises and have failed to obtain certificates of convenience and necessity from the Public Service Commission for the First District. It is estimated that the competition of buses is costing the company approximately $34,000 monthly. E. L. Winthrop, of counsel for Mr. Hedges, told Judge Mayer that the company's cash balance amounted to $680,602, or $198,305 less than the predictions made a month ago forecast.

Acting on behalf of Manhattan taxpayers, E. L. Schafer has obtained from Justice Newburger a temporary injunction restraining the city from using an appropriation of $1,140,000 made by the Board of Estimate for the installation of additional municipal bus lines. The order was obtained on the grounds that the bus project would incur indebtedness other than for city or county purposes in violation of the State constitution; that the city has not received from the Legislature any power to use the credit, or the funds, of the city for such a purpose and that the city, as a municipal corporation, possesses no franchise to operate bus lines.

Accepts Columbus Grant

The Columbus Railway, Power & Light Company, Columbus, Ohio, on March 9 filed with the City Clerk its acceptance of the 6-cent fare ordinance recently passed by the City Council. The ordinance provides for a 6-cent cash fare for a six-year period. During the first two years the company is to sell five tickets for 25 cents and during the remaining four years six for 25 cents. Opponents of the measure have circulated petitions for a referendum on the question. The company on March 12 asked the Common Pleas Court to restrain the Columbus City Clerk from certifying the referendum petitions on the ground that they did not comply with the provisions of the law.

Transportation News Notes

Six-Cent Fare Continued.—By order of the Illinois Public Utilities Commission the 6-cent fare now charged by the Springfield Consolidated Railway will continue in effect until May 1.

Jitney Bonds in New Albany.—The City Council of New Albany, Ind., has passed an ordinance requiring jitney operators to deposit with the municipal authorities bonds of $1,000. The fare is limited to 5 cents on improved streets.

Wants City to Operate Lines.—Municipal ownership of the Phoenix (Ariz.) Railway is asked in petitions which are being circulated in Phoenix by M. J. Morley. Several thousand signatures have already been signed to the petitions.

Eight Cents in Alton.—The Illinois Public Utilities Commission has authorized the Alton, Granite & St. Louis Traction Company, Alton, to charge 8-cent cash fares and to sell two tickets for 15 cents. The present fare is 7 cents.

Six Cents in Centralia.—The Centralia & Central City Traction Company and the Centralia Traction Company, which operate in Centralia, Ill., have received permission from the State Public Utilities Commission to raise their fare from 5 cents to 6 cents.

Seven Cents in Pleasantville.—The Atlantic & Suburban Railway, Pleasantville, N. J., has received permission from the State Board of Public Utility Commissioners to raise the fare in each of its zones from 6 cents to 7 cents, beginning April 1. The company will sell tickets in strips of ten for 65 cents.

Traffic Probe in New Orleans.—The Association of Commerce of New Orleans, La., has appointed a committee to conduct an investigation of traffic conditions in that city. The committee will study the service furnished by the New Orleans Railway & Light Company and will make suggestions for its improvement.

Asks More in Shreveport. — The Shreveport (La.) Traction Company has petitioned the Shreveport City Commission for an increase in fare from 5 cents to 7 cents. The company asks that the question of amending its franchise to permit the fare to be raised be submitted to the voters at a referendum election.

Ten Cents Asked in Nashua.—The Nashua (N. H.) Street Railway has petitioned the State Public Service Commission for permission to increase its cash fare from 8 cents to 10 cents. The company hopes by raising the cash fare to increase the use of metal tokens, which it plans to sell at the present rate of five for 35 cents.

Increase on Connecticut Line.—Judge L. F. Burpee of the Superior Court has authorized an increase in the fare charged by the Hartford & Springfield Street Railway, Warehouse Point, Conn., to 10 cents in each zone. The new rate is approximately 3 cents a mile. The fare between Springfield and Hartford is increased by 5 cents.

Five Cents to Coney Island.—Fares between points in Manhattan and Brooklyn and Coney Island on the lines of the Brooklyn (N. Y.) Rapid Transit Company will be reduced to 5 cents on May 1, when the company's through rapid transit lines to the island will be ready for operation. Under the dual contracts it was provided that no more than a nickel should be charged for a continuous ride from any point in the city to the island, but the company has been charging 10 cents because it has been necessary to break the continuous ride provision by a transfer.

Oppose Fort Wayne Increase.—The City Council of Fort Wayne, Ind., has passed a resolution directing the Mayor to take steps to prevent the Public Utilities Company, which operates the Fort Wayne city lines, from raising its fare. The company has applied to the State Public Service Commission for permission to increase the fare from 5 cents to 7 cents.

One-Man Cars in Franklin.—The Citizens' Traction Company, Oil City, Pa., has placed a number of Birney one-man safety cars in operation on its lines in Franklin, Pa. B. C. Everinghim, executive secretary of the Franklin Board of Trade, has written a letter to J. H. McClure, general manager of the company, expressing approval of the use of the cars in Franklin.

$1,500,000 Improvement Plan for Cincinnati.—Several important changes in car routing will be made by the Cincinnati (Ohio) Traction Company during the next few months. Walter F. Draper, vice-president of the company, has informed Street Railway Director W. C. Culkins that the carrying out of the company's improvement program will involve an expenditure of $1,500,000.

New Safety Campaign in Youngstown.—The Pennsylvania-Ohio Electric Company, the successor to the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, is about to engage in an intensive safety campaign. It has retained the Bureau of Safety, Chicago, to direct the work. Safety committees have been organized for the different departments, also a general safety committee.

Three Cents a Mile on Kansas Lines.—The Kansas Court of Industrial Relations, which has taken over the work of the State Public Utilities Commission, has granted the Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., and the Joplin & Pittsburg Railway, Pittsburg, Kan., an increase in fare to 3 cents a mile. Commutation tickets are to be sold at the rate of 2½ cents a mile.

Chicago Traffic Survey Starts.—John A. Beeler, traffic expert, who has been retained by the Chicago (Ill.) Surface Lines to make a survey of traffic conditions in Chicago, has announced that he will begin his investigation of transit conditions in that city at once. Mr. Beeler will go thoroughly into the matter of car routing with a view to evolving a plan of relief in the congested sections of the city.

Paving Neglect a Misdemeanor.—The City Commission of Phoenix, Ariz., has passed an ordinance under the terms of which it will be a misdemeanor for any electric railway operating within the city limits to neglect improvements ordered by the commission. Under the ordinance failure on the part of the Phoenix Railway to comply with an order of the commission is punishable by a fine of $200 for each day the company fails to obey the order.

May Raise Dallas Fares.—An increase in revenue is necessary if the Dallas (Tex.) Railway is to take any steps to improve its service. Announcement to this effect was made recently by J. M. Everman, who has been appointed supervisor of public utilities for Dallas. Mr. Everman is understood to favor an increase in the company's fare. It is reported that he will shortly request the City Commission to grant a higher rate and at the same time to order improvements in the service furnished by the company.

Decision Against Commission.—The Court of Appeals of New York has denied the appeal by the Public Service Commission from the decision of the Supreme Court, which granted an alternative writ of prohibition preventing the commission from hearing an application of the receivers of the Manhattan & Queens Traction Corporation for an increased fare. The court stated that the order of the lower court was not appealable as a right and that the permission granted by the Appellate Division to appeal had been revoked.

Demand Utility Board's Removal.—Charges of neglect of duty and misconduct in office have been made against the New Jersey Board of Public Utility Commissioners by the Mayor and Aldermen of Jersey City. The Jersey City officials have asked Governor Edwards of New Jersey to remove the commissioners from office. The board is arraigned on eighteen counts, which seek to show that the board has failed to serve the public, has been unduly dilatory and formal, and has favored the Public Service Railway.

Wants Philadelphia Service Improved.—William S. Twining, director of city transit of Philadelphia, Pa., in a recent statement declared that the Philadelphia Rapid Transit Company would require 600 additional cars to provide service equal to that of 1914. Mr. Twining announced that he was prepared to demand the placing of many additional cars in operation, the taking over of the Frankford "L" by the company, and the utilization of streets at present unused, to relieve the congestion in the central part of the city.

Bus Lines Planned for Detroit.—The Detroit Motor Bus Company, formed in Detroit, Mich., for the operation of bus lines in that city, has now organized permanently with the following officers: President and general manager, R. W. Meade; vice-president, S. D. Waldron; secretary, Sherman D. Callender. The board of directors besides the foregoing officers, includes H. W. Alden, W. F. Evans, Edwin Denby, W. J. Kennedy and others. The company plans to establish service on one route in the near future and later to extend it to include others.

Zones for Philadelphia?—Joseph A. Lewis, president of the Cliveden Improvement Association, Philadelphia, Pa., testifying before the State Public Service Commission on March 19, declared that the Philadelphia Rapid Transit Company planned to introduce a zone-fare system in Philadelphia. Mr. Lewis asserted that the location of the conductor in the company's side-door cars indicated that the company intended to install such a system. The conductor in this type of car is stationed at the rear of the side exit. Mr. Lewis argued for a 5-cent fare with universal free transfers.

Setback for Hylan's Staten Island Plan.—Mayor Hylan's plan to operate city-owned cars over the tracks of the Staten Island Midland Railroad, Richmond Borough, New York City, has encountered an obstacle. The Mayor proposes to seize the tracks of the company, which suspended operation early in January, and to purchase twenty cars from the Emergency Fleet Corporation. Corporation Counsel Burr now informs his Honor that for him to operate cars over the Midland's tracks would violate the city's agreement with the company. The latter holds some twenty-five franchises, of which 50 per cent. provide from sixty to ninety days' grace which the company is allowed in warning before the termination of the franchises.

Urges Reduction for Regular Riders.—Lower fares for short-haul rides, retention of the present 5-cent fare for regular riders, and an increase to 6 or 7 cents in the rate paid by casual riders, are advocated as a partial solution of New York City's transit difficulties in a brief recently submitted to the Public Service Commission for the First District and to Judge Mayer of the United States District Court. The brief was prepared by William M. Speer for Elon S. Hobbs, who represents the minority bondholders of the Interborough Consolidated Corporation. Mr. Speer advocates a 3-cent fare for short rides on the surface lines. He would retain the present 5-cent fare in the shape of commutation tickets and would raise the cash fare to 6 or 7 cents.

City Loses Fare Fight.—The city of San Antonio, Tex., lost its fight before the United States Supreme Court for an early hearing of appeals brought by the city from Federal Court decrees restraining the city from interfering with the San Antonio Public Service Company in putting into effect higher fares as authorized by Judge Duval West of the United States District Court. Judge West, after a hearing before a master who made a report on the earnings of the company, held that the 5-cent fare authorized by the city of San Antonio was confiscatory, and declared that the company had the right to charge such fares as would assure an adequate return on invested capital. Acting on this decision, the company announced an increase in fares through the inauguration of the zone system. The city then sought an injunction in the Federal Courts, and being denied the relief sought, it appealed to the Supreme Court. Motions to expedite the hearing were denied by that body during the week ended March 13.

Personal Mention

Nominations for A. I. E. E. Officers

At the meeting of the board of directors of the American Institute of Electrical Engineers held in Pittsburgh, Pa., on March 12, the report of the committee of tellers on its canvass of the nomination ballots cast for candidates for the Institute offices falling vacant July 31 next was presented. As required by the constitution of the Institute, the board then selected by ballot its list of "directors' nominees," with the following result:

For president—A. W. Berresford, Milwaukee.

For vice-presidents—C. S. Ruffner, New York; E. H. Martindale, Cleveland; Charles Robbins, Pittsburgh; C. E. Magnusson, Seattle; C. S. McDowell, U. S. N.; L. T. Robinson, Schenectady.

For managers—E. B. Craft, New York; Harold B. Smith, Worcester, Mass.; James F. Lincoln, Cleveland.

For treasurer—George A. Hamilton, Elizabeth, N. J.

Bond Anderson has been appointed auditor of the Piedmont & Northern Railway, Charlotte, N. C.

Lucius S. Storrs, president of the Connecticut Company, New Haven, Conn., has been elected chairman of the public utilities section of the Connecticut Chamber of Commerce for the coming year.

Alfred S. March, a member of the New Jersey Board of Public Utility Commissioners, has tendered his resignation to Governor Edwards. Mr. March was appointed to the board by Governor Edge in 1917. He will resume the practice of law.

F. H. Hensel will on May 1 assume the duties of superintendent of the light and power department of the Wilmington & Philadelphia Traction Company, Wilmington, Del. Mr. Hensel will succeed Augustus T. Throop, who has tendered his resignation to take effect on that date.

C. W. Hardesty, traveling passenger and freight agent of the Monongahela Valley Traction Company, Fairmont, W. Va., has been promoted to the position of division superintendent with headquarters at Clarksburg, W. Va. Mr. Hardesty succeeds W. V. Neal.

W. V. Hill, formerly manager of the Washington (D. C.) office of the American Electric Railway Association, has reopened his office in the Holbrook Building, San Francisco, Cal., as manager of the California Electric Railway Association. In resuming his work in California Mr. Hill will turn his attention to the many new problems confronting the electric railways of the State. Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, has taken over Mr. Hill's duties at Washington, as announced in the ELECTRIC RAILWAY JOURNAL for March 6.

Mr. May, Club President

Comptroller of Connecticut Company Heads New England Body — Active Association Worker

The New England Street Railway Club has chosen for its president during the coming year I. A. May, comptroller of the Connecticut Company, New Haven, Conn. Mr. May's election as head of the club took place at the meeting of that body at Boston, Mass., on March 25 and 26. The nominations for president and the other officers were made on March 25 and were confirmed by the club at the banquet that evening.

I. A. MAY

In choosing Mr. May to direct its activities the club has selected a man well fitted both by natural ability and by training to carry on its work successfully. Mr. May is one of the best-known railway men of the New England section. He has for many years been identified with the club's activities, and has also taken much interest in the affairs of the American Electric Railway Association. He is president of the Accountants' Association of the national organization.

An accountant by profession, Mr. May has had a varied and interesting experience during his eighteen years' connection with street railway work. He entered the electric railway business in 1902 with the building of the Berkshire Street Railway in Massachusetts, as clerk and paymaster of the company. Two years later he joined the staff of the Consolidated Railway in New Haven. Here he handled the railway, electric light, gas and water accounts as head bookkeeper and chief clerk to the auditor. When the Connecticut Company was formed in February, 1910, the Consolidated Railway became a part of that system. Mr. May continued with the Connecticut Company. He was promoted to auditor in 1912 and in the following year was again advanced, this time to the office of comptroller, which he has since filled.

Mr. May passed the certified public accountancy examination in 1915. He is the author of "Street Railway Accounting," recognized as a standard work on accounts in the electric railway field. He is vice-president of the Connecticut Society of Certified Public Accountants. He has served as vice-president for Connecticut of the New England Street Railway Club for the past year.

George C. Towle, formerly general manager of the People's Railway, Dayton, Ohio, resigned on March 1 as manager of the Logansport (Ind.) Utilities Company. Mr. Towle entered the transportation field in 1890 in Ohio. In 1891 he was appointed master mechanic of the Allentown & Bethlehem Rapid Transit Company, Allentown, Pa. He resigned the next year to become superintendent of the Biddeford & Saco Railroad, Biddeford, Me., remaining with the company for three years. In 1895 he left railway work for manufacturing, but returned to it in 1900, when he was placed in charge of the Houghton County Traction Company, Houghton, Mich., by Stone & Webster. Two years later he was transferred by Stone & Webster to Ponce, Porto Rico, where for two years he had charge of the organization and construction of the Ponce Railway & Light Company. He then took charge of the Mattoon and Charleston properties of the Central Illinois Traction Company, Mattoon, Ill., and later of the Syracuse & South Bay Electric Railroad, Syracuse, N. Y. In 1906 he was appointed general manager of the People's Railway, subsequently receiving a similar appointment with the Springfield (Ohio) Railway. In October, 1919, he severed his connection with the latter company and in February of the present year he withdrew from the management of the People's Railway to take charge of the rehabilitation of the Logansport Utilities Company.

Obituary

Douglas M. Easton, at one time identified with the street railway industry in Massachusetts, died at his home in East Weymouth, Mass., on March 11. Mr. Easton was eighty-three years of age.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Labor Shortage Cuts Malleable Production

Brass and Bronze Castings Will Be Used in the Railway Field to Replace Malleables Wherever Possible

With the exception of light malleable castings such as are used in trolley construction and on which one prominent railway manufacturer is quoting delivery of from two to four weeks, the malleable market situation is serious. Production in this industry, which includes from sixty to seventy malleable iron foundries, is estimated to be 70 per cent of normal. Railways, unable to place requirements for malleables within a reasonable time, already have ordered certain fittings, castings, etc., to be made up of bronze or brass.

Manufacturers who are making brass and bronze castings in place of malleables are getting 25 to 30 cents per pound, which is cheaper on the average than malleable castings, which range from 18 to 48 cents per pound.

Deliveries on light malleable castings range from two to ten weeks and on heavy castings from three to eight months.

According to the American Malleable Castings Association, there is ample foundry capacity to provide for all known demands, provided labor can be obtained to operate the plants. As the labor shortage appears to be increasing rather than decreasing, no relief from present conditions can be foreseen within the next few months.

Wage Boost for Miners

Increase Amounts to 27 Per Cent to Become Effective April 1—Seasonal Buying Recommended

President Wilson has removed the regulation of bituminous coal prices to become effective April 1 and has transmitted the report of the majority of the Bituminous Coal Commission notifying the mine workers and operators that this must be the basis on which the wage settlement must be made.

The commission awarded the miners a wage increase which is on a 27 per cent basis, the 14 per cent increase of last October to come to an end March 31. The new wage is to continue for two years. In this way the wage contract is terminated in the spring rather than the fall.

In addition to the award, the majority report made recommendation looking to the storage of a minimum of three months' winter supply of bituminous coal by July 1 of each year by federal government departments, public utilities, railroads and domestic consumers; the study of the Interstate Commerce Commission of the advisability of instituting freight rates on coal lower in the spring than in the fall and winter months, and that steps be taken to minimize as far as possible car shortages in the transportation of coal.

Freight Delays Hold Up Work Schedules

Railways, Waiting for Material and Supplies, Unable to Commence Bonding and Repairing Overhead

Several railways within the past week report having received railbonds and other supplies by parcels post on account of the seriousness of the car shortage. Very heavy weather conditions have held up freight cars throughout the whole winter season, but particularly from the first of the year on. It is only now that some of them are finding their way to their destinations and helping to relieve the critical situation that exists. One manufacturer reports that of one hundred cars ordered from the railway to remove finished products from his factory, only nineteen were sent, and of this number nine were unfit for use because they leaked so badly it would have been unsafe to trust the materials to them. One company reports the receipt of rusted heating devices in a recent shipment made during a storm. It has been virtually impossible to withdraw freight cars from service for repairs because they were so badly needed. Recent orders placed with the steam road car builders promise to give some relief to this situation in the near future. With the condition of steel deliveries this relief is even more likely, because it is understood that steel for railway purposes is getting the preference over that for other industries.

Many manufacturers have resorted to express shipments, and although units have been limited to 200 lb. each, a great amount of material has been delivered in this way.

Certain railroad companies are demanding that their cars be sent back to their own lines immediately—cars which had been allotted to other lines while the roads were under government control. In cases this insistence has been so great that freight cars have gone back empty where with a little manipulation they could have picked up a load, although at a cost of a few days' further delay. This recall of cars to their home lines is undoubtedly going to cause a still greater car shortage than now exists on certain lines and divisions, but it will benefit the home lines.

Demand for Fiber Conduit Shows Increase

Mills Booked Up to Good Capacity with Prospects of an Advance in Prices

Fiber conduit has been purchased in large quantities this spring and mill capacities have been booked for many months ahead. The supply of pulp from Canada is in satisfactory condition for all requirements anticipated for the year. Conduit mills are running in a comfortable capacity, but if they are required to resort to extra shifts to supply a sudden demand during the summer it is expected that a price advance will result, possibly to the extent of 20 per cent.

Sufficient material is on hand to satisfy the orders now booked at the prevailing rate, which has held for some time. Additional business for quick delivery would require overtime labor and fresh ordering of raw materials at a rate higher than on those already laid in. Consequently it is of advantage to companies contemplating extensions wherein fiber conduit would be used to place their orders as soon as possible for shipment as far ahead as can be done, in order to get in on present prices.

It is known that some large contracts have not yet been placed which undoubtedly will have to be placed before the summer is out. At this time there is a certain amount of capacity which can be turned to shipment in five to six weeks. While the popular demand is for 3-in. conduit, there also has been good ordering of other sizes as well.

Trolley Cord Scarce

Heavy Demand for Sash Cord Cuts Down Available Supply for Railways

Bell cord and trolley cord deliveries are now four to six weeks on a fair sized order. Present stocks are practically nil, with but slight chances of obtaining anywhere near enough to fill orders now on hand.

Demands by the building trades for sash cord are partly responsible for the present shortage, as both sash cord and trolley cord are made on the same machine. Also, failure of the railroads to deliver raw materials, yarn, etc., to the manufacturers is a direct cause of lengthened deliveries.

Inquiries and orders from the railways on bell and trolley cord have assumed considerable volume of late and the manufacturers of cord are hoping to have sufficient quantities to equip the large number of new cars which are now in process of construction in the plants of the different car builders. For maintenance needs railways must worry along with present supplies until the spring building rush is over, after which deliveries are expected to be improved.

Prices since the first of the year have advanced approximately 5 to 10 per cent on all grades. Quotations on one well-known brand are as follows: No. 8 white, 97 cents per lb., drab, $1.04 per lb., and mahogany, $1.09 per lb.

Magnet Wire Scarce

Unprecedented Condition Results in Long Time Deliveries, With No Signs of Immediate Relief

Manufacturers of magnet wire are unable to satisfy the present demand. As far as can be learned there is no mill capacity available under three months, and from that length of time it runs up to nine months in one case. Producers have been carried away by this unprecedented condition, and there is apparent no immediate relief from the situation.

In the case of the cotton-covered magnet wire the greatest factor in the shortage is the dearth of long-fiber cotton. When this supply would increase no one was prepared to say. For enamel wire there was found no particular shortage of enamel, although its price has been constantly increased by the manufacturers. The inability to turn out any more product under present capacity seems to be the main cause, with the result that the manufacturer must scan his list of orders and pro-rate the amount to be shipped to each company.

Better Packing of Supplies

Trolley Catchers and Retrievers Now Packed in Corrugated Board Cartons

Recently a manufacturer of railway supplies and accessories discovered that its trolley catchers and retrievers were not always reaching the purchaser in the best of condition. Rough handling in transit sometimes destroyed the enamel finish and the excelsior used in packing would work up inside and clog the mechanism.

Now each catcher and retriever is packed in a corrugated board carton after final inspection so that as a result the device is protected until it is placed on the cars. A label on the outside identifies the contents and it is therefore unnecessary to open the package until ready to put the retriever in service.

This package service which has been used to a great extent in other lines of business is proving very satisfactory according to reports received from electric railway men.

Rolling Stock

Danbury & Bethel Street Railway, Danbury, Conn., is reported to have placed an order for six safety cars.

Boston (Mass.) Elevated Railway is in the market for six cars for snow removal, some of which will be snowplows and the remainder snow-sweepers. Four large steel dump cars also will be ordered.

Washington Railway & Electric Company, Washington, D. C., is remodeling and will put in operation fifty summer cars. The cost per car will approximate $6,000, according to figures filed with the Public Utilities Commission, which has authorized the work.

Michigan Railway, Kalamazoo, Mich., will purchase thirty-six new cars for its lines in Kalamazoo if the voters on April 5 approve the tentative agreement between the railway and the City Commission under which 1 cent of every 7-cent fare which it is proposed to allow will be impounded to create a fund to pay for improvements to be carried out at once.

Northwestern Elevated Railroad, Chicago, Ill., has purchased two new 50-ton electric locomotives. These will be equipped with Westinghouse 567 motors which are of the same type as were specified for part of the last all-steel cars bought by the elevated line. The two electric locomotives will be used in connection with the interchange of freight between Chicago, North Shore & Milwaukee Railroad and the Chicago, Milwaukee & St. Paul Railroad.

Power Houses, Shops and Buildings

Fort William (Ont.) Electric Railway.—Plans have been prepared for an addition to and reconstruction of this company's carhouse. The improvements will cost $50,000.

Port Arthur (Ont.) Civic Railway.—A portion of the carhouse and four cars belonging to the Port Arthur Civic Railway were recently destroyed by fire. The loss is estimated at $100,000.

Montreal (Que.) Tramways.—This company will erect a sub-station at a cost of $75,000.

Cape Breton Electric Company, Sydney, S. C.—Fire recently destroyed the carhouse and two cars of the Cape Breton Electric Company with a loss of $50,000.

Track and Roadway

British Columbia Electric Railway, Vancouver, B. C.—This company plans to build an interurban line 10 miles long between Cloverdale and Blaine, B. C. A portion of the right-of-way has already been cleared and graded.

British Columbia Electric Railway, Vancouver, B. C.—The British Columbia Electric Railway will shortly double track its extension in Hastings Street East from Renfrew Street to Boundary Road, Vancouver, at a cost of $17,000.

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway has presented to the Chamber of Commerce of Wilmington, Cal., tentative plans for the installation of electric railway service in that city. The plans call for the building of a line by bonds to be voted by the municipality, and for the operation of the same by the Pacific Electric Railway.

Pekin (Ill.) Municipal Railway.—The Pekin Association of Commerce has petitioned the City Council to order extensions to the lines of the Pekin Muncipal Railway.

Boston (Mass.) Elevated Railway.—This company is preparing to carry out an extensive improvement program involving a new power installation in its main power house and the reconstruction of its carhouse and yard layout. The proposed track work calls for a thorough rehabilitation and reconstruction. The plan will require about four years for its completion.

Eastern Massachusetts Street Railway, Boston, Mass.—The city of Revere, Mass., has petitioned the Legislature to give the State Department of Public Utilities authority to consider a plan whereby the Eastern Massachusetts Street Railway would secure a lease of the East Boston Tunnel and the track rights of the Boston Elevated Railway in East Boston, and would build two miles of track, in order to shorten the present route between Boston and Revere. Under the plan the company would build a freight station at the western terminus of the East Boston Tunnel.

Public Service Railway, Newark, N. J.—The City Council of Camden, N. J., has requested the Public Service Railway to double track its line in State Street, Camden, for a distance of five blocks.

Cincinnati (Ohio) Traction Company.—The Cincinnati Traction Company plans to reroute several of its lines and to extend its Warsaw Avenue line. The cost of the improvements will approximate $1,500,000.

Toronto (Ont.) Civic Railway.—The Board of Control has approved the estimates of Works Commissioner Harris for $168,378 for the construction by the Toronto Civic Railway of a line on the Prince Edward Avenue viaduct.

Montreal (Que.) Tramways.—The Montreal Tramways will shortly begin work on an extension to its Park Avenue line.

Dallas (Tex.) Railway.—The Dallas Railway will shortly begin work on its Masten Street extension.

Virginia Railway & Power Company, Richmond, Va.—The Virginia Railway & Power Company has been authorized by its board of directors to spend $123,329 in track renewals and extensions. The appropriation will cover the reconstruction of 8,395 ft. of track on Hull Street, four blocks on Main Turnpike, and 700 ft. on Eighth Street, Street, 1,900 ft. on the Petersburg and the extension of the double track at the end of the First Street line for 2,902 ft. Work will begin as soon as materials and competent labor can be procured.

Seattle (Wash.) Municipal Street Railway.—Work has been begun on the East Marginal Way extension of the Seattle Municipal Street Railway. The construction involves the installation of a 3-ft. fill, 1,400 ft. long. The project will cost $170,000.

Trade Notes

Safety Car Devices Company, St. Louis, Mo., has established a district office in the Munsey Building, Washington, D. C.

American Armature Engineering Company, Bluefield, W. Va., has let contracts for a plant, 40 x 100 ft., at Mullins, W. Va.

The Black & Decker Manufacturing Company, Baltimore, Md., has established a permanent office and showroom at 1436 South Michigan Avenue, Chicago, in charge of R. G. Ames, whose territory has been extended to cover the entire Mid-West. F. E. Marrion and J. N. LaBelle will assist Mr. Ames.

Poole Engineering & Machine Company, Baltimore, Md., on Feb. 1 moved its general office from 50 Church St., New York City, to its works at Baltimore. The company will still maintain a district office at 50 Church Street. All general correspondence should be addressed to Baltimore, Md.

The Continuous Rail Joint Company of America has received orders for approximately 2,500,000 continuous and Weber rail joints so far this year. The bulk of this is, of course, in the steam road field. Deliveries are now being made only in time to meet rail deliveries.

Buda Company, Harvey, Ill., announces that Frank W. Marvel, formerly Middle West representative and later in the eastern territory, has again been transferred to Chicago as the Middle-West representative of the company in the electric railway field. Peyton W. Wood, who has been handling the territory in the Middle West will represent the company in Southern territory with headquarters at New Orleans.

Oxweld Acetylene Company, Newark, N. J., and Chicago, Ill., has recently extended its manufacture of oxy-acetylene apparatus and equipment to include "Eveready" welding and cutting outfits. This is a new name but the apparatus is not new, excepting for certain refinements of design, having been used extensively in the metal-working trades for several years under the name of "Prest-O-Lite" apparatus.

Standard Underground Cable Company, New York, N. Y., announces that its Detroit sales office, which for several years has been a sub-office of the Chicago office, has been made a full branch office with R. E. Green in charge. Mr. Green has been in charge of the Detroit office since it was first opened. He has been connected with the Standard Underground Cable Company since 1909 as salesman and is well known in his territory.

Western Electric Company, New York, N. Y., has appointed A. Buehler, sales manager at its Minneapolis office. Mr. Buehler joined the company in the early part of 1915, and became sales manager at Omaha during the fall of 1917. Eliot Lum has been promoted to be sales manager at the Omaha office, to succeed Mr. Buehler. Mr. Lum joined the company in 1905, and in 1907, became a member of the telephone engineering department at Chicago. In 1909 he was transferred to the sales department of the Minneapolis house, joining the Omaha organization in a similar capacity in the winter of 1912.

American Steam Conveyor Corporation, Chicago, Ill., has appointed the Kon-Wald Engineering Company, Mutual Life Building, Buffalo, New York, of which F. A. Konzelman is manager, as its representative in Buffalo and Western New York. The Brooks-Fisher Company, Candler Building, Atlanta, Georgia, are now southeastern representatives. J. M. Fisher of this company was for fifteen years in the erection department of the Babcock & Wilcox Company, the last six of which he was district superintendent of the Atlanta territory. E. A. Brooks, was assistant sales manager of the Atlanta office of the Babcock & Wilcox Company.

Ohio Brass Company, Mansfield, Ohio, is introducing its gas-welded type of rail bond into the signal field. It has been the practice in connection with steam-road track signal installations to utilize a long solid wire bond fastened to the web of the rail and with the terminals spanning the splice bars. By contrast, the Ohio Brass bond terminals are fastened to the rail head and only about 3 in. apart. It developed that this short span is a particular advantage, since some 60 per cent or more of the breakages in rails occur through the bolt holes underneath the splice bars. With the long type of bond now used for the signals a rail break of this character does not open the signal circuit, and the signals do not therefore protect against this kind of break. The new Ohio Brass bond, however, would cause the signal to assume the danger position if a break in the rail occurred anywhere. This bond was exhibited at the National Railway Appliance exhibit in Chicago, March 13 to 18, and attracted a great deal of interest among railway signal engineers.

New Advertising Literature

Pelton Water Wheel Company, San Francisco, Cal.: Bulletin No. 10 describing its lines of centrifugal pumps.

W. S. Godwin Company, Baltimore, Md.: Booklet B descriptive of steel paving guard for use with groove girder rail and street railway paving.

Russell Manufacturing Company, Niagara Falls, N. Y.—A catalog on the "Triggerlock Reversible Controller Finger," showing economies possible by use of this product.

American Steam Conveyor Corporation, Chicago, Ill. Folder containing fifty to sixty trade marks and trade names of nationally advertised concerns using American steam jet ash conveyors.

Locomotive Superheater Company, New York, N. Y.—Bulletin T-5 on the "Advantages of Superheated Steam," setting forth in concise language statements of interest to all power plant owners.

Mitchell-Rand Manufacturing Company, New York, N. Y., has sent out cards of samples of armature twines. The company has adopted a new system of gaging these twines, which greatly simplifies the method of determining sizes.

General Electric Company, Schenectady, N. Y.: Bulletin No. 47,419-A, superseding bulletin No. 47,419, descriptive of its small-capacity industrial oil circuit breakers, type FP-10, 50-amp., 600-volt, for three-phase and quarter-phase induction motors of 25 hp. or less.

Esterline Company, Indianapolis, Ind., Bulletin No. 395 covering power factor recording instruments which points out the evils of low power factor to the central station, to the isolated plant and to the power customer, as well as how to locate and eliminate the causes of low power factor.

The English Electric Company, Ltd., Queens House, Kingsway, London, England: The first number of the English *Electric Journal* dated January, 1920, being Vol. 1, No. 1, of this publication. This company represents under a new name a consolidation of the number of old companies which it controls and operates under one management. It includes the Dick, Kerr Works, Preston; the Ordnance Works, Coventry and Scotstoun; the Phoenix Works, Bradford; the Siemens Works, Stamford; and the Williams Works, Rugby, which with the exception of the Ordnance Works, are all well known as pioneers of the electrical industry in its various branches in England. Many illustrations and descriptions of large turbines, railway motors, control equipment, rolling stock showing multiple unit control equipment as used on the Continent, trucks and third rail equipment, track and roadway construction as well as a number of technical articles are included.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 55 New York, Saturday, April 3, 1920 *Number* 14

Cincinnati Explains the Difference

IN THE issue of March 20 we commented on the excellent report on the street railway situation made in Kansas City. This week we print a digest of a Cincinnati report analyzing the reason for fare difference in Cincinnati and Cleveland. It is another piece of evidence of the rapidly growing appreciation of the electric railway business. The report shows a comprehension of some of the costs of furnishing local transportation.

But, more than this, it is another example of what happens when two parties who have different conceptions get acquainted with each other's views and problems. We have consistently encouraged such efforts on the part of both company and public and believe these efforts should never be allowed to lag. The final result is sure to be an appreciation on the part of the public of many of the problems of transportation and also a growing confidence in the managers and operators of transportation properties.

Novel Features Introduced in a "Service-at-Cost" Plan

THE idea of cost of service as a basis for the conditions under which city transportation is to be supplied is extending. The latest city to adopt the plan is Memphis. In the method of its adoption, however, the Memphis case is unique, at least so far as we now recall. In that city the plan was not the result of a bargain between the company and the city, but it became an order through the new Public Service Commission of Tennessee. It has been accepted, however, by both company and city.

The origin and the authority under which the plan was promulgated, however, are not the only novel features of the Memphis agreement. One departure from previous practice is that the agreement provides for two reserve funds, each with critical upper and lower limits and independent of each other, one for a depreciation fund and the other for determining fares. The latter, as usual, is the surplus after all the charges of every kind are paid, while the former is a variable percentage of the value of the depreciable property of the company, the variation in percentage depending upon the amount of money in the fund. Incidentally, there are some other novel features, such as the use for a service index of car-miles per passenger instead of its reciprocal and the establishment of a maximum service limit, that is to say, a minimum number of passengers per car-mile. The latter we regard as a salutary sign of the growing interest of cities and the public in general in limiting the expenses of the companies. The provision of procedure to follow in the case of emergencies is a rather wise planning for the future.

It is only reasonable to expect that there will be progress in franchise making, as in other branches of human endeavor. The service-at-cost franchise is one of the youngest forms of agreements for railway operation and evolution in it is to be expected. The Public Service Commission of Tennessee has helped the industry by its contributions toward this development.

What Electric Railroading Is Like Under Arctic Conditions

NO PLAN has yet been formulated to build an electric line over the route from northern Greenland to the North Pole followed by the late Admiral Peary. Nevertheless, if such a line should be built there are many managers in this country who feel that so far as experience with fighting snow is concerned, based on the experience of the past winter, they would be fully qualified to operate such a line. Evidence from every side is that the past three months have been the worst as regards snow ever experienced, at least in the northeastern part of the country.

January was unusually severe on electric operation, but it remained for the next two months to cap the climax. The storm of Feb. 5 was so heavy that many of the routes had actually to be abandoned, and some of them had not been dug out when the storm of March 6 put things in as bad condition as they were before, or worse. There are still parts of New England, or were last week, where there are cars on the road in the position in which they were stalled on Feb. 5. Even in New York City traffic was stopped because of the weather on at least one of the longitudinal lines for about the same length of time as on the interurban stretches. The sections thus blocked have been, it is true, lines of normally light traffic, and the energies of the operating companies have naturally been devoted first to clearing the heavily traveled routes, but the fact that traffic had to be suspended on them for more than seven weeks shows the severity of the climatic conditions.

The trouble seems not to have been due entirely to the quantity of snow which fell during the two major snowstorms in the period in question, but to the nature of the precipitation. This consisted in many areas in part of fine hail, which, combined with partially melted snow, coated the tracks with ice. This made necessary the use of picks as well as shovels. Another factor more important than ever before to delay electric railway traffic was the increased number of automobiles, particularly of motor trucks. These not only kept on the tracks, because the tracks were the only parts of the highways which were cleared, and thus impeded the car movements, but with their heavy loads they packed the snow down again on the rails and made not one but many clearings of the tracks by the railway companies necessary.

There is no doubt that the large increase in the number of motor vehicles during the last few years makes necessary some change in the plan by which our highways, both in cities and between cities, are kept free from snow in winter. Heretofore, this burden has been thrown almost entirely on the electric railway companies. They have removed snow from their tracks, and as other streets have not been touched all traffic has naturally used the narrow strip cleared by the railway company. This condition prevails not only in the city but also in the country where electric tracks are built along the highway. Even where the space between the rails is at one side of the highway and not paved the motor vehicles will use the tracks, because the snow soon becomes packed there to the height of the rails and the rest of the road is impassable.

To lessen the delays which have been caused by the use of his single-track line in this way by motor vehicles last winter one ingenious railway manager organized a sort of dispatching system between his cars for these trucks. He dug out turnouts for the trucks at intervals along the line and then sent his cars through in batches. Otherwise, there would have been endless confusion and congestion. It was not done primarily as an act of civic betterment, but purely to permit his own cars to use his own tracks after they had been dug out by his own men.

But this was not the only gratuitous work that he had to do to keep his tracks clear for his own cars. On account of the severity of the weather individual motor trucks would frequently break down, and as they always broke down on the track, because that was the only clear part of the highway, they had to be lifted off by railway employees. Again, motor vehicles which used the track at night, when there were no railway employees to help, and were broken down or became stalled from the snow would frequently be found in the morning abandoned and blocking the track. Even the movement at night of motor trucks which did not break down and did not require dispatching was a source of considerable expense to the company. This was because they would pack down hard on the track and roadway any snow which fell in the night or drifted over onto the tracks, with the result that railway traffic in the morning could be resumed only if the solidified ice and snow left by the motor trucks was removed by the renewed use of pick and scraper by the railway company. The experience of one manager has been cited not as an isolated instance, but because it is typical of many roads in New England similarly situated.

Something must be done to remedy this state of affairs. We believe that every one will admit that it is not the duty of the railway companies to act in the winter as a servant without pay to every user of the highway, providing the only route by which they can travel and helping them out if they break down, at least to the extent of getting them off the track. The question has not been a critical one before because the number of motor vehicles has not been large, nor have they constituted so large a percentage of the total number of users of the highway. The farmer's sleigh would use the portion of the road intended for general vehicles, but if the number of vehicles on wheels is now so large in winter as to require cleared roads they should be provided by the county or city. Otherwise, the railway companies may well consider making no attempt to keep in operation after a heavy snowstorm those sections of their tracks which have only a light traffic.

Snow and Water Keep the Motor Maintainer Awake at Night

THE recent terrible weather has brought up questions other than that of whose duty it is to remove snow and ice from the highways for the use of vehicles other than the electric cars. One of these questions is as to what is the most efficient form of snow-fighting equipment. Another is whether there is any way of making motors so that they will be less adversely affected by such weather as we experienced during the past few months.

Undoubtedly the conditions have been most unfavorable for electrical apparatus. Motors with ample capacity to operate cars on a dry, clean rail become overloaded unless very large when the cars have to be forced over a rail covered with snow and with the grooves often filled with ice. Where the wheels slip motormen will leave the current on for a long period, hoping that the wheels will bite. Water will find its way into the casing and snow and small particles of ice will be drawn in through the ventilating ducts. If brine from the salt used to melt the snow at switch points gets into the motor it will hasten deterioration.

Alternate baking from overload and wetting will affect the windings of any motor. In spite of these difficulties some means must be found for preventing motors from failing even under the arduous conditions presented by winter service. It will not do to consider the motor only as a "fair weather" machine. This is a matter which should be taken up most seriously by the electrical companies.

"In the City Hall" a Continuous Performance

"NIGHTIE NIGHT" is a play that sounds naughty but turns out nice. It is a legitimate farce with a thousand laughs. One pays a speculator $3 for a ticket and feels well repaid. In New York, however, there is a greater farce than "Nightie Night" or even "Up in Mabel's Room." It is the uproariously funny "In the City Hall." The principal actors are all politicians. The direct admission price is nothing. There will be an ultimate price, however, but that is another story. In "In the City Hall" the unwilling villain recently withdrew. The going got too rough for him. He had been heckled enough. The late Richard Mansfield was a rough leading man, but he was gentle compared with leading man Hylan and his understudies in the great traction drama. But the *dramatis personnae* of "In the City Hall" announce that the show will go on without the villain.

Of course it will. Jesters are jesters. But let us return to the stage. The Interborough villain was arraigned by the city for not saving enough. The New York Railways villain was arraigned for saving too much. Buses were put on Staten Island by the city to replace the trolleys that were withdrawn. Now the city wants to buy electric cars, seize the Midland Railway and run the road itself.

In Manhattan, however, more than a million dollars is appropriated by the city to purchase buses to replace street cars. In the midst of the play New York's Mayor, all worn out shoveling snow, went to Palm Beach, leaving the sun and the rain to do away with the snow that he hadn't removed. Nature's slow process has succeeded where human nature failed. And yet Barnum & Bailey have come to New York with their clowns. As if there were not enough high-paid circus talent in New York already!

Of Course Shoe Prices Are Higher

THE Allied Council of the Shoe and Leather Industry and Trades (a name to conjure with!) is reported to have decided upon a campaign of publicity. Its purpose is not primarily to increase the consumption of shoes, but to explain why shoes cost more than they did. And this is a perfectly straightforward proposition, because the shoe industry wants satisfied patrons. Of course the shoe men are not pleading for permission to charge a higher price, they do that anyway; but they want shoe users, which category takes in everybody, to wear their footgear contentedly, feeling that they have had a "good buy."

How similar is the case of the shoe men to that of the electric railway operators, and yet how different! Car rides cost more than they did, just like shoes. But the ride makers and vendors cannot put up their prices and then tell the public, "It's too bad, but it must be done." No, the public somehow has a different standard for utility service and shoe service. In fact, the shoe purchaser says almost with pride: "I paid $16 for those shoes; some price, eh?" And as for luxuries, the people are throwing money away like water. They seem to enjoy paying high prices. But who ever heard of a car patron hankering for a higher fare?

All of this is so obvious to the railway operator that it seems as if the dullest member of the body politic ought to see it. But he doesn't, or possibly he will not. Hence there is on each railway manager a burden, not only of giving the best service possible under his circumstances, but of convincing the public, often against its will, that if diamonds, shoes and toothpicks legitimately cost more, as they do, then it must be willing to pay a small part of the enormously increased contents of its pay envelope for being transported safely, reasonably, quickly and, in general, comfortably from place to place by means of the electric car.

The Water Bug and His Monomania

THE water bug is a creature who is obsessed with the monomania that if he could run electric railway securities through a clothes-wringer the electric railway's fare would shrink in the same ratio as the dehydrated securities. Without entering into any of the "reproduction cost new" or other valuation theories of the day, we venture to affirm that in most cases the amount of water squirted out from the wringer rolls would be much less than the water bug expected. In fact, we had a specific case called to our attention recently where the "rentals and interest" item proved amazingly small despite the fact that the property in question is not exactly as dry as the United States at large. "Rentals and interest" were actually less than 10 per cent of all expenditures. Hence if this railway had no overhead at all, the fare could not possibly be cut more than ½ cent if figured from a 5-cent basis. It would have astonished the water bug to find that "taxes," if abolished entirely, would have permitted practically the same reduction! But, of course, the water bug does not believe in the elimination of taxes, even if he does dream that people will lend money to a concern which cannot guarantee either the payment of interest or the return of principal.

The real reason for the insufficiency of the 5-cent fare lay exactly where the railway had asserted it did, namely, in the higher cost of labor, materials and fuel. Thus the increase alone of platform wages was in itself equal to entire fixed charges and taxes together. If electric railway managers would but stress points like this more often there would be less backbiting by the water bugs. It is proper enough to insist that fictitious values should be squeezed out, but the public ought to and can be made to understand that on most electric railways "rentals and interest" is not of primary or even of secondary importance in the allocation of the fare to the several channels of expenditure.

Steam Railroad Electrification Must Be Considered More Broadly

SO far the transportation interests of the country have merely dabbled in the subject of steam railroad electrification. Probably this is natural and logical, but the time is now here when the situation must be changed. In the past attention has been focussed more on the technical than the economic phases of the subject. This is certainly not to be deplored, as it is the normal and proper order first to develop a new system to a reasonable degree of perfection, then to fit it into its proper place in the industrial machine. It would have been foolish to spend a lot of money in equipping a railroad for electrical operation before the locomotives and power supply had emerged from the experimental stage. They have done so now, however, and attention may well be turned toward the next stage, that of application to the transportation needs of the country.

A glance at the pages of transportation papers here and abroad will show the change which is now going on in the minds of the leaders of thought in this field. There are at least two salient features here. One is the necessity for fuel conservation, a conspicuous factor in European electrification plans. The other is the urgency of complete rehabilitation of the steam roads, involving vast sums, running into the billions of dollars. Now if electrification is coming, and all thoughtful transportation men seem to feel that it is, it is vital to bring in a logical electrification program in connection with the coming great expenditures. We realize that the money for all of this work is not in sight and that 1920 budgets are being pruned to the limit. But the country's life depends upon good transportation. The H. C. L. will come down when the character of our transportation in all of its various phases goes up.

We must have good railroads, fine railroads, and what we must have we can have; maybe not in 1920, but progress will not stop with 1920. We may have to think in decades, rather than years, but whatever the unit of time in which we think, the unit of investment cost in railroads must be the billion.

Norfolk Invites the Public Utility Investor

This Virginia City Announces a "Service-at-a-Profit" Policy—State Corporation Commission Encourages This Attitude

A POLICY of actual encouragement and invitation to public utility investors is now the official corporate platform of Norfolk, Va. We believe this to be the first case in which a municipality by corporate action, in this instance unanimous, has *guaranteed* both capital and cumulative return at an inviting rate on that capital invested in public utilities within its limits. It is perhaps the most striking example of the changing attitude of the public toward public utility enterprises and may prove a leading case in the future treatment of public utilities by governmental agencies. In effect, the city recognizes not only the right but the necessity of a public utility earning a fair profit.

The present case has to do with the City Gas Company of Norfolk, one of the subsidiaries of the Virginia Railway & Power Company, but this is merely the first of a series, for there are rearrangements of railway and light and power relations to follow. A policy had to be determined at the start. The city, therefore, when advised by the company that an increase in gas rates would be requested through the State Corporation Commission, set out to determine its own attitude in the matter. Norfolk acts in public utility matters on the advice of its Public Utilities Commission, an advisory body of leading citizens, which reports to the council of five. The commission and council engaged A. Merritt Taylor, former Transit Commissioner of Philadelphia and manager of the Division of Transportation and Housing of the Emergency Fleet Corporation during the war.

Norfolk Public Utility Platform

"Capital legitimately invested in public utility properties must be safeguarded and protected by municipalities, both as to principal and as to a just and inviting return thereon after reimbursement to the company for expenses incurred in providing service."

A valuation and report were made by Mr. Taylor and his associate, Charles B. Cooke, Jr., some details of which were noted in the ELECTRIC RAILWAY JOURNAL of March 27. A principle announced in this report was unanimously adopted by the Public Utilities Commission and also by the City Council as a sort of city platform toward utilities. Personal interviews with the chairman of the commission, the city attorney and others indicate that the city means what it says. The authorities have gone into the matter with their eyes open and with a full appreciation that the public utility is a business responsive to the same fluctuations and limitations as other businesses.

As corollary to the platform the city states further its belief:

"Municipalities which ignore this cardinal principle are not entitled to the confidence of those who have capital to invest and will be shunned by them.

"Municipalities which adopt and adhere to this cardinal principle will be sought out as safe places to which capital will become readily available for the up-building of public utilities and other constructive enterprises."

The city and company met on this platform and agreed on a valuation and a rate. The understanding was not one-sided, for there was disagreement as to valuation, as well as criticism as to service and as to quality of gas, points on which the company recognized its duty and so made concessions in valuation and arrangements to restore 100 per cent service condition. The company felt assured that the city's attitude would make possible the obtaining of necessary funds for extending and improving the service. The city authorized its representatives and Mr. Taylor to urge its program before the State Corporation Commission at the hearing.

When the case came before the State commission on Monday of this week Virginia's attitude as a state was shown to have that same broad-gage business policy reflected by the city of Norfolk. There was no trial, or even a presentation of testimony in the usual sense. The commission, while reserving the right to check the figures in detail, took the business-like attitude that if the city authorities, the city's expert and the company agreed on a working basis, on a platform approved by the commission and on a rate for gas, the agreement was probably fair and the new rate would be approved. Commissioner William A. Rhea, chairman, repeated the commission's policy that "Unless public utilities get some relief, Virginia will either lose its utilities or get poor service. . . . The present instance presents a *prima facie* case and it appears the commission's duty to approve this agreement." There were a few objections from irate citizens who didn't want to pay $1.60 per thousand cubic feet for gas, but even they expressed a desire to deal fairly with the company and merely questioned the accuracy of figures.

The general impression, after a study of the situation on the ground, is that the city of Norfolk and the State of Virginia desire to encourage utility growth. They believe that public utilities are necessary and as businesses are amenable to the same laws as other businesses. They realize that successful public utilities encourage not only healthy growth in the utilities themselves but also the development of other enterprises in the community. They believe that the "service-at-a-fair-profit" policy they have adopted will assist in the material and social advancement of the whole state.

The Place of the Bus—II

Details Are Presented of the Relative Costs of Car and Bus Operation in Great Britain, Together With Some Notes on Bus Design, Weight and Capacity—Operating Speeds, Legal Regulations, Fuel and Roadway Taxes Are Also Considered

BY WALTER JACKSON
Consulting Engineer

LONDON'S NEW DOUBLE-DECK FORTY-SIX-SEATER, WHICH WEIGHS ONLY 170 LB. PER SEAT

ALTHOUGH British unit costs are different from our own, there is much that can be learned by studying comparisons of car and bus operations in Great Britain, particularly where the figures relate to the respective operations in the same community and under the same management. These figures will show that wherever the services are co-ordinated instead of competitive the number of passengers per vehicle-mile is usually much less on the bus than on the car, clearly indicating that the buses are being used for light-traffic routes. Furthermore, the earnings per bus-mile and the receipts per passenger are generally in excess of like classifications on the electric railway because the average ride on the bus is longer and the rate of fare on the bus is higher. The schedule speeds of the buses are almost always higher than those of the cars, not on account of superior flexibility or higher maximum speeds but because the buses average fewer stops per mile and have a much larger proportion of their runs in suburban territory or open country.

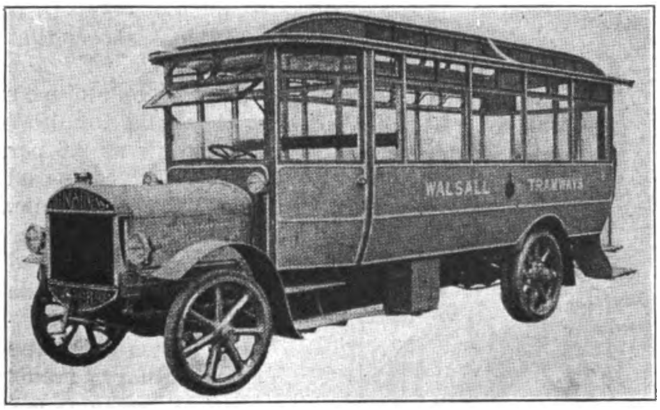
Facts like the foregoing can be readily deduced by a study of the accompanying Table I, which has been prepared from the private records of a number of British tramways conducting bus services. In this table there have been included the bus figures for both 1917 and 1918, whereas the car figures were available only for 1917. It will be understood, of course, that the operating expenses of the cars have also gone up during 1918, as will be seen from the following data, but not in the same proportion as for the buses. The reason that favors the car is its larger capacity, which makes the predominant increase, wages, less troublesome than with the smaller bus. On the other hand, the bus is not held down by statute to fixed maximum rates of fare and therefore has been more successful in getting more revenue per passenger carried. As the average length of ride is also greater on the buses, there is less tendency to lose traffic because of any increase in fares.

Table I shows that on System "E" the passengers per vehicle-mile for 1917 ran as low as 2.6 per bus-mile compared with 9.3 per car-mile, and as high as 6.6 per bus-mile compared with 11 per car-mile on System "H." System "C," enjoying the extraordinary traffic of 19.4 passengers per car-mile, did not do better than 3.3 passengers per bus-mile. These figures clearly indicate that the buses are confined to lines of what the British consider extremely light traffic, or to routes of seasonal or pleasure traffic. System "C" has been running buses for nearly fifteen years, System "E" for nearly seven years and System "H" for six years, so it may be assumed that these companies have had enough experience to determine the correct field of the motor bus.

TABLE I—COMPARATIVE EARNINGS, EARNINGS PER PASSENGER, EXPENSES, PASSENGERS PER VEHICLE MILE AND SPEEDS OF CARS AND BUSES RUN IN THE SAME DISTRICT UNDER THE SAME MANAGEMENT. BUS AND CAR FIGURES FOR 1917, ALSO BUS FIGURES FOR 1918

Community	A Cents	B Cents	C Cents	D Cents	E Cents	F Cents	G Cents	H Cents
Earnings per car-mile 1917.	31.4	31.0	36.9	32.8	22.11	28.5	27.9	31.3
Earnings per bus-mile 1917	47.0	46.9	38.3	43.0	34.6	36.7	36.4	34.8
Earnings per bus-mile 1918	60.6	50.8	45.4	52.9	43.6	43.7	45.8	41.2
Earnings per car-pass. 1917	2.54	1.92	1.10	2.46	2.38	2.38	2.54	2.38
Earn. per bus-pass. 1917....	10.04	11.04	11.24	13.82	12.24	8.48	10.34	5.28
Earn. per bus-pass. 1918....	11.58	12.18	11.72	16.16	13.04	9.20	12.34	5.60
Earnings per car-hour 1917	$1.88	$2.34	$2.67	$1.41	$1.36	$1.80	$1.80	$2.16
Earnings per bus-hour 1917	3.85	4.04	3.34	2.89	3.94	2.61	3.34	2.81
Earnings per bus-hour 1918	4.20	4.18	3.79	3.51	4.49	3.12	4.01	3.36
Expenses per car-mile 1917	20.2	24.0	20.9	17.8	13.2	17.4	17.1	14.9
Expenses per bus-mile 1917	26.2	27.1	31.4	27.5	24.5	25.6	29.4	28.9
Expenses per bus-mile 1918	34.1	32.3	31.3	37.1	28.7	32.1	39.1	33.6
Exp. per car-hour 1917	$1.21	$1.81	$1.51	$1.08	$0.82	$1.10	$1.11	$1.06
Expenses per bus-hour 1917	2.16	2.33	2.74	1.86	2.09	1.82	2.61	2.33
Expenses per bus-hour 1918	2.98	2.65	2.61	2.46	2.96	2.32	3.43	2.73
Miles per car-hour 1917....	6.0	7.5	7.2	6.1	6.2	6.3	6.5	7.1
Miles per bus-hour 1917...	8.2	8.6	8.7	6.7	8.5	7.1	8.9	6.6
Miles per bus-hour 1918...	8.1	8.2	8.3	6.6	10.3	7.2	8.8	7.3
Pass. per car-mile 1917....	12.3	16.0	19.4	9.4	9.3	11.8	10.8	11.0
Pass. per bus-mile 1917..	4.6	4.2	3.3	3.1	2.6	4.2	3.6	6.6
Pass. per bus-mile 1918.....	5.2	4.1	3.7	3.2	3.0	4.6	3.3	7.3

That the fares are higher and the average length of ride longer on the buses is shown by their universally higher intake per vehicle-mile and per passenger. In 1917 System "A" showed 47 cents per bus-mile against 31.4 cents per car-mile, although the cars had 12.3 passengers and the buses only 4.6 passengers per car-mile. Hence the earnings per passenger were more than 10 cents on the bus against only 2.54 cents on the car. Similar conditions prevail on the other systems. The schedule speeds of the motor-buses varied from 6.6 to 8.9 m.p.h. as compared with 7.1 to 7.5 m.p.h. on the larger cars in heavier service.



SINGLE-DECK BUS FOR WALSALL CORPORATION TRAMWAYS

Table I also shows that the operating expenses per vehicle-mile are invariably higher with the bus even without due allowance to the car for its larger capacity. Against 13.2 cents per car-mile on System "E" we have a bus cost of 24.5 cents (28.7 cents in 1918); against 17.8 cents per car-mile on System "D" we have 27.5 cents per bus-mile (31.1 cents in 1918), etc. It will be understood that in both cases only actual operating expenses are presented. Taxes, depreciation and overhead charges are not included. The operating expenses charged against the car include power, distribution, track, line and buildings.

COMPARATIVE COSTS ON MUNICIPAL TRAMWAYS

The Manchester Corporation Tramways has been running buses since 1914. The relative development of the bus service in this city of 950,000 is expressed by the following comparative data for the fiscal year ended March 31, 1919:[1]

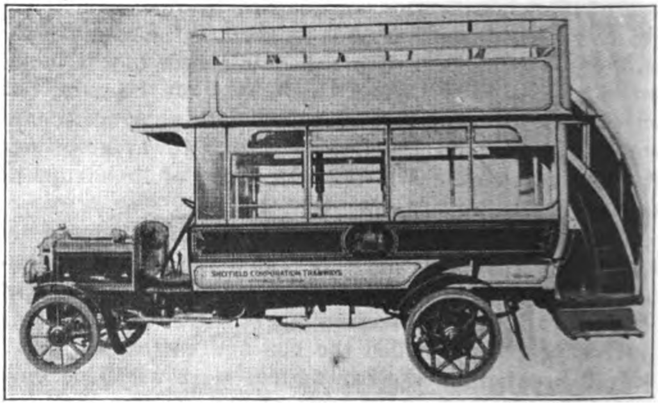
Passengers carried on cars	253,940,203
Passengers carried on buses	1,821,310
Car-miles run	18,146,551
Bus-miles run	218,292
Revenue per car-mile	36.2 cents
Revenue per bus-mile	29.8 cents
Operating expenses per car-mile	25.5 cents
Operating expenses per bus-mile	23.2 cents

The foregoing comparisons are not absolutely exact because the last annual report gives the over-all statistics with buses included, aside from the separate bus tabulation. However, the bus is so small a part of the whole that it is hardly necessary to make corrections for the same. The operating expenses per bus-mile are in this case less than for the cars, but the cost per bus-seat furnished is undoubtedly much higher, judging from the fact that Manchester operates double-deck, double-truck cars. As 218,292 bus-miles were required for 1,821,310 passengers, the passengers per bus-mile equal 8.3 while the revenue per passenger is 3.6 cents. The passengers per car-mile during the same period equal 13.9 while the revenue per passenger is 2.6 cents. The present Manchester bus routes are extensions from the Palatine Road tramway terminus to Northenden, Cheadle and West Point. The headways are thirty and sixty minutes. Table II is a detailed statement of the cost of Manchester motor-bus operation for the year ended March 31, 1919. It will be noted that, because of the present abnormal price of automobile fuel, the cost of petrol is even higher than wages.

TABLE II—OPERATING COSTS PER MILE OF MOTOR BUSES OF MANCHESTER CORPORATION TRAMWAYS

Traffic expenses:	
Superintendence and other traffic wages	0.2d.
Wages of drivers and guards	2.507
Bonuses and sick pay	0.040
Cleaning and oiling	0.719
Depot expenses	0.192
Ticket check	0.285
Uniforms (furnished free)	0.113
Licenses and sundries	0.065
General expenses:	
Salaries and wages—administration	0.138
Taxes on depots	0.088
Printing and stationery	0.023
Fuel, light and water	0.022
Compensation	0.055
Insurance	0.044
Repairs and maintenance:	
Tires	0.530
Chassis	1.500
Bodies	0.255
Buildings and machinery	0.060
Power—petrol	4.801
Total operating expense	11.637 d.
Depreciation	1.376 d.
War bonuses	1.674 d.
Balance	0.231 d.
Total income	14.918 d. or 7.5 cents

Without question, the paper on motor-bus costs versus car costs presented before the 1919 conference of the Municipal Tramways Association by A. R. Fearnley, general manager Sheffield Corporation Tramways, is the best presentation of the subject to date. It will be well, therefore, to repeat and supplement some of the figures presented by Mr. Fearnley and abstracted in the ELECTRIC RAILWAY JOURNAL for Dec. 13, 1919.



DOUBLE-DECK BUS FOR SHEFFIELD CORPORATION TRAMWAYS

The first point to be noted in Mr. Fearnley's paper is that the expenses of different classifications (traffic expenses, general expenses, repairs, road maintenance and fuel) have risen as follows:

Cost per bus-mile in 1915	14.070 cents
Cost per bus-mile in 1918	28.044 cents
Cost per bus-mile in 1919	35.792 censt

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[1] In this and all other tables in this article 2 cents have been taken as being the equivalent of 1 penny.

It will be interesting to compare these increases with those pertaining to Sheffield cars as presented in the annual report for the fiscal year ended March 25, 1919:

Cost per car-mile in 1915	13.136 cents
Cost per car-mile in 1918	20.344 cents
Cost per car-mile in 1919	24.776 cents

From this it appears that while the bus has risen 21.722 cents per mile since 1915, the car has risen but 11.64 cents per mile. The maximum carrying capacity of the Sheffield buses is thirty-seven each, and of the cars seventy-six, or more than twice as great.

Mr. Fearnley observes that on the basis of unit per unit, regardless of seating capacity, the comparison of operating and fixed charges works out as follows for his conditions:

	Car, Cents	Bus, Cents	Per Cent for the Bus
Operating expenses per mile	24.776	35.792 or	44.5 more
Fixed charges or overhead per mile	3.376	1.846 or	45.3 less
Total cost per mile	28.152	47.638 or	33.7 more

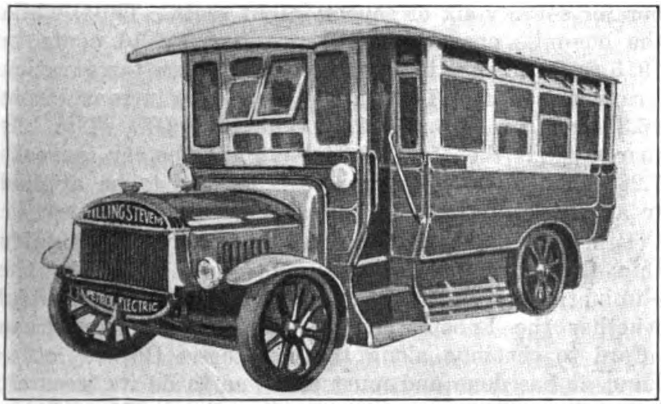
But this is only part of the story, because it is also necessary to credit the car with its greater passenger-carrying capacity. The comparison then stands:

	Car, Cents	Bus, Cents	Per Cent for the Bus
Operating expenses per passenger	1.432	4.274 or	198.0 more
Fixed charges or overhead per passenger	0.196	0.220 or	12.3 more
Total cost	1.628	4.494 or	176.0 more

Upon the basis of passengers actually carried, even the fixed charges were greater with the bus than with the car. Again, upon the basis of number of seats provided per vehicle-mile run, we have the following:

	Car, Cents	Bus, Cents	Per Cent for the Bus
Operating expenses	0.460	1.064 or	131.3 more
Overhead or fixed charges	0.062	0.054 or	12.9 less
Total cost	0.522	1.118 or	114.1 more

The receipts per bus-mile were 40.914 cents compared with 33.326 cents per car-mile, an excess of 23.5 per cent; while the receipts per seat-mile provided were 1.216 cents for the bus and 0.614 cents for the car, an excess of 98 per cent. Although the bus fares averaged 3 cents a mile against 1.304 cents a mile for the car, an excess of 130 per cent, the higher rate and slightly higher speed were not sufficient to offset the higher cost of giving bus service. With regard to speed, Mr. Fearnley noted that as about three-fourths of the bus operation was in open country, a superiority of 15.26 per cent for the bus (9.97 m.p.h. against 8.65 m.p.h.) was not important. Mr. Fearnley might have added that the speed of the buses would have been considerably less if they had been seventy-six seaters like the cars, and operated under like conditions of traffic.



GAS-ELECTRIC BUS WITH FRONT DOORWAY

While the Sheffield management is well aware of the higher cost of the bus on any comparable basis, it does not hesitate to recommend the installation of motor buses where thin-traffic extensions, cross-town routes, high-grade residential districts and seasonal pleasure routes are to be served. In fact, it also considers the possibility of paralleling a tramway route, or running toward the same terminus, for purposes of traffic relief.

GREAT EASTERN RAILWAY
17

SINGLE-DECK BUS WITH BAGGAGE RACK, USED FOR RAILROAD STATION CONNECTIONS

LONDON GENERAL OMNIBUS COMPANY NO LONGER A BONANZA

Without questioning the value of the motor bus for the various purposes outlined in these articles, it is necessary to emphasize the fact that the bus does not cure all the difficulties incident to transportation on rails and that it is not exempt from the necessity of earning more than it spends. For these reasons, it is well to look closely into the operations and history of the London General Omnibus Company, because conscienceless bus promoters in this country are pointing it out as the "embodiment of everything that's excellent" in the way of making money. A recent prospectus, for example, declares that: "The £100 shares of the company which stood at £18 in December, 1909, had risen steadily to £400 in June, 1913." How many investors are buying *electric railway* stock on the basis of the quotations of 1913? About as many as are buying London General Omnibus shares after the heavy losses of recent years!

There is no mystery whatever about the status of this company, for, following an application for fare increases, an audit of its books was made last year for the Home Office of the Government by Sir Arthur F. Whinney. Some of the following figures are derived from this report, published in July, 1919:

In 1913, gross earnings per mile were 8.57d. and expenses, 7.10d.
In 1914, gross earnings per mile were 9.14d. and expenses, 7.44d.
In 1915, gross earnings per mile were 10.78d. and expenses, 8.58d.
In 1916, gross earnings per mile were 10.99d. and expenses, 9.26d.
In 1917, gross earnings per mile were 12.72d. and expenses, 11.58d.
In 1918, gross earnings per mile were 15.32d. and expenses, 14.05d.
In 1919, gross earnings per mile were 16.68d. and expenses, 17.71d.*

* From abstract of London General Omnibus Company's Report for 1919 in *Electric Railway Journal* for March 20, 1920, page 620.

Table III on page 686 shows the principal operating expenses for 1913-1918. From these figures it is clear

TABLE III. OPERATING EXPENSES IN PENCE PER BUS-MILE, LONDON GENERAL OMNIBUS COMPANY, YEARS 1913 TO 1918, INCLUSIVE

	1913	1914	1915	1916	1917	1918
Traffic expenses, wages, etc	2.92	3.24	3.70	3.86	4.24	5.26
Maintenance, repairs and renewals	1.52	1.56	2.13	2.47	3.17	3.41
Petrol	1.00	1.16	1.31	1.46	2.60	3.80
Tires	....	....	....	....	....	....
Other expenses, including adminis-	1.02	1.10	0.59	0.52	0.51	0.50
tration and depreciation	0.64	0.68	0.85	0.95	1.06	1.08
Total	7.10	7.44	8.58	9.26	11.58	14.05

NOTE—Platform expense alone (drivers and conductors) was 2.6d. per bus-mile in 1916, 2.8d. in 1917, 3.7d. in 1918. These increases do not include increases and 8-hour day inaugurated during 1919.

Cost of petrol rose from 7.8d. per gal. in 1913 (when 7.8 miles were being obtained per gallon) to 27.5 d. in 1918. These prices include a net tax of 1.5d. per gallon up to 1915 and a tax of 3d. per gallon since 1915.

that all items have advanced except tires. The increases in gross earnings during the latter years of the war are due more to overcrowding than to increased fares. There was so great a shortage of equipment by the end of the war that it was necessary to impress 143 motor trucks into an emergency service that resulted in a loss of 10 cents per mile operated. An idea of the conditions caused by the war is indicated by the fact that in 1918 the operation of 67,197,422 bus-miles brought £4,289,114, whereas in 1914, 99,365,363 bus-miles were operated to earn £3,785,581. That increased fares had little to do with this appears from the following record:

DECREASES IN LENGTH OF AVERAGE PENNY RIDE (IN MILES)

	To Sept. 1917	To Aug. 1918	To April 1919	To June 1919	Since
Central area (including city) west and northwest area	1.60	1.53	1.38	1.25	1.25
Rest of London and suburbs	1.52	1.52	1.46	1.46	1.31

It will be observed that the figures also include changes made during 1919. Nevertheless, the London General Omnibus Company's report for the quarter ended March 31, 1919, showed an operating loss of £9,590, while the deficiency for all of 1919 (as met by the Common Fund payment herewith described) was £424,003.

Returning now to Table III, it will be seen that by the end of 1918 the operating expenses had doubled during the war period in rising from 7.1d. (14.2 cents) to 14.05d. (28.1 cents) for vehicles seating no more than thirty-four passengers. The differential of 1.27d. (2.54 cents) between receipts and expenses in 1918, the year of maximum crowding, has been wiped out by the coming of the eight-hour day, as shown by the figures for 1919.

In the meantime, the majority of the buses had been in use for more than the five years which the company fixes as their efficient life. For this reason, the company had accumulated a reserve fund of £1,904,868, which, however, was over £1,000,000 short of the £3,000,000 needed to replace outworn equipment, with 2,500 forty-six-seaters costing at least £1,200 each. In addition to this renewal fund, the company had on hand the sum of £511,153, derived from the sale of motor buses for war purposes, but this still left it several hundred thousands of pounds short for renewals. The effect of keeping equipment in use for an average of seven instead of five years appears in part from the fact that the maintenance charge per bus per annum rose from £222 in 1913 to £451 in 1918. In other words, the annual upkeep of buses averaging less than thirty-four seats was more than one-third the first cost of the new forty-six-seat bus!

Stripped of all detail, the actual status of the London General Omnibus Company is best revealed by its relationship to the Common Fund established under the London Electric Railway Companies' Facilities Act, 1915, whereby each company (the bus company and the underground lines) pays its own operating expenses, fixed charges and interest on debentures, dividends on preferred stocks and shares (except the second preferred stock in the Metropolitan District Railway) and retains such sums as it thinks necessary for depreciation and reserve. The balance of income is then paid over to the common fund, of which the London General Omnibus share was 40 per cent up to Dec. 31, 1915, and 32 per cent thereafter. The respective London General Omnibus payments follow:

	Paid In	Received
1915	£311,803	£180,546
1916	259,077	162,230
1917	*Nil*	190,396
1918	*Nil*	210,043
1919	*Nil*	424,003
Total	£570.880	£1.167.218

From this it is clear that the London General Omnibus Company is no longer the rich uncle of the famous London combine. It never would have been that welcome relative at any time in its career if buses had been taxed as heavily as trams. Thus, in the year 1915, when the London General Omnibus showed a profit of $1,500,000, it was figured by H. H. Gordon of the London County Council that proportional taxation would have wiped out this profit, for the buses were then paying only $200 each a year as a contribution toward public needs compared with $1,000 per annum by every car in the London area. One must conclude, therefore, that the motor bus, like the electric car, is not gifted with any miraculous powers over the laws of economics.

If anything, the bus has suffered far more from the effect of war increases. Gasoline has risen more than coal; shorter-lived rolling stock must be replaced regardless of cost, and wage increases naturally have been more hurtful to a vehicle employing two people for thirty-four-seats than one employing the same number for seventy-six or seventy-eight seats. Thus, while the bus-mile operating cost rose from 17.16 cents in 1915 to 28.1 cents in 1918, the West Ham Corporation Tramways in East London had a car-mile increase from 15.3 cents in 1915 to 22.56 cents in 1918. The bus increase was therefore 10.94 cents and the car increase 7.26 cents, and the greater increase had to be applied to a vehicle of one-half the capacity of the car.

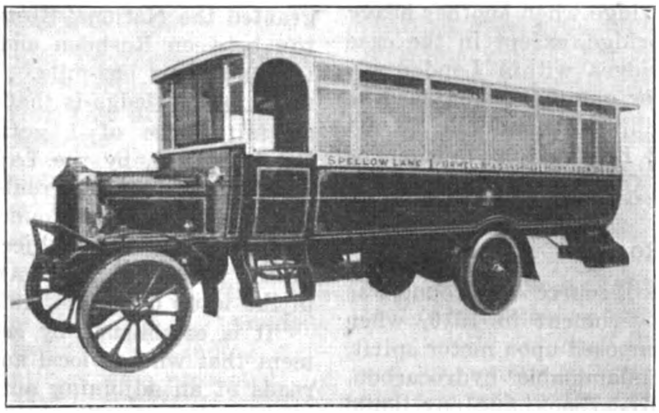
It is to be hoped that the present Government inquiry into the London traffic situation will result in the elimination of wasteful competition, for it is doubtful whether the London General Omnibus Company can afford to continue along the old lines. On the other hand, it has done and must continue to do its greatest and most necessary work in serving the trackless heart of London where the density of traffic and demand for short-haul riding should still permit profitable operation without a prohibitive increase in rates of fare.

LONDON'S STEAM BUSES ARE WITHDRAWN

In concluding the subject of whether motor buses pay invariably or not, attention is directed to the withdrawal of the National Steam Car Company's buses from London the end of October, 1919. In a statement made on Nov. 14, 1919, by W. J. Iden, managing director of this company, it was declared that the year ended Oct.

31, 1918, had shown a loss of £5,393 in the London area. Between December, 1918, and Sept. 30, 1919, the introduction of higher wages as well as the eight-hour day had added £40,000 a year to the payroll. A further increase of 4 shillings (nominally 96 cents) a week as of Oct. 1, 1919, added £6,250 per annum, with the result that in October there was a loss of 10 cents per mile.

A significant difference between British bus and American electric railway conditions was revealed in connection with this case when a deputation asked for an audience with Sir Eric Geddes, Minister of Transport, to request resumption of service. Sir Eric stated that it would serve no purpose to receive the deputation, for when a company withdrew its vehicles on the ground that traffic was not remunerative, the Ministry could not interfere.



SINGLE-DECK BUS WITH REAR AND FRONT DOORWAYS

Casual reference has already been made to the capacity of the motor buses used by several undertakings. The largest high-mileage bus to date is the new forty-six-seater of the London General Omnibus Company. This is of the double-deck type with cross-seats top and bottom except that longitudinal corner benches seating three each are used at the doorways of the lower deck. The over-all length of this vehicle from crank handle to rear clearance is 22 ft. 6½ in. and the wheelbase is 12 ft. 10⅝ in. The lower deck is 6 ft. 10 in. wide over all, which is sufficient to permit pairs of cross-seats 2 ft. 8 in. wide and an aisle of 15 in. The platform width is 3 ft. 10 in., an increase of 10 in. made to facilitate passenger interchange. The unladen weight is 7,840 lb., or 170 lb. per seated passenger—an achievement that seems well nigh incredible. This ultra-lightness was a necessity in view of official regulations. The new bus is no heavier than the thirty-four-seater which it is replacing. The approximate unit price of these vehicles was placed at £1,200 during the London traffic inquiry hearings held the middle of 1919. This figure is close to the American costs.

The advantage of using the higher-grade metals customary in motor-bus design would appear from the circumstance that both the New York and Pittsburgh double-deck cars weigh much more per seat, despite the fact that these cars represented a great reduction over preceding types. The New York double-deck stepless car weighed 46,000 lb., or 522 lb. per seat, and the Pittsburgh double-deck car was estimated to weigh 487 lb. per seat. (See ELECTRIC RAILWAY JOURNAL for Aug. 10, 1912.) The buses' advantages of using better materials must be admitted even if allowance is made for the fact that the cars are not open-top and that the low-step feature made extra-deep girders necessary.

TYPES OF BUSES—REGULATIONS

The maximum permissible speed of motor buses in London is placed at 12 m.p.h., but the London General Omnibus Company has requested permission to go to a maximum of 16 m.p.m. It is doubtful whether any notable increase in schedule speed would be obtained except on runs with a considerable portion of open running. One can hardly expect also that the improvements in ingress and egress will offset the increased standing time from the greater number of stops incident to changing from a thirty-four-seat to a forty-six-seat vehicle. Hence, anything better than the present schedule speed of 8.5 m.p.h. is hardly to be expected. A considerable saving in platform expense should ensue from increase in capacity, if there is no loss of speed.

The Sheffield Corporation Tramways is another user of double-deck buses. The maximum carrying capacity of the Sheffield bus is given as thirty-seven, compared with seventy-six for the Sheffield car. Manager Fearnley, at the 1919 Municipal Tramways Conference, declared that this size bus was too small for Sheffield peak loads. The rougher roads of the provinces also made it impracticable to use a bus of London lightness. As against 7,840 lb. in London, a bus of 10,080 lb. would be required to stand the harder wear and tear. As previously noted, the schedule speed of the Sheffield buses is 9.97 m.p.h., owing to their large proportion of light traffic conditions.

According to a paper on "Bus Development After the War," read by Eric Cauldwell before the British Institution of Automobile Engineers, the double-deck bus is favored chiefly in London because of the need for capacity. It was possible to build a single-deck vehicle of thirty-four-seat capacity. As a matter of fact, Mr. Cauldwell's idea is borne out in the recent installation by the Birkenhead Corporation Tramways of three single-deck thirty-three-seaters which apparently are intended for pleasure and long-ride traffic, judging by the provision of a compartment for smokers. It might be added that the standard Paris bus is of single-deck type with twenty-eight seats in two compartments.

Most of the buses are made for rear entrance and exit, the one-man near-side operation of small American buses being almost unknown. However, such operation is only a matter of time.

In addition to the standard single-track and open-top double-deck buses. British tramways also operate cross-bench sightseeing type cars, known locally by the French name of char-a-bancs. Such vehicles are used for cross-country service as well as for seasonal riding.

In the London Metropolitan area motor buses and their drivers are licensed by the Metropolitan Police. Elsewhere, the councils of boroughs and other urban districts exercise the same powers. Where rural district councils have not had such powers conferred on them by the Local Government Board, licenses to ply for hire need not be taken out. Generally speaking, there have been almost no legal restrictions to bus development, even for competitive purposes, in comparison with the awkward procedure relative to tramway extension. Under the Ministry of Transport Act passed in 1919, those who are refused licenses may appeal to the Minister of Transport, who has the "power to make such order thereon as he may think fit."

The Motor Car Act, as amended down to 1909, includes the following provisions:

If the unladen weight (exclusive of water and fuel) exceeds 3 British tons (6,720 lb.). the width must not exceed 7 ft. 6 in.; otherwise a width up to 7 ft. 2 in. is specified.

A bus weighing 6,720 lb. (unladen) is restricted to a speed of 12 m.p.h., and one weighing 11,200 lb. (unladen) to 8 m.p.h. If trailers are used, the maximum speed permissible is only 5 m.p.h. (The regulations of the London Police are noted on the preceding page.)

The weight of a loaded motor bus must not exceed 12 British tons (26,880 lb.) nor must the axle weight of any axle exceed the registered axle weight of that axle. A heavy motor car whose axle weight exceeds in the aggregate 6 British tons (13,440 lb.) may not be driven upon any highway bridge when another heavy car or locomotive is on the bridge, except in the case of the Menai Bridge and bridges within London.

The duty payable on a motor omnibus when used as a hackney carriage is 15 shillings (nominally $3.60) plus 42s. ($10.85) if under 2 British tons unladen or 63s. ($15.12) if over 2 tons. Obviously, this charge is not onerous.

PETROL TAXES AND ROADWAY CHARGES

The self-propelled vehicle as a source of revenue was discovered by the British government in 1910, when a tax of 6 cents a gallon was imposed upon motor spirit, which is defined as "any inflammable hydrocarbon, including any mixture of hydrocarbons, and any liquid containing hydrocarbon which is capable of being used for providing reasonably efficient motive power for a motor car." In 1915 the Government took another bite by doubling the tax to 12 cents per gallon. The actual tax for public utility operators using more than 500 gal. a year has always been one-half of these charges, so that the present rate to practically all motor-bus operators is 6 cents per gallon.

The original purpose of the Government was to apply the revenue from licenses and motor spirit taxes "for the improvement, construction and maintenance of roads in the United Kingdom, and to render financial assistance to the County Councils." To this end a Road Board was appointed under the Development and Roads Improvement Funds Act of 1909. Millions of dollars derived from the impositions named were spent upon the improvement of existing roads. By 1915, however, the war led to the suspension of such grants from the National Exchequer, since which time only the interest on the Road Board's investments have been available. The status of the matter is well expressed by the following remark of Sir Eric Geddes, Minister of Transport, before the Nov. 5, 1919, meeting of the Society of Motor Manufacturers and Traders.

"In the petrol tax," Sir Eric said, "the motor industry was contributing more than it got for the maintenance of the roads." So far as his influence could be used, he added, they would get back that tax for its original purpose of road maintenance. The Chancellor of the Exchequer has recently announced that the petrol tax is to be abolished in favor of some other form of impost less easy to evade. For example, users of coal gas, producer gas, paraffin and home-produced benzol pay no equivalent tax. Taxation on the basis of unladen weight, mileage or horse-power is now under consideration.

The motor spirit tax, however, is not the only highway tax which the motor bus will have to meet in the future. The national tax was to be devoted to help out local authorities up to 75 per cent of the net roadway cost. To be on the safe side, local authorities are showing a more and more distressing interest in making bus operators contribute directly to road upkeep at the rate of so and so much per bus-mile operated. The electric railway operator, weighed down by decades of excessive taxes for paving that he does not destroy, will smile a pitying smile when he reads a busman's hope that "any road charges on motor-bus operation should not exceed the true recoupment, and should in no circumstances extend to profit-making for the district."

The road maintenance payments vary considerably in Great Britain. The highest known is that of the Northampton County Council, which has recently granted the National Steam Car Company the right to run between Rushden and Bedford at the rate of 3d. (6 cents) per bus-mile. The next highest within the writer's knowledge is that of 4 cents per bus-mile, plus an initial fee of 1 guinea (say $5), demanded in October, 1919, by the Lancashire County Council. In sanctioning four bus routes, about the same time, the Oxfordshire County Council also demanded 4 cents per bus-mile. On this subject, the London correspondent of the ELECTRIC RAILWAY JOURNAL wrote as follows in the issue of Oct. 4, 1919:

"It is established by several private acts of Parliament that when a local authority works buses over the roads of an adjoining authority the operators pay ⅝d. (1.25 cents) per mile for road maintenance. Companies can, however, run buses without statutory powers, and some of the English County Councils, before giving consent, demand 2d. (4 cents) per mile run. These powers are of recent origin."

A payment of 2d. per mile would have cost the London General Omnibus Company on the basis of the 67,197,422 miles' run in the year 1918 the ruinous sum of $2,687,896.88, and would have been equivalent to more than 13 per cent of the gross earnings per bus-mile, 15.32d., in 1918.

The Sheffield Corporation Tramways are more fortunate. They pay the road authorities only ⅜d. (¾ cent) per bus-mile. As of March 31, 1919, they made a five-year contract at this rate with the West Riding and Derbyshire County Councils following five years' experience in operating over the roads of these authorities. Since Oct. 29, 1919, the Stockton Corporation Tramways pay 1¼d. (2½ cents) per bus-mile to the North Riding County Council for running over a bridge.

An example of advancing costs is that indicated by clauses of the Walsall Corporation Tramways bill for 1914 and 1919 respectively. In the 1914 act, £275 per-route-mile was to be set aside for reconstruction of roads and ⅜d. per bus-mile for maintenance; in 1919, the figures were £700 per route-mile for reconstruction and ¾d. per bus-mile for maintenance.

That "there's a reason" for continually higher charges for the purpose of road maintenance appears from some figures presented by Sir Eric Geddes in his talk on Nov. 5, 1919, before the Society of Motor Manufacturers and Traders. He stated that it cost £4,690 per mile to surface a 40-ft. water macadam road and £7,700 per mile to surface a tar macadam road. A high-grade asphalt road would cost £18,000 per mile, and a wood-paved road, £47,000 per mile. The Government could not build better roads without levying upon their users.

It will be evident from the foregoing that the motor bus in Great Britain is now attaining the same status from the standpoint of taxation as the tramway. Consequently, its future development promises to be even more closely than in the past in fields for which it is especially adapted and in which a higher rate of fare is permissible than is charged on city and suburban railways. Only a great decrease in the cost of fuel and in the upkeep and replacement costs of the motor bus could alter this situation.

In the following article a study will be presented of American conditions.

A. R. E. A. Convention Makes New Record

At Recent Meeting in Chicago Engineering Association Adopts New Bridge Specifications and Specifications Prohibiting Use of Twisted Bars in Concrete

THE twenty-first annual convention of the American Railway Engineering Association, held in Chicago from March 16 to 18 inclusive, surpassed the record of any previous convention both in attendance and in volume of important committee work passed upon. The attendance exceeded by more than 100 any previous convention and reports of twenty-two standing committees and two special committees were presented. A number of the reports of interest to the electric railway field were abstracted in the ELECTRIC RAILWAY JOURNAL March 27, page 652. Two reports of special importance, on stresses in railroad track and on electricity respectively, are abstracted at some length elsewhere in this issue and the remainder of the reports are abstracted briefly below.

A. R. E. A. REPORTS OF ELECTRIC RAILWAY INTEREST

Conservation of Natural Resources. In the presentation of this report the committee emphasized the necessity of salvaging all old materials removed from building, track and rolling stock and explained how this could be done. Reports of reclamation work on several railroads were given. A section of the report which was highly commended was that concerning the conservation of human life and energy. These parts of the report were received as information. Rules for the prevention of the spread of forest and field fires were given also and approved for publication in the Manual.

Economics of Railway Location. The report of this committee dealt with resistance of trains, effect of curvature on cost of maintenance of way and on maintenance of equipment, effect of train resistance on fuel consumption and effect of electric locomotives on economics of location. On the subject of curvature the committee quoted from tests made on the Canadian Pacific Railway, apparently establishing the fact that when the diameter of the outer wheels exceeds that of the inner wheels by an amount sufficient to compensate for the increased distance traveled by the outer wheels the wheels hug neither one rail nor the other, regardless of speed from 5 to 25 m.p.h.

In regard to the influence of the electric locomotive on the economics of location the committee presented two monographs on the subject. These explained the different characteristics of steam and electric locomotives and stated that net savings in fuel cost of 50, 60 and 67 per cent respectively might be expected in passenger, freight and switching service by the use of electric locomotives. Engine repairs were said to be reduced 50 per cent. The effect of rise and fall, curvature and rate of grade were explained and the results obtained on several electrified steam roads were recorded.

Iron and Steel Structures. The adoption of new steel bridge specifications presented by this committee was one of the important actions taken by the convention. A 16-ft. width for the clearance diagram was objected to by several speakers, but was adopted. This width is not required, however, in new bridges built on old masonry where extensive reconstruction would be made necessary. E-50 loading as an alternative for E-60 was suggested, but the latter was adopted. The specifications provide 90, 80 and 75 per cent of the live load, including impact, for two, three and four tracks, respectively. Clear tie spacing of 7 in. is specified, as are also rounded ends for through-plate girders. The latter are said to be important in the case of derailment of cars. Specific permission for the welding of minor defects in castings was eliminated from the specifications upon motion.

The committee's report also included a new column formula of the straight-line type, as a substitute for that of the parabolic type submitted last year. Principles for detailed design of flashing, drainage, reinforcement and protection for waterproofing purposes were given and the reasons for continuing the use of the Cooper system of live loading instead of some specific modern engine loading were dealt with.

Wooden Bridges and Trestles. This committee presented, in the nature of a progress report, specifications and classifications and grading rules for lumber and timber to be used in the construction and maintenance of way departments.

Records and Accounts. The report of the committee covered cost-keeping methods and statistical records, forms for analyzing expenditures, forms for maintenance of way and structures, for construction and for records.

Rules and Organization. Rules in considerable detail for the inspection of bridges, trestles and culverts were submitted by the committee and were adopted.

Signs, Fences and Crossings. The committee introduced a design for an approach warning sign and this was adopted. A report was made on grade elimination.

Signals and Interlocking. On the subject of ties treated with any solution which affects the length of track sections the committee recommended that as the electrical conductivity of zinc-treated ties decreases with age better results may be had by allowing the ties to season for from 2 to 6 months before using in a circuited track. Also that for best results the number of zinc-treated ties installed per year in any track circuit should not be greater than 15 per cent of the total number of ties in that circuit.

Masonry. The specifications for plain and reinforced concrete, prepared by this committee, were adopted, as also was the report on methods of depositing concrete under water. There was considerable discussion concerning the proposed specifications for billet-steel concrete reinforcement bars specifically prohibiting the use of twisted bars. It was stated that hot-twisted bars are dangerous and that cold-twisted bars give no advantage over plain or deformed bars. The specifications were adopted.

Wisconsin Utility Men Meet

Twelfth Annual Convention of Electrical Men Considers Safety Cars, Automatic Substations, Labor Welfare and Publicity at Well-Attended Two-Day Session

THE necessity and value of well-planned educational publicity and the possibilities for the improvement of labor conditions through a high-purpose development of living conditions and leisure-time occupations held the interest of a large attendance at the joint meeting of the Wisconsin Electrical Association and the Wisconsin Gas Association at the Pfister Hotel, Milwaukee, on March 24. The Gas Association had been in session on March 23, concluding its convention with the joint meeting of March 24, while the Electrical Association continued its twelfth annual convention, which began with the joint session, through March 25, President W. C. Lounsbury presiding on both days. The joint session on March 24 was concluded by a splendid banquet in the evening, at which Edward J. Dempsey, Oshkosh, Wis., was toastmaster and James H. McGillan, Green Bay, Wis.; M. H. Aylesworth and William Rainey Bennett were the speakers.

The labor welfare problem came before the joint meeting through a paper on the "Leisure-Time Factor," by William C. Knoelk, executive-secretary of the Community Service of Milwaukee. In the discussion which followed the paper several delegates spoke of the irresponsibility of unions and of the fact that it was not the eight-hour day nor entirely a question of wages that seemed to be the fundamental causes behind the present labor unrest. The representation of labor in the management of a corporation and the close contact which this afforded between management and employees were commented upon as being highly desirable. M. 'C. Ewing, Wausau, said that it had been his experience that trainmen do not desire an actual eight-hour day, and he cited as proof of this the fact that they continually choose the longer runs, since these pay the most money.

Concluding the discussion on his paper, Mr. Knoelk endeavored to emphasize that he was not interested in the actual eight-hour day nor the length of the working day, primarily, but rather the value of preparing and planning for the leisure time. He said that we should not become impatient if welfare work conducted along the right lines did not seem to produce immediate results; that it would take considerable time to overcome the feeling which many workmen have, regardless of what the facts may be, that they have been mistreated in the past. He explained what this feeling now is by quoting a labor leader of a striking union as saying: "Thirty years' experience has taught us how to handle the situation when we have the other side where we want it." It will take time to overcome this feeling, but a proper provision for occupation during leisure time will prove to be very effective.

ORGANIZED PUBLICITY PLAN RECOMMENDED

B. J. Mullaney, chairman Illinois committee on public utility information, addressed the joint session of the associations on the work which has been done by his committee in Illinois toward educating the public to a real understanding of the public utilities, and recommended that a similar committee be established in Wisconsin. Mr. Mullaney presented the need for publicity work generally from a new angle when he pointed out that it often happens that when a public utility commission has completed its study of a situation and is about to make an order it is confronted with an aroused public sentiment which places the commission in a very unfavorable position. He said that we are only fooling ourselves when we condemn a commission for not having the backbone to make a determined decision in the face of public criticism; that the whole question gets back to the fact that the public holds in its hands the lives of the commissioners, who in turn hold the lives of the companies. Hence we must have publicity which will educate the public to an understanding of the utility business so that commissions will not be restricted in their free and deliberate functioning. Much of the opposition of the public comes from suspicion and ignorance, so that it devolves upon the companies to dispel this ignorance of public utility affairs.

Mr. Mullaney then explained the manner in which the Illinois committee had gone about this important work of educating the public and brought out the policies which have guided the committee from the first. He told of the splendid success which had been realized in securing the publication of utility matters in the public press and gave proof of the change in public attitude resulting therefrom.

The speaker was anxious to inspire the formation of a similar organization and work in Wisconsin and urged the association to give the matter serious consideration. He quoted Charles L. Henry, Indianapolis, Ind., as saying that if the formation of the Indiana committee on public information accomplished nothing else than the co-operation between the various utilities of the State, which had already been realized in a splendid measure, the organization would be worth while.

Mr. Mullaney and the Insull interests are working toward the formation of such a committee in every state, believing that the work can be more effectively handled through state units than through the national associations of the several utility industries. He explained that later on it may be possible for such state units to come together in convention or to co-operate in some other manner to give the work a national scope. The aim of such a magnificent educational work is to make the utility business just as safe from attack as the churches and schools, the speaker explained.

Asked about the cost of carrying on this publicity work, Mr. Mullaney explained that the cost to the Illinois committee was $15,000 for the first year. He said that this was abnormally high on account of the very wide distribution, free, of nearly all of the literature got out. He said that the Indiana committee estimated that an assessment of one-fiftieth of one per cent of the gross revenue of the utility companies of the State would carry on the work for a year.

At the conclusion of Mr. Mullaney's talk the association passed a resolution giving him a vote of thanks and recommending that the new executive committee take up the consideration of his suggestions, looking toward some definite plan.

PRESIDENT LOUNSBURY'S ADDRESS

Upon the adjournment of the two associations the twelfth annual convention of the Electrical Association was called to order by President Lounsbury, who then read his address. In this he called attention to the fact that the Wisconsin Electrical Association now has a history to which the members can point with pride, for it has won the respect and confidence of the State governing boards and has lent a forceful influence in the betterment of service rendered the people of the State. He pointed out that one of the fundamental objects of this association was to encourage a friendly relation between companies and the public. He said this could be obtained by creating a public faith in the properties represented by the delegates, provided first that these delegates have an abounding faith in them themselves. He lamented that utility operators were inclined sometimes to make apologies for the product of their business and the rate charged for it, whereas in reality these utilities are rendering service to the communities at a cost much less than the actual value to the community. To emphasize his point, he quoted Henry L. Doherty as saying:

"In the wave of antagonism against corporations throughout the country we are the ones most likely to be reached and harmed, and we can go to greater ends in correcting this antagonism of the public toward corporations than any one else. . . . There is nothing that creates faith in the company like having the man who works for it say the company is all right and honest and straight."

Mr. Lounsbury went on to say, in regard to employees, that the policies of the utilities must be so formulated as to secure "fairness to labor, fairness to stored labor, which is capital, and fairness to the public. We must not expect our employees to stand the brunt of our trouble; they must be well paid or in the long run the industry will not carry on."

Speaking of the future work of the association, Mr. Lounsbury expressed the belief that this would be better handled by creating several active standing committees of three members each, which would report annually after study carried on through the year. In this connection, he recommended the appointment of a membership committee, a committee on taxation, a committee on accounting, a committee on legislation, a street railway committee, a commercial and sales committee, a committee on rural service extension and a committee on interconnections of power plants. These recommendations were later adopted by vote of the association.

M. A. Aylesworth, executive manager of the National Electric Light Association, addressed the association on the "Relations of the Central Stations to the Public."

DISCUSSIONS ON SAFETY CAR PAPER

E. M. Walker, Terre Haute, Ind., who had been invited to come to Milwaukee as the guest of the association for the purpose of presenting a paper on "Possibilities of City Street-Car Operation," was heard at the morning session on March 25. Mr. Walker's paper appears in abstract elsewhere in this issue. It was very well received, the delegates seeming to be very much interested in the possibilities of economies and increased revenue which were modestly shown to be available through the use of safety cars.

B. W. Arnold, in discussing Mr. Walker's paper, said that he was operating 100 per cent with safety cars in Oshkosh. He called attention to the mistake that had been made in placing the standard safety car, which was developed in the South for a warm climate, in Northern cities, where the temperature in winter is much lower. He had found it necessary to have his safety cars built with double flooring and with inside sheathing and head lining in order that passengers might be comfortable in winter. He said that the people of Oshkosh were all boosters for the safety cars.

F. L. Markham, American Car Company, explained that it was not the practice of the manufacturers to build a car for Wisconsin cities the same as they would for Southern cities, saying that some mistakes of this character had been made in the early installations of safety cars. Cars for Northern cities are now not only being built warmer but equipped with twelve instead of eight electric heaters, with one additional on the platform for the operator. He pointed out that many improvements have been made in the last five years in the design and equipment of the safety cars and that the manufacturers stand ready to make further changes.

Questioned as to the manner of flagging safety cars and the earnings per car-mile, Mr. Walker replied that the earnings in Terre Haute averaged a little better than 21½ cents per car-mile. He said that there were seven grade crossings in Terre Haute, five of which were trunk-line crossings, and that a ground flagman was employed at each crossing. The interurban cars also get the benefit of these crossing flagmen. He said that the cost of flagging all crossings in this manner was about 1½ per cent of the gross operating expense, which he considered a very small item when looking upon it as an insurance measure. Mr. Arnold made a rapid calculation and commented that if it were necessary to employ a flagman at every crossing in Oshkosh for the sake of using one-man cars he could put two men on each car and then save three men. He said that his operators are required to bring their cars to a stop at a safe distance from a crossing, leave the cars and flag themselves, then return and run the cars across. This procedure is now required by the Wisconsin laws. The object in making a man leave his car, he explained, is that it made sure that the car will be stopped prior to crossing.

J. P. Pulliam, after hearing Mr. Walker's paper, said that there was no question but that the street railway industry had been asleep for many years. He said there were any number of cities in Wisconsin in which the headway of the cars was the same now that it was twenty years ago. He thought that the safety car offered a way to give the service the people wanted and ought to have, and he thought railway operators should keep their ears and eyes open for new developments and be prepared to make the most of them. He said that the safety car might not be the last word in urban transportation, but that it was certainly a great improvement in the art and should be taken advantage of.

J. N. Canby, consulting engineer, Madison, in discussing a paper by Paul Stark, which was entitled "Investment or Cost of Reproduction Less Depreciation" and advocated the investment method of valuation and criticised the deduction of depreciation from capital value, said that the courts and commissions had determined that the method of fixing rates on the depreciated value of a property was obsolete, so that it would seem Mr. Stark's paper was based on a misleading assumption. The Wisconsin Railroad Commission has defined depreciation as an operating expense of that amount which must be regularly set aside to keep a property in proper operating condition. Mr. Canby said that he was inclined to believe that the investment value of a property should be used for rate-making purposes in abnormal times, since the value on the basis of cost of reproduction new in such times would result in rates which were too high.

At the meeting on Thursday afternoon C. A. Butcher presented a paper illustrated with lantern slides on "The Development of Automatic Substation Equipment." This paper had to do mainly with the installation of automatic equipment in railway work, but the author also discussed briefly the possibilities of its application to industrial substations. His paper appeared in abstract in the issue of the ELECTRIC RAILWAY JOURNAL for March 27. This was followed by 2,000 ft. of moving pictures illustrating methods of creosoting, presented by a representative of the Barrett Company.

The following officers were elected to direct the affairs of the association during the coming year: President, W. C. Lounsbury, general manager Superior Water, Light & Power Company; first vice-president, L. N. Boisen, vice-president Ashland Light & Street Railway Company; second vice-president, Harold Geisse, vice-president Wisconsin Power & Light Company, Janesville; third vice-president, P. D. Kline, second vice-president and general manager Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis.; secretary-treasurer, J. P. Pulliam, vice-president Wisconsin Securities Company, Milwaukee.

Possibilities of City Street Car Operation*

A Tribute to the One-Man, Light-Weight Car by a Manager Whose Property Will Soon Be on a 100 Per Cent Safety-Car Basis

BY E. M. WALKER
General Manager Terre Haute (Ind.) Traction & Light Company

THE effect of enlisting the popular interest in the street railways during the past few years has been at least to show that they are a necessity, and as such that they must and will be made self-supporting. Bearing this in mind, it must be contended that the industry has possibilities.

The street railway developed with the idea of selling rapid transit to people living in and near cities. As the communities grew the railway company found that it had to furnish rapid transit to an increasing number of people, hence the tendency was to increase the size of cars. With increased size, of course, came increased weight, with the other things that go along with it, namely, heavier track construction, more power and much more investment of capital. All went well for a time, though it became evident that with large cars it was increasingly expensive to move empty seats. Hence there was not much incentive to provide more frequent service, so that the needs of the people had to be met rather by the regularity than by the frequency of the schedule.

With the appearance, in numbers, of the private automobile, and then by easy and rapid stages the low-priced automobile and the jitney bus, the public began to experience the pleasure of frequency as well as regularity of service. Instead of waiting on the corner ten minutes for a car Mr. Citizen began to want to go up town "right now," and his wants either found expression in complaints as to the inadequate service of the street car company or in patronage of the jitney bus. It was manifestly impossible to improve the frequency of the service with large, heavy-weight cars at the old rate of fare, especially after war-time costs of operation had become a fact, and therefore it quite suddenly became a question of one of two things—higher fares or smaller, lighter cars, if more frequent service were to be given.

In speaking of the possibilities of street car operation I shall draw attention principally to the safety car, because its possibilities have been demonstrated so effectively in so many places and because it has furnished the means of providing quick, frequent and satisfactory street car service at a reduced cost of operation. The safety car first began to be talked of and written about in 1917, and since that time no less than 3,000 safety cars have either been delivered or are being built for early delivery for more than 125 American cities located in practically every state in the Union.

In April, 1909, it was my privilege to present a paper at the annual convention of the Iowa Street Railway Association, at Cedar Rapids, in the course of which paper the following statement appeared: "In many cases the size of cars has been reduced, as it has been found that smaller cars, operating at more frequent intervals, have made possible a vastly improved service and at the same time a reduced car-mile cost of operation." At that time there was probably but one automobile owned in the State of Iowa for every hundred now owned, so that there was no competitive force to bring out the thought. The conditions were that we were operating in a small town in eastern Iowa closed cars in the winter time weighing 14 tons each and in the summer time small six-bench open cars weighing only about half as much. One could not help being forcibly impressed with the great reduction in power required to operate in the summer time. And then, too, about 50 per cent of our annual earnings came during the period of the four or five months of the light-weight car operation.

The impression of the light-weight car was lasting. So abiding was that impression of eleven years ago that our property in Indiana now operates practically 100 per cent safety cars. It owns sixty-six standard safety cars, of which ten are still to be delivered. When they are delivered the installation will be complete. The result is, in 1919 more people rode on the cars than ever before, even with but 50 per cent safety car operation. Car-miles increased more than 30 per cent and power used on city lines increased only 4 per cent. The first quarter of 1920, with more than 90 per cent safety car operation, shows an increase in car-miles over 1919 of slightly lower than 30 per cent and an increased number of passengers riding on the cars of somewhat more than 30 per cent.

Aside from the mere statistical aspects of safety car operation, there are other phases that illustrate its bearing on the subject. An analogy to the safety car is presented in the skyscraper. Let us suppose that our problem is to design and plan the elevator service for an office building of twenty stories. Having a given space at our disposal in which to build the elevators, we should not hesitate long on the question as to which would provide the more satisfactory service, a small number of large capacity cars or double the number of cars of half the capacity. At once we would decide on the larger number. And so it is with the safety car. Its function is to make possible two car-miles where there was only one before. If it will perform that function it will please the people and attract passengers. Car-miles are what we have to sell, and we must be prepared to furnish all the car-miles that the people will buy.

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*Abstract of a paper presented before the Wisconsin Electrical Association, Milwaukee, March 24, 1920.

Occasionally comment appears in the newspapers in cities where the adoption of the safety car is suggested implying that the car is suitable only for small towns. Nothing could be farther from the truth. Making possible, as it does, a much more frequent service, it is readily adaptable to almost any condition of city street-car service. In fact, it would seem almost capable of mathematical demonstration that safety cars running on one-minute headway, seating thirty-two passengers per unit, would give a much more satisfactory service than cars weighing more than twice as much as a safety car, seating fifty people each and operating on a two-minute headway. One might easily have his doubts resolved by getting the verdict of the riding public on this point.

Some antagonism to the safety cars is often prompted by sympathy for the man who will be out of a job on account of one-man operation. It works out in practice, however, that by having cars that one man can operate more safely, more quickly and more efficiently than two men can operate the old-style car we have in fact more men to operate more cars.

There is another phase of one-man operation. As the operator is in sole charge of the car and on his own resources he accepts more responsibility and becomes more nearly a business man. As such, he can and does render more satisfactory service both to public and company. This statement has been confirmed by conversation with many of the 150 men operating safety cars in our city, and as an added confirmation, such a thing as a complaint of discourtesy or inattention on the part of a safety car operator is practically unknown. This sort of complaint used to be a very frequent source of annoyance.

ACCIDENTS ARE REDUCED FOUR TO ONE

The safety of the car, as evidenced by the great reduction in accidents following its use, is another of the possibilities. Step accidents, which usually arise from boarding or alighting while the car is in motion, are unknown with the safety car. Personal injuries are very rare, and such as do occur are not in any sense peculiar to the type of car. Careful records extending over a period of sixteen months of safety car operation, during which this type of car has made in actual service more than 2,000,000 car-miles, have shown an accident cost which is only about one-fourth of the cost of accidents occurring with the non-safety type car operating about two-thirds of that mileage in the same period of time, expressed in terms of cost per 1,000 car-miles.

One other criticism of the safety car has to do with the life of the car. It is said that the car is so light that it cannot last very long. Analyzing this, we find that 75 per cent of the car, with proper maintenance and renewal of wearing parts, ought to last at least twenty-five years. By this is meant the truck, motors, brakes, safety devices, wiring, etc. This, then, would leave but a small portion of the car, from the standpoint of value, to be renewed during the life of the other 75 per cent. Cars of this type that have made more than 50,000 miles and have carried more than 250,000 people are coming out of the shops, overhauled and repainted, looking like new.

Down our way the people like the safety car. They frankly say that the service was never so good and that they would not willingly go back to the old system. At first a good deal of fun was made of the car on account of its size and its radical difference in appearance from the "orthodox" type of city car. But the people soon began to warm up to it, and when one now sees anything about the car in the papers, as he may occasionally, there is almost a suggestion of affection in its designation, which has become a standard with one of our papers, as "the little green car."

Wages of Employees Increased 151 Per Cent

According to the last annual report of the Philadelphia Rapid Transit Company the average wage per employee has been increased from $622.16 per annum in 1910 to $1,581 in 1919, or 151 per cent. Greater efficiency is also evident in the 120 per cent more traffic units produced per trainman. The rides per capita have also increased in the same period 47.5 per cent. This means 288 rides per capita in 1910 as against 425 in 1919. The total wages paid to all employees in 1919 were $16,415,008 as against $7,282,995 in 1910, equivalent to an increase of 125 per cent in the payroll.

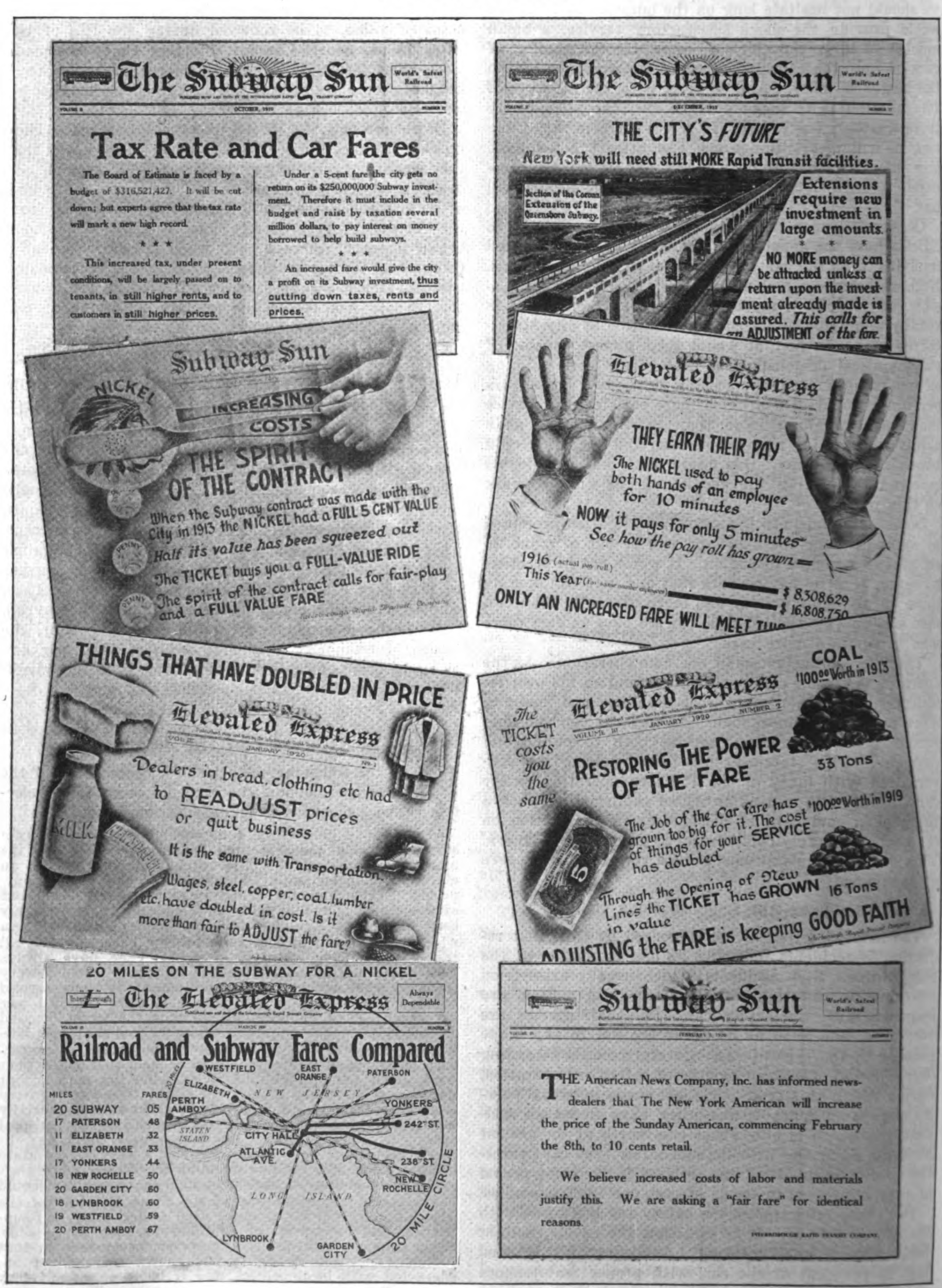
With the maximum rate of 58 cents per hour, the wages of trainmen, it is said, average $5.51 per day as against $5 per day in Cleveland and $5.10 in Detroit, where the maximum rate is 60 cents per hour.

The Dilemma of the Tramways

From the following editorial in a recent issue of the *Electrician*, London, the financial crisis in the electric railway business is an international one:

> If we are to judge from a memorandum drawn up by a sub-committee of the Municipal Tramways Association, the municipal tramways of this country (England) are in an alarming financial state. We cannot say that we are surprised. Many municipal tramway schemes were "born out of due time" and, like many such children, have not only been weakly but have had time and money spent on them which have been denied to more healthy progeny. But all the care has done them little good. They have always been ailing and now their state is critical. "Almost every tramway system," says the memorandum, "is being carried on at a loss, which, in many cases, is more than 1d. per car-mile." Then, in addition, there is the usual demand for increased wages from the employees and the usual hostility of the public to an increase in the fares. A conference of tramway authorities is to be held in London next week (first week in March) to examine the patient, but the general secretary thinks that if the tramway industry is to be continued either the fares must be substantially increased or tramways must depend upon compulsory local rates. In other words, if the townspeople won't pay directly they must pay indirectly. Not a very happy state of affairs! But of the two we think the former more preferable, as it is essential in our opinion that the rider should pay at least the actual cost of the ride. The aim of the association should be to make each undertaking self-supporting and to get rid of subsidies as soon as possible. Some tramway systems have, however, never been in that fortunate position, owing to well-known reasons not unconnected with local politics, and it looks now as if they never will be.

The Interborough Rapid Transit Company Keeps Its Patrons Well Informed on Traction Matters



The Subway Sun

World's Safest Railroad

Tax Rate and Car Fares

The Board of Estimate is faced by a budget of $316,521,427. It will be cut down; but experts agree that the tax rate will mark a new high record.

* * *

This increased tax, under present conditions, will be largely passed on to tenants, in still higher rents, and to customers in still higher prices.

Under a 5-cent fare the city gets no return on its $250,000,000 Subway investment. Therefore it must include in the budget and raise by taxation several million dollars, to pay interest on money borrowed to help build subways.

* * *

An increased fare would give the city a profit on its Subway investment, thus cutting down taxes, rents and prices.

The Subway Sun

World's Safest Railroad

THE CITY'S *FUTURE*

New York will need still MORE Rapid Transit facilities.

Section of the Corona Extension of the Queensboro Subway.

Extensions require new investment in large amounts.

* * *

NO MORE money can be attracted unless a return upon the investment already made is assured. *This calls for* an ADJUSTMENT *of the fare.*

Subway Sun

NICKEL

INCREASING COSTS

THE SPIRIT OF THE CONTRACT

When the Subway contract was made with the City in 1913 the NICKEL had a FULL 5 CENT VALUE

Half its value has been squeezed out

The TICKET buys you a FULL-VALUE RIDE

The spirit of the contract calls for fair-play and a FULL VALUE FARE

PENNY

PENNY

Elevated Express

THEY EARN THEIR PAY

The NICKEL used to pay both hands of an employee for 10 minutes

NOW it pays for only 5 minutes

See how the pay roll has grown =

1916 (actual pay roll) $ 8,308,629

This Year (for same number employees) $ 16,808,750

ONLY AN INCREASED FARE WILL MEET THIS

THINGS THAT HAVE DOUBLED IN PRICE

Elevated Express

JANUARY 1920 No. 1

Dealers in bread, clothing etc had to READJUST prices or quit business

It is the same with Transportation.

Wages, steel, copper, coal, lumber etc. have doubled in cost. Is it more than fair to ADJUST the fare?

MILK

Elevated Express

VOLUME III JANUARY 1920 NUMBER 2

The TICKET costs you the same

RESTORING THE POWER OF THE FARE

COAL

$100.00 Worth in 1913 33 Tons

$100.00 Worth in 1919 16 Tons

The Job of the Car fare has grown too big for it. The cost of things for your SERVICE has doubled

Through the Opening of New Lines the TICKET has GROWN in value

ADJUSTING the FARE is keeping GOOD FAITH

---

20 MILES ON THE SUBWAY FOR A NICKEL

The Elevated Express

"L" Interborough

Always Dependable

Railroad and Subway Fares Compared

MILES		FARES
20	SUBWAY	.05
17	PATERSON	.48
11	ELIZABETH	.32
11	EAST ORANGE	.33
17	YONKERS	.44
18	NEW ROCHELLE	.50
20	GARDEN CITY	.60
18	LYNBROOK	.60
19	WESTFIELD	.59
20	PERTH AMBOY	.67

Subway Sun

World's Safest Railroad

THE American News Company, Inc. has informed newsdealers that The New York American will increase the price of the Sunday American, commencing February the 8th, to 10 cents retail.

We believe increased costs of labor and materials justify this. We are asking a "fair fare" for identical reasons.

INTERBOROUGH RAPID TRANSIT COMPANY

The A. R. E. A. and Electrification

Committee on Electricity Gives Results of Study of C., M. & St. P. Electrification and Reports on Topics Having General Bearing on Application of Electricity to Heavy Traction

AT THE meeting of the American Railway Engineering Association held in Chicago, March 16 to 18 inclusive, the committee on electricity, of which Edwin B. Katté is chairman, reported on the following assignments: (1) Critical examination of subject matter in Manual. (2) Continuation of collection of statistical data relative to clearances of third rail and overhead working conductors. (3) Continuation of revision of joint specifications for transmission line crossings. (4) Report on study of electrolysis and its effect upon reinforced concrete, etc. (5) Report on study of maintenance organization and its relation to track structures. (6) Report upon utilization of water power for electric railway operation. (7) Report on recommended practice for mitigating interference with telephone and telegraph lines. (8) Co-operation with Bureau of Standards in preparation of safety codes. (9) Submit specifications for insulated wires and cables.

In the following abstract attention will be concentrated upon those topics of most immediate interest in the electric railway field. Reference has already been made to the subject of overhead crossings, the specifications for which have now been adopted by all of the associations concerned. This matter was considered in detail at the convention of the A. E. R. E. A. at Atlantic City last fall.

CO-OPERATION WITH AMERICAN COMMITTEE ON ELECTROLYSIS

The sub-committee on electrolysis and insulation, comprising Martin Schreiber, chairman; D. J. Brumley, R. D. Coombs, E. B. Katté and F. E. Wynne, reported on the activities of the American committee on electrolysis and on a study of the effect of electrolysis on reinforced concrete.

On the first of these topics it was said that the American committee had now formed a research sub-committee, which will actively engage in technical investigations, both in the laboratory and in the field, collaborating with the United States Bureau of Standards. On this research sub-committee the A. R. E. A. is represented by Mr. Katté and the A. E. R. E. A. by R. F. Stevens and P. W. Ripple.[1]

The sub-committee will take up the study of the autotransformer system, will join with the Bureau of Standards in the survey of conditions at Des Moines, Iowa, and will investigate pipe drainage with particular reference to drainage at joints. At a meeting of the subcommittee held on Sept. 22 a committee was appointed to investigate pipe-joint corrosion and soil corrosion, the investigation to be made in cities where large current is carried by piping systems and in cities where mains are to be uncovered during maintenance work.

A meeting of the sub-committee of the American committee on technical features of construction in operation was held on Sept. 26 to plan for a portion of the report of the main committee having to do with this topic. The work has been divided up into these sections. (1) Railways. (2) Affected structures. (3) Measures applicable to railroads. (4) Measures applicable to affected structures. (5) Joint responsibility of interests and necessity for co-operation. The first section is in charge of Prof. A. S. Richey and the last in that of Professor Richey, H. S. Warren and S. S. Wyer.

As to the effect of electrolysis on reinforced concrete the committee referred to its 1918 report, in which the conclusion was stated that the disintegration of concrete may be laid at the door of electrolytic action to a certain extent, but that it is possible so to design and install concrete work as to reduce this disintegration to an almost negligible amount. This year the committee suggested consideration of the subject along the following lines: (1) The use of copper-plated reinforcing bars. (2) The introduction of reinforcing bars made of a copper alloy. (3) The surrounding of the reinforcing bars with a rough enamel. (4) The installation of a waterproofing structure around ordinary structures in salt water, this waterproofing to consist of a plastic layer of material with petroleum asphalt as a basis, or some established waterproofing material free from electrolytes. The plastic casing should be finally protected with another layer of concrete or masonry material.

THE ST. PAUL ELECTRIFICATION AND ITS LESSONS

An important report on the subject of water power for the generation of electricity for the operation of trains was made by a sub-committee consisting of George W. Kittredge, chairman; W. L. Morse, vice-chairman; A. H. Armstrong, D. J. Brumley, R. H. Ford, M. Schreiber and F. E. Wynne. It was taken up with the results of a study of the electrified section of the C., M. & St. P. Ry. between Harlowton and Deer Lodge. Electric power for this is obtained from the Montana Power Company, and several of the more important water-power developments of this company were inspected by the committee. Some high spots of the report follow:

The Montana Power Company was organized in 1912 for the purpose of consolidating and unifying the business of power systems then owned by the Butte Electric & Power Company, the Missouri River Electric & Power Company and their respective subsidiaries. Subsequently the Montana Power Company acquired the Great Falls Power Company and the Thompson Falls Power Company, and by virtue of the original consolidation proceedings the Montana Power Company became vested with title to all of the properties, rights and franchises of the system owned by the Butte Electric & Power Company, the Missouri River Electric & Power Company and their subsidiary and associated companies. The Great Falls Power Company and the Thompson Falls Power Company have been continued as separate corporate entities. This has given the Montana Power Company the ownership of all the undeveloped power sites on the Missouri River in the vicinity of Great Falls, which were owned for more than twenty years by the Great Falls Power & Townsite Company, organized and owned by the late James J. Hill and his associates.

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[1] An article on the organization of the research sub-committee and on the plan and scope of its work will appear in an early issue of the ELECTRIC RAILWAY JOURNAL.—EDS.

The Montana Power Company has developed and now owns twelve hydro-electric plants and four steam plants. It develops 290,000 hp. and has about 1,900 miles of high-tension lines with seventy-five substations. From five of the more important hydro-electric plants, high-tension power lines, approximately 250 miles in length, radiate to and connect with five substations of the C., M. & St. P. Ry. These five plants are: The Madison plant on the Madison River, 12,000 kw.; the Holter plant on the Missouri River, capacity 40,000 kw.; the Rainbow Falls plant on the Missouri River, capacity 35,000 kw.; the Great Falls or Volta plant on the Missouri River, capacity 60,000 kw., and the Thompson Falls plant, located at Clark's Fork, capacity 30,000 kw.

The Montana Power Company has much greater capacity than is required for the railroad, and the additional power is used for other commercial purposes.

COMMITTEE INDORSES JUDICIOUS ELECTRIFICATION

The committee reported that the C., M. & St. P. installation has demonstrated that the transmission of railway electric power over long distances is efficient, economical and reliable at 110,000 volts. The multiple feed points at which the power company's separate lines connect to the railway lines are desirable because: (a) they secure for the railway the advantages of duplicate transmission lines with the actual construction of a single line, and (b) they permit the use of the railway lines for transferring power between the power company's lines.

Furthermore, cedar pole construction with treated-butt H-frames for the power company and single poles for the railway company, under Montana conditions, is reliable and more economical than steel towers both in first cost and annual cost. No. 00 or equivalent diameter is the minimum size of cable for avoiding corona losses at 110,000 volts in this climate at these altitudes. Satisfactory lightning protection is obtained by the use of lightning arresters at the power houses and substations with a ground wire along the transmission line. The minimum spacing of the conductors is 9 ft. apart for 110,000 volts and has proved adequate. Adjusting the tension in the conductors so that at 0 deg. F. with 1½ in. sleet coating and wind pressure of 3½ lb. per square foot the stress will be slightly below the elastic limit produces a satisfactory construction in this territory. Transposition of telephone wires every half mile and of the railroad's dispatching telephone wires every 900 ft., without transposition of paralleling power wires, gives adequate correction of interference. It is practicable to employ short cuts for the railway transmission lines by leaving the right-of-way where track curvature is great. Sectionalization of the power company's lines by switching stations fifteen miles apart provides for rapid location and correction of line failures. The sectionalization secured on the railway company's transmission line by looping it through substations, spaced approximately 32 miles apart, is sufficient. Treatment of pole butts for 8 ft. by boiling in creosote, which is allowed to cool before the poles are removed, has been found advantageous and gives about fifteen years of life.

The overhead construction in the electrified territory (438 miles) is maintained by a force of three crews located at different points on the line and provided with work trains. There are ten men in each crew as follows: One foreman, three linemen, one groundman, one engineman, one fireman, one conductor and two brakemen. Two men are assigned to the testing of rail bonds. The regular maintenance and renewal of bonds is taken care of by the track section gang.

In general the construction of the distribution line does not differ materially from that of other direct current electric traction and trolley lines aside from certain special features, as follows: (a) The catenary construction, with two trolley wires hanging side by side and supported by messengers. (b) The higher direct-current voltage. (c) The joint use of ground wire and supplemental return circuit.

The committee goes into the details of the locomotive and signal systems, largely by way of description. On the latter subject the report says that the type of trolley pole construction used prohibited the use of upper or lower right-hand quadrant semaphore signals, as either of these types would have been obstructed from view by the poles. It was necessary, therefore, to install either upper or lower left-hand quadrant signals or light signals. The latter were installed.

Comparing the initial cost of the alternating-current signals, as installed here, the cost of these was said to exceed an equivalent signal installation of direct current by approximately 35 per cent when the overhead structure is available for support of the necessary signal conductors. In general the operation cost will be considerably less in an a.c. signal installation due to the lower power cost. Climatic and other conditions being favorable, the simplicity in the apparatus of an a.c. signal system, particularly with the light type of signal, permits assigning much longer sections to a given maintenance force than is possible with d.c. systems.

As to interference between the propulsion current and communication circuits the committee reported that there has been no marked interference in the talking system. The engineers of the American Telephone & Telegraph Company had made some study on the ground and found slight interferences from so-called tooth ripples of some 1,300 cycles. Experiments have indicated that the installation of resonant shunts in the substations will remove the trouble.

As for the accident phase of the St. Paul installation, it was stated that one employee had been killed through disobedience of orders. No passengers had been killed, but some trespassers had met with accidents due to attempting to ride on top of the locomotives.

No particular changes were necessary on account of the introduction of electrification in the arrangement of buildings or tracks, but the fact that two electric locomotives could handle a 2,800-ton train necessitated the lengthening of all the passing tracks to 1,000 ft. each.

KEEPING DOWN THE LOAD PEAKS AUTOMATICALLY

Under the terms of its contract with the Montana Power Company the railway considered it necessary to install a power indicating and limiting system in order automatically to prevent excessive peak demands for power and as a guide for the train dispatcher. This system is in operation over the 220 miles of the Rocky

TABLE I—COMPARISON STEAM AND ELECTRIC OPERATION — FREIGHT

	OCTOBER		NOVEMBER		DECEMBER		TOTAL	
	Steam	Electric	Steam	Electric	Steam	Electric	Steam	Electric
1,000 ton-miles	98,512	125,522	93,228	130,848	91,122	107,717	282,862	364,087
Train-miles	60,666	65,400	58,014	63,299	58,257	57,311	176,937	186,010
Ton-miles per train-mile	1,625	1,920	1,605	2,070	1,563	1,880	1,600	1,960
Total time, hours	6,094	5,022	5,946	5,084	5,785	4,429	17,825	14,535
Number of trains	535	585	523	583	526	543	1,584	1,711
Hours per train	11.29	8.59	11.26	8.72	10.99	8.16	11.25	8.50
Minutes per 1,000 ton-miles	3.70	2.40	3.83	2.23	3.81	2.47	3.78	2.39

Mountain division, where there are five feeding-in points with the Montana Power Company.

This system was designed and installed to accomplish the following results: (1) Indicate the total power. (2) Record the total power on a curve-drawing meter. (3) Automatically take care of certain power returned to the power company's line due to the regenerative braking features on the locomotives. (4) Protect each substation against excessive overload. (5) Limit the total power demand on the power company to an adjustable predetermined amount. (6) Reduce the direct-current voltage of the substation when the load exceeds the peak limit decided upon, affecting first the substation with the greatest load, then those with less load. (7) Provide manual means by which the total resistance of the pilot-wire circuit can be easily and instantly adjusted at the dispatcher's office to compensate for the variations in resistance due to temperature changes. (8) Accomplish the purposes outlined above with power supplied to the railway's 100,000-volt transmission lines at five feeding-in points distributed along the 220-mile division.[2]

The committee reported as to certain modifications which had been made in the load-limiting system, which as yet was in operation only on the Rocky Mountain division. The system was put in operation in July, 1918, with a kilowatt setting of approximately 12,000. On April 1, 1919, this was increased to 14,000 kw. Without the limiting feature of the power indicating and limiting system the demand would probably run to not less than 20,000 kw.

A chart showing the power required for trains of different tonnages at all points in the district is posted in the train dispatcher's office to enable him to become familiar with the loads, so that he can handle them promptly and provide the proper intervals between trains, so as to avoid bringing the power-limiting features into play. The higher the power-limiting feature is set the easier it is to dispatch trains, but the power costs are correspondingly increased. With a little study of train operation and a little practice the dispatchers are able to adjust the train movements to the needs of the service.

Under the subject of comparative operating results the committee quoted from a paper by R. Beeuwkes, electrical engineer of the railway, read before the New York Railroad Club, March, 1917.[3]

Table I was reproduced in order to show the early effect of electric operation in the movement of freight. It was stated further that the same tonnage all over the Rocky Mountain division has required 22½ per cent fewer trains, 24½ per cent less average time per train has been consumed, and operating conditions have been improved, so that nearly 30 per cent more tonnage can be handled by electric operation in about 80 per cent of the time formerly required to handle the lesser tonnage by steam. This means a valuable increase in the single-track capacity of the line.

As for comparative operating expenses, attention is called to the effect of the war at this point and the very considerable correction necessary to bring steam expense prior to Jan. 1, 1917, to a proper basis of comparison with electric operation expense. Table II was, however, compiled from the annual operating statements to serve as a guide.

The committee reported that in the opinion of the roadmasters and superintendents on the electrified zone there is no more slipping of the locomotive wheels on the rail and consequently no more damage to the top of the rail under electric operation than there is with steam locomotives. There is no greater tendency for the rails to creep under regenerative braking, nor have the electric locomotives moving at a high speed tended to displace the rail on the ties or the ties in the ballast. Roadmasters agree that the electric locomotive is easier on the track than the steam locomotive because of the less rigid construction. The flange wear on curves is less, also. From figures given some years ago by Mr. Beeuwkes, it was estimated that one kilowatt-hour measured at the low-tension side of the transformer in the substations is equivalent to 7 lb. of coal on the tender of a steam locomotive.

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[2] Details of this system will be given in an early issue of the ELECTRIC RAILWAY JOURNAL.—EDS.

[3] See issue of ELECTRIC RAILWAY JOURNAL for March 24, 1917, p. 540.

TABLE II—ELECTRICAL OPERATING COSTS
From Annual Reports to Stockholders

	1917 **12 Months**	1918 **12 Months**	Averages per Year **1917 and 1918**
Maintenance of way and structures:			
Power substation buildings	$ 468.64	$ 622.38	$39.00 per substation
Power transmission systems	1,000.68	4,265.44	$7.10 per mile transportation line
Power distribution systems	81,944.74	73,277.70	$134.00 per mile track
Power lines poles and fixtures	14,572.92	20,810.72	$40.20 per route-mile (440)
Maintenance of equipment:			
Power substation apparatus	$10,034.37	$25,914.23	$1,284 per substation
Other locomotive repairs	220,525.76	236,906.35	0.1023 per locomotive-mile
Other locomotive depreciation	77,134.23	85,208.51	0.0363 per locomotive-mile
Transportation:			
*Yard switching power produced	$ 233.83	....	....
*Train power produced	49,402.15	$94,580.46	$5,151.00 per substation
Yard switching power purchased	8,321.86	12,230.88	....
Train power purchased	544,224.25	683,997.96	....
Yard motormen	$16,007.63	$23,084.87	....
Train motormen	262,177.75	346,260.32	....

*Sum of these two items represents mainly substation attendance.

The committee concluded this section of its report by the following statements regarding the utilization of water power for electric operation of other railroads: (1) Transmission of electric power at 100,000 volts, with 3,000 volts on the contact wire, is practicable and reliable for electric railroad service for 100 miles or more of single track. (2) Such a system of electric operation will increase the capacity of a railroad from 25 to 35 per cent. (3) Such a system of electrification will probably prove economical as compared with steam operation, when the cost of reliable electric power and coal bear the relation to one another shown above the diagonal line in Table III, provided that the railroad traffic is favorable for electric operation. (4) The introduction of electric locomotives equipped with electric brakes has made possible the haulage of heavier trains at higher speeds on heavier grades, such as mountain divisions, and with greater safety and reliability under all climatic conditions.

Price of Coal 2000 lb	Price of Power Cents per Kwh														
	525	700	.875	1.050	1225	1400	1575	1750	1925	2100	2275	2450	2625	2800	2975
8.50	176	235	294	353	412	.471	529	.588	.647	706	765	.824	882	.941	
8.00	188	250	313	375	438	.500	.563	625	688	750	813	.875	938		1.063
7.50	200	267	333	400	467	.533	.600	.667	733	800	867	.933		1067	1.133
7.00	214	286	.357	.429	500	571	643	714	786	857	929		1.071	1.143	1.214
6.50	231	.308	385	462	538	.615	692	769	846	.923		1.077	1.154	1.231	1.308
6.00	250	.333	.417	500	.583	667	.750	833	917		1.083	1.167	1.250	1.333	1.417
5.50	273	364	455	546	636	727	.818	909		1.092	1.182	1.273	1.364	1.455	1.545
5.00	.300	.400	.500	600	700	.800	.900		1.100	1.200	1.300	1.400	1.500	1.600	1.700
4.50	333	.444	.556	667	778	889		1.111	1.222	1.333	1.444	1.556	1.667	1.778	1.689
4.00	375	.500	.625	750	.875		1.125	1.250	1.375	1.500	1.625	1.750	1.875	2.000	2.125
3.50	429	.571	.714	.857		1.143	1.286	1.429	1.571	1.713	1.857	2.000	2.143	2.286	2.429
3.00	.500	.667	833		1.167	1.333	1.500	1.667	1.867	2.000	2.67	2.333	2.500	2.667	2.833
2.50	.600	800		1.200	1.400	1.600	1.800	2.000	2.200	2.400	2.600	2.800	3.000	3.200	3.400
2.00	750		1.250	1.500	1.750	2.000	2.250	2.500	2.750	3.000	3.250	3.500	3.750	4.000	4.250
1.50		1.333	1.667	2.000	2.333	2.667	3.000	3.333	3.667	4.000	4.333	4.667	5.000	5.333	5.667

Note Diagonal Line Indicates for what Prices of Coal and Electric Power the Expense is Identical

TABLE III—RATIO OF POWER EXPENSE TO FUEL EXPENSE FOR VARIOUS PRICES OF COAL AND ELECTRICAL ENERGY, BASED ON 1 KW.-HR. OF SUBSTATION INPUT BEING EQUIVALENT TO 7 LB. COAL ON TENDER OF STEAM LOCOMOTIVE

SOME OTHER TOPICS DISCUSSED

Brief reports, in addition to the above, were made on the subjects of electrical interference and national safety codes.

On the first of these topics a committee, comprising A. H. Armstrong, chairman; H. K. Lowry, vice-chairman; R. H. Ford, J. B. Savage, M. Schreiber and F. E. Wynne, said that it had no record of existing interference of a serious nature with communication circuits by direct propulsion current carried through a third rail and track return. The interference caused by alternating current traversing an overhead trolley conductor with track return may be serious without the introduction of devices or measures which will minimize its magnitude. This may be caused partly by the static charge induced on neighboring conductors by reason of the high voltage usually employed, but is chiefly due to the magnetic effect of the current flowing in the trolley-track circuit. The most severe of these disturbances are set up at times of abnormal conditions, such as extreme overloads or short circuits.

Corrective measures and devices for alternating-current interference include: (1) Neutralizing transformers in telegraph circuits. (2) Combination of coils and condensers commonly known as "resonant shunts" in telegraph circuits. (3) Balance and insulation of telephone circuits. (4) Frequent transformer substations feeding trolleys and feeders in multiple. (5) Avoidance of stub-end feed. (6) Sectionalization of propulsion circuits. (7) Auto-transformer distribution system as installed on the New Haven Railroad. (8) Track booster transformers. (9) Current-limiting reactors. (10) Increase in the separation of telephone and telegraph wires from the propulsion circuits of the railway.

The committee quoted from an A. I. E. E. paper by H. S. Warren, of the A. T. & T. Co., to the effect that means are now known whereby alternating railway current can be kept sufficiently within control, except under abnormal conditions, to prevent substantial interference with neighboring communication lines, although there still remains the problem of obtaining a sufficient reduction of interference without incurring a cost which the railway companies consider excessive.

Interference by direct-current propulsion circuits may be occasioned by ripples caused by tooth harmonics, and a further source of disturbance may be the short circuits inevitable in electric railway practice. Tooth harmonics may be minimized and practically eliminated by proper machine design in new installations and by the introduction of resonant shunts in the substations of existing installations where tooth harmonics have caused appreciable effect on neighboring telephone circuits. The effect of short circuits may be greatly reduced by the introduction of high-speed circuit breakers.

Tests made on the C., M. & St. P. Ry. for the French Electrification Commission early in 1919 showed that there was no interference with the regular operation of the Helena-Spokane double multiplex printing telegraph circuits. The measures employed to minimize telephone and telegraph interference by direct propulsion current include: (1) The use of resonant shunts. (2) Design of generators to give negligible tooth harmonics. (3) Use of high-speed circuit breakers. (4) Reduction in the track-circuit voltage drop. (5) Balancing and insulation of telephone circuits. When such of the above means as are necessary are carefully applied no serious interference is noted.

Regarding the rules in the National Electrical Safety Code, it was suggested that in the matter of construction of galleries or rooms containing oil-filled transformers, etc., the rules should be worded to permit the construction of dams to confine the oil within small areas when no convenient means for drainage are available. Some detailed suggestions were also made regarding grounding rules and labeling of generators and motors.

A report was also made as to the getting together of the various interests with the United States Bureau of Standards in the American Engineering standards committee for the purpose of formulating consistent industrial safety codes.

A. I. E. E. Section Discusses Automatic Railway Substations

"Automatic Railway Substations" was the topic of the evening at the Feb. 27 meeting of the San Francisco Section American Institute of Electrical Engineers. The principal paper was presented by W. T. L'Hommedieu, Westinghouse Electric & Manufacturing Company. Discussion was presented by P. J. Ost, electrical engineer for the city of San Francisco, Walter Evans, electrical engineer of the Sacramento Northern Railway, and A. V. Thompson and O. E. Shreve of the General Electric Company.

The Safety Car Next Door to the North Pole

Experience at Levis, Que., During the Winter Just Closed Has Demonstrated That Climatic and Topographical Handicaps Do Not Put Light-Weight Cars Out of the Race

By H. E. WEYMAN
Manager Levis County Railway, Levis, Que., Canada

ARRIVAL OF THE FIRST BIRNEY SAFETY CARS IN CANADA

SOME operators have believed that the lightweight safety car cannot be operated satisfactorily under extremely severe winter conditions. Actual demonstration, however, with a dozen Birney cars at Levis this past winter has demonstrated that this idea is false. The first instalment of our cars arrived early in September, 1919, and the remainder about the end of November. All of them have since been in service.

To enable the reader to understand the severe operating conditions in this locality it will be necessary to give some of its topographical and meteorological features.

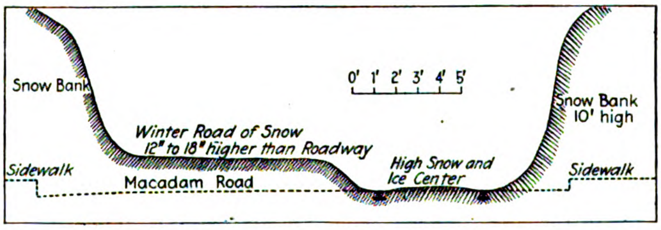
Levis and the adjoining municipalities which are served by this railway are situated on the south shore of the St. Lawrence River, Levis being opposite Quebec city and connected with it by a ferry line. This ferry is the only approach to Quebec from the south shore, for while the famous Quebec Bridge is in service only two or three trains pass over it each day and no provision is made for vehicles and pedestrians. Furthermore, the bridge is eight miles above Quebec, too far to be of service if facilities had been provided.

The severity of winter is much greater in Levis than in Quebec, which is protected by the heights to the north. On the other hand, Levis could not be more fully exposed, particularly because the valley between the Laurentian Mountains and the Island of Orleans forms a huge gully through which northeast and east winds sweep, hitting the land point at Levis. On a fine winter day, with a 30-mile west wind blowing, one finds Quebec city quite comfortable, while over at Levis a cloud of snow is driving down the streets, forming drifts from 3 to 10 ft. high. On a stormy day conditions in Quebec are bad enough, but across the river it is impossible even to face the storm and the houses are invisible from the center of the street. A double-broom sweeper may be passed over the track at one moment and five minutes thereafter the track may be buried under 5 ft. of snow.

The streets in this locality are very narrow, averaging 24 ft. between sidewalks, with some streets as narrow as 12 ft. Thus car tracks must be on one side of the street, and as no sidewalks are cleaned of snow a bank is formed on the sidewalk next to the track 5 to 10 ft. or more in height. This bank is responsible for much of the difficulty experienced in the operation of the railway.

IN WINTER AT LEAST THE RAILWAY MEN IN LEVIS EARN THEIR PAY

Levis is situated near the center of the "snow district" of Canada. Snow arrives to stay about Nov. 20, without fail, and remains until April. From November until March the sun is not powerful enough to melt the snow, so that whatever snow falls remains until March and disappears finally only at the end of April. In January and February, the months of heaviest snow, the average is 34 in. each, with a total snowfall for the winter of 140 in. This sometimes goes as high as 160 in.



CROSS-SECTION OF STREET SHOWING WINTER ROAD CONDITIONS IN LEVIS, QUE.

Extreme cold is also experienced from November to March, but, provided the temperature is not much below zero and no heavy wind drifts the snow, the cold is of advantage in operation, as it keeps the streets and tracks free of water and ice. The temperature from November until March averages below zero, and as a rule the changes in temperature are very sudden. The following table shows a meteorological record for a typical storm:

A TYPICAL STORM AT LEVIS, QUE.

		Wind, Direction	Wind Velocity, m.p.h.	Temperature, Deg.
7.00 a.m.	Dull	N.E.	15	Zero
10.00 a.m.	Dull	N.E.	25	5
12.00 m.	Snow	N.E.	30	10
2.00 p.m.	Snow	N.E.	40	12
4.00 p.m.	Snow	N. E.	40	15
11.00 p.m.	Snow	N.E.	40	15
7.00 a.m.	Snow	N.E.	40	15
11.50 a.m.	Snow	N.E.	20	15
12.30 p.m.	Sun	N.W.	30	Zero
1.00 p.m.	Sun	N.W.	40	—5
2.00 p.m.	Sun	N.W.	40	—10
3.00 p.m.	Sun	N.W.	40	—10
6.00 p.m.	Sun	N.W.	20	—12
9.00 p.m.	Sun	N.W.	20	—15
11.00 p.m.	Sun	N.W.	20	—20
4.00 a.m.	Sun	N.W.	5	—25

Occasionally the temperature will rise to 25 deg. during a storm and two hours after the wind will change, the snow will stop and the temperature will drop to 15 deg. below zero. The table below is a record of what we have been through this winter:

WEATHER REPORT FOR WINTER OF 1919-1920

Date	Description	Wind, Direction	Wind Velocity, m.p.h.	Thermometer, Deg.
Dec. 14	Snow	E.	20	20
Dec. 15	Snow	E.	30	— 6
Dec. 16	Fine	N.W.	40	—21
Dec. 17	Fine and drifting	N.W.	20	—30
Dec. 18	Fine and drifting	N.W.	40	—32
Dec. 19	Fine and cold	N.W.	10	—15
Dec. 20	Snow	E.	2	— 2
Dec. 21	Fine and cold	N.	15	—15
Dec. 22	Snow	N.E.	1	10
Dec. 23	Mild	S.W.	1	28
Dec. 24	Snow	S.E.	10	25
Dec. 25	Fine	W.	10	— 6
Dec. 26	Snow	N.E.	20	—10
Dec. 27	Fine and mild	S.W.	10	25
Dec. 28	Snow	N.E.	20	— 3
Dec. 29	Fine and cold, drifting	N.	25	— 8
Dec. 30	Fine and cold, drifting	N.	28	— 6
Dec. 31	Dull and cold	N.E.	5	— 0
Jan. 1	Blizzard	N.E.	40	— 6
Jan. 2	Cold and drifting	N.	40	—15
Jan. 3	Cold and drifting	N.	35	—15
Jan. 4	Fine	N.W.	5	—10
Jan. 5	Fine and cold	N.W.	15	—18
Jan. 6	Snow	E.	5	10
Jan. 7	Snow	E.	2	20
Jan. 8	Snow	E.	5	25
Jan. 9	Fine	N.W.	15	0
Jan. 10	Fine	N.W.	10	0
Jan. 11	Snow	N.E.	2	18
Jan. 12	Fine	N.W.	10	— 6
Jan. 13	Fine and cold	N.	12	—10
Jan. 14	Snow	N.E.	6	—15
Jan. 15	Fine and cold	N.W.	15	—15
Jan. 16	Snow	N.E.	10	—12
Jan. 17	Blizzard	N.E.	35	— 2
Jan. 18	Cold and drifting	N.W.	45	—15
Jan. 19	Cold and drifting	N.	30	—30
Jan. 20	Fine and cold	N.	10	—25
Jan. 21	Heavy snow	E.	20	—15
Jan. 22	Fine and cold	N.W.	15	—10
Jan. 23	Snow	N.E.	10	— 5
Jan. 24	Cold and drifting	N.	40	—15
Jan. 25	Cold and drifting	N.	35	—15
Jan. 26	Cold and drifting	N.	10	—25
Jan. 27	Snow	N.E.	15	— 1
Jan. 28	Fine	N.W.	10	— 3
Jan. 29	Cold	N.W.	5	—10
Jan. 30	Snow and drifting	N.E.	30	—20
Jan. 31	Cold and drifting	N.	35	—35

It will be readily understood that the operation of a railway under conditions prevailing here requires the use of meteorological instruments and good judgment as to weather probabilities. If the snow sweepers go out a half hour late the cars will be stalled, and this in turn means more or less burnt-out equipment. On the occurrence of a blizzard failure to order the cars into the carhouses at the right time has the same result and seriously complicates the opening up of the railway after the blizzard is over. If passenger cars and sweepers try to fight their way back to the carhouses they leave bad rail for the plows to operate upon and much valuable time is lost and derailments are caused.

The snow at Levis is of a fine nature due to the cold, being similar to a good grade of table salt. Under wind pressure it will sift through even the smallest cracks. If equipment is left out the motors are filled with snow, and the drifting and sifting of snow of this kind at 10 deg. below zero produces one of the worst conditions of the rail under which cars must operate. Such are the conditions with which the safety cars have had to contend on this property.

An accompanying cross-section of a street in winter is given to enable the reader to visualize the operating conditions. There are no sidewalks in winter, because cleaning them would mean a very heavy expense to the taxpayer. The track is therefore used as a walkway, particularly after a storm. The railway has to cut the roads for the vehicles with plows and sweepers and the city of Levis and the other municipalities pay three-quarters of the cost of snow removal. Owing to the location of the tracks on one side of the street special snow-fighting machinery is used, including rotary plows. Nose plows are useless.

The snow-fighting work is done by men especially trained to handle the equipment and they must be on their machines as soon as the snow begins to fall. Sweepers are first sent out, but if there is danger that the storm will become a blizzard all cars are ordered in. As soon as the storm shows signs of abating the rotary plows are put to work, each accompanied by a sweeper. As soon as the plows have completed their work and the track is swept the wing levelers are used, leveling off and pushing back the snow on the road. In some places the drifts have to be cut out by hand. It is urgent that this work be done before the temperature falls and the road traffic has much chance to harden the road. Otherwise the roads will build up several feet high, endangering road traffic and interfering with the operation of the sweepers.

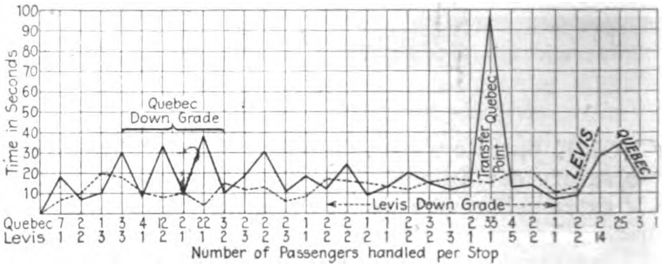


CHART SHOWING TIME IN SECONDS CONSUMED IN STOPPING AND STARTING CARS

Quebec Railway, Light, Heat & Power Company's double-truck car between Upper Town and Limoilou and return, round trip thirty-eight minutes. Birney safety car at Levis between Bienville Junction and uptown terminus, round trip twenty-six minutes. Both runs made during the winter of 1919-20.

After the roads are cut one of the rotary plows having a square nose and small extended wings is sent out to cut more of the banks on the sidewalk side. This is accompanied by a sweeper. This completes the operation unless the track centers are high, in which case a special ice cutter attached under a construction flat car is sent out, accompanied by a sweeper.

FEW CITIES CAN MATCH THESE OPERATING CONDITIONS

The Levis County Railway consists of 12 miles of single track with the usual turnouts or meeting points. It is divided into three divisions, one west 7½ miles, one east 2¾ miles and one south, or Upper Town, 2½ miles, all radiating from the center of traffic at the Quebec Ferry. The eastern division is on 15-minute headway with three cars and three-quarters of an hour for the round trip. It takes care of the large drydocks and shipbuilding yards. There are four extras put on morning and night to take care of the workers on the docks, two of which go to Upper Town and two to Quebec Bridge.

The western division follows the river at the foot of the cliff, with many curves, but only two serious grades of 7½ per cent, 500 to 600 ft. long. It serves approximately 10,000 people and there are two fare zones on this line.

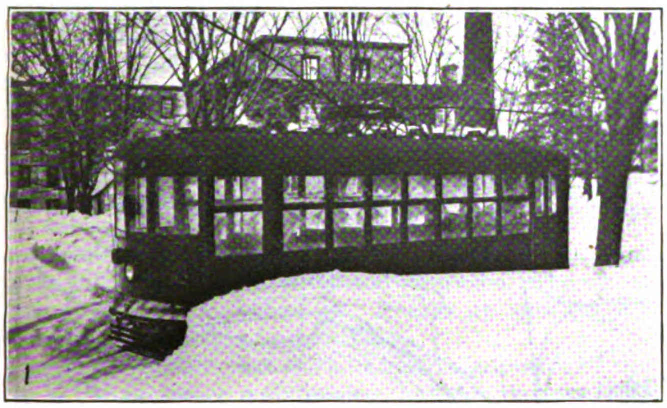
The eastern division serves 8,000 people about the docks already mentioned and has a very heavy grade of 13½ per cent for 400 ft. with two curves on it, and two other grades of 6 per cent 1,200 ft. long each. The track is largely tangent on this division.

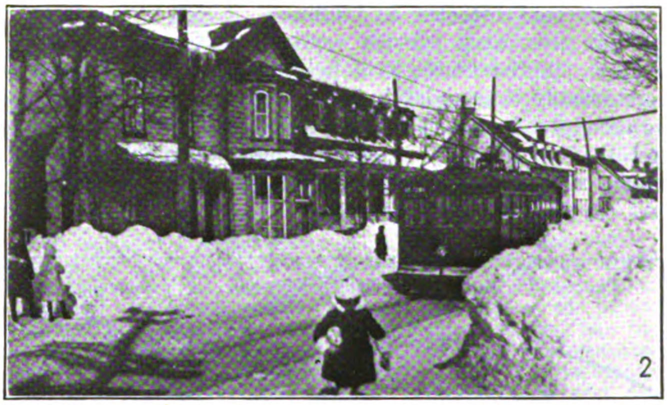
The Upper Town division is nothing but grades and curves, the worst being 13½ per cent for 400 ft. with two curves and 11½ per cent for 1,200 ft., also with two curves. This division rises 320 ft. in 2⅛ miles, the grade averaging 6 per cent. It serves 7,000 people.

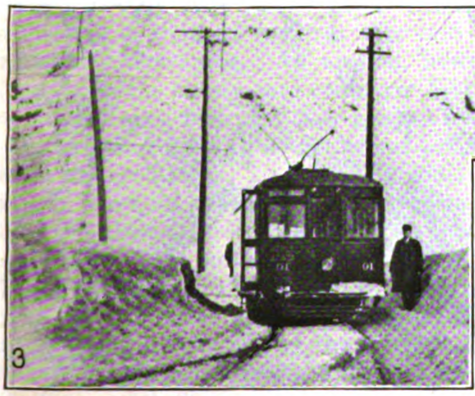
Between the eastern division and Upper Town there is quite an interchange of traffic. The density of traffic is controlled by the ferry, which is on fifteen-minute schedule in summer and half-hour schedule in winter. There is thus a congestion every fifteen minutes in summer, intensified in winter by the longer headway. In winter 300 to 400 passengers have to be handled by the cars every half hour.

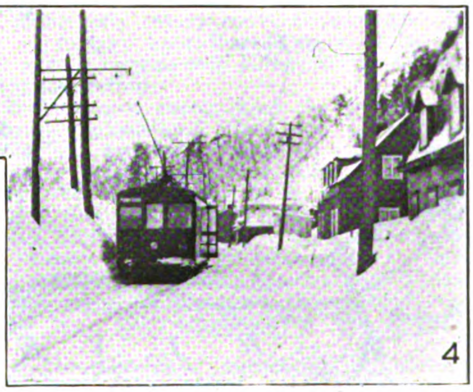
As early as 1916 the company decided to try out one-man car operation and converted an old single-truck car for this purpose. The success of this car was such that it was decided to apply the Birney type of car, especially fitted up for Canadian climate. The difference from the usual standard features was as follows:

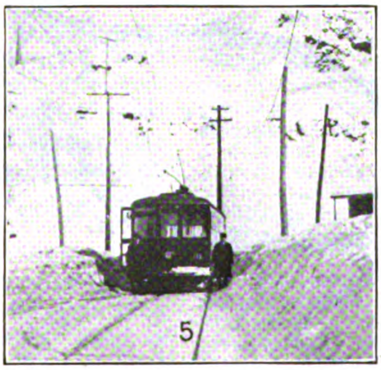
Car Body	Double-lined throughout. Double floor. Storm windows or sashes on all windows. Ventilators capable of being closed as required. All vestibule windows permanently fixed except center window being drop sash.

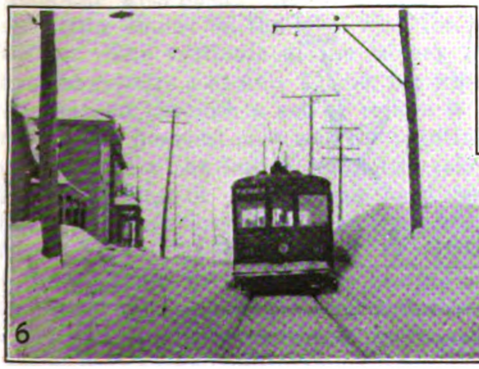


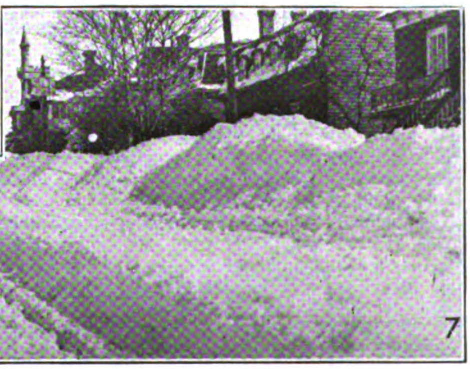












No. 1—Uptown terminus, Levis, at the peak of a cold wave. Note windows partly frosted.
No. 2—Wolf Street uptown, Levis. 10 deg. below zero and 40-mile wind.
No. 3—Point Levi. A Birney in the snow.
No. 4—In Hudlow Cove near Levis.

No. 5—Point Levi, one mile from ferry, Quebec Bridge division. Note snowbank at top of cliff ready to slide down.
No. 6—In one of the river coves, Quebec Bridge division. Note height of winter snow road at left.
No. 7—Fraser Street uptown, just after storm. Rotary plow just passed, sweeper has to follow. Tracks only route for team.

Air Equipment	Especially installed with the proper amount of radiating pipe to prevent freezing of air and moisture accumulation from the cold.
Motors, GE-258	To have covers for closing up the ventilating ducts in winter to prevent snow accumulation inside.
Trucks	26-in. wheels to give maximum clearance on account of high centers, due to snow and ice.
Heaters	12 single coil heaters.

These cars were highly satisfactory. It was found, however, that the motor drain holes had to be covered up and some other minor details required attention.

THE SAFETIES QUICKLY ADAPTED THEMSELVES TO CONDITIONS

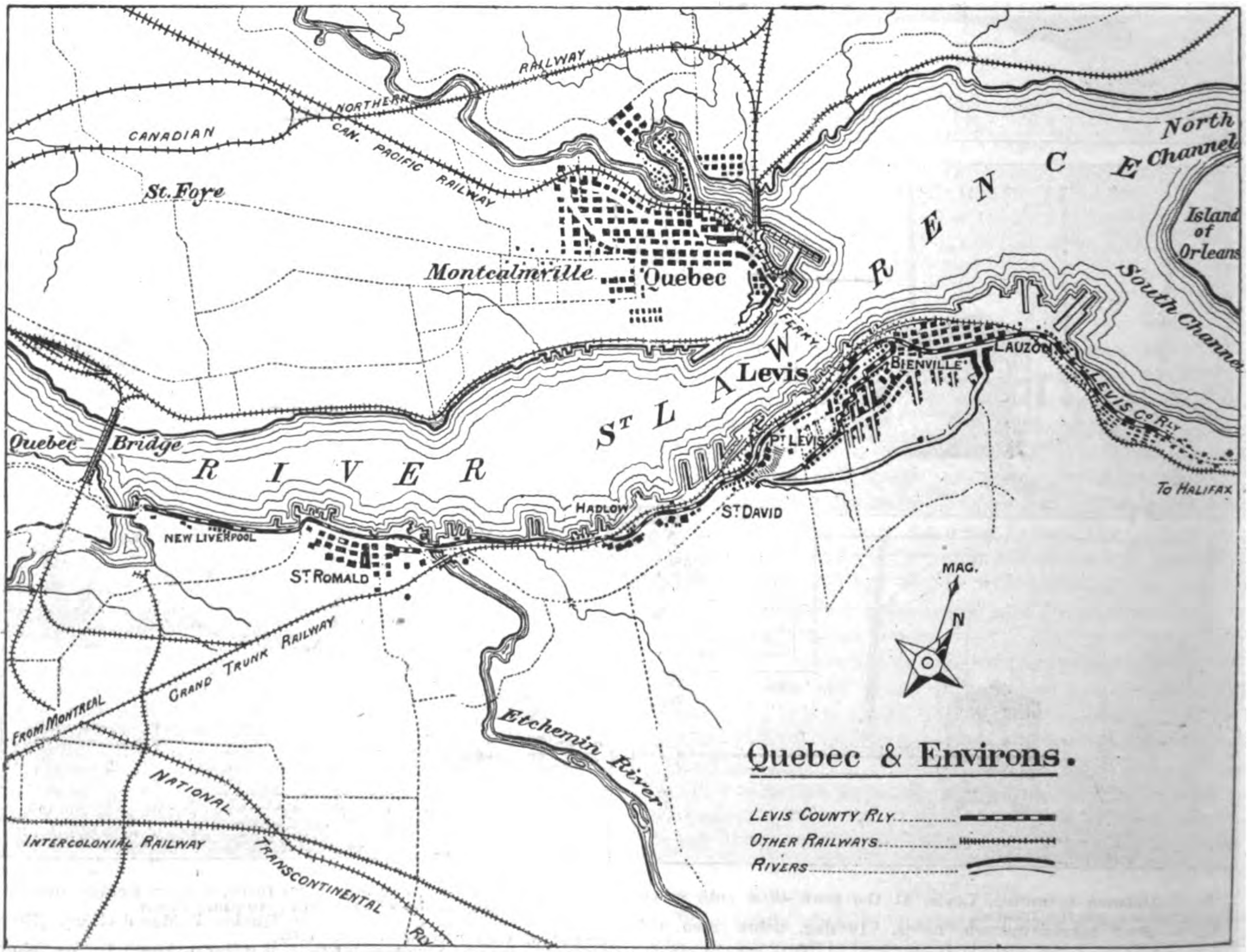
When the safety cars were installed they had to face not only the weather conditions already described, but also heavy congestion at the ferry, which had caused the double-truck cars to be full to overflowing. The first three new cars placed in service on the Upper Town line early in September replaced four old single-truck two-man cars. They ran on the same headway, but were only allowed three-quarters of an hour for the round trip. The new cars made good from the start, producing a 30-per cent increase in traffic.

When the ferry service went to half-hour headway on Nov. 25 the traffic still held up and the cars were considerably overloaded in the rush hours, running from eighty-eight to ninety-three passengers each, all going up hill. Two extra Birneys were put on during the rush hours, running as double-headers, and even then both cars carried many straphangers.

The remaining eight cars arrived early in December and three were used to replace three double-truck cars on the Quebec Bridge division under the same operating conditions, the former double-truck cars having been operated by one man each. The new cars were able to handle the traffic except in rush hours, when two extra Birneys were put on with a turnback at the three-mile point. This gave double-headers every half hour from the ferry, which handled the traffic nicely, although it had taxed the capacity of the double-truck cars. The public has been much pleased with the change. This is a suburban traffic and no increase was looked for, but a slight one has resulted. The snow conditions on this line are severe, but the new car has proved equal to them. It must be understood, however, that the cars are not allowed to buck snow, because we have found that it pays to let snow-fighting equipment do this and save the passenger equipment.

The eastern division is still being operated with old converted one-man cars, much to the disgust of the public. When new cars are put on this division they will certainly bring a 30 per cent increase in traffic because the traffic density is greatest here. Snow conditions are better on this line than on the others. The dock workers here are handled by means of the discarded one-man cars.

A comparison test has just been made between a double-truck open-platform P.A.Y.E. car of the latest type, but without folding doors and steps, used on the


Railway
Northern
Canadian
Can. Pacific Railway
St. Foye
Montcalmville
Quebec
North Channel
Island of Orleans
South Channel
St Lawrence
River
Ferry
Levis
Bienville
Lauzon
Pt Levis
Levis Co Rly
To Halifax
St David
Hadlow
Quebec Bridge
New Liverpool
St Romald
Grand Trunk Railway
From Montreal
National Transcontinental Rly
Intercolonial Railway
Etchemin River
Mag.
N
Quebec & Environs.
Levis County Rly
Other Railways
Rivers

ROUTE OF THE LEVIS COUNTY RAILWAY AND OTHER LINES

Limoilou division in Quebec City and the Birney car on the Upper Town line in Levis, to show the time consumed per stop. Omitting passengers who boarded or alighted from the Quebec car while it was in motion, the time taken per passenger to alight was practically the same in the two cases. The time taken in boarding per passenger was two seconds greater for Levis, which can be explained by the large platform of the Quebec car and the fact that the car can be in motion before the passengers have paid their fare. However, the more rapid acceleration and braking on the Levis car made up for this difference. The graph on page 700 illustrates this comparison.

In this study stops or traffic holdups are not included. Attention is directed to the fact that the grades encountered by the Levis car are much greater than those in Quebec.

VERY FEW MAINTENANCE DIFFICULTIES HAVE BEEN EXPERIENCED

The Levis safety cars have been operated all during the past winter without any snow scrapers or flangers, but a small light scraper would be of some benefit and would not overload the motors any more than would 6 in. or more of snow on the rail.

We have found one unavoidable trouble with all types of cars in that the passengers bring in a lot of snow on their feet, which melts and keeps the floor wet. This water has percolated into the sand traps and register foot valves, interfering with their operation. The sand-trap trouble has been remedied, but the air-register foot valves will have to be relocated and improved. The water seeps down into the valves and freezes up, putting the whole air system out of commission.

There is no doubt that the additional equipment of the Birney car increases maintenance, but this is more than offset in other ways. Executives must remember that additional equipment requires care and must make the necessary allowances. All around, however, the maintenance on the safety cars compares favorably with that on the old cars, provided they are not neglected.

I have said nothing so far about accidents. We have had a few collisions. In a head-on collision between two Birney cars, in which one was making 12 m.p.h. and the other had started to back up at 2 m.p.h., the shock was taken at the buffer beams, which were not damaged. The main quarter-elliptic spring truck bolt was sheared clean off, the shock evidently passing right through the underframe of the car to the truck. Another head-on collision occurred between a Birney and an old single-truck car with 33-in. wheels, the buffer beam of the old car being almost on the level with the headlight of the Birney. The vestibule of the Birney was smashed in, but the repairs cost only $35.50, for when the sheathing was passed through a set of rollers it was as good as new. The heaviest cost was for painting. In collisions with vehicles the buffer beam has taken the brunt of the blow, one or two having been bent. The buffer beams held up just as well as those on the old type of car.

With regard to the interior seating arrangement, we use the cross seats all the way to the front. It has been suggested that the two front cross seats should be removed and short longitudinal seats installed, forming a well for standing passengers. Our experience indicates that it is easier to get the patrons to go to the rear when the cross seats are used in the front than when there is a well, because the operator can see better whether there is room at the rear and can urge his passengers to go back. The Levis cars are for double-end operation and are so wired that the car cannot move unless the proper trolley pole is on the wire. These cars were the first to be wired in this way.

Swiss Install Automatic Substation

Brown-Boveri Substation Operates by Clockwork of Simple Construction, but Does Emergency Switching Automatically

THAT the automatic substation has invaded continental Europe is indicated by Brown, Boveri & Company in their December, 1919, *Mitteilungen.* The automatic features are, however, not the same as those employed in this country where the station is caused to operate and furnish power intermittently as may be required by load variations. The Swiss station is operated by clockwork, which causes it to start at a given time and operate continuously until another given time, when the clock mechanism stops it.

Stephen Q. Hayes, switchboard engineering department, Westinghouse Electric & Manufacturing Company, mentioned this substation at the Pittsburgh meeting of the American Institute of Electrical Engineers. He has since furnished the ELECTRIC RAILWAY JOURNAL with the following abstract of the description of this substation, which appeared in the B., B. & Co. publication:

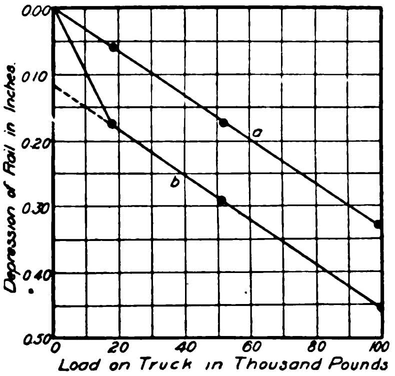
> Full automatic installations of machinery are now recognized more and more as being necessary for many kinds of installations to secure economical and advantageous operating conditions. The increase in wages of labor, together with the shorter hours that labor works, has increased considerably the expenses of operation and maintenance. For these reasons it is desirable that future small, separately located substations, for which steady and dependable labor is difficult to secure, should be made automatic. These are principally rotary converter stations for tramway, railway or factory operation. Standard transformer stations as a rule require less superintendence and do not need constant inspection.
>
> Brown, Boveri & Company, recognizing the future importance of automatic substations, have for some time studied such installations and have conducted experiments with a full automatic rotary converter substation with satisfactory results. Such a station is in operation at Riehen, near Basle, in Switzerland, and serves as a feeder for the Basle-Lorrach Railway. This is, so far as we know, the first automatic rotary converter substation on the old continent, although in America during the last few years substations have been erected. However, they operate on a different principle than that employed by the Brown-Boveri Company.
>
> The functions of the automatic substation at Riehen consist of automatic starting in the morning and automatic shutting down in the evening, as well as temporary opening and reclosing in case of temporary open circuit in the source of supply or overload or short circuit on the direct-current end. Furthermore, in case of a period of long duration of open circuit of the source of supply an alarm is given at the central point regarding the interruption of power. The different combinations for securing these results are secured in our equipment by a combination of relays and contactors which control different switches. The automatic starting in the morning and automatic shutting down in the evening are accomplished by a time-clock of simple construction.
>
> With the Brown-Boveri system present substations can quickly be changed over to the automatic type without interrupting the operation of the system during the change-over. Naturally, such changing over of old installations requires that a part of the old apparatus must be changed or replaced by new. Even then the automatic substation pays for itself after making an allowance for cost of new apparatus plus 15 per cent for insurance and depreciation. Still more economical is the up-keep of new installations, where original costs are almost the same as for substations with attendants.

Stresses in Railway Track Analyzed

Report of Joint A. R. E. A. and A. S. C. E. Committee Deals With Tie Bending as Related to Tamping and With Distribution of Ballast Pressure

IMPORTANT data applicable to electric railway track and forming a valuable addition to existing knowledge on track mechanics are included in the second progress report of the American Railway Engineering Association's committee on stresses in railway track, presented at the recent convention in Chicago. This was a joint committee with the American Society of Civil Engineers.

The first report of the committee, presented in March, 1918, recorded the following conclusions: The stress in the rail under a train or any other load is determined by the general track depression, with little regard to tie spacing. The roadbed acts as an elastic structure except for certain looseness or play absorbed in the first stage of the depression. Heavy rail, hard ballast and deep ballast make stronger track by reducing the track depression. Thorough tamping of track also reduces depression and rail stress. It was also found that a train produces larger stresses when running at speed than when standing, and although the increase could not then be measured satisfactorily, it would seem to be of considerable amount. Transverse bending of the rails was observed, arising from conditions not fully explained; in some cases the ratio of stress in outer flange of the rail base to stress in inner flange is greater than 3 to 1.



TYPICAL LOAD DEPRESSION DIAGRAM. (a) TRACK IN BEST CONDITION, (b) SPACE OR PLAY UNDER TIE

The investigations covered by the second report indicate that:

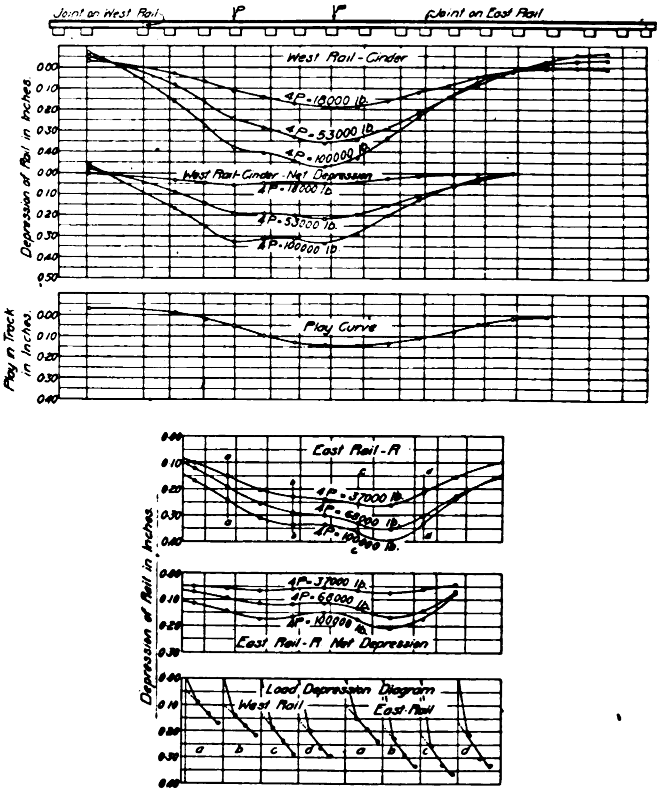
(1) There is a large speed effect. This is roughly proportional to the speed and may equal or exceed one-half the static stress.

(2) Wheel loads are distributed to the several ties in the same ratio for large as for small loads. The depression of any tie is proportional to its load, except that there is an initial irregularity of deflection chargeable to soft bearing or to slight play between rail and ballast. The maximum tie reaction under a four-wheel truck ranges from 13 to 16 per cent of the truck load, agreeing with theory.

(3) Most track is distinctly center-bound before tamping. The endbound condition produced by tamping rapidly disappears, but the bending moment in the tie is greater directly under the rail than at mid-length. The critical bending moments in the tie range from 2 to 6 lb.-in. per pound of tie load, but should not exceed 2 to 2½ for first-class track well maintained.

(4) Transmission of pressure in ballast follows laws deductible from theoretical considerations. At any level below the tie the lateral distribution of load follows the "error curve." In this respect sand, gravel and broken-stone ballast behave alike. The pressure decreases downward according to an exponential or logarithmic law. The pressure of tie on ballast is greater at the middle of the width of the tie and least at the edges, due to the friction between ballast and tie, as the ballast tends to flow out laterally.

(5) About 4 in. below the tie the ballast pressure is equal to or greater than that just at the tie. At 6 in. depth the load begins to spread, and at a depth equal to the tie spacing the pressure is nearly uniformly distributed.

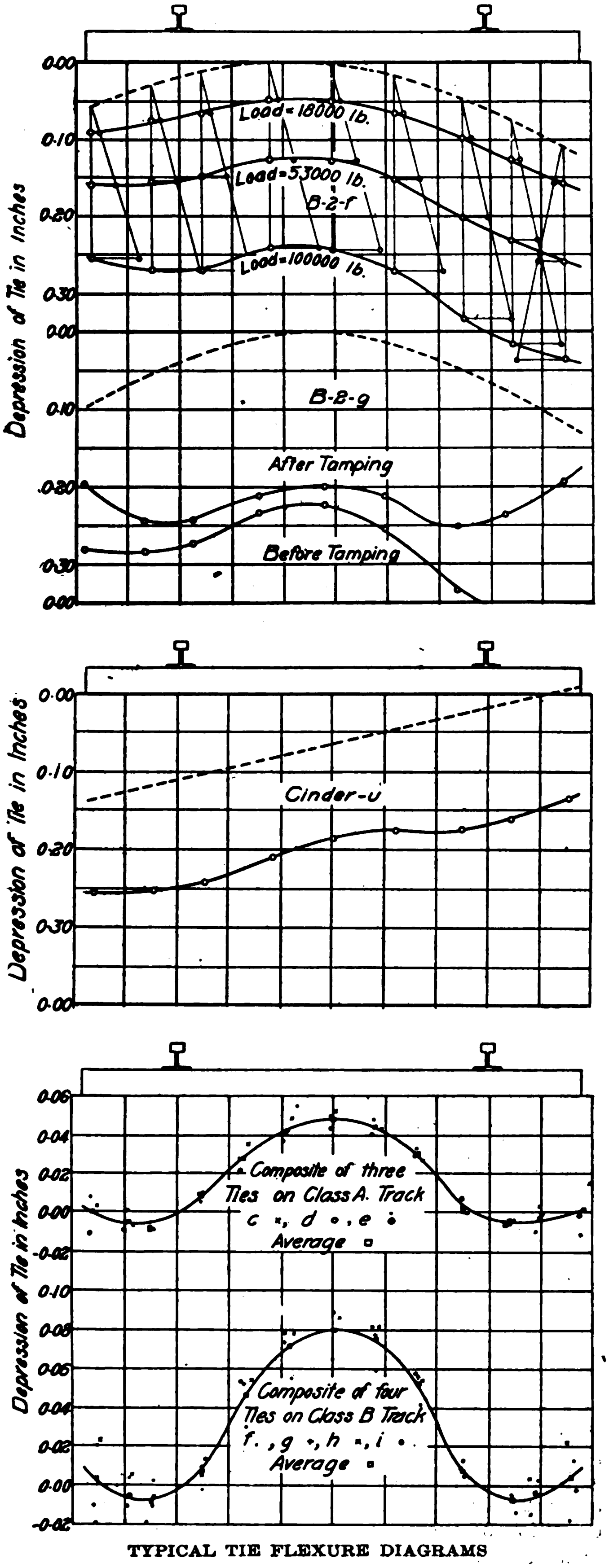


TRACK DEPRESSION PROFILES. LOAD APPLIED TO FOUR-WHEEL TRUCK AT ONE END OF CAR. WHEEL BASE 5 FT. 6 IN. (UPPER DIAGRAMS) SAWED OAK TIES, CINDER BALLAST, 85-LB. RAIL, (LOWER DIAGRAMS) HEWN SOFT WOOD TIES, GRAVEL BALLAST, 75-LB. RAIL

DISTRIBUTION OF LOAD TO TIES

New measurements of track depressions under known loads not only confirmed the former deduction that track is elastic but also provided data for computing the load on the individual ties.

A leveling bar was used to measure the depressions and plots were made of depressions under a four-wheel truck loaded to different total loads. When the depressions at any one point were plotted on a base of load a straight line resulted, demonstrating elastic action, but in the early stage of the depressions there was a divergence from the straight line, indicating the equivalent of a slight looseness or play in the track before solid bearing was reached and elastic action began. Taking from these plots the amounts of play for different points along the track a play curve was obtained. Deducting the amounts of play from the depressions curves of net or elastic depression were obtained.



TYPICAL TIE FLEXURE DIAGRAMS

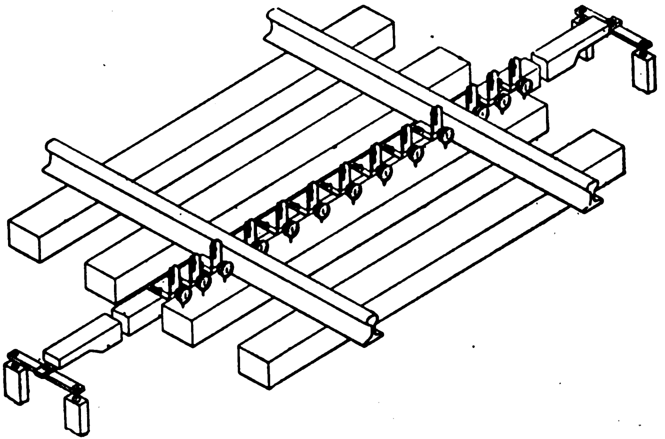
From such net curves the depressions of all the ties affected were summed and equated to a total load. Simple division thus yielded the value of load required to depress one tie one inch, and this value multiplied by the depressions of the individual ties gave the loads borne by them. The load on a tie directly under an axle generally amounted to 13 to 16 per cent of the two-axle truck load; midway between wheels the tie reaction was as much as 1½ per cent more.

TIE REACTIONS IN TERMS OF LOAD ON FOUR-WHEEL TRUCK

(Typical results of tests for 7 x 8-in. ties on 36-in. gravel ballast. First three lines refer to main-line track with 100-lb. rail; last two lines to branch-line track with 75-lb. rail.)

Tie 1	Tie 2	Tie 3	Tie 4 (Under Wheel)	Tie 5	Tie 6	Tie 7 (Under Wheel)	Tie 8	Tie 9	Tie 10
0.08	0.09	0.10	0.11	0.11	0.10	0.11	0.11	0.10	0.07
0.04	0.08	0.11	0.13	0.13	0.13	0.12	0.12	0.09	0.05
0.03	0.07	0.11	0.15	0.15	0.15	0.14	0.11	0.07	0.02
0.06	0.08	0.10	0.10	0.10	0.11	0.14	0.13	0.10	0.07
0.06	0.09	0.13	0.14	0.13	0.13	0.12	0.10	0.06	0.03

Measurements of the flexure of the tie were considered the best means of studying tie action. A gage bar was supported on stakes at either side of the track and thirteen Ames dials attached to the bar bore each on a line at the middle of the width of the tie. A two-axle truck with 18,000 to 100,000-lb. load was placed on the track so that the leading axle was directly over the tie under test. The ties sawed ranged from 7 in. x 8 in. x 8½ ft. to 6 in. x 8 in. x 8 ft.



BAR FOR MEASURING TIE BENDING

Many curves of tie flexure were obtained, of which an accompanying illustration gives examples. The upper part of the upper diagram shows how the several bending curves on any given tie were utilized for determining the "play" or looseness of the tie. At various points along the bending curve the loads for the respective curves were plotted as abscissas, with the deflections as ordinates, and load-deflection curves were drawn as straight lines through the resulting points; the zero points of these load-deflection lines were taken to represent the initial solid bearing. By this means the dotted lines shown in the illustration above the observed tie-flexure curves were obtained, these dotted lines representing in effect the profile of the tie at the moment it reached solid bearing.

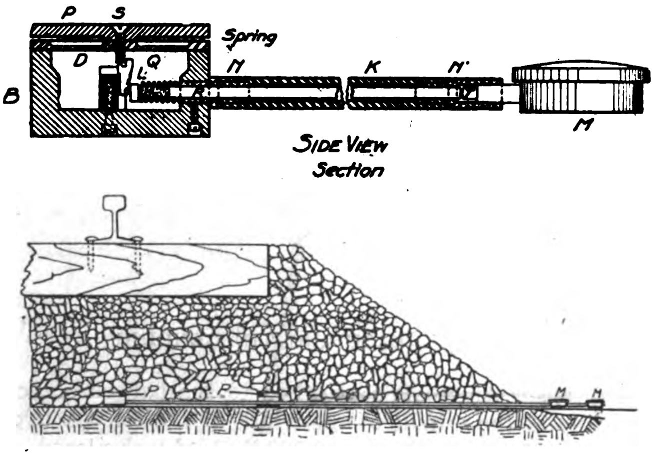
Net deflections, reckoned from the curves of solid bearing, were plotted in the two composite tie-flexure curves constituting the lower diagram of the same illustration. It will be seen that the net deflections showed fairly similar action in different ties, although the gross deflections varied greatly.

From the flexure curves the bending moments in the ties were computed, based on average moduli of elasticity found by bending tests of ties in a testing machine (oak ties, 1,250,000 lb. per square inch; soft wood ties, 800,000 lb. per square inch). The committee concluded that in first-class track a center moment of 2 *W* and a reverse moment at the center of 1 *W* is to be expected, and a moment under the rail of 2.5 *W*.

Comparing the bending moments with those which would result from various distributions of bearing pressure on the lower face of the tie, the committee concludes that "the maximum bearing pressure per unit of length of tie under static loading will not ordinarily exceed twice the average bearing pressure over the length of the tie, and for track in good condition the maximum will be less than one and one-half times the average."

PRESSURES IN BALLAST

To measure the pressure in the ballast at various depths below the tie special gages were constructed. In the gage the deflection of a steel diaphragm plate protected by a faceplate is measured by a small lever whose motion is transmitted to the plunger of an indicating-dial micrometer. The faceplate has an exposed area of 5 sq.in.



PRESSURE CAPSULE AND LOCATION IN BALLAST

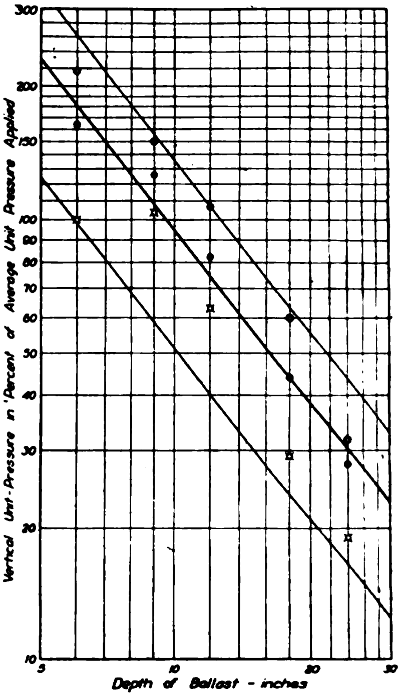
The test rig consisted of a reinforced concrete slab 16 ft. x 19 ft. x 12 in. thick, on which the ballast was carried, and over this slab a reaction frame was anchored to it by tie rods to serve as abutment for a jack by which loads could be applied to one or more ties resting on the ballast. The jack load was measured by a calibrated steel spring. Measured pressure obtained with this apparatus confirmed the deduction that at any horizontal plane in the ballast the vertical pressures are distributed laterally in proportion to the ordinates of a probability or error curve, which curve spreads out wider and has a lower middle ordinate as the depth below the concentrated load is increased.

From a single-tie test it was found that the distribution of pressure laterally followed a law very similar to the probability law. This pressure distribution flattens out with increasing depths below the tie. The effect of several ties whose zones of influence overlap is in close agreement with a curve obtained by adding the separate effects of the individual ties. In stone ballast the pressure distribution is somewhat less regular than in fine ballast, but the same general laws are evidently effective for both types of construction.

The committee concludes that "the laws of distribution of pressure through ballast are practically the same for the various kinds of ballast." From contours of equal vertical unit pressures in ballast it is concluded that "in general the vertical pressures become nearly constant at a depth equal to the tie spacing."

In regard to the effect of friction between the bottom of the tie and the ballast, tending to crowd out from under the tie, it was concluded that "there is a concentration of pressure a short distance below the tie, say at 3 to 4 in., and the intensity of pressure in the ballast at such a depth is greater than exists at the bottom of the tie. For the tie of ordinary width the intensity of pressure at a depth of 6 in. and the distribution of vertical pressure over a horizontal plane at this depth do not differ greatly from those existing immediately under the tie. The directions of the pressure are not the same. At or below this depth the distribution of pressure laterally begins."

Also, the committee says "for the ordinary width of tie the effect of the pressure transmitted from the adjacent tie to points midway between ties is noticeable at a depth equal to about half of the usual tie spacing. At a depth of three-fourths of the ordinary tie spacing the pressure immediately under the center of the tie is about one and one-half times that resulting from a uniform distribution over the horizontal plane. At a depth equal to the ordinary tie spacing the lateral distribution has become such that the variation in intensity of pressure from tie to tie is small. The variation in intensity of pressure in the ballast lengthwise of the tie becomes less and less with increase in depth and it may be expected that the variations will be smoothed out at a depth equal to the ordinary tie spacing or a few inches below, where there will be a fairly uniform pressure over the horizontal plane."



VARIATION OF BALLAST PRESSURE WITH DEPTH

New Signal Service on Boston Elevated Railway

PLANS have been prepared by the Boston Elevated Railway Company for the installation of a new signal service on a portion of the rapid-transit lines. It is planned to install a three-light system on about 1.14 miles of line in the Washington Street subway, in addition to installations at the north and south approaches. Under the new system there will be a total of thirty-three blocks equipped with these signals, operating under an alternating-current service, with the exception of the automatic stops, which will be of the pneumatic type of control.

Speeding Kansas City's Traffic

The Third Beeler Report Is Devoted to Main Street, the City's Greatest Traffic Artery—It Urges Island Platforms, More Extended Use of Prepayment and Some Rerouting—More Strict Regulation of Automobiles Also Recommended

THE third Beeler report on Kansas City, recently issued, is devoted largely to traffic conditions on Main Street. This street is the main artery for north and south traffic, and throughout the business district it is densely lined with retail stores and shops. It also forms the most direct connecting link between the business and hotel district and the new Union Station, through which all trains enter and leave the city.

The average width of the roadway through the congested section is 46 ft. Double tracks, 10 ft. center to center, occupy the middle of the street. The clearance between the street cars and the curbing is 13½ ft., which is more than sufficient for the passage of a single line of vehicles, but lacks by 1½ ft. to 2½ ft. enough clearance for a double row of vehicles, standing or moving.

Three important car lines run on Main Street for the greater part of its length and furnish service between the business section and the southern residential district. In addition, the Main Street tracks are used for several blocks by a number of other lines which turn onto or off between Fifth and Nineteenth Streets. The number of through cars scheduled both northbound and southbound on Main Street is but fifty-two, but this number is increased to ninety-two northbound between Ninth and Tenth and to sixty-two southbound between Eighteenth and Nineteenth.

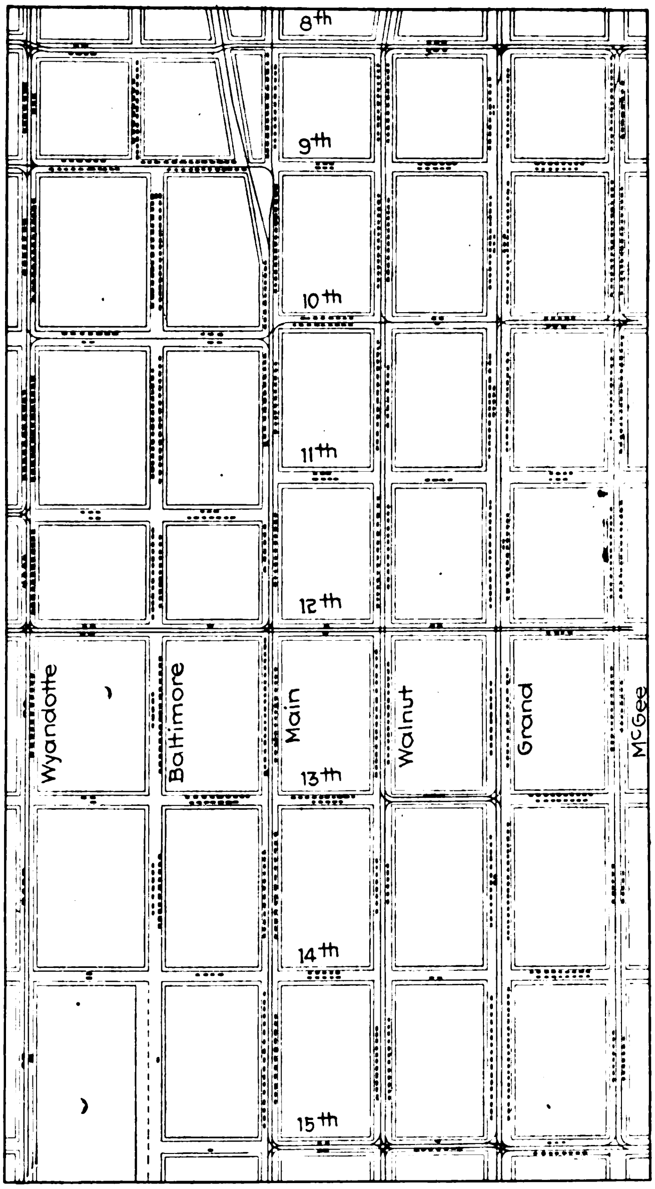
Twelfth Street is the heavy intersection with 183 cars an hour scheduled to go through during the rush. Other busy intersections are scheduled to pass 161 cars, 144 cars and 132 cars respectively during the same period.

The improvements suggested in the previous reports have been effective in bettering car operation. A total of forty-nine more cars are now passed through the intersection of Main and Twelfth Streets during the rush hour, or more by 40 per cent, than were passed previously. Nevertheless, the intersection is still vacant practically 60 per cent of the time as far as car movements are concerned. Double-berthing, according to Mr. Beeler, has been a great factor for good. It is also a fact that by giving precedence to the street cars and by co-ordinating the movements of all other traffic with those of the street cars the traffic officers have been able to put all traffic through with greater dispatch. At other intersections, where there is much left-hand turning, rerouting is suggested.

CAR SPEEDS ON MAIN STREET

From 5 to 6 p.m. the average speed of the cars on Main Street, southbound, or in the direction of the heaviest traffic, is but 5.83 m.p.h. all the way from Ninth to Twenty-fourth Street. From Ninth to Tenth Street it is 4.34 m.p.h. and from Tenth to Twelfth Street it drops to 2.51 m.p.h. Cars have been observed making less than 2 m.p.h. in this district.

At other points the speeds are low. The frequency of passenger and positive stops, the lack of double-berthing at heavy boarding points, and slow loading are all contributing factors to these abnormally slow car movements.



THIS CHART SHOWS HOW PARKED VEHICLES BLOCK TRAFFIC IN KANSAS CITY'S BUSINESS DISTRICT. THIS COUNT REPRESENTS CONDITIONS AT 2 P. M. ON NOV. 15, 1919

The amount of vehicular traffic on Main Street is illustrated by a count made at the principal intersection, Twelfth Street, on Nov. 15, 1919. Between 4:45 and 6:15 p.m. on that day 736 vehicles, one-fourth of which were jitneys, passed either north or south on Main Street, while 245 passed east or west on Twelfth Street. On Nov. 20 a count between 4 p.m. and 6 p.m. showed the following division of traffic:

Type	Number	Per Cent
Automobiles	795	58
Jitneys	324	24
Trucks	224	16
Wagons	20	2
Total	1,363	100

A vehicular passenger count showed that the 795 passenger automobiles carried 1,547 persons including driver or an average of 1.9 persons per car. The 324 jitneys transported 1,349 passengers or an average of but 4.2 per vehicle not including the driver. The small number of people transported by each jitney, and the consequent high ratio of man-power employed, 1 to 4.2, according to Mr. Beeler, shows the extremely wasteful methods required by this form of transportation. Additional street cars at the rate of only nine per hour would have cared for this number of patrons. This would save the necessity of passing 324 jitneys over this crowded thoroughfare and through its congested intersections, thus reducing the vehicular traffic movements 24 per cent. The fact that the private automobile carries less than two persons per car shows the necessity of giving the street cars precedence if the people are to be transported expeditiously.

Two charts were prepared, of which one is reproduced showing typical morning and afternoon parking conditions in the business district. They demonstrate that all streets in the business section are used extensively for parking purposes throughout the entire day. During the rush hours, especially the evening rush, conditions are still further aggravated by the jitneys and the automobiles which enter the business district and sometimes even park in double rows while waiting for passengers.

Mr. Beeler declared that this parking interfered greatly with rapid car movement in numerous ways, as it prevented the cars from pulling into the berths, hampered car movements, bunched the cars and filled the streets with waiting patrons. This prevents traffic officers from properly co-ordinating the movements of vehicles with those of the street cars, which is the secret of expediting traffic movements.

MEASURES FOR RELIEF RECOMMENDED

In addition to employing the measures previously recommended, such as restricting the number of stops in the congested district, giving precedence to street cars, double-berthing, limiting parking and keeping vehicles off the car tracks, Mr. Beeler recommended the following:

1. Use raised loading platforms in the streets at the most important passenger stops in the congested district.
2. Prohibit jitneys from using Main Street within the congested district.
3. Employ prepayment method of fare collection at Union Station Plaza.
4. Reroute some of the car lines so as to reduce the number turning into and out of Main Street at congested points.

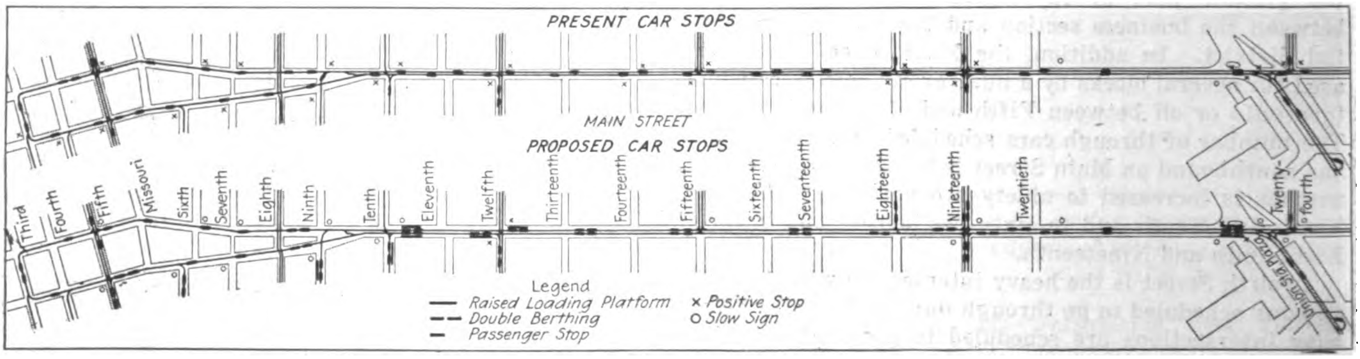
LOADING PLATFORMS TO BE INSTALLED

The loading platforms recommended by Mr. Beeler and subsequently built were installed at three passenger stops northbound on Main Street, three southbound on Main Street, one eastbound on Tenth Street and one westbound on Ninth Street.

The platforms recommended were to be approximately 100 ft. long, 4 ft. 6 in. wide, and 9 in. above the top of the rail in height, and the inside edge was to be 26 in. from outer rail. This would allow a space 9 ft. wide for vehicular traffic between the platform and the street curb. As laid out, these loading platforms occupy what was actually waste space in the roadway.

Mr. Beeler believed that these platforms, by concentrating the passengers just opposite the car entrances, would materially assist in quickly loading the cars and thus speed up the car movements. He also recommended that vehicles should not be permitted to park at any time between the curb and loading platforms nor along the curb for a distance of 50 ft. from the end of any platform. Neither may vehicles use the car tracks at these points. A rigid enforcement of these rules, Mr. Beeler says, will reduce street accidents as well as increase the capacity of the streets very materially.

At present, in order to secure early relief, these platforms should be built of wood. Afterward they may be replaced with more permanent construction of stone and cement. At night they should be red-lighted at each end.



PRESENT AND PROPOSED CAR STOPS ON MAIN STREET. THE LOWER DRAWING ALSO SHOWS THE LOCATION OF THE PROPOSED ISLAND PLATFORMS

BANISH JITNEYS FROM MAIN STREET

While the traffic from jitneys amounts to 25 per cent of the total vehicular movements on Main Street, their proportionate value as transportation carriers is so low that they should not be allowed to congest so important a thoroughfare, at least between Fifteenth and Eighth Streets. If jitney operation is considered necessary to supplement the street car service in Kansas City, Mr. Beeler says that their downtown operations should be confined to Grand Avenue, which is a wider street, and to Baltimore Avenue, which is free from car tracks.

It is recommended that the prepayment method of fare collection be employed at the Union Station passenger stop, at least in the northbound direction.

Prepayment is a great convenience to patrons, especially where such large numbers of strangers and others, mostly burdened with grips and parcels, board cars as they do here in the northbound direction. Southbound, the passengers are leaving the cars and comparatively few are boarding, consequently prepayment in this direction would be of little value. At other heavy loading points street collectors are recommended. Where used, standard cars should be loaded at the front end and safety cars at the rear end. Collectors should have a key by which they can open the rear door of the safety cars from the outside.

Parking Regulation

Strong emphasis is laid on the importance of a rigid enforcement of the anti-parking ordinances in view of the fact that the average auto transports less than two persons including the driver during the evening rush. "How long," Mr. Beeler asks, "will the taxpayers continue to provide $10,000 worth of improved street to park a vehicle that has an average transportation value of less than two persons per trip? Assuming every one in the business district used this method of transportation where would the automobiles be kept? A principle that must be adopted and adhered to is that the streets of the city are its arteries and must be reserved for moving traffic and not for storage purposes."

Electric Railway Notes from Italy

Electric Railway Expert Sizes Up the Present Situation with Regard to Heavy and Light Electric Traction

By Ferdinando C. Cusani
Milan, Italy

ALTHOUGH the commission appointed by Minister of Transportation De Vito has not submitted as yet its decisions about the system of electric traction to be adopted for the 3,120 miles of Italian State Railways lines, which will have to be electrified in accordance with the decision of the Italian Parliament, the State Railways management is actively pushing the electrification of about 375 miles of track in the northwestern part of the country. The several routes connecting Turin with Genoa are being provided with aërial lines, power feeders and substations for a total of 250 miles. The work is being done directly by the electric traction service of the State Railways.

At the same time private contractors are equipping the Turin-Milan and Voghera-Milan lines, totaling 125 miles. Both of these groups of lines will be operated on the three-phase system, as they are simply links connecting the three existing groups of three-phase lines, namely, the Genoa-Riviera-Giovi tunnel group, the Modane-Frejus tunnel (Moncenis)-Bussoleno-Turin group, and the Monza-Lecco-Colico-Sondrio and Colico-Chiavenna (Valtellina) group. It is hoped that electric traction on these two projects will be started within this year, and in the meantime arrangements are being made with electric power companies to supply the railroads' demands.

Electric power companies of Central Italy (Aemilia, Tuscany and Umbria) have already arranged with the State Railways for the supplying of power for the electrification of the trunk lines crossing their zone. Two power stations, which will supply about 20,000 kw., and will burn lignite directly as it is brought out of the mines, will be erected at Tavernelle di Perugia and Torre del Lago. These stations have been planned in such a way that, as soon as the output of the lignite mines increases, their capacity will be augmented accordingly. It is the intention to use as much as possible of the lignite, which is a rather low-grade fuel, directly in specially designed boilers, where it can be much better utilized than under the present practice of mixing it with coal and burning it in locomotive fireboxes.

In this respect it is interesting to note that the State Railways, after very careful experiments, have decided to convert as many engines as possible from coal to crude-oil burning. The reason given is that, although both fuels have to be imported, it has been found that it costs much less to handle oil, which, although more costly at the point of origin, can be most easily transshipped from tank steamers to reservoirs ashore and from these, through pipe lines and tank cars, to the locomotives themselves. Moreover, the adoption of liquid fuel is certainly going to improve the conditions under which the locomotive crews are laboring in the south, especially during the torrid summer season, and to make working conditions less exacting on the mountain divisions.

As for the private railroad companies, it may be stated that although many projects of electrification have been started, they are generally lagging behind on account of the very difficult conditions of the materials market, and on account of the most prohibitive exchange rates, which positively enjoin the use of foreign materials and machinery.

New Electrification Will Probably Be 1,200-Volt Direct Current

The Torino-Ciriè-Lanzo Railway is being electrified, the contract having been awarded to a Swiss firm which has been hitherto known as the strongest advocate of three-phase traction. It is said that this line will operate on high-tension direct current at a voltage over 1,000 and, although this is an interurban line, according to the American point of view it is probable that locomotive operation will be resorted to.

Construction of the Rome-Ostia-Harbor of Rome electric high-speed line, which will be operated by the Rome Municipal Corporation, is being pushed forward, while at the same time the Roman Tramway & Omnibus Company, which has surrendered operation of all its city lines except two to the Municipal Corporation, has been reincorporated under the name of Italian Railways Company (Società Ferroviaria Italiana) and will engage in the construction and operation of an electric line from Civitavecchia to Orte and eventually to Terni, the steel city.

The Lombard Electric Traction Company (Società Trazione Elettrica Lombarda) has been definitely incorporated as the successor of the Italian Edison General Electric Company, and has already taken possession of the lines formerly operated by that company around Milan and of the lines which were controlled by that company. It has also acquired control, through ownership of a major part of the shares, of the Milan Northern Railways, and it appears that a merger will be made with the Brescia Electric Company (Società Elettrica Brescianna), operating some hundreds of kilometers of 1,200-volt direct-current interurban electric railways. This will mean that, apart from the city lines generally owned and operated by municipal corporations, and from a few narrow-gage interurbans, all the electric railways not operated by the State Administration and all the steam tramways in Lombardy will be owned by this new corporation.

LARGE MILEAGE WILL BE ELECTRIFIED

It appears that electrification work and new electric construction planned by different private companies throughout Italy will amount to about 2,500 to 3,000 miles, thus bringing the total of planned electrification to more than 6,200 miles.

Electric street railways are laboring under very heavy difficulties just now, the most important one being the lack of rolling stock and the inability of local manufacturers, who are overburdened with repair and construction work for the State Railways, to supply even a small part of their requirements. And as similar conditions seem to prevail in other countries, no relief can be sought through the importation of rolling stock. The abnormally and unjustifiedly high exchange rate makes it almost impossible to think about ordering cars in the United States, although some companies appear to have given serious thought to the matter.

Owl service, which was hitherto unknown in this country, is being started in a number of cities. Beginning on Feb. 23, the Milan Corporation Tramways has been giving hourly service between 1 a.m. and 6 a.m. on twelve of its lines, giving access to all of the different sectons of the city. The rate is 1 lira per ride, that is four times the common fare (25 centessimi) and ten times the morning reduced fare (10 centessimi). Conductors of the owl cars on leaving the carhouses are each supplied with a regulation army revolver, which they have to turn in with the money collected when they reach the carhouses after 6 o'clock. It is hoped that the owl service will be appreciated by the public, the hack service having been seriously cut down during the war and taxicab service being both costly and uncertain due to the lack of gasoline. It appears that other cities will soon follow the lead of Milan in giving such service.

Recent Snows Shop Many Cars

THAT the snows of the past two months have placed an exceptionally heavy load on the repair shops in New England is shown by the Connecticut company's experience. For example, the records since Feb. 4 show that the minimum number of cars per day which have been in the repair shops has been ninety-one, and on many days the number has risen to as high as 110. These figures are for the lines centering at New Haven and operating with about 800 cars. Normally, not more than forty cars are in the shops.

There are two chief causes for these high numbers. One is that the icy nature of the snow and the impossibility of keeping sweepers going all the time were conducive to the formation of high ice centers, until many motors dragged on these high centers with consequent damage. The second difficulty which caused many failures was that there have been several periods of thaw with no possibility of the water running off to sewers. This has caused many wet motors and wet leads, which in turn have caused cars to go to repair shops.

The additional travel due to snow-blocked automobile roadways, all thrown on this reduced equipment along with the regular travel, would tax the energies of any operating force.

Why Do Car Fares Differ?

Cincinnati City Council Receives Report Showing Reasons for Difference in Cincinnati and Cleveland—Local and Contractual Conditions Affect Comparison of Fares

THE reason that street car transportation costs more and therefore demands a higher fare in Cincinnati than in Cleveland is shown in a well-presented analysis of the relative situations in the two cities, which was recently made for the Cincinnati City Council by W. C. Culkins, Director of Street Railroads for the city of Cincinnati. Cincinnati patrons pay a 7-cent fare, while their cousins in Cleveland can secure six rides for 25 cents. Evidently desirous of being sure of their grounds in case they should make any demand upon the local street railway system, the members of the Council requested the Director of Street Railroads to make an investigation into the reason for the difference. That which follows is largely a digest of the report which Mr. Culkins has made, with the significant figures contained in his report set up in a table to show the comparative statistics.

In both cities the companies are operating under service-at-cost franchises based upon the same fundamental principles, but the method of applying these principles differs materially. To secure a fair period of comparison, the first eleven months of 1919 were taken. Primarily it must be borne in mind that street car service is a commodity, and like sugar, coal and other articles its price in one city cannot be fairly compared with that in another without taking into consideration the quality and cost of production and all other conditions affecting it.

Considering first the characteristics of the two cities, Cleveland has wide streets, flat surface and a gridiron layout of its principal sections, while Cincinnati has narrow streets and a hilly country, with a limited number of highways from the business center to the residential districts. In brief, Cleveland is almost an ideal city for street railway operation, while Cincinnati presents problems not found anywhere else in the country. Cleveland is a compact city, and long open spaces traversed by street cars in which little or no population is found, so characteristic of Cincinnati, do not exist in Cleveland. As a result, more miles of track are required in Cincinnati. From figures for the period mentioned, Cincinnati has 55.80 per cent more miles of track for the same number of passengers than has Cleveland. Longer car trips are necessary and earnings per mile of track are less in Cincinnati.

EFFECT OF TRAFFIC DENSITY AND TRANSFERS

The natural rate of fare in any city is determined by the cost of furnishing the service per car-mile divided by the number of passengers per car-mile. For example, if the company carries eight passengers per car-mile at a cost of 40 cents, the fare should be 5 cents; if only five passengers per car-mile are carried, the fare should be 8 cents. Under the service-at-cost plan, an increase in the number of passengers or a reduction in the number of car-miles by operating fewer cars with the same number of passengers will reduce fares, and conversely. The car rider pays for what he gets in proportion to the number paying. The figures indicate a much higher traffic density in Cleveland and a consequent lower cost.

But there are other reasons for lower fare possibilities in Cleveland. For example, in Cleveland a charge of one cent for a transfer is made and a second one is not given except on cross-town lines. In all other cases a passenger must pay a second fare. In Cincinnati transfers are free; over 18 per cent of the transfers are double transfers, 5 per cent are triple transfers and sometimes four transfers are allowed. If the same transfer charges had been applied in Cincinnati, $528,789.98 would have been realized in the eleven-month period. Cleveland car routes call for more transfers, as is evidenced by the fact that 37.49 per cent of the Cleveland riders took transfers and paid for them, while in Cincinnati, with free transfers, only 33.35 per cent took transfers.

Other important items are the fact that Cleveland has no half fare for children, whereas in Cincinnati the half rate amounts to $32,000 per annum; the Cleveland Railway Company pays no franchise tax, while in Cincinnati the company pays $350,000 per year; the skip-stop plan is in full operation in Cleveland, allowing higher schedule speeds, more trips per car and consequently fewer cars; in fact, Cleveland cars run 40 per cent faster than Cincinnati cars. Traffic regulations also affect cost of operation, and in Cleveland the superior rights of the street car rider are recognized because of his greater preponderance, the street car is given right of way and other regulations assist street car traffic. Cleveland operates on what is known as the "split run" method, splitting the platform man's hours into morning, afternoon and evening hours. This eliminates much overtime and permits a much lower proportion of regular to extra cars. This is impracticable in Cincinnati.

ANALYSIS OF COMPARATIVE STATISTICS INDICATING REASONS FOR FARE DIFFERENCES IN CINCINNATI AND CLEVELAND

	Cleveland	Cincinnati
Population	905,000	401,000
Area square miles	58.7	72
Density (population per square mile)	15,000	5,570
Revenue passengers per mile of track (eleven months)	894,900	405,900
Total passengers per mile of track (eleven months)	1,235,000	545,900
Average trip (car-miles, eleven months)	5.18	11.02
Passenger earnings per mile (eleven months)	$46,700	$24,100
Total revenue passengers (eleven months)	264,589,945	107,160,088
Total car-miles operated (eleven months)	32,736,697	19,342,223
Density of traffic, passengers per car-mile (eleven months)	8.08	5.54
Density of traffic, car-miles per 100 passengers (eleven months)	12.38	18.05
Total cost of service (November, 1919)	$1,339,099.10	$682,549.97
Total cost of service per car-mile (November, 1919)	45.33	39.26
Density of traffic, passengers per car-mile (November, 1919)	8.73	5.59
Cost per car-mile per revenue passenger (November, 1919), cents	5.22	7.02
Operating cost per car-mile (eleven months), cents	30.05	24.54
Sinking fund requirement (annual)	0.0	$82,445
City tax (annual)	0.0	$350,000
Base fare, cents	4.167	7.0
First transfer charge, cents	1.0	0.0
Second transfer charge, cents	4.167	0.0
Third transfer charge, cents	1.0	0.0

OPERATING COSTS, VALUATION AND RATE OF RETURN

That higher fares are not the result of high operating costs is shown by the fact that the cost per car-mile is higher in Cleveland than in Cincinnati. In fact, in every detail item except power cost the cost per car-mile was higher in Cleveland during the eleven-month period.

Overcapitalization of the Cincinnati system has been blamed for high fares, but Cleveland, even by scaling down to the lowest valuation per mile of track of any city in the country, realized little benefit. To quote Peter Witt, formerly Street Railroad Commissioner of Cleveland: "Yes, the 'water' was squeezed out, but the statement that its squeezing out has had a material effect on the rates of fare charged is far from the truth. . . . The outstanding stock and bond obligation . . . was reduced from $34,000,000 to $24,000,000. . . . Assume that . . . the $10,000,000 had not been squeezed out. . . . They (the car riders) would have been called upon to pay . . . $600,000 more than they did pay. . . . But with three hundred million riders the increase in the rate of fare, had the 'water' remained, would have been one-fifth of a cent." Similarly in Cincinnati, even taking the Cleveland valuation per mile of track, and eliminating the sinking fund payment, the reduction in fare would amount to only one-fifth of a cent in fare.

Another point is that in Cleveland it has been agreed, after arbitration, to allow 7 per cent on the Cleveland stock, while, under the Cincinnati ordinance, only 5.619 per cent is allowed and the return can be increased only as a reward for reducing fares.

If Cleveland conditions were established in Cincinnati—reduce cars until the density is eight passengers per car mile, eliminate taxes and sinking fund payment, introduce the skip-stop, add a similar transfer charge, eliminate half fares—the cost would be 4.99 cents per revenue passenger. But, in fairness, it should be said that it is not practicable to reduce service to eight passengers per car mile. However, elimination of city tax, introduction of the skip-stop, transfer charges, proper traffic regulation and similar moves would lower fares if Cincinnati wants it. There is no idea of criticising Cleveland service. The people there are satisfied with it.

But Cleveland cannot be regarded as typical of our American cities generally. This is shown by the fact that more than a hundred cities have higher fares than in Cincinnati and in fifty-nine of these the rate is 10 cents; 118 have a 7-cent fare and by reason of the zone system and charges of from 1 to 2 cents for transfers a ride costs more in a number of cities to a great number of the passengers.

In the few cities where the fares have been continued at the old rate there are conditions that must be considered. In New York the Public Utilities Commission has decided that the rate on the surface line should be 8 cents, but a political situation has held up the increase, 78 miles of track have been abandoned, and 700 miles of track are in the hands of the receivers. In Philadelphia, where much publicity has been given to the 5-cent fare, 70 per cent of the passengers must purchase a 3-cent exchange ticket and it is stated by public officials that the average fare is actually 7½ cents. Detroit has a density of traffic almost as great as Cleveland and hauls three times as many passengers as are hauled in Cincinnati on about the same number of miles of track.

These instances are given to further demonstrate the necessity of an inclusion of local and contractual conditions in any study of comparison of fares in different cities.

In the 6½ years since the National Safety Council was formed, with fourteen members, the number of industrial concerns and public utilities on the rolls had increased to 3,854 by March 1, 1920. The increase in 1919 was 253, and the annual rate in the first two months of 1920 was over 700.

Service at Cost in Memphis

Commission Recommends Plan with Several Novel Features — Accepted by City and Company — Fare Begins at 6 Cents

A DECISION which virtually established a service-at-cost plan for the Memphis Street Railway was rendered on March 15 by the Railroad Public Utilities Commission of the State of Tennessee.

The commission issued an order on June 12, 1919, authorizing the receivers of the company to establish a 6-cent emergency rate of fare, and further provided for an examination into the amounts invested in the property of the company upon which it or its receivers were entitled to a reasonable rate of return. This appraisal, as has been noted in these columns, was made jointly by Albert S. Richey of Worcester, Mass., representing the commission; J. H. Perkins of Birmingham, Ala., representing the receivers, and Ross W. Harris of Madison, Wis., representing the city of Memphis. Reports of the appraising engineers were filed with the commission on Dec. 13, 1919, and the commission held hearings on the rate case during January and February. The commission decided that the rate base should be $11,846,034, which was practically the amount found by Mr. Richey, the engineer for the commission. The commission further found that $7,600,000 represented the cost of the renewable property and that 3 per cent of that amount for the present should be set aside out of earnings for a renewal and replacement reserve.

As to the rate of return, the commission decided that it should be not less than 6½ per cent nor more than 7½ per cent on the rate base, as noted above. Taking into account estimates of operating expenses, as prepared by Mr. Harris, the city's engineer, and Mr. Tutwiler, one of the receivers and former president of the company, as well as renewal and replacement accrual and rate of return as stated, the commission determined that the proper present rate of fare should be 7 cents cash or 6½ cents by ticket, the latter to be sold in lots of ten for 65 cents.

The skip-stop plan of operation was retained, as it was shown that the cost of providing the same standard of service was reduced about $100,000 per annum thereby, but it was directed that the company should confer with the city as to modifications of it that might lessen the inconvenience without materially reducing economy.

OUTLINE OF PLAN IS PUBLISHED

During the progress of the hearings the service-at-cost plan was mentioned in the course of the testimony both of Mr. Richey and Mr. Harris, and this plan meeting with the approval of the city authorities, as well as of the receivers of the company, the commission's order provides for its adoption, in brief as follows:

The cost of service is first defined as including operating expenses, with such allowances for a renewal and replacement reserve as is later described, as well as taxes and a return on the investment.

It is provided that the accounts of the company shall be kept in accordance with the Interstate Commerce Commission's classification.

The standard of service which shall be provided by the company is, of course, subject at all times to the control of the commission. In this order the commission specifies that until such time as it may make further order the company shall provide not less than 0.155 nor more than 0.185 passenger car-miles for each revenue passenger carried. (NOTE.—This corresponds approximately to 6½ and 5½ revenue passengers per car-mile.)

The investment upon which a return is to be allowed as a part of the cost of service is as stated $11,846,034, as of July 1, 1919, plus or minus such amounts as have been or may be added or deducted since that date with the approval of the commission.

A renewal and replacement reserve is provided for, consisting of such amounts as have been or may be credited to such reserve after July 1, 1919, with future credits and charges as provided for in the current order. It is provided that the renewal and replacement reserve shall be credited monthly at the rate of 3 per cent of the investment in depreciable property until the balance in this reserve shall have reached the amount of $500,000; thereafter, whenever the balance in this reserve is more than $300,000 and less than $500,000, the monthly credit shall be at the rate of 3 per cent. Whenever the balance is more than $500,000 the monthly credit shall be at the rate of 2 per cent, and whenever the balance is less than $300,000 the monthly credit shall be at the rate of 4 per cent of the depreciable property. As stated above, the investment in depreciable property is taken as $7,600,000, as of July 1, 1919, plus or minus such amounts as have been or may be added or deducted after that date with the approval of the commission. The credits to this reserve, as above provided, are to be charged to operating expenses and considered as a part of service, and the amounts in this reserve are to be used for the sole purpose of providing renewals and replacements (other than ordinary maintenance) due to depreciation, obsolescence or abandonment, as may be approved by the commission from time to time.

The rate of return on investment is to be considered as a part of the cost of service and is to be allowed monthly at a rate per annum to be determined as follows: Whenever the "fare index fund" balance (surplus) is less than $60,000, the return is to be at the rate of 6½ per cent; whenever this balance is above $60,000, the return may be at any rate between 6½ and 7½ per cent which the company may be able to pay out of the current revenue after paying operating expenses, charges to reserves and tax accruals, but without decreasing the fare index fund balance below $60,000. It is further provided that if the earnings for any month, plus the balance then in the fare index fund, be insufficient to pay the minimum return, then such deficit in return payments are to be paid from the earnings of succeeding months, plus accrued interest at 6½ per cent per annum, before any amounts are added to the fare index fund.

The "fare index fund" is simply another name for "surplus" and is maintained by crediting to it monthly all revenues after the cost of service has been paid. It is provided that the fare index fund shall be used to pay such deficits as may occur between revenues and the cost of service, and that it also shall serve to determine the rate of return on the investment, as above described, as well as the rate of fare as follows: Whenever on Jan. 1 or July 1 of any year the balance in the fare index fund shall be greater than $200,000 and shall have been increasing during the preceding two months the rate of fare shall be reduced to the next lower in the following list, but if on such dates the balance in this fund shall be less than $60,000 and shall have been decreasing during the preceding two months the rate of fare shall be increased to the next higher. It is further provided that in the event that the fare index fund continues to increase for the next two months after a decrease in fare or if it continues to decrease for two succeeding months after an increase in fare an emergency change in the rate of fare can be made to the next lower or higher, as the case may be, without waiting for the next succeeding Jan. 1 or July 1, but such emergency changes may be made only with the specific approval of the commission.

The rates of fare which automatically may be in effect in accordance with the operations of the fare index fund under this order are listed as follows:

1. 8 cents cash
2. 8 cents cash, with ten tickets for 75 cents
3. 7 cents cash
4. 7 cents cash, with ten tickets for 65 cents
5. 6 cents cash
6. 6 cents cash, with ten tickets for 55 cents
7. 5 cents cash

It is further provided that whenever fare No. 2 or fare No. 6, as listed above, shall go into effect the commission will extend this list either upward or downward, as may be necessary, and will make further additions from time to time, so that the list may always contain two rates of fare above and two below the rate of fare in effect at the time.

The order also provides that the company shall furnish detailed monthly statements of the results of its operation to the commission and provides for any special investigation which may be desired by the commission at any time. Specifically relative to the latter, the commission provides that inasmuch as the city of Memphis has expressed the desire to have a traffic survey made to determine whether or not as satisfactory service may be provided at less cost than at present the company is directed to co-operate with the city in making such a survey and one-half of the cost of it is to be paid by the company and charged to current operating expenses. The company is also directed to confer with the city authorities concerning possible modifications of the skip-stop plan which may be made without a material reduction in present economy of operation.

COMPANY WILL START WITH 6-CENT FARE

After the order, as described above, had been determined upon by the commission and its principal features had been made known to the company and city officials the latter made strenuous objections to the initial rate of fare which was provided therein, viz., 7 cents cash, with ten tickets for 65 cents, and appealed to Judge McCall of the United States District Court, under whose direction the receivers are now operating the property. Judge McCall suggested to the receivers that they consent to an addendum to the proposed order of the commission to the effect that instead of beginning at the proposed initial fare the present fare of 6 cents be continued as a test fare for a period of three months from the date of putting the plan into operation. If at the end of three months the 6-cent fare shall not provide enough revenue to meet the cost of service, as described in the order of the commission, then the rate of fare automatically shall go to the initial rate provided for in the commission's order, and if at the end of the second three months this rate of fare shall not produce sufficient revenue, then the order as written by the commission shall go into full force and effect until changed by the commission or by a court or other tribunal having jurisdiction. It was suggested that the results at the end of both the first and second three months period be submitted to Judge McCall by sworn reports of the receivers at the end of such periods and that he should determine whether or not such results shall require a change in the rate of fare.

This suggestion was made by Judge McCall only on the understanding that the Mayor and Commissioners of the city of Memphis would co-operate with the receivers of the company in giving the new plan a fair trial. The Memphis City Commissioners accepted this suggestion of Judge McCall and the receivers also agreed to it, and these facts having been brought to the commission an addendum was added to the order of the commission providing for initial three months test periods with the initial rate of fare 6 cents.

The order of the commission was a majority one, one member (Commissioner Welch) dissenting as to the rate base (placing it at $10,236,646 instead of $11,846,034) and as to the initial rate of fare (placing it at 6 cents). All three members of the commission agreed as to the other features of the order, including the service-at-cost plan, requirements for renewals and replacement reserve, rate of return and fare scale.

RECEIVERS ISSUE STATEMENT

The receivers in a statement to the public, issued with the announcement of the commission, say:

> As receivers of the Memphis Street Railway Company we have been and are officers of the court appointing us, and as such have impartially represented, as it has been our duty to do, the public, the creditors of the company and the owners of the property.
>
> We have appeared before the state commission by order of the court, after the company had vainly appealed to the preceding city commission for relief, to insure proper service in Memphis and the restoration of solvency to the company, so that new capital may be available as extensions and additions to the property may become necessary.
>
> We have contended for a fair valuation of the property, a fair rate of return, a necessary renewal and replacement reserve and a proper standard of service and revenue enough, but no more than enough, to insure service for the public and fair treatment of those who own the property. There is not a doubt in our minds about the absolute integrity of the members of the state commission who subscribed to its opinion, nor about their ability and their singleness of purpose and desire to reach just conclusions upon all issues.
>
> As receivers we are quite willing to have the test of a 6-cent fare made as agreed upon. We hope it will prove unnecessary ever to make effective any higher fare and that even a lower fare may be eventually possible, but this will depend upon future volume of traffic and trend of operating expenses. It will of course be our purpose to do all possible to get the best results in service and net returns during the test period.
>
> In conclusion we appeal to the city officials, the press and the public generally to remember that the street railway is a city essential, that those now in charge of it are entitled to co-operate in efforts to make it serve adequately those who must use it and that the investment in this property is legitimate and those interested financially are entitled to the fairest treatment.

Our action in agreeing to the further test of the 6-cent fare is not intended in any degree as an abandonment of the contentions made before the state commission nor as a criticism of its action, but is taken in pursuit of a desire to dispose of and settle a controversy which has been precipitated as to the sufficiency of a 6-cent fare in Memphis.

The date at which the ordinance was to go into effect was set as April 1, 1920.

Letter to the Editor

Concrete Stringer Track Good If Many Conditions Could Be Met

THE DENVER TRAMWAY COMPANY
DENVER, COL., March 27, 1920.

To the Editors:

We have taken a lively interest here in the tieless concrete track described in a recent issue of the JOURNAL. A number of years ago the Denver Tramway experimented with a concrete beam substructure designed to eliminate wood ties. This held up very well for a while, but later on it was necessary to remove it and go back to wood ties and ballast, the reason being that at the very outset it was difficult for the construction forces to obtain a uniform grade and alignment. The gradient particularly caused trouble. A rolling load, constantly encountering resistance due to the presence of foreign matter on the tracks, sets up a vibration in the foundation upon which it rolls. This in time disintegrates the foundation unless its mass is so great that the vibration is damped down to the point where it results only in abrasive stresses on the rail head. The construction used by us did not have sufficient depth of beam properly to withstand the vibration shock.

We are not in a position to criticise Mr. Taylor's concrete street railway track support as used in Anderson, but we have had some experience with concrete bents approximately 5 ft. high, spaced on 10 ft. centers and connected by a reinforced concrete beam approximately 18 in. thick, on which a standard 100-lb. T-section rail had been fastened by bolts through the beam. After a number of years the concrete surrounding the reinforcing rods became separated from the rods and fell off. In a concrete paving job done by this company a number of years ago chicken wire mesh was used for reinforceing the slab. We found in time that the pounding of horses' hoofs and the passage of heavy vehicles broke through the cement and exposed this wire mesh. In making joint repairs we found this mesh a nuisance.

This entire matter is just the old controversy of "rigid track structure" versus "resilient." There still is a great difference of opinion in regard to what is best and what will last the longest. We have some rigid track construction here that has stood up well. However, we have other rigid track structures, under heavy traffic, which have developed corrugation to a very marked degree. The following thoughts come to me regarding Mr. Taylor's structure:

Strains: I cannot see the need for wire mesh reinforcement through the slab. The strains are mostly compression, and there is very little tension.

Joints: I would gather that Mr. Taylor constructed his track with the idea that "the life of the joint is the life of the track." The use of a 42-in. channel under the joints seems heavy to us here.

Rigidity: The rigid construction necessitates the greatest care in having the track lines absolutely level and to a uniform gradient in order to prevent corrugation. The article did not state the method used to hold track to surface and line prior to and during the pouring of concrete.

Support: The placing of the 8-in. longitudinal bearing plates in the concrete form in such shape and in such manner as to insure the track being to gage, alignment and grade after the concrete has set must require a very careful and painstaking supervision, which, in the case of the labor we deal with, would be exceedingly difficult and expensive. I wonder if it would not be cheaper instead of using the 8-in. longitudinal plate and ⅝-in. hook bolts 14 in. long to substitute a light-weight continuous I-beam or T-section, which would afford a rigid bearing plate for the base of the rail. In the case of the concrete foundations experimented with by this company, the greatest difficulty resulted from the absence of a wearing plate next to the concrete.

Trench: I can see some saving in the amount of excavation necessary, or rather not necessary, with Mr. Taylor's structure as compared with ordinary track construction. However, if forms are used, then the fabricating and placing of these would, it seems to me, offset the amount saved in excavation.

Time Required: The statement in the article that concrete has been found to "wear better when it has been given plenty of time to harden" is very much to the point. In the case cited the concrete was allowed to cure for twenty-eight days. This length of time would be prohibitive on many of the larger systems, unless the construction program for a brand new piece of track permitted this much time to be taken. In this particular, the management of the street railway company is more often than not the victim of circumstances not of its initiation or control. The "city dads" and public opinion regulate the length of time that a street car company can keep a street to itself. It is my opinion, however, that the value of Mr. Taylor's structure would be greatly enhanced and its life prolonged by a long period of "cure" or "set."

General: With minor changes, Mr. Taylor's concrete track support should be approved by maintenance of way engineers generally. For permanence it should replace ballasted wood tie construction. With a heavy rail head and cars not of over-weight, his track should outlast that of any other type. Any company that can have all the time it needs to let the concrete cure should be able to construct according to the Taylor plan at less initial cost and with guarantee of greater permanence than by following any other plan, providing the expense incident to proper surfacing and alignment does not offset these advantages.

EDWARD A. WEST,
General Superintendent.

The Iowa Railway & Light Company, Cedar Rapids, Iowa, will adopt aluminum conductors for use on all transmission lines operating at 6,600 volts or more. The company already has 700 miles of aluminum conductors in use. The engineers have selected this construction believing that a stranded aluminum conductor with a steel core, if purchased to give equal conductivity with copper, will have greater strength and give lighter loading on the poles than copper wire.

Recent Happenings in Great Britain

The Need for Increased Fares Is the Principal Theme Underlying These Notes from Abroad

From Our Regular Correspondent

During February there was much lamentation among British electric traction undertakings over the present and prospective financial position, owing to the ever-growing cost of operation. This applied both as regards the tramways of the country and the London underground railways. As to the former, the gist of the matter was put in a memorandum by the Municipal Tramways Association, published on Feb. 21 as a preliminary to conferences of all British tramway authorities held in the end of the month to consider the present financial position.

OPERATING EXPENSES 20 PER CENT HIGHER

The statement says almost every tramway system is now being carried on at a loss. Yet the association is confronted with a further application for an increase of wages of 10s. per week, making the pay 44s. a week above pre-war rates. Either the fares must be substantially increased or tramways must depend on compulsory local rates. It is pointed out that more than 20 per cent of the municipally owned tramways in Great Britain are a charge on the local rates. The increase in the working costs has been 20 per cent higher than the increase of revenue. No proper provision can be made for renewals.

Preliminary to consideration by the joint industrial council for the tramway industry of renewed application by employees for increase of wages, the meetings above mentioned were held on Feb. 25 and 26 of the Municipal Tramways Association and of representatives of tramway companies respectively. The joint industrial council (which consists of representatives of employers and employed) met on Feb. 26. The application, which was presented to it by the National Transport Workers' Federation, was for an addition to wages such as would bring the total earnings up to 44s. per week per man above pre-war rates. At the close of the sitting it was announced that the employers' representatives had asked for an adjournment for a fortnight so that further facts might be elicited regarding the increases of wages in comparable industries and that statistics relating to the increase in the cost of living and the financial position of the tramway undertakings might be put in. A committee was appointed to make the necessary investigations and the council adjourned till March 11.

UNDERGROUND GROUP SUFFERING

As to the financial condition of the underground railways group, including four railway companies and the London General Omnibus Company, it was voiced by Lord Ashfield when presiding at the annual meetings in February. He had a tale to tell of greatly increased gross revenue, but of correspondingly increased expenditure. Moreover, as some of the advances in wages or shortening of hours only came into force near the end of the year little of their effect is shown in the accounts for 1919. It is not possible here to go into details of the figures, but generally it may be said that by means of government subvention to the Metropolitan District Railway (which is the only one of the group under government control and guarantee) and with the aid and the operation of the common fund of five companies it was possible to pay dividends for the year at reduced, and for the most part at little more than nominal, rates. The omnibus company used to do best. It is now doing the worst. After providing for working expenses, fixed charges and reserve fund there was a debit balance of £424,000. The biggest credit balance was that of the District Railway, namely, £781,000, including the government subsidy of £566,000. Lord Ashfield stated at the meeting of the District company that on each passenger carried last year by the five undertakings there had been an actual loss of 0.07d. If regard had been given to the necessity of making adequate allowance for depreciation and a return to the shareholders of only 4 per cent had been assumed then the loss would have been 0.38d. per passenger.

RETURN OF LESS THAN 3 PER CENT

In his address to the shareholders of the City & South London Railway Lord Ashfield focussed the whole position thus: The gross earnings of five companies for last year amounted to £10,240,469 and the expenses absorbed £9,744,082, which left a balance of only £496,387. This was the whole sum available for the payment of dividends on a capital totaling more than £20,000,000 and secured a return of less than 2½ per cent. Omitting the government subsidy and making an allowance for depreciation the companies were working at an actual loss. In view of these facts and of the fact that expenses are still going up the companies are promoting a bill in Parliament to enable them to charge higher fares and to abolish workmen's fares.

The opposition which the London County Council is offering to the bill of the underground railway companies is of a somewhat qualified kind. This was only to be expected, seeing that the County Council has already greatly increased the fares on its own tramways and is contemplating another increase. At a meeting of the Council on Feb. 10 it was resolved that the opposition should be directed so as to secure that only such fares were authorized and charged on the railways as were reasonably necessary. Another aspect came up in a report presented to the Council by the highways committee on Feb. 17. It said that one effect of the abolition of workmen's fares on the railways might be to throw an undue strain on the Council's tramways during the rush hours. The committee considered that whatever alterations in fares might be sanctioned the railway companies should be required to provide adequate accommodations for passengers during the heavy traffic hours. The committee also considered that any financial advantages granted to the railways should not be used to assist the allied omnibus companies in competing with the Council's tramways.

DRASTIC ACTION NECESSARY

A fresh move was made by the highways committee and the finance committee of the London County Council early in March when they issued reports recommending drastic action for dealing with the deficit on the working of the Council's tramways. The former committee proposed a further increase in ordinary fares based on 1.2 miles for a penny (1d. a mile is the statutory maximum), instead of 1.5 miles for a penny as at present and 1.8 miles for a penny prior to the last increase. The scheme provides for 2.4 miles for 2d., 3.6 miles for 3d., and for any longer distance there is a flat charge of 4d. The latter for long rides is the same as at present. Workmen's reduced return fares are to be abolished and their single fares are to be 1d., 2d. and 3d., according to distance. These changes are expected to reduce the estimated deficit for the year 1920-21 from £760,000 to £601,000. The next step suggested is to make application to the Ministry of Transport under the Statutory Undertakings (Temporary Increase of Charges) Act for sanction to increase the statutory maximum fare from 1d. a mile up to a limit of 50 per cent. The finance committee on its part proposes that provision for repayment of outstanding capital debt on the cumulative annuity system (3½ per cent table) should be made instead of on the instalment system as at present, and that for twelve years half the cost of renewals of track be charged to capital account, repayable within 12 years. This, with the aid of a heavy draft on the renewals fund, would meet the deficit for the current year.

COVERED BUSES TO BE TRIED

Considerable interest attaches to the fact that omnibuses with top-deck covers are about to be tried in Bradford and Liverpool. This is the first occasion on which the government has allowed the use of a roof to the upper deck of an omnibus. The Bradford vehicle is a trackless electric trolley car, while the Liverpool one is driven by petrol. The Liverpool vehicle is also fitted with a life-guard for the front wheels. No design of the sort has hitherto proved practicable for omnibuses. The Bradford bus seats fifty-one passengers and the Liverpool one fifty-five. They are thus more spacious than the usual London type.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Subway Meetings Begin

Campaign Opened to Secure $15,000,000 to Start Cleveland Underground Construction

The initial meeting in preparation for the campaign in favor of the issue of $15,000,000 of bonds for the construction of the proposed subway system in Cleveland, Ohio, was held in the office of Mayor Harry L. Davis on March 26. In addition to city officials, representatives of a number of civic and other organizations were present.

CLEVELAND MUST BE SHOWN

While no direct opposition developed, questions that were asked indicated that the need of the subway must be shown if its backers are to secure the support of some of the larger organizations. Suggestions pointing to other means of relieving congestion on the streets were made by some of those present, and the advisability of eliminating automobile parking on the streets was discussed as one of the principal means to this end.

C. A. Dykstra, secretary of the Civic League, who represented a special committee of that organization, stated that until a report had been made to the organization and its attitude toward the matter determined it would be embarrassing to him and his colleagues to be placed upon a boosting committee. While it was the desire of the backers of the project to form such a committee at this meeting, it was finally decided to call another meeting for April 5, in order to give the representatives of all organizations an opportunity to make reports and receive instructions.

Mayor Harry L. Davis urged favorable action on the proposed bond issue at this time and argued that the city must have improved means of transportation as soon as possible if it is to escape many limitations in growth and retain its importance as an industrial point. He was supported by Fielder Sanders, Street Railway Commissioner, who is struggling with problems of carrying the people and preventing congestion.

MR. BRINCKERHOFF SUMMARIZES MATTER

Henry M. Brinckerhoff, of Parsons, Klapp, Brinckerhoff & Douglas, who prepared the subway plans, spoke at length on the proposition and answered many questions. The chief points made by him are as follows:

> Cities that have subways commenced to develop rapid transit systems when the population was around 1,000,000.
>
> Cleveland has an advantage over other rapid transit cities in that the Tayler franchise plan enables it to have a unified transportation development. This probably will keep the per capita cost down to around $70, as compared with $100 or more in cities like New York, Brooklyn, Boston, Philadelphia and Chicago.
>
> The function of a transportation system is to take people from where they live to where they work and back again. Cleveland's is largely a rush-hour problem. Cleveland has 48 per cent of walkers as compared with 28 per cent in Chicago and 24 per cent in Detroit. That is due largely to continuous employment in the same factory.
>
> The Public Square has been made the transfer point in the system because nearly one-half of the traffic is involved in that central point. The future rapid transit trunk line, because of the trend of traffic, must go through the Public Square.
>
> The first step in rapid transit should be the establishment of a central terminal point from which the city can develop its system as the trend of population and business determines.
>
> Cleveland should not tie itself up by attempting construction of any considerable length of rapid transit tubes, by committing itself to a beforehand guess at which way the city will grow.
>
> The present plans provide for through routes east, west and south and looping to prevent unprofitable car mileage.
>
> The necessity of making provision now is indicated by an increase of 19 per cent in the number of car riders last winter, sufficient, if maintained, to double the traffic in about five years.
>
> It will take three years to build the subways. Cleveland can save $25 to $30 per capita by building its subways as a start for rapid transit now.

A day or two later Mr. Brinckerhoff announced the cost of the different branches of the proposed subway, based upon the present cost of labor and price of materials. The portion between the Public Square and the new high-level bridge on Superior Avenue, N. W., including the two loops necessary at the square, will cost $4,400,000. To place Euclid Avenue cars in a subway between East Twenty-second Street and the Public Square and build loop No. 3, thus establishing through connection between the east and west sides, the estimated cost will be $5,500,000. The Ontario Street subway will cost $2,500,000 and the St. Clair Avenue portion $2,400,000.

Kansas Plan Regarded as Unworkable

Herbert C. Hoover is not provincial. Because he is not provincial he has come out openly against the new Kansas labor law. He decries the law and predicts that the difficulties in labor compulsion in Australia will be repeated here. Mr. Hoover looms large on the political horizon at this time. His opinions are of considerable import at any time, but extraordinary importance attaches to them just now. In an address before the Chamber of Commerce of Boston on March 24 he discussed the relationship of employer and employee as considered by the National Industrial Conference, of which he is a member, and the difference in viewpoint of the conference and the Kansas legislation for the judicial settlement of labor disputes.

Will Unify Voltages

Indiana Company Proposes to Make Important Line and Power Changes

It is proposed to eliminate the two voltages on the system of the Interstate Public Service Company, Indianapolis, Ind. This will greatly enhance the flexibility of operation of both freight and passenger service. The Interstate Public Service Company took over the Indianapolis & Louisville Traction Railway in June, 1918. This is a 1,200-volt line.

THROUGH OPERATION LIMITED

As a result of this purchase, the Indianapolis & Louisville has been limited to those cars which are equipped for both 600-volt and 1,200-volt operation. This limiting feature is now to be removed by changing over the 1,200-volt section between Seymour and Sellersburg, Ohio, for 600-volt operation. Work is expected to be completed by June 1, 1920.

This section of the line was formerly equipped with one substation in which there were installed two pairs of 500-kw., 600-volt converters which operated in series to produce the 1,200-volt trolley current. This substation will be replaced with five new substations, of which one at Langsdon will be of the automatic type. The others will be manually operated, since they will be located at points where there is a station agent or other employee who can also be utilized as the substation operator.

NEW ROLLING STOCK PURCHASED

The company has purchased eight new 62-ft. all steel passenger cars on which delivery is expected early in June. These will be equipped with four 150-hp. motors each and will be used to haul from one to three trailers. During the summer months, heretofore, the company has been forced to operate the passenger trains in sections, sometimes as many as five sections being required to handle the traffic. With the new equipment it is planned to utilize trailers largely, rather than to operate the trains in sections.

The Interstate company is also planning to buy two combination dining and parlor cars like those furnished the Chicago, North Shore & Milwaukee Railroad by the Cincinnati Car Company. They will be used on the through limited trains between Indianapolis and Louisville which make the run in four hours.

The Interstate Public Service Company operates 62 miles of line. It is headed by Harry Reid of Indianapolis.

British Electrification Projects

Reports of Chairmen at Annual Meetings Show Plans for Increases in Electrical Working Provided Funds Can Be Obtained

At the recent annual meetings of British steam railway companies the chairmen of several of the companies made references to electrification schemes. An abstract of these is given below, along with explanatory notes.

London & North Western Railway.—Sir Gilbert Claughton said that the statement of capital expenditure required for the year 1920 included £150,000 for the widening of the line between Chalk Farm and Willesden for the electric service and it was in the interest of the railway that this work should be completed as early as possible for the increased traffic which the company might certainly expect in the future. Another large item was for new electric trains, without which the company could not establish its full service between London and Watford. In connection with the electrification of the company's London suburban lines, the government restriction during the war on the works necessary to complete the last section had been withdrawn. The works were now actively in progress. [Note.—The electrification of all London & North Western suburban lines was begun before the war and, the delay being removed, the work should soon be completed. The scheme embraces also the North London Railway, an allied line. The through connection between Watford, some 20 miles out, and Baker Street and Waterloo underground railway is working regularly.]

Tremendous Increase in Traffic

London & South Western Railway.—Brig.-Gen. H. W. Drummond said that in 1913 the number of local passengers carried on the company's suburban lines which had been electrified was 25,000,000. Last year the company carried over those sections just under 48,000,000, an increase of 70,000 per day as compared with 1915, in the end of which year the first section began working electrically. The original electrification scheme, submitted in 1913, had to be cut because of the war. In June last the directors ordered the conversion of additional coaches so as to permit of the operation of trains of eight cars instead of six, but the conversion has been delayed by the molders' strike. Regarding the company's Waterloo & City underground line, the board had decided to supersede the present electrical equipment, which was out of date, by modern equipment and to extend the length of the trains. The estimated cost of this, including the necessary coaches, was about £750,000, or three times what it would have cost at prewar prices. Nothwithstanding all this, the advantages were so pronounced the directors have ordered the work to proceed.

Great Eastern Railway.—Sir A. E. Fellowes (deputy chairman) said that with a view to meeting the increasing demands made on the railway, the board had instructed General Manager Sir Henry Thornton to prepare a scheme of electrification. In Sir Henry's opinion the suburban area served by the Great Eastern Railway lent itself readily to electrification. The investigation had not proceeded far enough to permit prediction as to the financial results. [Note.—The Great Eastern Railway has for years had the largest suburban passenger traffic of any of the main lines running out of London. This electrification is long overdue.]

Hopes to Proceed with Work Soon

London, Brighton & South Coast Railway. — The Earl of Bessborough said that at the rush hours the number of trains into the company's London termini, Victoria and London Bridge, was so large, and the railway between London and Croydon was so congested, that it was not possible in existing circumstances to squeeze in another train. The great hope was in electrification. The relief obtained by the quicker working of electric trains in and out of the termini and the advantages those services showed over steam services in stopping and starting were so considerable that if they could only carry out the program laid down before the war to extend the electrical services throughout the whole of the suburban area the road could unquestionably improve the traveling facilities very much. The attention the government was giving to the matter encouraged the directors to hope that at an early date the road might be authorized to proceed with the work. [Note.—The inner suburban lines of this company have been worked electrically for some years.]

Lancashire & Yorkshire Railway. — E. B. Fielden said that the directors were satisfied with the results of the electrification of the company's lines, both in the Liverpool district and between Manchester and Bury, and they recommended an extension between Manchester and Oldham and on to Shaw and Royton. This would require an increase in power facilities. The traffic on the electrified lines in the neighborhood of Liverpool continued to grow. Touching on the financial prospects, the chairman said that, unless the government was prepared to find the capital, the proposed improvements would have to remain in abeyance.

Great Western Railway.—Viscount Churchill said that one of the principal works which the company had in hand at present was the electrification of the Ealing & Shepherd's Bush Railway. The line was completed in 1917 for steam trains, but it had only recently been possible to obtain contracts for its equipment for electric traction. The directors were hopeful that this work would be carried through in the course of a few months. [Note.—The line referred to is a junction railway some 3 miles long connecting the main line of the Great Western at Ealing with the western terminus of the Central London Railway. The only other electric railway belonging to the Great Western is a spur line of about the same length in the west of London connecting with the Metropolitan Railway (Inner Circle).]

North Eastern Railway. — Lord Knaresborough said that the directors had for some time had under consideration and had provisionally sanctioned a scheme for the electrification of the main line between York and Newcastle (a distance of 80 miles), the details of which had been worked out by Sir Vincent Raven, the chief mechanical engineer, in consultation with the traffic officers of the company, and Messrs. Merz & McLellan, consulting electrical engineers to the company. On this part of the railway is a very heavy and varied traffic. [Note: Hitherto the experience of the company with electric traction had been confined to a multiple-unit passenger service between Newcastle, North Shields, Tynemouth and Whitley Bay, and the hauling of coal trains by electric locomotives between Shildon and Newport, Middlesbrough.]

Economic Necessity Their Compelling Motive

The employees of the Interborough Rapid Transit Company, New York, N. Y., have resumed their agitation for an increase in pay. P. J. Connelly, vice-president of the Brotherhood of Interborough Employees, headed a delegation named by the organization to wait upon the city authorities and endeavor to enlist their sympathies. The delegation called at the City Hall recently and in the absence of Mayor Hylan talked with F. H. La Guardia, president of the Board of Aldermen and acting Mayor.

A few weeks ago a similar delegation conferred with Frank Hedley, the president of the Interborough company. They asked for an increase of 25 per cent in their wages, and contended that the increase was promised them when they relinquished their fight for an increase of 50 per cent last August and accepted half the amount demanded.

After the conference with Mr. La Guardia, Mr. Connelly said:

> The acting Mayor told my committee that the city's investigation of the company was practically finished. He gave us the impression that the figures relating to the financial situation of the Interborough, as developed by the investigation, would be ready in a week or so. This was one of the things we went to see him about. The Interborough has been telling us that to grant another wage increase would force it into bankruptcy. The men are indifferent whether they work for the present management of the Interborough or for a receiver. They insist that they are entitled to live decently, and they don't care where the money for more wages comes from.

In Its Concluding Phase

Detroit on Eve of Election in Which City Seeks $15,000,000 to Build Railway

The Detroit (Mich.) United Railway's own ordinance must be approved as to form by Corporation Counsel Wilcox, according to an order in a writ of mandamus signed by Circuit Judges Webster, Mandell and Dingeman. If this decision is sustained the railway may proceed to obtain signatures to the petition for the ordinance, and after the proper number of signatures are obtained the ordinance will be submitted to the City Clerk, who must forward the measure with the signatures to the City Council within ten days. If passed by the City Council the ordinance will then go to the people for ratification, but if the Council fails to pass it within thirty days the measure will go to the people for decision.

CITY WILL APPEAL RULING

Three questions raised in the application for a mandamus by Frank W. Brooks were reviewed by the judges in the joint decision. It was held, first, that the fact that the ordinance was submitted to the Corporation Counsel by a corporation and not by a qualified voter did not impair its standing.

The second question, as to the necessity of submitting a formal initiatory petition together with the form of the ordinance, was decided negatively. The third point, or the question as to whether or not the proposed ordinance was in proper form, was dwelt upon most fully by the judges. It was held that of the thirty-nine reasons advanced by Corporation Counsel Wilcox for refusing to approve the ordinance as to form only two, namely, that the title of the ordinance was defective and that the ordinance in question was a contract or franchise, related to the form.

In answering the contention that the proposed ordinance in question is also a contract or franchise, it was pointed out that the railway rights in Detroit have usually, if not invariably, in the past fifty years been granted by ordinance.

The ruling of the three judges will not be accepted as final by the Corporation Counsel, but an appeal to the State Supreme Court will be made for a review of the case, since the Corporation Counsel holds that the question involved is too far reaching to be left without a final ruling.

PROBLEMS TO BE OVERCOME

In answering questions raised by the citizens' committee regarding the Couzens plan, Mr. Wilcox stated that in drafting the municipal ownership ordinance a contract to purchase the 34.25 miles of Detroit United Railway "day-to-day agreement" lines was not included in order that the city might be free to order those tracks torn up and be replaced by city-built lines.

It was claimed that it was impossible to present an ordinance divided into sections in which the construction features were separated from the purchase phase of the plan, since some voters who favored the construction of lines by the city might object to a purchase plan, or those who approved a purchase plan might not wish to approve a construction plan. The Corporation Counsel holds that the city may find it cheaper and more expedient to order the company to remove its tracks from the streets now operated as day-to-day lines and build the tracks itself.

These statements were made by Mr. Wilcox in answer to questions asked by the citizens' committee on street railway service, an organization formed by Detroit business men and others for the purpose of studying the Couzens plan and the Detroit United Railway proposal by comparison and analysis and to aid the voters in solving the problem now before the city. The committee asserts that the railway question ought to be settled by cool heads and accurate analysis rather than in any spirit of partisanship and selfishness.

The Mayor and his supporters contend that under the Couzens plan the public will get twice the amount of service it now gets, for the municipal lines not only will supply service with 101 miles of new track and 550 additional cars—half what the Detroit United Railway has for the whole city—but it will force the Detroit United Railway to give the best service it is able.

George Engel, former City Controller and present Commissioner of Public Works, points out that Detroit is in a better position to finance the construction of a railway than is the Detroit United Railway. Detroit municipal bonds are sought by investors at 4½ per cent, Detroit having the lowest bonded indebtedness of any city in the country in proportion to its wealth, while the Detroit United Railway would probably have to pay 8 per cent for the money necessary for it to finance its own program, if the company were to compete for funds in the open market.

In a final plea to the voters to defeat the Couzens plan on April 5 the Detroit United Railway supporters claim that the Mayor's plan means:

> Two railway systems and double and triple fares with no fixed rate of fare on the municipal line.
>
> Duplication of plant and fewer cars per mile of track than are operated now.
>
> Years of litigation as to the price to be paid for lines taken over by the city.
>
> Delay in building extensions, as all bonds must be voted. The $15,000,000 is only the start of the expenditures, as the A and B lines or the first lines to be built cannot be equipped for less than $10,000,000 more than the bond issue. No allowance for the C lines and no organization to carry on the work.
>
> Curtailing water and lighting extensions, as such come out of the same utility bonds as any city car system, and these bonds cannot exceed 2 per cent of the assessed valuation.

It is maintained that the Detroit United Railway service-at-cost plan means:

> One system with one fare and free transfers, and the extension of one fare to all the city, including territory that may be added. Twenty million dollars in extensions and equipment will be extended now when needed.
>
> Service controlled by the Common Council and operated by experienced railway men and engineers, with the city reserving the right to purchase or lease the property. all franchises, some perpetual, to be canceled. Company agrees to equip and operate subways and elevated when constructed. Separation of city from interurban accounts by forming of new company. Construction work to begin immediately with material the company now has on hand.

Wages Become a Problem in Toledo

City Faces Another Shutdown of Its Railway Unless Satisfactory Temporary Fare Is Installed

Seven-cent fares with 2-cent transfers or nine tickets for 60 cents appeared to be the latest development in the Toledo railway situation during the week ended April 3. The present fare is 6 cents with 2 cents for each transfer. City, company and labor union officials have been in conference for several days attempting to justify the increased fare with the wage demands of the men. Mayor Schreiber is contending for a scheme to lower fares to workingmen and transfer passengers, making the "straight" riders pay the increase.

The company officials, who proposed the 7 and 2 cent rate, say they will lose $90,000 annually and not be able to increase the wages over 54, 56 and 58 cents an hour. At present the men are getting 42, 44 and 46 cents an hour. They asked for 55, 57 and 60 cents an hour.

The Mayor has tried to get the company to agree to free transfers during rush hours on a 7 and 1 cent basis all day.

The wage agreements expired on April 1 and the men declare they will strike if their minimum is not granted. They have set the minimum at 10 cents lower than the original demand. Whatever agreement is reached in conferences will have to be submitted to the Council for ratification as an amendment to the ordinance repealing the famous "ouster" ordinance.

Company and union officials have agreed on all the working clauses and wage scales of the electrical workers. The men were granted an increase as a compromise. This increase was not enough to affect the operating costs of the railways to a very large extent.

If any scheme of tickets is decided upon the company has said that it will adopt the metal token plan in order to continue the use of the automatic fare register boxes it installed a few months ago. Toledo has not had car tickets for more than three years.

Henry L. Doherty has decided to tackle only one problem at a time in disposing of the wage question, the demand of the Municipal Ownership Commission for a cash price for the Toledo railway property and in the submission of corrections and substitutions for the cost-of-service ordinance.

MANY CORRECTIONS TO BE SUBMITTED

Dewey C. Bailey, counsel for Mr. Doherty, has been working with the objections to the cost-of-service measure. As it was submitted to the company there were more than a hundred added features placed into the ordinance after Mr. Doherty's representatives left the sessions of the commission.

Mr. Doherty declared that the many corrections necessary would be made and submitted to the commission before the time limit of April 3 set by Federal Judge Killits.

Mr. Doherty has pointed out the impossibility of his acceptance of many of the propositions contained in the ordinance by reference to the clause governing the regulation of interurbans. He maintains that the interurbans are not made a party to the contract and do not have to abide by any agreements arrived at through arbitration. Whenever there is a disagreement between the operating company and the interurbans the ordinance provides that the city and interurbans shall have representatives on the board of arbitrators, but that the company shall not be represented. Whatever decision is reached cannot be enforced against the interurbans because they are not parties to the contract. Mr. Doherty declares there are many such provisions which make it impossible for him to operate under the cost-of-service plan as drafted by the commission.

The commission may change the measure drastically after Mr. Doherty's objections are received. However, Mr. Doherty has decided that he is about ready to bargain with the Municipal Ownership Commission. It has asked him for a "cash" price. But he is withholding this matter till the wage propositions and other matters are cleared away.

MR. DOHERTY ASKING $11,000,000

The price set upon the lines by Mr. Doherty is $11,000,000, of which 20 per cent will be cash and the remainder in lien bonds on the property. The valuation set upon the property by the city service director, David Goodwillie, and his assistants was $12,000,000 at present invoices, but $7,110,000 as a "fair" price. This latter valuation was the one taken by the cost-of-service commission in its franchise draft.

Mr. Doherty has said he will give the city a discount for the entire purchase if made in cash.

The decision of the Supreme Court which allows to the city the right to issue general credit bonds for the purchase of a transportation system has the limitation of the debt-contracting power held over against unlimited bonding.

County Auditor Gabe Cooper, who is also a member of the Municipal Ownership Commission, has given it out that the city's total limit of indebtedness would be approximately $20,000,000. The present indebtedness is $14,000,000 gross, but the net is about $9,000,000. This would allow the city to bond itself for approximately $11,000,000 for the purchase of the lines. The difference between the gross and net debt is accounted for by the self-sustaining waterworks and other properties and sinking fund accounts.

The general impression that the city could not raise more than $8,000,000 caused this inquiry into the debt-contracting limitations of the city.

Mr. Doherty expressed great surprise when he was told that the city would be able to issue bonds for the entire price which he had set.

The Municipal Ownership Commission conferred with Mayor James Couzens at Detroit last week in an effort to make a study of his methods of dealing with his street railway problem.

Chairman Henry W. Ashley of the commission will be sent to New York City to study transportation problems there. Mr. Ashley and Commissioner John B. Merrell are working with the law director of the city in drafting an ordinance providing for public ownership of the street railway.

Mr. Hanson Has Learned by Experience

Business leaders and workingmen of Toledo, Ohio, were addressed several times during the week ended March 13 by former Mayor Ole Hanson of Seattle, who told them the dangers that he had encountered in a municipally operated railway in his city. It was under Mr. Hanson that municipal ownership was brought about.

The Toledo men were advised to vote against any measure which would mortgage the property owned by taxpayers in order to buy the Toledo railway system. Mr. Hanson said:

> Don't let them tell you that everything is bad about municipal ownership or don't let the advocates of the proposition tell you that all you have to do is to buy the lines. It's a different story and a large part of it is in the management.

In a graphic story of his career as Mayor of Seattle he pointed out these weaknesses in the public ownership and management of the railway system there:

> 1. Low-priced managers put the business amounting to millions of dollars annually into the hands of wornout old employees or young apprentices in electric railway operation.
>
> 2. Laboring men consider the treasury of a street railway system a perpetual "Christmas tree."
>
> 3 The whole matter becomes a "political football" which is kicked about at every municipal election with higher wages as the goal.
>
> 4. Disloyalty is promoted by making workers, dissatisfied with any refusal of demands, enemies of the government.
>
> 5. By preventing improvements operation is made uneconomical. City Councils can very seldom see the effect of cost-cutting measures.

Mr. Hanson also declared that few cities realize the service of expert engineers with sufficient salary to keep a good man on the job any length of time.

Seattle Shake-Up Started

New Seattle Official Begins His Career With an Attack on the Municipal Railway

Since Mayor Hugh M. Caldwell of Seattle, Wash., took office, on March 15, fourteen positions in the Municipal Street Railway Department have been abolished and three heads of departments have resigned. Mayor Caldwell's initial movement, upon assuming his position as head of the city government, was to request City Comptroller Harry W. Carroll to furnish him with a statement showing complete financial operations of the railway department during 1919.

THREE PLACES ABOLISHED

The three resignations and the abolition of fourteen other positions means a reduction, it is claimed, of approximately $2,885 a month or $34,620 a year in salaries in the department.

The three resignations, which according to reports were desired by the Administration, were from Glenn Hoover, supervisor of publicity; H. M. Nuzum, service and equipment inspector, and George Walsh, real estate appraiser.

The positions abolished were general electric foreman, held by Glen Dunbar; assistant superintendent of equipment, occupied by A. B. Flannagan; junior accountant, head storekeeper, two instructors in power saving, one transportation inspector and six clerks and stenographers.

Mayor Caldwell is still undecided as to the appointment of a permanent head in the Public Utilities Department, saying the temporary appointments of E. D. O'Brien as acting superintendent of the Utilities Department and D. W. Henderson as superintendent of the Municipal Railway will continue in effect until he has decided definitely on what is to be done with the department.

Meanwhile Mayor Caldwell has instructed Corporation Counsel Walter F. Meier to prepare an ordinance creating the division of Municipal Street Railways. The members of the City Council have approved such an ordinance and it will be introduced at a special meeting of the Council to be held at an early date.

MAYOR DEMANDS THE FACTS

In his letter to Comptroller Carroll asking for a financial statement Mayor Caldwell said there are discrepancies in reports that have come to him regarding the finances of the Municipal Street Railway and he asks the official municipal bookkeeper to prepare a statement that will show actual conditions. The Mayor's communication follows in part:

> Some time last fall I read in the papers that the Municipal Street Railway had made a profit of more than $7,000, and only recently I read also in the daily papers a purported statement from the then superintendent of public utilities to the effect that the lines had lost about $18,000 during the same period. There is a discrepancy here of some $25,000.
>
> I should like to have a detailed statement so that I may know whether or not the Municipal Railway was operated at a profit or loss during the balance of 1919, after the lines were taken over by the city.

Ten-Cent Wage Advance

Denver Tramway Says City Must Now Provide Some Means by Which Company Can Meet Arbitration Finding

The arbitration proceedings in the wage controversy between the Denver (Col.) Tramway and Division 746 of the Amalgamated Association were brought to a close on March 18 with the handing down of an award by a majority of the board of arbitrators. One arbitrator filed a dissenting opinion.

COMPANY ARBITRATOR DISSENTS

The trainmen were granted a flat increase of 10 cents an hour over the National War Labor Board scale previously effective. This makes the new wage schedule 53 cents for the first three months, 56 cents for the next nine months and 58 cents thereafter with time and one-half for overtime. The guarantee for extra trainmen was increased from $85 to $100 a month. Demands for an eight-hour day were denied.

The wages of male employees in the mechanical, track and bridge and building departments were increased by the same percentage that the maximum of the wage scale paid trainmen was increased. Employees in the carhouses were granted a wage scale of 52½ cents an hour for the first three months, 55½ cents for the next nine months, with 57½ cents an hour thereafter. A minimum wage of 52½ cents an hour was established for adult male employees.

The arbitrator for the company in the dissenting opinion which he filed stated that he did not concur in the award as it fixed a rate of pay higher than is required to provide a reasonable living wage and imposed such an excessive additional operating expense upon the railway that the company will be unable from its present revenues to render adequate public service, maintain its property and meet its obligations to investors. The dissenting opinion goes on to state that the maximum rate of pay for trainmen as fixed by the award is an increase of more than 20 per cent in the maximum award made by the National War Labor Board and an increase of more than 93 per cent in the maximum wage in effect when the world war began, and further that it is much higher than the average minimum wage paid trainmen in the employ of railways in cities having from 100,000 to 300,000 inhabitants.

CONTROVERSY MANY MONTHS OLD

Attention is also drawn to the fact that in compliance with the provisions of the agreement under which the arbitration proceeded it was incumbent upon the Board of Arbitrators to give consideration not only to the question of reasonable compensation for the employees but to the maintenance of the public service and to the fair return which the owners of the property are entitled to upon the actual value of their property devoted to the public service.

The beginning of this controversy dates back to July of last year when the employees' union presented demands for an increase in the wage scale for trainmen to 60 cents the first three months, 65 cents the next nine months, with 70 cents thereafter; also for overtime pay and changes in working conditions. These demands were made following the action of the municipal authorities in reducing the rate of fare from 6 cents to 5 cents and the decision of the Colorado Supreme Court vesting in the municipal authorities jurisdiction over the rates of utilities operating in Denver and other home rule cities in Colorado. The reduction in the rate of fare necessitated a reduction in the wage scales which precipitated a four days' strike and brought about the higher wage demands. The strike was ended by the municipal authorities agreeing to restore the 6-cent fare and the employees agreeing to return to work on the National War Labor Board scale of wages with the understanding that their demands would be taken up and disposed of within a period of six months.

ARBITRATION STARTED LAST NOVEMBER

Under the agreement of Sept. 4, 1919, between the company and the union the questions at issue were submitted on Nov. 19, 1919, to a board of arbitration consisting of William G. Evans, former president of the Denver Tramway, appointed by the company, and William C. Thornton, an insurance agent and a member of the Bookbinders' Union, appointed by the employees. Hamilton Armstrong, chief of police of Denver, was selected as the third arbitrator on Jan. 13, 1920.

The data filed by the company with the board of arbitrators brought out that on the basis of the October, 1919, earnings on the National War Labor Board scale the average annual compensation of its trainmen employees would be $1,578 for that year with an average of $1,836 for the 10 per cent of the men who earned the highest wages and $1,247 for the 10 per cent of the men who earned the lowest wages. Average annual earnings for shopmen were shown at $1,522 with a maximum of $1,992 and a minimum of $1,143, while the trackmen would average $1,325 with a maximum of $1,694 and a minimum of $1,134.

Comparisons made with other occupations in Denver showed that the annual average compensation of truck drivers is $1,125; retail grocery clerks, $1,026; express company employees, $1,170; mail carriers and clerks, $1,250; skilled mechanics, $1,500; carpenters, $1,100; bricklayers, $1,028. Sworn statements made by representatives of various labor unions before the Colorado Industrial Commission were submitted by the company in substantiation of its data.

Despite the authoritative and undisputed data filed by the company, one of the most important factors which influenced the decision of the two arbitrators who signed the award was undoubtedly the wage scales of 60 cents an hour and in excess thereof which had been agreed to in other cities.

The company has placed upon the municipal authorities the entire responsibility for solving the problem. In short, the company said:

> Thus the solution of the problem rests entirely with the city; either the 7-cent fare with the 58-cent scale of wages now made effective, or the 6-cent fare with the National War Labor Board scale of wages.
>
> The tramway is definitely out of politics and will make no campaign for or against either policy, but pledges its utmost efforts to give the best possible service permitted by the revenues, whatever may be the decision of the city. The problem presented is purely a question of business and sound economics. It is not a political question and should not be made a political issue.

Rochester Men Demand 100 Per Cent More

Wage increases of nearly 100 per cent, an eight-hour day and a six-day week are asked by the motormen, conductors and other employees of the New York State Railways. The demands, if accepted, will go into effect on May 1, when the present agreement with the union will expire. This scale also has been agreed upon by the union divisions in Syracuse and Utica.

In detail the compensation asked is 81, 83 and 85 cents an hour for motormen and conductors on city cars and 90 cents an hour for those on interurban lines. The scale now in effect fixes the men's compensation at 41, 43 and 45 cents an hour for city work and 47 cents an hour for interurban runs. The agreement which the Amalgamated has with the company virtually assures the settlement of differences between the company and the union by arbitration.

If the company were to meet the maximum demands of its employees on the Rochester lines it would mean an increase in the annual payroll of the New York State Railways of $2,120,000, according to James F. Hamilton, president of the company. Testimony which was presented at the recent hearings of the Public Service Commission indicated that the railway would need a 7-cent fare to operate its lines properly. If that is true, granting the maximum demands of the men would probably make a fare of 9 or 10 cents necessary. Each cent an hour the wages of the men are advanced will add $53,000 to the cost of operation of the Rochester lines, according to Mr. Hamilton. Mr. Hamilton said:

> It will be impossible for the company to meet the demands of its employees. A conference is to be called with the employees of the company within the next few weeks and I feel quite certain that when we sit around the table a fair and amicable adjustment will be made. I do not expect any trouble, for I am confident that the men will be fair and just and that the public of Rochester will not be inconvenienced.

M. O. Vote on April 6

Madison, Wis., Will Decide on That Day Whether It Will Take Over Local Railway

The electors of Madison, Wis., will vote on April 6 on the question of municipal ownership of the railway system. After a five-hour debate, the Common Council by a vote of ten to seven decided to submit to a referendum at the municipal election the question:

> Shall the city of Madison acquire property actually used and useful for the convenience of the public of the Madison Railway Company?

This settled nearly a year of debate over municipal ownership in the Council and was the result of a majority and minority report of a special committee of the Common Council and citizens appointed to study the local situation. The railway contended it could not improve the service with its present 6-cent fare.

The majority report of the special committee recommended that the company be permitted to pay its indebtedness to the city of more than $36,000 for paving between its tracks in ten annual instalments; that the city assume the cost of such pavement in the future; that the use of one-man cars now permitted on one line be extended to other lines.

The minority report opposed all recommendations of the majority.

The fight for municipal ownership has been led by City Attorney William Ryan, who drafted the bill passed by the Legislature at the last session permitting the municipal ownership of railways upon referendum vote of the electors. The recent primary campaign for Mayor of Madison was waged on the referendum question. Blied and Kittleson, who favored the immediate referendum, defeated Mayor Sayles, who opposed the vote until the public had secured more information.

Not a Wheel Has Turned in Thirty Days at Dubuque

The trainmen of the Dubuque (Iowa) Electric Company went on strike on March 1 for a wage increase from 42 cents to 60 cents an hour. The company has not operated a car since that time. It offered the men a compromise wage of 50 cents an hour, with 5 cents extra for operating safety cars if these are later installed. The men rejected this.

There is no particular quarrel between the company and the men. The company continues to deal with the union and has told both the city authorities and the employees that it is willing to pay the men the wages they ask if any one can show them where the money is to come from. The net earnings for last year would be more than exceeded by the increase asked by the men.

The City Council passed an ordinance recently directing the company to begin operation of its cars within twenty-four hours, but the franchise which the company holds has a provision which protects it in case the cars are not operated because of a strike. The company officials have asked the union for suggestions as to what it thinks should be done. Meantime the company's attitude is that it is losing less money by permitting the cars to stand in the carhouse than by operating them at the increased wage.

Railways Escaped Serious Damage

Apparently the electric railways escaped the worst of the storm in the Central West. At least this was the trend of the information which the Chicago office of the ELECTRIC RAILWAY JOURNAL had been able to obtain up to March 31.

The Chicago Surface Lines lost forty poles on the Milwaukee Avenue line extension, so that about 4,000 ft. of trolley wire and feeder were dropped to the ground. The trolley wire and feeder were undamaged, however, and were put back in place on new poles. The cross-arms were destroyed for the most part.

The Aurora, Elgin & Chicago Railroad had some trouble in Elgin, where a few poles and some trolley lines were blown down. The building next door to the terminal station in Elgin was almost completely demolished and the débris blocked the entrance to the interurban station, but the station itself was not badly damaged.

The Chicago, North Shore & Milwaukee Railroad was tied up for about two and one-half hours through the blowing down of some trolley wire and some high tension line and poles. The center of this trouble was in Wilmette. The crossing gateman at Wilmette Avenue suffered a broken arm and other injuries when he was picked up with his shanty and stove and carried across the street.

The Chicago & West Towns Railway, Oak Park, had about 400 ft. of trolley wire blown down.

The tornado approached Toledo from the west, divided in the Maumee Valley and swept toward Lake Erie parallel to the river, avoiding Toledo by 15 miles on either side.

At Genoa part of the city was swept away and the Northwestern Ohio and the Lake Shore Electric suffered damage in poles blown over and service was interrupted for a period of nearly twelve hours.

On the west the Toledo & Western service was interrupted for three days when whole miles of trolley poles and high tension were swept away. The Toledo & Indiana suffered a similar loss and the town of Swanton, on its lines, was almost completely devastated. The Toledo, Bowling Green & Southern, the Toledo, Fostoria & Findlay and the Ohio Electric Railway were held up for several hours on Monday as a result of damage to lines.

In the city of Toledo telephone poles and electric lines were torn down along Summit Street.

News Notes

Property Damage Recovered in Strike Suit.—The International Railway, Buffalo, N. Y., will receive $3,317 from the county of Erie to cancel the judgment obtained as the result of the suit for damages resulting from the railway strike in 1913. The company has agreed to stop further litigation. The company sued for loss of revenue through alleged inadequate police protection. The verdict is only for actual property damage.

Toronto Will Extend Civic Line.—By a vote of fourteen to ten the City Council of Toronto, Ont., in committee, has decided in favor of the construction and equipment of the Mount Pleasant road civic car-line, at an estimated cost of $1,060,000, by using $117,060 remaining to the credit of By-law No. 7,629 and applying for a private bill to raise the balance of $943,000 by issuing debentures without the consent of the ratepayers.

Wheeling Men Prepare Wage Demands.—At a meeting of the executive board of the union of the electric railway workers of the Wheeling and Eastern Ohio districts, held during the week ended March 27, plans were completed to present the new wage scale to the railway officials of the Wheeling district. The old scale expires on April 30. A communication was read by Clyde E. Bartlebaugh, president of the union, stating that all the men of the Pittsburgh district had been granted a 10 per cent increase.

Buffalo Men Ask Increase.—Platform men and shopmen employed on the Buffalo, Niagara Falls and Lockport lines of the International Railway, Buffalo, N. Y., who are affiliated with the Buffalo local of the Amalgamated Association, have presented demands for a wage increase of approximately 60 per cent. The present agreement expires on May 1. The new scale of pay will be close to 90 cents an hour. An eight-hour day and a six-day week are also demanded by the men. The men are now receiving from 41 to 48 cents an hour.

Mr. Dempsey Being Tried Again.—The second trial of John J. Dempsey, former vice-president of the New York Consolidate Railroad (Brooklyn Rapid Transit System), charged with culpable negligence amounting to manslaughter in the second degree, began with the work of selecting a jury in the Supreme Court at Mineola on March 29. The charge grows out of the Malbone Street tunnel disaster in Brooklyn, which occurred in November, 1918, and in which ninety-two persons lost their lives and scores were injured. Mr. Dempsey was tried on similar charges last December, but the jury disagreed.

Financial and Corporate

Revenues Outstrip Expenses

Statistics for December Show Greater Comparative Increase in Revenues Than Operating Costs

A very favorable showing for December, 1919, is made by the electric railways reporting their monthly operating statistics to the information bureau of the American Electric Railway Association. In the first four of the eight accompanying tables a comparison of these returns is made with those of December, 1918, and the improvement made is brought out strikingly.

A Promising Showing Made

The feature of the tables is probably the relative increase per car-mile in the operating revenues and operating expenses. In all sections of the country the revenues are apparently increasing more rapidly than the expenses, a condition which has not existed since before the war, and which, if it really indicates the trend of permanent operating conditions, promises better times for the traction industry. However, too much importance should not be attached to the showing for one month; it is promising, but until the same trend can be established over a period of several months at least it is a promise which should be scrutinized warily. Meanwhile the details of the situation may be examined and studied.

Taking the country as a whole, the total railway operating revenues of the companies reporting increased from 40.14 cents to 47.00 cents per car-mile, or 17.09 per cent. The operating expenses increased from 34.51 cents to 35.60 cents per car-mile, an increase of only 3.16 per cent. This produced an increase in the net operating revenue of 102.48 per cent., the amount rising from 5.63 cents per car-mile in 1918 to 11.40 cents in 1919.

Large Increase in Net in West

Much of this large increase is due to conditions in the West, where the net operating revenue increased 343.49 per cent. In the East, where the bulk of the companies reporting operate, revenues increased 17.75 per cent while expenses were increasing 11.07 per cent per car-mile, producing an increase in the net operating revenue of 53.07 per cent per car-mile. In the South revenues increased 14.77 per cent per car-mile, expenses increased 6.38 per cent and net operating revenue 34.62 per cent.

The principal cause of this favorable showing is probably the large number of fare increases which has been in effect for a long time. These increases have now come to be accepted by the public as a matter of course. Whatever loss of riding occurred when the early increases went into effect has long since been made up and the normal increase in the number of passengers carried takes place from year to year under the new fares as it did under the old. Furthermore, the increases which have already been obtained have paved the way for additional increases, and now, when companies which have managed to struggle along on their original fares decide at last that they must go to a higher rate, the resentment against the advance is not as marked as that manifested toward the pioneer increases. In consequence there is not so great a falling off in the riding habit. In short, the fetich of the 5-cent fare is losing its potency.

Explanations Offered

The showing in the West is, of course, abnormal. It is probably due in part, at least, to the lingering effects of the influenza epidemic in 1918. It will be remembered that the epidemic occurred later in the West than in the other sections of the country and lingered there long after it had disappeared elsewhere.

Another cause of this showing in the West is that a number of the companies conducted extensive repairs and improvements in their roadbed and tracks in December, 1918, and as a consequence their expenses for way and structures were abnormally heavy and several times as great as in December, 1919, thus producing an effect of falling off in expenses for the latter month.

As in the past, the returns from both city and interurban companies have been classified according to the following geographic grouping: Eastern District—east of the Mississippi River and north of the Ohio River; Southern District—south of the Ohio River and east of the Mississippi River; Western District—west of the Mississippi River.

Ohio Road May Be Abandoned

That the Toledo & Western Railroad, which operates between Toledo and Pioneer, Ohio, with a branch to Adrian, Mich., may be abandoned because it does not pay was the information given to members of the Morenci, Mich., Chamber of Commerce recently by business men and railroad officials.

Frank Coates, president, and party had inspected the lines and were being entertained by Morenci business men. He told them that the motor truck and motor passenger business had cut into the revenue of the line enormously at a time when costs were advancing and fares remaining low.

Cars have been removed to cut down the cost of operation, but the road still shows a deficit. The roadbed and the equipment are in need of repair, but Mr. Coates said there was no money available to do the work.

Morenci would lose its largest industry and Pioneer would be without rail communication if the line is abandoned. The road is a Doherty property.

Puget Sound Company Changes Its Name

At a special meeting of the stockholders of the Puget Sound Traction, Light & Power Company, Seattle, Wash., on March 23 the stockholders voted to authorize the issue of $10,000,000 of 7 per cent cumulative prior preferred stock and to change the name of the company to Puget Sound Power & Light Company. The authorization of this issue of stock puts the company in a better position to finance its requirements, both as to the liquidation of its floating debt and as to financing expenditures required to take care of new business. The position of the present outstanding 6 per cent preferred stock is materially strengthened by this method of financing, which should advance the prospects of the resumption of the full dividend rate of 6 per cent.

A circular about the change issued in anticipation of the meeting explained matters as follows:

> Since the refunding of the short-term notes in June, 1918, it has been necessary to spend very considerable sums for construction purposes to keep pace with general development stimulated by the war and to bring into full use those portions of its plant, mainly water powers, which were not then fully loaded, not only to cover war necessities but also to improve the net earnings.
>
> The outlay has been amply justified by the improving net earnings, but it has made necessary borrowing from banks, the floating debt now amounting to $1,838,000. Additional funds will be needed from time to time to finance for like expenditures. Existing conditions require that bank borrowings should be kept at a minimum and also preclude the sale of more of the present 6 per cent preferred or common stock.
>
> Your directors believe that it would be highly undesirable if not impossible to finance all of the requirements by further increases in the funded debt, and they therefore recommend the issue of $10,000,000 of 7 per cent cumulative "prior preference stock," which it is their intention to dispose of from time to time as market conditions permit and requirements make desirable. The sale of stock not only will make it possible to maintain a more conservative balance between the debt and capital stock, but also will enable permanent borrowing on a more economical basis if it appears wise to resort to such borrowing.
>
> The company has sold to the city of Seattle its street railway system in that city for $15,000,000 of utility bonds which are held under the mortgages in substitution for the property sold. Our capital expenditures, therefore, will be largely devoted to the development of the electric light and power business, making advisable a change of name to Puget Sound Power & Light Company.

Much Financing Being Done

Corporate financing in March was on a large scale, the total issue of railroad, industrial and public utility bonds amounting to $251,336,000. Public utility financing accounted for $38,639,000.

TABLE I—INCOME STATEMENT OF THIRTY ELECTRIC RAILWAYS FOR DECEMBER, 1919, COMPARED WITH DECEMBER, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Railway operating revenues	$3,841,224	$3,247,654	$2,504,587	$2,102,128	$147,673	$136,546	$1,188,964	$1,008,980
Railway operating expenses	2,908,943	2,792,050	1,987,168	1,767,600	96,252	95,982	825,523	928,468
Net operating revenue	932,281	455,604	517,419	334,528	51,423	40,564	363,441	80,512
Net revenue: Auxiliary operations	201,986	180,896	167,571	137,749	22,941	43,147	11,474	....
Taxes	245,800	218,002	150,334	143,425	12,350	12,550	83,116	62,027
Operating income	888,467	418,498	534,656	328,852	62,014	71,161	291,797	18,485
Non-operating income	53,279	54,696	47,198	39,663	469	8,167	5,612	6,866
Gross income	941,746	473,194	581,854	368,515	62,483	79,328	297,409	25,351
Deductions from gross income	648,956	623,255	415,175	375,524	38,401	43,381	195,380	204,350
Net income	292,790	*150,061*	166,679	*7,009*	24,082	35,947	102,029	178,999
Operating ratio (per cent)	75.73	85.97	79.24	84.08	65.18	70.29	69.43	92.02
Car-miles operated	8,172,039	8,091,106	5,325,627	5,263,027	421,338	447,113	2,425,074	2,380,966

TABLE II—INCOME STATEMENT IN CENTS PER CAR-MILE OF THIRTY ELECTRIC RAILWAYS IN TABLE I, COMPARING DECEMBER, 1919, WITH DECEMBER, 1918

	United States			East			South			West		
	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent. Increase
Railway operating revenue	47.00	40.14	17.09	47.03	39.94	17.75	35.05	30.54	14.77	49.03	42.38	15.69
Railway operating expenses	35.60	34.51	3.16	37.31	33.59	11.07	22.84	21.47	6.38	34.04	39.00	*12.72*
Net operating revenue	11.40	5.63	102.48	9.72	6.35	53.07	12.21	9.07	34.62	14.99	3.38	343.49
Net revenue: Auxiliary operations	2.47	2.24	10.26	3.15	2.62	20.22	5.44	9.65	*43.63*	0.47	....	....
Taxes	3.01	2.69	11.80	2.82	2.72	3.67	2.93	2.81	4.27	3.43	2.61	31.42
Operating income	10.86	5.18	109.65	10.05	6.25	60.80	14.72	15.91	*7.48*	12.03	0.77	1,462.33
Non-operating income	0.65	0.68	*4.41*	0.89	0.75	18.66	0.11	1.83	*93.99*	0.23	0.29	*20.69*
Gross income	11.51	5.86	96.41	10.94	7.00	56.28	14.83	17.74	*16.40*	12.26	1.06	1,056.60
Deductions from gross income	7.94	7.70	3.12	7.80	7.13	9.40	9.11	9.70	*6.09*	8.06	8.58	*6.06*
Net income	3.57	*1.84*	.....	3.14	*0.13*	.....	5.72	8.04	*28.86*	4.20	7.52	....
Operating ratio (per cent)	75.73	85.97	.....	79.24	84.08	.....	65.18	70.29	.....	69.43	92.02	....
Car-miles operated	8,172,039	8,091,106	6.13	5,325,627	5,263,027	1.19	421,338	447,113	*5.76*	2,425,074	2,380,966	1.85

TABLE III—OPERATING EXPENSES OF *FORTY-TWO ELECTRIC RAILWAYS FOR DECEMBER, 1919, COMPARED WITH DECEMBER, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Operating expenses	[1]$3,399,166	[2]$3,311,691	[3]$2,405,176	[4]$2,253,773	[4]$331,772	$275,966	$662,218	$781,952
Way and structures	412,300	552,448	322,393	321,436	26,119	25,490	63,788	205,522
Equipment	409,199	382,489	263,791	278,906	44,579	31,771	100,829	71,812
Power	594,599	597,289	499,092	462,759	16,713	16,328	78,794	118,202
Conducting transportation	1,469,387	1,276,160	959,733	832,556	192,512	155,760	317,142	287,844
Traffic	18,630	24,700	13,972	17,667	1,076	1,303	3,582	5,730
General and miscellaneous	468,752	454,706	319,896	316,550	50,773	45,314	98,083	92,842
Car-miles operated	10,859,756	10,619,575	6,677,745	6,561,715	1,459,358	1,367,617	2,722,653	2,690,243

* NOTE—This table includes the expenses of the thirty companies shown in Tables I and II, and in addition twelve other companies, which are not included in Tables I and II, because of the fact that they do a power and light business and do not separate their railway taxes and fixed charges of their other business.

[1] Includes $26,299 express charges. [2] Includes $23,899 express charges. [3] Includes $26,299 express charges. [4] Includes $23,899 express charges.

TABLE IV—OPERATING EXPENSES OF FORTY-TWO COMPANIES APPEARING IN TABLE III, SHOWING THE AMOUNTS IN CENTS PER CAR-MILE FOR DECEMBER, 1919, COMPARED WITH DECEMBER, 1918

	United States			East			South			West		
	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase
Operating expenses	[1]31.31	[2]31.17	0.45	[3]36.01	[4]34.34	4.86	22.73	20.17	12.69	24.32	29.07	*16.34*
Way and structures	3.8	5.20	*26.93*	4.83	4.90	*1.43*	1.79	1.86	*3.76*	2.34	7.64	69.37
Equipment	3.77	3.60	4.72	3.95	4.25	*7.06*	3.05	2.33	30.90	3.71	2.67	38.90
Power	5.48	5.62	*2.49*	7.47	7.05	5.96	1.15	1.19	*3.37*	2.89	4.39	*34.17*
Conducting transportation	13.53	12.02	12.56	14.37	12.69	13.23	13.19	11.39	15.80	11.65	10.70	8.87
Traffic	0.17	0.23	*26.09*	0.21	0.27	*22.23*	0.07	0.09	*22.23*	0.13	0.22	*40.91*
General and miscellaneous	4.32	4.28	0.93	4.79	4.82	*0.62*	3.48	8.31	5.13	3.60	3.45	4.34
Car-miles operated	10,859,756	10,619,575	2.26	6,677,745	6,561,715	1.77	1,459,358	1,367,617	6.71	2,722,653	2,690,243	1.20

[1] Includes 0.24 cents per car-mile. [2] Includes 0.22 cents per car-mile. [3] Includes 0.39 cents per car-mile. [4] Includes 0.35 cents per car-mile.

TABLE V—COMBINED INCOME STATEMENT OF *SEVENTY-THREE ELECTRIC RAILWAYS FOR DECEMBER, 1919

	United States	East	South	West
Railway operating revenue	$8,762,710	$5,583,231	$918,187	$2,261,292
Railway operating expenses	6,598,474	4,404,507	615,251	1,578,716
Net operating income	2,164,236	1,178,724	302,936	682,576
Net revenue: Auxiliary operations	541,330	445,982	22,941	72,407
Taxes	541,273	303,447	96,487	141,339
Operating income	2,164,293	1,321,259	229,390	613,644
Non-operating income	514,208	133,492	239,019	141,697
Gross income	2,678,501	1,454,751	468,409	755,341
Deductions from gross income	1,835,134	1,075,345	231,121	528,668
Net income	843,367	379,406	237,288	226,673
Operating ratio (per cent)	75.29	78.91	67.02	69.81
Car-miles operated	20,039,523	12,014,931	2,599,138	5,425,454

* Includes the companies shown in Tables I to IV and others for which the 1918 figures are not available.

TABLE VI—COMBINED INCOME STATMENT OF TABLE V, SHOWING THE AMOUNTS IN CENTS PER CAR-MILE

	United States	East	South	West
Railway operating revenue	43.72	46.46	35.32	41.68
Railway operating expenses	32.92	36.66	23.67	29.10
Net operating income	10.80	9.80	11.65	12.58
Net revenue: Auxiliary operations	2.70	3.72	0.88	1.33
Taxes	2.70	2.53	3.71	2.61
Operating income	10.80	10.99	8.82	11.30
Non-operating income	2.57	1.11	9.20	2.61
Gross income	13.37	12.10	18.02	13.91
Deductions from gross income	9.16	8.95	8.89	9.74
Net income	4.21	3.15	9.13	4.17
Operating ratio (per cent)	75.29	78.91	67.02	69.81
Car-miles operated	20,039,523	12,014,931	2,599,138	5,425,454

TABLE VII—DETAILED STATEMENT OF THE OPERATING EXPENSES OF *NINETY-THREE ELECTRIC RAILWAYS FOR DECEMBER, 1919

	United States	East	South	West
Operating expenses	[1]$8,415,990	[2]$5,926,190	$890,790	$1,599,010
Way and structures	1,000,185	731,801	87,339	181,045
Equipment	1,063,046	743,990	109,387	209,669
Power	1,270,432	974,904	57,918	237,610
Conducting transportation	3,701,608	2,494,681	496,113	710,814
Traffic	34,888	25,676	1,803	7,409
General and miscellaneous	1,313,787	923,094	138,230	252,463
Car-miles operated	26,625,524	17,040,687	3,818,699	5,766,138

* This table includes the expenses of the seventy-three companies shown in Tables V and VI, and in addition twenty other companies which are not included in Tables V and VI because of the fact that they do a power and light business and do not separate their railway taxes and fixed charges from the taxes and fixed charges of their other business.

[1] Includes $32,044 express charges.
[2] Includes $32,044 express charges.

TABLE VIII—DETAILED STATEMENT OF THE OPERATING EXPENSES OF THE NINETY-THREE COMPANIES APPEARING IN TABLE VII, SHOWING THE AMOUNTS IN CENTS PER CAR-MILE

	United States	East	South	West
Operating expenses	[1]31.60	[2]34.76	23.32	27.73
Way and structures	3.76	4.29	2.29	3.14
Equipment	3.99	4.36	2.86	3.64
Power	4.77	5.72	1.52	4.12
Conducting transportation	13.90	14.63	12.99	12.32
Traffic	0.13	0.15	0.05	0.13
General and miscellaneous	4.93	5.42	3.61	4.38
Car-miles operated	26,625,524	17,040,687	3,818,699	5,766,138

[1] Includes 0.12 cent per car-mile for express charges.
[2] Includes 0.19 cent per car-mile for express charges.

Seattle Municipal Railway Lost $517,173

Apparent Profit of Line There Turned Into Deficit When Proper Allowance Is Made for Depreciation

According to a statement prepared by City Comptroller Harry W. Carroll, Seattle's municipal railway during the year ended Dec. 31, 1919, operated at a net loss of $517,173. This statement takes into consideration the depreciation of the railway property since the city of Seattle purchased the lines last April. The depreciation figure is given as $499,173.

The total expense of operation of the railway, including the depreciation item, was shown to be $4,675,326; total operating revenue for the period was $4,158,153. Regarding the item of depreciation, which was estimated by A. F. Whalley, of the State Bureau of Inspection and Supervision of Public Offices, in conjunction with Comptroller Carroll, Mayor Hugh M. Caldwell issued the following explanatory statement:

The item of $499,173 depreciation of road and equipment is taken from the figures just completed by the State Bureau of Inspection and Supervision of Public Offices. Mr. Whalley of this department has been working on the accounts for the last two months.

The depreciation figure has been segregated by him on the various units of plant according to the classification of plant accounts by the Interstate Commerce Commission, ranging from one-half of 1 per cent on units such as grading and ballast, to 20 per cent on miscellaneous equipment (automobiles, etc.).

On the lines purchased from the Puget Sound Traction, Light & Power Company the ledger value of $15,000,000 was taken, from which was deducted lands and other undepreciable property aggregating $647,-719. In other words, the depreciation has been figured on the valuation of the lines taken over from the Traction Company of $14,352,281, representing the full purchase price of depreciable assets; in other words, the $499,173 depreciation charged is approximately 4 per cent of the total depreciable assets.

The State of New York Public Service Commission, Second District, advises in its classification adopted Aug. 20, 1918, that its experience shows in the operation of electric railways the depreciation on way and structures should not be less than 2 per cent nor more than 5 per cent per annum; that the depreciation on equipment should not be less than 2 per cent nor more than 10 per cent per annum on the average total cost of such assets. Applying the average or mean of these rates to the assets of the street railways of the Seattle Municipal Railway a figure is arrived at approximating very closely the amount charged to depreciation in 1919.

The Puget Sound Traction, Light & Power Company figured its depreciation while operating the lines at 20 per cent of the passenger revenue less the amount expended for maintenance. This was a purely arbitrary method of figuring depreciation and varied with the revenues and maintenance each year.

If the city paid $5,000,000 more than the lines were worth, as many people believe to be the case, the depreciation, of course, is being figured upon an inflated valuation. As I understand it, an engineer was employed to spread the $15,000,000 over the assets which were being turned over to the city and to estimate the proportionate value of each class of property or equipment making up the total. At an actual value of $10,000,000, the depreciation would be approximately $200,000 less per year.

For comparative purposes we find that the municipal railway lines of San Francisco for the year ended June, 1919, charged to depreciation $334,867.21 on a total valuation of $6,499,480. The method used in San Francisco took 14 per cent of the passenger revenues without any deduction for maintenance. This would be slightly more than 5 per cent on the valuation of $6,500,000, whereas the percentage used on the Seattle lines was slightly over 4 per cent.

The city of Seattle in its light and power plant has been and is now charging depreciation each year. For the year 1919 the sum of $244,128 was charged to depreciation, which on a valuation of approximately $7,600,000 of assets actually in service, would make the rate of depreciation approximately the same as that used for the street railway by the State Board of Accountants.

From the examination I have been able to make, it seems to me that the city must take one of two courses—it must continue to proceed on the $15,000,000 valuation and figure actual depreciation on what is equivalent to watered stock, or else it must make a new valuation and charge off in a lump sum the excess price paid for the lines and thereafter figure the actual depreciation on the actual value of the lines.

Expense	
Operating:	
Way and structures (maintenance of roadway, buildings and grounds)	$282,993
Equipment (maintenance of cars, shop equipment, automobiles, etc.)	528,507
Power (power produced and purchased)	558,529
Conducting transportation (trainmen, carhouse and car service expense)	1,950,459
Traffic (advertising park and resort attractions)	2,228
General and miscellaneous (general office expenses, industrial insurance, injuries and damages, stationery and printing, store expense, rent of track and facilities)	245,109
Auto buses (expense of auto buses connecting outlying territory with end of car line)	904
	$3,568,729
Depreciation of road and equipment	499,173
	$4,067,902
Deductions from gross income:	
Interest on general bonds	$23,282
Interest on revenue bonds	579,683
Amortization of discount on revenue bonds	2,314
Miscellaneous interest (interest on railway fund warrants)	2,145
	$607,424
Total	$4,675,328
Revenue	
Operating revenue:	
Passenger car service	$4,030,602
Special passenger car revenue	471
Auto bus service	274
Express service (carrying newspapers)	3,948
Freight service	32,112
Mail service	6,213
Municipal employment passenger service (police and firemen)	38,000
Miscellaneous transportation service	3,265
	$4,114,885
Miscellaneous revenue:	
Station and car privileges (advertising privileges on stations and cars)	$12,947
Rent of track and facilities	20,938
Rent of cars	3,523
Rent of real estate	4,638
Electric current sold	579
Other miscellaneous revenue	643
	$43,268
Total	$4,158,153
Net loss for 1919	$517,173

In submitting his report to Mayor Caldwell, Mr. Carroll attached the following commentary:

The statement of income, profit and loss of the City Railway Department does not include certain expenses, properly chargeable to railway operation, borne by the general fund and charged by authority of the legislative body of the city to the expense of the respective departments rendering the services.

When the city acquired the traction properties of the Puget Sound Traction, Light & Power Company on April 1, 1919, it became necessary to increase the number of employees in several general fund departments. In the corporation counsel's office, two assistants to the corporation counsel, five claim agents, one law clerk and two stenographers were added to the force. Owing to the large grist of damage claims and increased litigation, expense for office supplies, stationery and printing, postage, etc., was materially increased.

The total cost of the city railway legal business borne by the general fund in 1919 was about $20,000; the purchasing department expenses were increased approximately $5,000; the expense of the comptroller's department for auditing claims, issuing warrants and keeping accounts of the railway department cost in round figures $6,000. In addition, there was an increase in the city treasurer's office expense of about $1,000 for handling city railway business in 1919. In the Public Utilities Department, all of the superintendent's salary of $4,500 and half of the auditor's salary of $3,250 have been charged to that department and paid from the general fund, notwithstanding more than two-thirds of their time has been devoted to railway operation.

Altogether some $35,000 of expense for the railway department was paid in 1919 out of the general fund. It is true that the general fund receives 2 per cent per annum on all railway fund money on deposit in city depositories, which would amount to perhaps $15,000 in 1919.

Similar expenses of light and water utilities, though relatively small, are likewise borne by the general fund and are consistently subject to the same criticism.

Loans and advances have been made to the railway fund, altogether amounting to $200,000, by other funds, principally by the general fund, without charge for interest. This practice is not new. It has been the custom of the legislative body to make loans to other utilities from various funds without providing for interest payment thereon, same being in my judgment a questionable policy.

In the budget for 1920 provision was made by the City Council for reimbursement to the light department depreciation reserve fund of an item of $25,000 previously loaned by that fund to the railway department. In accordance with this plan, the $25,000 was included in the general fund tax levy for 1920, and in February of this year was paid by the general fund, thus relieving the railway fund of this liability and reducing the total loans and advances from $200,000 to $175,000. In other words, the city made a levy of $25,000 for the benefit of the city railway.

Another matter that should now be presented for consideration is the provision for redemption of outstanding railway bonds. On Feb. 1, 1922, $833,000 of the $15,000,000 of bonds issued the traction company will be due and payable. Each succeeding year till 1929 a like amount will fall due. Thereafter, this amount will be increased by the addition of other serial bonds falling due, yet no sinking fund provision has been made by the city to take care of these redemptions.

The accompanying table shows the figures of earnings contained in Comptroller Carroll's report.

Changes in the personnel of the railway are referred to elsewhere in this issue.

Tax Assessments Protested

The Brooklyn (N. Y.) Rapid Transit Company has obtained from Justice Lazansky in the Supreme Court twelve writs of certiorari in connection with its appeal for the reduction of the 1920 special franchise taxes levied by the State Tax Commissioner. The writs are returnable in the Supreme Court at Albany on May 10, when the commission will be required to show by what process it arrived on the valuations it estimated and the railroad companies will be given an opportunity to show that the companies' properties were much overvalued. The reductions in valuations asked by the various companies total more than $25,000,000, with actual tax reductions of several million dollars.

Rhode Island Agreement

Quick Change in Attitude of Security Holders Indicates Likelihood of Success of Reorganization Plan

The stockholders and bondholders of the United Traction & Electric Company and the Rhode Island Suburban Railway, Providence, R. I., have agreed upon a plan of reorganization of the Rhode Island Company. In a final desperate attempt to reach common ground, the traction and the suburban bondholders at a meeting on March 31 accepted the ultimatum of the stockholders.

SPEEDY ACTION NECESSARY

Action was necessary on March 31, if at all, to save the entire system from disintegration. It was the last day for the introduction of legislation in the General Assembly under the rules, except by unanimous consent, and this was recognized as impossible.

Several acts proposing sweeping changes in the laws regulating the electric railway transportation and motor bus systems were presented in the lower branch of the Assembly. It is now up to the Legislature to make possible the transformation of the electric railway properties.

Governor Beeckman, contrary to custom, appeared before the House on March 31 and appealed to the members to give prompt and favorable consideration to the measures for the best interests of the whole State. He said that the reorganization of the railway was a subject of the most vital importance to the State, and that upon passage of the acts presented depended the future welfare of the traction system. He said:

> Under the plan accepted this morning, there will be a saving of $560,000 in annual fixed charges, and in return for this the company asks relief aggregating about $300,000 or $400,000.
>
> I believe that if we do not grant this relief we are going to cut off a great part of our electric railway system certainly, and possibly all of it.. If we do not pass these acts in some form the railway will go under the hammer. It is absurd to say that the legislation proposed would harm the jitneys or buses in any way. It does not mean that the fares are to be raised. That would be manifestly ridiculous.

Based upon the plan drawn up by the protective committees of both sets of bondholders on March 11, the settlement provides for the merging of all properties now operated by the Rhode Island Company in the United Electric Railways to be capitalized at $22,600,000.

SLIGHT CHANGE IN PLAN

The only change made in this plan, as originally made public, is to eliminate the sinking fund which was to have been established to extinguish the prior lien bonds in twenty-five years and which would have required an estimated fixed charge of $54,680 a year.

Under the provisions of the plan, the securities of the United Electric Railways will consist of $3,000,000 prior lien bonds, $11,100,000 general mortgage bonds and $8,500,000 stock. The prior lien mortgage is to be an open mortgage to secure bonds to the amount of $5,000,000. Of these, $3,000,000 will be not-to-exceed 7 per cent bonds, of which $1,000,000 will be issued at once for new money for the corporation. The remaining $2,000,000 would be issued hereafter, at not to exceed 7 per cent, if new money is required.

The holders of the traction bonds and suburban bonds agree to forego the defaulted interest on their bonds to the amount of $1,200,000. In addition to this they cut their principal by $1,400,000 and receive $1,400,000 in stock.

The stockholders will receive, for their present $8,000,000 holdings, $6,600,000 in the stock of the new corporation. Without the obligation to raise any new money they are to be subjected to a scaling of less than 20 per cent. Arrangements have been made by which the United Electric Railways will be able to get the $1,000,000 new money as soon as needed.

The plan is made subject to the obtaining from the General Assembly of suitable legislation, including the placing of railways, jitneys and motor buses under the supervision of the Public Utilities Commission as common carriers.

For their $9,000,000 holdings the traction bondholders are to receive $8,100,000 in general mortgage bonds, the interest rate to continue at 5 per cent, and $900,000 in stock.

The suburban bondholders will get in exchange for their $5,000,000 of 4 per cent bonds $2,000,000 of 4 per cent bonds, based on the prior lien, $2,500,000 of 4 per cent general mortgage bonds and $500,000 stock.

For all its electric railway properties in Rhode Island, the New Haven Railroad will get $500,000 in 5 per cent general mortgage bonds and $500,000 in stock.

The general mortgage will be a junior mortgage to the prior lien mortgage and will have a life of thirty years.

The amount of fixed charges to be met by the United Electric Railways by this plan would be $680,000 a year.

Financial News Notes

Additional Director Elected.—Isaac E. Sawyer of the Mechanics' Savings Bank, Holyoke, Mass., has been elected an additional director of the Holyoke Street Railway.

Middlesex & Boston Reopens Lexington Line.—The Middlesex & Boston Electric Company has reopened its line between Waltham and Lexington after a shutdown of about two months.

Operating Managers for New York Interurban.—Day & Zimmerman, Philadelphia, Pa., are planning to take over the Western New York & Pennsylvania Traction Company, Olean, N. Y., as operating managers.

Berkshire Service Suspended.—Due to shortage of funds and lack of coal together with the blocking of tracks by the heavy snow fall in January, the Berkshire Street Railway Pittsfield, Mass., has suspended all service in the Pittsfield district.

Abandonment Authorized.—The Public Service Commission for the Second District has granted permission to the Chautauqua Traction Company, Jamestown, N. Y., to abandon its lines between Westfield and Barcelona for the reason the road never paid.

Hingham Co-Operates in Financing Cost of Operation.—The town of Hingham, Mass., decided at the town meeting held on March 22 to appropriate $5,000 for aid in financing the operation of the lines in the town controlled by the Eastern Massachusetts Street Railway.

Equipment Purchased by Deferred Payments.—The Board of Public Utility Commissioners of New Jersey has approved the agreement of the Salem & Pennsgrove Traction Company, Salem, N. J., with the J. G. Brill Company, Philadelphia, for the purchase of six safety cars. The purchase price was $30,561. Thirty-six notes maturing at monthly intervals are to be given in payment for the cars.

Wants Abandonment Approved.—The Toledo, Bowling Green & Southern Traction Company, Toledo, Ohio, has filed a petition with the State Public Utilities Commission asking for permission to abandon service over its branch between Trombley and Jerry City, Ohio. The portion of the road is only 2 miles long. It is said to have been operated at a loss for several months. A hearing by the commission was set for April 2.

Holding Company Not Liable.—The United States Circuit Court of Appeals has sustained the ruling of a lower court that the Philadelphia Company is not liable for bond interest on underlying bonds of the Pittsburgh Railways. Suit was brought by B. C. Allen to hold the Philadelphia Company liable for accrued and current interest on $10,000,000 of first mortgage bonds of United Traction Company, a subsidiary of the Pittsburgh Railways.

Grand Rapids Seeks Valuation Data.—Mayor Gallmeyer of Grand Rapids, Mich., has invited the members of the State Public Utilities Commission to a conference for the discussion of the local utility problems. Among these are agreements with the gas company and the Grand Rapids Railway. An interim contrast is desired with the former, pending some form of stable settlement. As for the railway, that matter has not yet taken definite shape except that the city desires information about valuation methods and procedure in anticipation of the expiration of the railway franchise on April 21, 1921. The city contemplates retaining E. E. Brownell as consulting engineer to represent it. The company has retained as its representative William J. Hagenah, Hagenah & Erickson, Chicago.

Traffic and Transportation

Suggestions Adopted

Kansas City Railways Points to Many Improvements in Service During Past Few Months

Co-operating with the municipal authorities and civic organizations, the Kansas City (Mo.) Railways has recently put in effect a number of regulations calculated to relieve traffic congestion and speed up car schedules. The changes were recommended in the report of the committee of one hundred business men appointed by the Kansas City Chamber of Commerce to investigate traffic conditions and to report on a remedy for the congestion, especially in the business district. The committee's report was summarized in the ELECTRIC RAILWAY JOURNAL for March 20, page 614.

COMPANY HAS DONE ITS PART

The company has issued a statement through its official publication, the *Railwayan*, in which it calls attention to the fact that many of the committee's recommendations have been carried out since the body began its work several months ago. The carrying out of other recommendations rests entirely with the city and the public.

In the latter class the company places the proposal that its franchise be amended to include a service-at-cost clause providing for a variable fare and a variable rate of return upon the capital invested. The company points out that under the Public Service Commission operation the service-at-cost plan is already practically in effect.

The committee urged that charges such as licenses and street paving and cleaning, snow-removal and lighting costs be no longer charged against the company, since these only tend to increase the fare and have no place in the operating costs of an electric railway. The company's statement declares that the question of remitting these charges must also be decided by the city.

FRANCHISE CONDITIONS FULFILLED

It is pointed out that the company has fulfilled franchise requirements providing for extensions to its lines. The report recommends the repeal of the section of the franchise requiring certain prescribed investments in extension each year, and that only such extensions be required as the Board of Control deems necessary and believes will be self-sustaining. Other franchise changes, including the working out of uniform franchises for the lines in Missouri and Kansas, rest with the municipalities involved.

Interest money to the amount of more than $1,000,000 is to be invested in the property during 1920. The company points to this fact in noting the recommendation that new capital, so far as possible, be in the form of stock investment instead of bonds. Attention is called to the fact that under existing conditions there is no market for stock.

With regard to the committee's request that the company provide means of receiving and acting promptly upon complaints, the company states that all complaints and suggestions meet with prompt attention. To meet the demand that service in the outlying districts be adjusted to the actual demand, it is pointed out that the company has for some time been turning back cars on several lines.

INCREASE IN CAR SPEED

Increase in speed of cars, urged by the committee, has already been obtained, largely through the recommendations made by John A. Beeler. The company further states that it has for many years urged upon its employees the necessity of courteous treatment of the public. The committee's suggestion that looping in the downtown district be discontinued has been carried out by the Board of Control, which has discontinued looping wherever possible.

A resolution has been adopted by the City Council creating a traffic committee consisting of three aldermen each, from the upper and lower house, to confer with Mr. Beeler on ordinances which will provide for the further rerouting of cars, regulation of stops and other traffic measures.

Co-operation in Financing

The Eastern Massachusetts Street Railway, Boston, Mass., has prepared a plan for co-operation in financing and operating the railway lines in the towns of Dedham, Westwood, Norwood and Walpole, which if accepted by the towns served by the company will result in the continuance of the lines in these communities.

The plan calls for the contribution of $20,000 to be raised by the towns, to which will be added $40,000 to provide $60,000 required to rehabilitate the lines. If the $20,000 is raised the company will guarantee service for a period of one year.

In addition to the request for reimbusement, the Eastern Massachusetts Street Railway suggests that a committee be appointed from each community to co-operate with the trustees of the railway in the supervision of operation and the handling of questions and problems pertaining to service in the district.

The recent decision to discontinue service on these lines after April 1 will become effective if the plan proposed dces not meet with acceptance by the communities.

Fare Increase Denied

Oregon Commission Hopes to Secure Approval of Program That Will Forestall Increase

The Public Service Commission of Oregon, in a decision handed down at Salem on March 23, held in abeyance the application of the Portland Railway, Light & Power Company for increased fares with which to meet its steadily increasing costs of operation and recommended that the much discussed proposal for the city of Portland to take over the tracks of the company be referred to the voters of Portland at the special State election to be held on May 21. By taking over these tracks it is estimated that the valuation of the company's properties would be reduced about $5,000,000. Under the provisions of the order the latter recommendation applies only to the tracks in the streets and does not include the entire traction system.

Problems which in the opinion of the majority of the commission should be referred to the voters for decision at the special election recommended by that body are as follows:

> Elimination of financial burdens, including the maintenance on paving already laid and estimated at $47,000; bridge rentals, $65,000; franchise taxes, $15,500; car licenses, $7,500; free transportation to city employees, $22,000; maintenance, depreciation, taxes and interest on prospective paving (average six months), $13,000, or an aggregate of $170,000.

The majority decision was signed by Fred G. Buchtel, chairman of the commission, and Fred Williams, while a dissenting decision urging an increase was written by H. H. Corey.

The majority opinion points out that the commission is reluctant under present conditions and circumstances to attempt to remedy the situation merely by increasing fares. It says:

> We seriously doubt whether any fare would result in a complete and final solution of the difficulties of the railroad corporation at this time. From our investigation and analysis of the data presented it is not at all unreasonable to assume that the acquisition of the tracks by the city, together with elimination of bridge tolls and other relief, would not only place the Portland railway system at present and for the future upon a sound financial basis, but permit of a prompt reduction in the present rate of fare.

Mayor Baker asserted that this solution of the transportation problem, indicated by the action of the commission in declining, for the present, to grant an increase in fares, is an obviously disagreeable one, but the best that can be afforded under the circumstances. The Mayor believes that the suggestion of the commission that the city acquire the trackage is the best way out of the transportation tangle, while declaring that he is in no respect converted to municipal ownership and that even the partial partnership proposal should be accepted only as a last expedient. He said that the City Council will discuss at an early date the advisability of placing both proposals on the ballot.

In commenting editorially on the decision the Portland *Oregonian* said:

> It is obvious that some drastic and not wholly desirable remedy must be adopted

in the carfare situation in the interests not only of the company but of the community itself. Purchase by the city of the rails is of that class. It cannot logically be offered as an economy in operation. It is proposed as a measure of relief for the company for which all the people shall pay in lieu of that other form of relief—an increase in fares—for which the car riders alone would pay. It is a plan that will appear to the apprehensive as a first step toward full municipal ownership and operation. It is difficult to understand how, even if the plan were not thus enlarged, it could escape some of the drawbacks of the latter policy.

More P. R. T. Improvements Planned

Philadelphia Transit Director Proposes Plan for Operation of Frankford Line—Company Wants Equipment Fund

Recommendations looking to the improvement of electric railway service in Philadelphia, Pa., were submitted to the City Council on March 30 by the Philadelphia Rapid Transit Company and by William S. Twining, director of city transit. Director Twining presented to the Council a report outlining a plan for the operation and equipment of the Frankford elevated line, now nearing completion. The company asked permission to establish a $6,000,000 equipment fund to meet the need for additional rolling stock.

Director Twining's program for the operation of the Frankford elevated calls for a 5-cent fare for a ride between any station on the present Market Street subway-elevated line to any station on the Frankford line, with free surface transfer privileges. Mr. Twining proposed two courses of action in the event that the company refuses to come to a satisfactory agreement. First, Mr. Twining suggested the city should petition the Public Service Commission for a peremptory order demanding the company equip and operate the new elevated, or, second, that the city should construct additional lines in the central business district to serve as a feeder for the Frankford elevated in its present headless and tailless condition.

WOULD GIVE THIRTY-YEAR LEASE

In case the company agrees to operate the new line, it will, under Mr. Twining's plan, receive a lease from July 1, 1920, to July 1, 1957. A provision is inserted for cancellation by the city upon reasonable notice and upon fair terms. Mr. Twining's plan calls for an annual rental payment to the city of 4 per cent of the city's initial investment in the line, this sum to be increased by the interest charges on additions made by the city during the life of the lease. The rental would be a direct obligation upon the company and not contingent upon any other payment. Sinking fund payments on city bonds would not be included in the rental requirements.

The company's proposal to establish a $6,000,000 equipment fund, which took the form of an ordinance, was accompanied by a letter from W. C. Dunbar, vice-president in charge of accounting. Mr. Dunbar explained that the certificates to be issued would bear interest at 6 per cent annually, maturing in equal semi-annual instalments during a period of not more than ten years, and they would be secured by a lien on 1,500 surface and ninety-seven elevated-subway cars.

This proposed equipment trust certificate issue is required to finance immediate necessities and supply increased car-carrying capacity, said Mr. Dunbar. The financing of new lines and extensions is planned to be accomplished by the formation of new companies issuing first mortagage bonds to cover the cost of construction to be guaranteed by the P. R. T., which company will also be the sole owner of such nominal issue of capital stock as may be required. Plans for the issuance and sale of these bonds will be presented from time to time for the Council's approval. Mr. Dunbar said in part:

> Pursuant to the specific provisions of the second section of the 1907 contract stipulating that upon the occasion arising for any additions or betterments to the lines, power or equipment of the Philadelphia Rapid Transit System, a communication shall be submitted by this company to City Council setting forth the necessity for such additions or betterments requiring additional capital and properly chargeable to capital account together with the estimated cost thereof and a plan of financing, we beg to advise:
>
> 1. That it is necessary each year to undertake substantial expenditures for the improvement and upbuilding of the physical plant to meet the increasing demands for transportation with new construction and equipment.
>
> 2. That in accordance with the uniform system of accounts for electric railways prescribed by the Interstate Commerce Commission and adopted by the Public Service Commission of Pennsylvania, expenditures are properly chargeable to capital account when incurred for new and additional property or when constituting a betterment as represented by the additional cost or value of track, power plant, car equipment or other facilities installed in the replacement of existing property.
>
> 3. That additional capital is required by the Philadelphia Rapid Transit Company in order to meet expenditures for additions and betterments to property actually incurred during the year 1919, and for additions and betterments necessary to be undertaken at this time.
>
> 4. That during the year 1919 the sum of $1,521,269.16 was expended for additions and betterments to track, power plant, car equipment and other property; that the sum of $1,000,000 was borrowed by the company on short term note in order to meet these expenditures; and that this obligation must be met by the issuance and sale of a marketable security.
>
> 5. That the sum of $2,400,000 is urgently required to meet the immediate necessities.

Trailer Cars an Issue

The question of trailer car operation is a live issue in Chicago at the present time. In an order issued last November by the Public Utilities Commission the Chicago Surface Lines was directed to add 200 cars to the service within five months. For financial reasons, due to the frequent changes in rates of fare, the companies have not been able to carry out this order.

At a hearing before the commission on March 24, Henry A. Blair, president, explained this situation and said the company has undertaken to construct an experimental trailer in its own shops and he thought this would be ready in sixty days. The plans and specifications will be submitted to the commission. Most of the routes operated by the Surface Lines do not have loops at both ends, but there are a number of lines where it is believed two-car trains can be operated to advantage, particularly on some routes entering the business district.

At the same session before the commission complaints were made through the Attorney General's office that many cars were being held in depots during rush hours. In nearly every case it was explained that this was due to defective equipment or shortage of crews.

Buffalo Fares Discussed

Council Members Inclined to Reject Proposal for a Charge for Transfers

Members of the City Council of Buffalo, N. Y., have signified their intention of rejecting the proposal of the International Railway that the city join with the company in an application to the Public Service Commission, Second District, for an order providing for a basic 5-cent fare with a charge of 3 cents for the first transfer and 1 cent for each additional transfer, in place of the 7-cent fare order of last November.

Herbert G. Tulley, now president of the railway, says that as soon as the Council formally rejects the proposal the company will give the city ten days' notice that it will put the 7-cent fare into effect. Thomas E. Mitten, a member of the bondholders' protective committee and a big factor in the operation of the International, has been opposed to a 7-cent fare. It was he who suggested the 3-cent transfer charge.

After a series of conferences with the municipal authorities, Mr. Mitten and Mr. Tulley agreed to reduce the charge for the second transfer from 3 cents to 1 cent. Mayor George S. Buck says he might consent to a transfer charge if a 2-cent charge is made for the first transfer and a 1-cent charge for the second transfer. This the company refuses to consider.

Three of the five members of the City Council have publicly announced they will not allow the company to charge a 7-cent fare despite the action of the Public Service Commission and will carry the appeal to the United States Supreme Court for a decision as to whether or not the Public Service Commission's 7-cent fare order is constitutional in view of the company's franchise fixing a 5-cent fare with free transfers.

In his report to the City Council after an investigation into the number of passengers who use transfers, Mr. Tulley said that only 40 per cent of the riders use transfers. He believed it would not be fair to charge a straight 7-cent fare when a 3-cent transfer charge would serve the same purpose and only affect part of the patrons.

City Protests 8-Cent Fare in St. Louis

The Public Service Commission of Missouri has granted an extension of time to the United Railways, St. Louis, under which it may collect an 8-cent fare from single passengers over its lines until April 15. The city is demanding a rate of 7 cents, with four tickets to be sold for a quarter. The city contends that the valuation of $60,000,000 claimed by the company for rate-making purposes is $10,000,000 too high. The order of the commission authorizing the 8-cent fare was effective until March 20. The company asked for an indefinite extension.

Major C. E. Smith, consulting engineer of the city, was one of the principal witnesses for the city. He said that it was his belief $2,000,000 a year could be saved by the company by installing one-man cars and operating them intelligently. There were several sharp tilts between Mr. Smith and Thomas E. Francis, attorney for the company. Mr. Smith submitted thirty-two exhibits covering the operations of railway systems in various cities. His conclusion was that the St. Louis railway is being poorly managed. Mr. Francis at one point said:

> Never having operated a street railway system yourself, you are merely giving horseback opinions as to how the St. Louis line should be operated, are you not?

Mr. Smith replied that was a horseback question. He then said:

> I do know that some 600 street railway lines are operating one-man cars, and that the St. Louis system is from five to ten years behind more progressive systems. I have made it my business to learn these facts.

Colonel Albert T. Perkins, manager of the company, said it was the intention of the company to ask the commission for authority to expend probably $2,000,000 for new cars and something like $1,500,000 for replacing old tracks, and these sums would more than consume the reserve and depreciation funds.

Four 10-Cent Zones Established

Four 10-cent zones on each side of the Connecticut River for the 13 miles of track on each side owned by the Hartford & Springfield Street Railway were authorized by Judge Lucien F. Burpee of the Superior Court of Hartford County on March 19, after Receiver Harrison B. Freeman had informed the court that the bondholders had refused to advance any more money to the road.

The new rates mean an advance in fare from 61 to 66 cents on each side of the river, between Hartford and Springfield, the Connecticut Company and the Springfield Street Railway operating part of the road on either side of Mr. Freeman's company and allowing the Hartford & Springfield company's cars to run over their lines. The connecting lines will not increase fares.

Only a week before the receiver had received authority from Judge Burpee to borrow $10,000 to keep the road running, the court telling Mr. Freeman to see if things could not be put on a paying basis, "if Providence would let him."

The railway's line on the west side runs from Windsor to the Massachusetts line and on the east side from East Windsor Hill to the State line. The increase in fares awaits formal action by the Public Utilities Commission, which assured Mr. Freeman before he asked the court for the increase that it saw no reason for refusing it.

The interest on the bonds of the company has been in default for about two and one-half years and the taxes due to the State of Connecticut have not been paid for three years. Mr. Freeman is not particularly optimistic about the way in which patrons of the road will take the new rate.

Transportation News Notes

Monongahela Fare Case Presented.—The rate case of the Monongahela Valley Traction Company, Fairmont, W. Va., which asks for increased fares on its lines in Parkersburg, was submitted to the Public Service Commission on March 27. The commission has taken the matter under advisement.

Ten Cents Asked in Walla Walla.—The Walla Walla Valley Railway, Walla Walla, Wash., has filed with the State Pubic Service Commission a rate schedule under which it proposes to charge 10-cent fares in Walla Walla beginning April 15. The present fare is 8 cents.

One-Man Cars for Boston.—Edward Dana, general manager of the Boston (Mass.) Elevated Railway, has applied to the State Department of Public Utilities for authority to operate one-man safety cars on the company's lines. The road has contracted for thirty such cars.

Savannah Hearings Ended. — The Georgia Railroad Commission has concluded hearings at Savannah on the petition of the Savannah Electric Company to increase its fare and its lighting and power rates. C. M. Candler, chairman of the commission, stated that a decision would be announced shortly.

Seven Cents in Sheridan.—The Sheridan (Wyo.) Railway began charging 7-cent fares on March 15. The increase was authorized by the State Board of Equalization & Public Service Commission. The commission's order provided for the sale of twenty tickets for $1.25, making the ticket rate 6¼ cents. The fare was formerly 5 cents.

Higher Fare in Morristown.—Seven-cent fares became effective on the lines of the Morris County Traction Company, Morristown, N. J., on April 1. The increase was made under authority of the State Board of Public Utility Commissioners. The rate was formerly 6 cents. The board refused to allow the company to raise the price of school tickets from 3 cents to 3½ cents.

Six Cents in Little Rock.—The City Council of Little Rock, Ark., on March 23 passed an ordinance under the terms of which the Little Rock Railway & Electric Company will be permitted to raise its fare from 5 cents to 6 cents. The company will be required to spend $100,000 on additional equipment for rush-hour service within the next four months.

Denies 8-Cent Fare.—The Missouri Public Service Commission has denied the application of the Kansas City Railways for permission to charge 8-cent fares on its lines in Independence. The present 5-cent fare within the city limits has been ordered continued. The commission has authorized an increase in the rate between Kansas City and Independence to 10 cents. The order went into effect on April 1.

Fares Up on French Lines.—French tramways and bus lines are raising their fares. The Paris "Metro," or subway, has been authorized by the municipal authorities to increase its rates from 5 cents to 10 cents, first class, and from 3 cents to 6 cents, second class. Fares on the Paris surface lines and bus routes have been advanced from 5 cents to 12 cents, first class, and from 3 cents to 10 cents, second class.

Fights Nashville Increase.—A resolution calling for a committee of three to recommend an expert appraiser to examine the books of the Nashville Railway & Light Company, Nashville, Tenn., was recently adopted by the Nashville City Commission. The resolution charged the State Railroad & Public Utilities Commission with "unjust discrimination" against the city in permitting the company to raise its fare to 7 cents.

Would Grant 6-Cent Fare.—The Public Service Commission of Washington has been petitioned by the Hoquiam Commercial Club, Merchants' and Traders' Bureau and the Rotary Club to grant the Gray's Harbor Railway & Light Company, Aberdeen, a 6-cent fare. The company has filed with the commission a 7-cent schedule to replace its present 5-cent fare. The City Council of Aberdeen has protested the 7-cent fare to the State commission.

Ask More for New York Lines.—Two electric railways operating in New York State have applied to the Public Service Commission for the Second District for permission to raise their fares. The Peekskill Lighting & Railroad Company asks authority to charge a 7-cent fare in Peekskill for a period of one year. The fare is now 6 cents. The Peekskill trustees have already approved the increase. A 10-cent fare is asked by the Putnam & Westchester Traction Company, operating between Peekskill and Oregon.

Bulletin for Charlotte Carmen.—As a part of its campaign for improved public relations, the Piedmont & Northern Railway, Charlotte, N. C., has begun the publication of a semi-monthly bulletin, the *P. & N. Special*, which is to be sent free to all employees and all shippers served by its lines. This publication is to be edited by John Paul Lucas, director of public relations for the Southern Public Utilities Company, who has assumed a similar position with the railway.

More Cars for Subway.—The Interborough Rapid Transit Company, New York, N. Y., on March 25 placed in operation new service schedules called for by the order of the Public Service Commission for the First District for increased service in both rush hours and non-rush hours. The principal increases made are in non-rush hours. Trains are to be operated on more frequent headway and with an increased number of cars. The service as called for provides nearly 25,000 more seats than were operated daily prior to March 25. Increases are made in the evening non-rush hours as well as in day-time non-rush hours, while there has also been a material increase made in the local service operated in the west side subway in evening rush hours.

Would Raise Commutation Rate.—The Union Traction Company of Indiana, Anderson, Ind., has filed a petition with the State Public Service Commission asking for an increase in its commutation rates on all of its lines. The company asks that the rate of 1⅜ cents a mile on commutation books be changed to a basis of forty rides for the price of twenty-five full one-way tickets at 2⅝ cents a mile. This would mean a rate of 1.64 cents a mile. The company asks that a minimum charge of from $3 to $4 be fixed for any book of tickets and that it have authority to put the new rates in effect on ten days' notice. It points out that the commission has granted commutation rates similar to those which it asks to traction companies in adjacent territory.

Must Pass on Jacksonville Fares.—The Supreme Court of Florida on March 19 handed down an opinion affirming the authority of the State Railroad Commission to fix rates of fare, municipal franchise ordinances notwithstanding. Under the court's order the commission is called upon to pass upon the petition of E. J. Triay, receiver for the Jacksonville Traction Company, for a 7-cent fare on the company's lines. Following the refusal of the Jacksonville voters to grant the higher rate, the receiver applied to the commission, which refused to act in the case on the ground of lack of jurisdiction. Mr. Triay then secured from the Supreme Court an alternative writ of mandamus directing the commission to hear the application. The commissioners thereupon asked the court to quash the writ.

Interurban Road Retrenching.—Package freight and other freight service was discontinued on March 15 on the lines of the Maumee Valley Railways & Light Company, connecting Toledo, Maumee and Perrysburg. The abandonment of the service has been approved by the Public Utilities Commission after the company showed that it had operated at a loss for some time. Approval of the passenger fare increase recently submitted to the commission is still pending. Several suggestions for curtailing passenger service have been presented, but company officials declare they are not feasible. Recently the company asked bondholders to allow an extension of one year with a higher rate of interest and an option on another extra year extension on account of the financial situation of the company.

Fargo Lines in Need.—The Fargo & Moorhead Street Railway, a subsidiary of the Northern States Power Company, which operates in Fargo, N. D., and Moorhead, Minn., has appealed to the authorities of these cities for financial relief. The Fargo City Commission has indicated its willingness to meet with representatives of the Moorhead City Council to consider the company's request with a view to granting it an increase in fare. In asking for additional income for the lines, M. L. Hibbard, general manager of the company, stated that net operating revenue for 1919 amounted to $3,185 and that wage increases made in January of this year involved additional expenditures of $7,500 annually. He pointed out that this increase in operating expenses would wipe out the apparent profit of 1919 and would create a deficit of over $4,000 in 1920.

New Publications

Controllers for Electric Motors

By Henry D. James. 354 pages. Illustrated. D. Van Nostrand Company, New York City.

This work is based on a series of articles originally published in the *Electric Journal* during 1917 and 1918. It refers particularly to industrial controllers, but it includes a chapter on series parallel control and the electropneumatic contactor. The book gives much practical information on this vital subject.

Diary for 1920

Published by the Electric Railway & Tramway Journal, 18 Eldon Street, London, E. C.

Besides containing a space for each day with blotter between the leaves, this diary gives the text of the 1919 transport act, award of the Court of Arbitration for workers, list of British tramways, railways, and light railway companies and their officials, together with a list of colonial and foreign railways with officials having offices in London, etc.

Statistics in Business

By Horace Secrist, Professor of Economics and Statistics, Northwestern University. 137 pages. Illustrated. McGraw-Hill Book Company, Inc., New York City.

In compact and readable form Dr. Secrist has given a lot of information regarding the collection, assimilation and presentation of data. In view of the increasing tendency to put facts into graphical form, such books as these should prove helpful and stimulating. In this book the author has something to say also regarding summarizing the facts, the deduction of averages, etc., a very important topic in electric railway analysis.

Design and Construction of Heat Engines

By W. E. Ninde, associate professor of mechanical engineering, Syracuse University. 704 pages. Illustrated. McGraw-Hill Book Company, Inc., New York, N. Y.

Professor Ninde states in his preface that the object of this book is to supply in one volume the material most essential to the well-equipped, independent designer of heat engines, and to give this material in the form most convenient for use in classroom and practical work by separate treatment of the different phases of the subject. He has based the book upon his notes covering twenty years of practice in this field and in the light of a teaching experience of ten years. The text is divided into sections on the heat engine, thermodynamics, friction and lubrication, power and thrust, mechanics and machine design. While the scope is very broad, the book seems to be well balanced and should be valuable not only as text in the classroom but as reference material for power-plant operating engineers.

Selling Your Services

By George Conover Pearson. Jordan-Goodwin Corporation, New York, N. Y. 237 pages, 5 in. x 7½ in. Price $2.

The book is filled with practical examples of advertisements, circular letters, application letters, follow-up letters, and telegrams, most of which have been actually used in obtaining better opportunities for technical men, salesmen, sales managers, foremen, accountants, advertising managers, clerks, stenographers, editors, etc. It is presented in very readable form and is completely indexed. "Selling Your Services" is not an instruction course. It tells the man seeking to sell his services how to take whatever knowledge and training he has now and find the best market, the market where his ability will be of the most value and therefore will give him the largest returns. Knowing that the same fundamental laws that are effective in selling any product apply equally well to selling a man's services, Mr. Pearson has given in simple, practical, usable form plans that any man can follow to conduct a resultful campaign to sell his own services. For the man who has no job, the man who has not the kind of job he desires, and the man who feels he has reached his limit in his present job, "Selling Your Services" should be of real benefit.

Personal Mention

New International President

Mr. Tulley Elected Head at Buffalo —Many Other Changes in Officers and Directors

Herbert G. Tulley of Philadelphia, vice-president of the Philadelphia (Pa.) Rapid Transit Company and acting president of the International Railway, Buffalo, N. Y., since the resignation of Edward G. Connette, has been elected president of the International. C. A. Weber, secretary to Thomas E. Mitten of the Philadelphia Rapid Transit Company, has been elected secretary of the International Railway, to succeed N. N. Ollie, who has been made assistant secretary. Willis C. Dunbar has been elected comptroller and E. J. Dickson has been reelected vice-president.

These members of the board of directors have retired: S. R. Bertron, Rodman E. Griscom, Edward G. Connette, George Bullock, Francis T. Homer, Marshal J. Dodge, H. G. Pritchard, Henry W. Killeen, of counsel; John L. Clawson and Robert W. Pomeroy.

The new directors elected include Dr. Henry C. Buswell, Walter P. Cooke, chairman of the board of the Marine Trust Company, Buffalo; E. J. Dickson, vice-president; Willis C. Dunbar, Coleman J. Joyce, R. Walter Leigh, New York; Thomas E. Mitten, Philadelphia; Nelson Robinson, Carlton H. Smith, Herbert G. Tulley, president, and Carl A. Weber. Mr. Joyce is counsel for the Mitten interests.

The directors who hold over include John W. Barr, Jr., Louisville; Charles R. Huntley, president of the Buffalo General Electric Company; Thomas Penney, general counsel; Harry T. Ramsdell, Harry Yates and Henry C. Zeller.

The election of the new board means the elimination of the Bertron-Griscom interests of New York and the entrance of Mr. Mitten and Mr. Robinson and their associates into the active management of the Buffalo lines. A number of the new directors are Buffalo financiers. President Tulley has decided to make his home in Buffalo.

Mr. Tulley was born in England in 1872. He received his early training in the British Army, from which he was honorably discharged after several years' service in India. Coming to the United States, he entered the employ of the Chicago City Railway, where he met Thomas E. Mitten. When the Stotesbury-Mitten management took hold of the Philadelphia traction situation in 1911, Mr. Tulley was made assistant to the president of the Philadelphia Rapid Transit Company. In December, 1918, he was advanced to vice-president of the company. When Mr. Mitten took over the direction of the International Railway, following Mr. Connette's resignation, Mr. Tulley was made acting president of that road. A portrait and biography of Mr. Tulley were published in the ELECTRIC RAILWAY JOURNAL for Dec. 21, 1918.

J. V. Sullivan, Executive

From Figuring About Facts, Chicago Statistician Turns to Face Facts With Figures

J. V. Sullivan, statistician of the Chicago (Ill.) Surface Lines, has received from Henry A. Blair the signal promotion to the position of assistant to the president. In his new capacity Mr. Sullivan will be entrusted with duties of a highly responsible nature.

J. V. SULLIVAN

For the immediate future his time will be largely occupied in working with John A. Beeler, consulting engineer, who is making an extended study of the traffic conditions, equipment and organization of the Surface Lines. Thereafter, he will presumably work closely with Williston Fish, general manager, in carrying out Mr. Beeler's recommendations and in bringing about operating economies and general improvements in the service.

Mr. Sullivan takes up his new duties with a well-rounded knowledge of transportation matters gained through sixteen years of service with the electric railways of Chicago, during which he has had many opportunities for study of the systems in other cities as well. His experience in the broad aspects of these matters has also been enhanced through service during the past several years as a member of the executive committee of the American Electric Railway Transportation & Traffic Association, chairman of the committee on rush-hour service, chairman of the committee on definitions, member for four terms and then chairman of the committee on fares and transfers and member of the standards committee. These activities have also given him a wide acquaintance among railway men.

Mr. Sullivan was born in Chicago on Nov. 1, 1878. He was graduated from Notre Dame University in 1897 and then spent seven years in newspaper work in Chicago. His railway experience began in 1904, when he became connected with the traction companies operating on the north and west sides of Chicago, the predecessors of the Chicago Railways, as general passenger agent. He served in this capacity for one year and was then promoted to the position of general supervisor, which he held until the operating consolidation of the Chicago Railways and the Chicago City Railway in 1914, to form the Chicago Surface Lines. Since that time he has been statistician of the combined companies.

Mr. Wood Heads Pacific Railway Club

At its annual meeting, held in San Francisco, Cal., on March 16, the Pacific Railway Club elected the following officers for the ensuing year:

President, Dennistoun Wood, assistant mechanical engineer and engineer of tests of the Southern Pacific Company; first vice-president, G. H. Harris, general superintendent of the San Francisco-Oakland Terminal Railways; second vice-president, F. S. Foote, Jr., professor of railroad engineering at the University of California; treasurer, G. H. Baker, assistant general freight agent of the Atchison, Topeka & Santa Fe Railway; secretary, W. S. Wollner, general safety and welfare agent of the Northwestern Pacific Railroad.

Following the election of officers, Samuel O. Dunn, editor of the *Railway Age*, delivered an address on "The Future of the Railroads."

C. H. Crooks, general manager of the Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, has been elected president of the company. Mr. Crooks will continue to act as general manager in addition to discharging the duties of president.

Gordon Campbell has been elected president of the Western New York & Pennsylvania Traction Company, Olean, N. Y., to succeed Wilson R. Page, resigned. Mr. Campbell is the representative of Day & Zimmerman, who will operate and manage the local properties. He is president of the York (Pa.) Railways.

Wilson R. Page has resigned as president of the Western New York & Pennsylvania Traction Company, Olean, N. Y., effective from April 1, when the management of the property was taken over by Day & Zimmerman. The company operates the Olean local lines and interurban lines from Olean to Rock City, Salamanca, Bradford and Little Valley.

Mr. Mortimer Resigns

During His Ten Years as Vice-President and President North American Company Net Earnings Have Nearly Trebled

James D. Mortimer, who has been connected with the North American Company for more than ten years, first as vice-president and for six years as president, has resigned, the resignation to become effective Nov. 1, 1920. He succeeded James Campbell as president in 1914. Mr. Campbell thereupon became chairman of the board of directors, but died a few months later.

EARNING CAPACITY EARLY VISUALIZED

Mr. Mortimer's career with the North American Company has been marked by loyalty to Mr. Campbell and his policies, as well as by a spirit of original progressiveness which has kept him on the front line of utility progress. Within two months of the date of his taking the North American vice-presidency Mr. Mortimer stated to Mr. Campbell that the company was capable of earning 10 per cent on its stock instead of the 4 per cent or so which it was then earning. That goal, which to others then seemed remote, has been reached in ten years, as for the twelve months ended Feb. 29 the net income was practically 10 per cent, after reaching 8.54 per cent in 1918.

Mr. Mortimer has always been willing to break away from the beaten paths in utility development, as is illustrated by a number of conspicuous events of his administration. For example, the zone system of fare collection appealed to him as rational as early as 1911 and three years later it was applied in Milwaukee and vicinity, with the result that now in that city riders are paying fares which have a relation to the length of ride, excepting in the central area. He also early advocated the use of trailers to increase car unit capacity at times. More important still he applied the principle of metering the effect of labor, leading to the development of a new system of wages providing additional compensation in accordance with productivity. This was first applied in the Cold Spring shops at Milwaukee, and gradually extended to the power plant, to the transportation and accounting departments and to the linemen. It is now the ruling plan in substantially all departments of all of the companies underlying the parent organization.

REAL CO-OPERATION WITH LABOR

In his efforts to co-ordinate the interests of employees and employer Mr. Mortimer applied in 1915 in the transportation department at Milwaukee a system of review by the employees of penalties imposed upon trainmen as part of the general scheme of wage conferences, all interwoven with the plan of bonus wages and bonus committees. This led naturally to the general labor contract with the Employees' Mutual Benefit Association and to collective bargaining and responsibility with the labor adjustment committee elected in each department by the employees. The E. M. B. A., which was organized in Wisconsin in February, 1912, and later on the other properties, operates as a fraternal industrial union. Its membership includes all of the permanent employees of the subsidiary companies. The activities of the association have since greatly expanded. In 1914 the E. M. B. Savings & Loan Association was organized and the employees of the subsidiary companies have subscribed for nearly $5,000,000 of its stock.

Mr. Mortimer was also one of the first to call the attention of the industry and others to the unprofitableness of the electric railway business. Much of his work as chairman of the program committee of the American Electric Railway Association has been along these lines, including his advocacy of an attitude on the part of electric railways favorable to municipal ownership as best for the railways although not for the public.

J. D. MORTIMER

This last statement brings us to Mr. Mortimer's great interest in what may be termed mass psychology. This, his experience shows, is a most important factor in getting results. His studies, for example, as to the psychological side of car riding, of the reaction secured from public addresses by utility officials, etc., illustrate this interest. As to car riding, the report prepared for the association by F. W. Doolittle, under Mr. Mortimer's direction as chairman of the committee on cost of transportation service, contains tangible evidence of the importance of getting a proper reaction from the people. In public addresses, also, he has proved it to be highly important for the speaker to know what interpretation will be put upon his remarks.

But most important of all, in many ways, of the duties which Mr. Mortimer has been called upon to perform are those relating to finance. He discovered a stratum of investors in public utility securities that had not previously been reached. More than 3,600 customers of the Union Electric Light & Power Company have purchased $2,668,200 of its preferred stock, and more than 6,000 investors in the territories that are served by the Milwaukee Electric Railway & Light Company and Wisconsin Gas & Electric Company have purchased notes of the former and notes and preferred stock of the latter. Through his personal contact with utilities controlled by the North American Company he succeeded in producing some interesting results as follows:

AFTER ALL, MONEY TALKS

In ten years the Wisconsin subsidiaries increased their gross earnings by $12,203,000, with a corresponding plant and property account increase of $19,226,000, or $1.67 for each dollar of increased gross earnings. For the Missouri group (omitting the United Railways, St. Louis) the corresponding figures were $5,596,000 and $10,770,000, or $1.92 per dollar. In Wisconsin the reserve and surplus, after providing for dividends and maintenance of physical property, increased from $4,592,000 to $11,543,000. In 1909 the railway utilities produced a substantial part of the gross income of subsidiaries, but in 1919 the gross income from such utilities was less than 22 per cent of that of the subsidiaries and their operating revenues were less than 29 per cent.

Mr. Mortimer's early observation of the trend of operating expenses resulted in practically the first applications to regulatory bodies for relief, and his advocacy of automatic regulation marked an epoch in all public utility industries which may soon be expected to bear fruit.

In all of the above results Mr. Mortimer gives great credit to the men by whom he has been surrounded, and for whose welfare he has constantly striven. As a college man he has appreciated the value of technical and classical training. Twenty years ago he graduated as honor man from the University of California. After teaching for a year he served as an engineer with several utility properties, reaching his present position as a result of his contact with Mr. Campbell, who was president of the Telluride Power Company when Mr. Mortimer was an officer of the Electric Bond & Share Company.

ACTIVE IN ASSOCIATION COUNCILS

Mr. Mortimer has labored diligently in behalf of the public utility industry in many ways, and his advice is always valued highly in the councils of the American Association which has been the vehicle for some of his best work. The most extended researches which have been conducted under his direction were those embodied in the reports to the American Association on cost of transportation service (1915) and on social relations (1917). With such an established record for initiative, progressiveness and administrative and financial ability it seems incredible that Mr. Mortimer is only forty years of age.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Credits in Railway Field Improving

Railways Commencing to Find Themselves After a Hard Winter—Manufacturers Cautious

Credits in the railway field are fair, and are believed to be improving gradually.

Manufacturers generally are cautious in regard to credit but have been liberal with the railways and helpful within reason. Of course, the management, past performance and prospects of the railway are taken into consideration before any extensions are permitted, but on the whole manufacturers and supply houses have been quite lenient during the past winter.

In virtually every section of the country collections are not in such good condition as they were at the first of the year. There has been no radical falling off in the situation, but just enough lengthening of collection time to cause considerable care in financial matters to be exercised. Money is not so free as it was and in some cases is tight. Call money is high. Early this week call money in New York was 12 per cent, following a renewal rate of 8 per cent. Time money is 8 to 8½ per cent. Actual need of cash, high loan rates, reduced income on account of bad weather during January, February and March and income-tax payments are given as causes for the general slowing up of collections.

Snow Plow Deliveries Five to Seven Months

Steel Plate Scarcity and Uncertainties in Lumber Market Add to Difficulties of Builders

Railways are rapidly coming into the market at this time for snow plows and sweepers. A number of inquiries have been received by different snow-plow and sweeper manufacturers and a total of seven equipments are reported as purchased during the past two weeks.

A large number of railways whose experiences with the snow storms of the past winter are still fresh in mind already have included allowances in their budgets for different kinds of snow-removal equipment. In addition, purchases since the beginning of the war of this type of equipment have been exceedingly small, so from all indications, the year 1920 will be a record-breaker as far as the purchase of snow-plows and sweepers is concerned.

Owing to the length of deliveries on steel plates for making nose plows, shear plows, flangers and scrapers, the builders are unable to quote less than five to seven months delivery.

Lumber is also hard to obtain and shipments have been held up entirely too long.

Deliveries on rotary plows and on short or long-broom sweepers are not much better than for the above types. Motors and control equipment will hold up shipments if nothing else interferes, as deliveries are now from four to six months on that equipment.

With the railways counting up their losses from the lack of proper snow-removal equipment, and with the report that Boston Elevated Railway has placed orders for from four to six snow-plows and sweepers, interest by both railway men and manufacturers will be focussed on this situation.

Heater Parts to Be Ordered Months Ahead

Extended Deliveries Force Railways This Year to Place Requirements Early

Lack of labor and raw material at the potteries, coupled with an unprecedented demand, has caused a shortage of hollow ware.

Deliveries are lengthening, with the result that electric railway heater manufacturers are experiencing great difficulties in making shipments.

Because of the scarcity of hollow-ware, large electrical manufacturers of stoves, ranges, sockets, insulators, etc., now are attempting to buy entire pottery factories in order to keep pace with production in their own plants. If they are successful, it will decrease the amount of hollowware available for electric railway heater purposes and cause additional delays in shipments.

Heretofore, railways have purchased heater parts during August and September for sixty to ninety days delivery. Under present conditions, with four months the best delivery that electric railway heater manufacturers can obtain on hollowware and with other porcelain and hollowware factories in the electrical industry on a six to eight months' delivery basis, it is plain to be seen that electric railways which expect to install heater parts next fall and winter must place their orders now for shipment as soon after Sept. 1 as the orders can be filled.

Inability of electric railway heater manufacturers to place large orders for raw material owing to last minute calls for heater parts has caused a heavy loss both to the manufacturer and to the railway. However, material is purchased anywhere it is obtainable at the best price, which is often double the regular price, and the railway must pay for the increased cost unless the manufacturer is willing to absorb a portion of it. Sheets for making covers are hard to obtain and premiums must be paid in most cases for this material. Shipments of clips, screws, fastenings and miscellaneous parts generally are late and are obtained only with much difficulty.

Orders for heaters to equip approximately 1,000 cars have been placed since Jan. 1, 1920, or are still pending and will be placed within the next few months. This indicates a healthy condition in the electric heater field and is undoubtedly just one more reason why railways which may be in the market for heater parts should act quickly in placing orders.

Mazda Lamps for Railways Marked Up

Increased Factory Production Costs Are Responsible for Advance Over the Prices of October, 1918

New lamp prices have been put into effect by the Mazda lamp manufacturers as of April 1. Increased costs of production on both railway lamps and on the ordinary types have been given by the manufacturers as the reason for the advances, and in this connection greater advances have been placed on frosted lamps than on clear lamps. Complications in the sand blasting have made this process still more costly.

Prices of Mazda "B" lamps where five in series are used on the 525, 550, 575, 600 and 650 volt railway circuits have advanced from 5 to 25 cents on the clear type and from 7 to 18 cents on the frosted variety, depending on the wattage of the lamp. These price changes appear in the accompanying table. The last increase was put into effect Oct. 1, 1918.

MAZDA "B" LAMPS FOR ELECTRIC RAILWAYS

Watts	Prices Clear		Prices Frosted	
	Old	New	Old	New
23	35	40	38	45
36	35	40	38	45
56	40	45	45	50
94	85	1.10	92	1.10

In the common run of lamps used in stations, etc., in the 110 to 125 volt type, the sizes up to 50 watts have increased from 35 to 40 cents clear and 38 to 45 cents frosted. Similar increase on the 60 watt "B" lamps are announced.

Type C lamps such as are used in up

to date car-houses, shops and powerhouses, show increases and decreases. The 75-watt has gone from 70 cents to 75 cents clear, and from 75 cents to 80 cents frosted. No change in price has been applied to the clear types in the 100, 750 and 1,000-watt sizes, but frosted lamps have gone up respectively in these three sizes from $1.15 to $1.20, from $6.75 to $6.85 and from $7.75 to $7.90. On the other hand, the 150-watt C has decreased from $1.65 frosted, the 200-watt from $2.20 to $2.10 clear and from $2.27 to $2.25 frosted. The 300-watt has decreased from $3.25 to $3.15 clear, and the 500-watt from $4.70 to $4.60 clear, while their prices, frosted, have not changed.

Heavy Demand for Railway Motors

Large Sales for Safety Cars With Number of Heavier Types Ordered Rapidly Increasing

Deliveries for large orders of rolling stock of all kinds now are dependent largely on motor shipments. For safety cars, these range from three to four months on a moderate sized order and from four to five months on large orders. Demand has been excellent and the large motor manufacturers are well satisfied with the volume of motor orders received so far this year for safety cars.

Orders for the heavier types of motors are rapidly increasing and with a number of double-truck car orders for large cities pending, sales are expected to show a healthy increase within the next sixty days.

Shipments of the larger sized motors are now being made in from six to eight months, and manufacturers are adding to their shop facilities to take care of the increasing demand.

Bond Prices Decrease

Owing to a recent recession in the copper market, the discount on rail bonds has been revised. Where formerly the old discount was 12½ per cent off list, the new one is 17½ per cent. Other copper products are not affected at this time for the reason that changes in discounts have been announced previously in most instances.

Preparations for spring bonding work are rapidly progressing and many railways have placed requirements for bonds, terminals, pins and for bond wire. Orders are still being received and within another six weeks it is expected that new bonding and repairing of old track circuits will be fairly under way.

Merger of Two Prominent Engineering Firms Effected

The plan for the merger of Westinghouse, Church, Kerr & Company, Inc., with Dwight P. Robinson & Company, Inc., was declared operative on March 18. Dwight P. Robinson has been elected president of Westinghouse, Church, Kerr & Company pending final completion of the merger.

It was stated at the office of Dwight P. Robinson & Company that the Westinghouse Electric & Manufacturing Company, the largest stockholder of Westinghouse, Church, Kerr & Company, will withdraw as a stockholder from the new company and that Guy E. Tripp will remain as chairman of the board of Westinghouse, Church, Kerr & Company only until the organization of the new company is completed.

Details of the new organization have not been fully worked out, but it was stated at the office of Dwight P. Robinson & Company that it is planned to retain the personnel of both of the merging companies. The new company will have an engineering office in the Grand Central Palace, New York City, and the present office of Dwight P. Robinson & Company, at 61 Broadway, will also be retained.

Rolling Stock

Newport & Providence Railway, Newport, R. I., has placed an order recently for two safety cars.

Saginaw-Bay City Railway, Bay City, Mich., is reported to have placed an order for seventeen safety cars.

Cincinnati, Milford & Blanchester Traction Company, Cincinnati, Ohio, is reported to have placed an order for three safety cars.

Boston (Mass.) Elevated Railway is reported to have increased its order of forty elevated cars, which was placed with the Pressed Steel Car Company as noted in the March 13 issue of the ELECTRIC RAILWAY JOURNAL. Twenty-six additional cars of the same type have been placed with this company.

Franchises

Los Angeles (Cal.) Railway.—The Los Angeles City Council has passed an ordinance authorizing the Los Angeles Railway to abandon its franchise for Pico and Eleventh Streets from Broadway to Main Street.

NEW YORK METAL MARKET PRICES

	March 3, 1920	April 1, 1920
Copper, ingots, cents per lb	18.37	18.50
Copper wire base, cents per lb	22.25	22.25
Lead, cents per lb	8.75	9.25
Nickel, cents per lb	45.00	45.00
Spelter, cents per lb	9.10	8.70
Tin, cents per lb	61.50	63.75
Aluminum, 98 to 99 per cent, cents per lb	33.00	33.00

OLD METAL PRICES—NEW YORK

Heavy copper, cents per lb	17.00 to 17.50	16.50 to 17.00
Lignt copper, cents per lb	14.75 to 15.25	14.25 to 14.50
Heavy brass, cents per lb	9.50 to 10.25	9.75 to 10.25
Zinc, cents per lb	5.00 to 5.25	5.00 to 5.25
Yellow brass, cents per lb	9.00 to 9.25	9.00 to 9.25
Lead, heavy, cents per lb	7.50 to 7.75	7.75 to 7.87
Steel car axles, Chicago, per net ton	33.00 to 35.00	35.00 to 36.00
Old carwheels, Chicago, per gross ton	41.00 to 42.00	39.00 to 40.00
Steel rails (scrap), Chicago, per gross ton	30.00 to 31.00	30.50 to 31.00
Steel rails (relaying), Chicago, gross ton	34.00 to 35.00	34.00 to 35.00
Machine shop turnings, Chicago, net ton	17.50 to 18.00	16.50 to 17.50

ELECTRIC RAILWAY MATERIAL PRICES

Rubber-covered wire base, New York, cents per lb	30.00	30.00
Weatherproof wire (100 lb. lots), cents per lb	27.00	30.00 to 47.00
T-rails (A. S. C. E standard), per gross ton	$55.00 to $57.00	$55.00 to $57.00
T-rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	55.00 to 57.00	55.00 to 57.00
T-rails, (A. S. C. E. standard), 500 ton lots, per gross ton*	45.00 to 47.00	45.00 to 47.00
T-rail, high (Shanghai), cents per lb	3.00	3.00
Rails, girder (grooved), cents per lb	3.00	3.00
Wire nails, Pittsburgh, cents per lb	4.00	4.00
Railroad spikes, drive, Pittsburgh base, cents per lb	3.35 to 3.85	3.35 to 3.85
Railroad spikes, screw, Pittsburgh base, cents per lb	7.50 to 9.00	7.50 to 9.00
Tie plates (flat type), cents per lb	3.00	3.00 to 4.00
Tie plates (brace type), cents per lb	3.00	3.00 to 4.00

ELECTRIC RAILWAY MATERIAL PRICES

	March 3, 1920	April 1, 1920
Tie rods, Pittsburgh base, cents per lb.	7.00	3.50 to 4.25
Fish plates, cents per lb	3.00	3.50 to 4.25
Angle plates, cents per lb	3.90	2.75 to 4.00
Angle bars, cents per lb	3.90	2.75 to 4.00
Rail bolts and nuts, Pittsburgh base, cents per lb	4.50 to 6.50	4.50 to 6.50
Steel bars, Pittsburgh, cents per lb	3.00 to 4.00	3.00 to 5.00
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.50 to 7.50	5.00 to 8.00
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	6.00 to 8.00	6.27 to 8.27
Galvanized barbed wire, Pittsburgh, cents per lb	4.60	4.60
Galvanized wire, ordinary, Pittsburgh, cents per lb	4.20	4.20
Car window glass (single strength), first three brackets, A quality, New York, discount †	77%	77%
Car window glass (single strength), first three brackets, B quality, New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York, discount	79%	79%
Waste, wool (according to grade), cents per lb	29 to 32	24 to 29
Waste, cotton (100 lb. bale), cents per lb.	16 to 17	18
Asphalt, hot (150 tons minimum), per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton	25.00	32.00
Asphalt filler, per ton	30.00	30.00
Cement (carload lots), New York, per bbl	2.90	2.80
Cement (carload lots), Chicago, per bbl	2.00	2.00
Linseed oil (raw, 5 bbl. lots), New York per gal	1.80	1.77
Linseed oil (boiled, 5 bbl. lots), New York, per gal	1.82	1.79
White lead, (100 lb. keg), New York, cents per lb	14½	15½
Turpentine (bbl. lots), New York, cents per gal	1.99	2.16 to 2.36

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*U. S. Steel Corp.

†These prices are f.o.b. works, with boxing charges extra.

Inspiration Consolidated Copper Company, Globe, Ariz.—The board of supervisors of Gila County, Ariz., has granted T. A. Donahue, general manager of the Inspiration Consolidated Copper Company, a franchise to build and operate an electric railway line between Globe and Miami.

Recent Incorporations

Cleveland & Sharon Rapid Transit Company, Youngstown, Ohio.—The Cleveland & Sharon Rapid Transit Company has been organized for the purpose of building an interurban line between Youngstown and Warren, Ohio, passing through McDonald and Niles.

Northern Neck Railway & Power Company, Fredericksburg, Va.—Application has been filed with the State Corporation Commission for a charter for the Northern Neck Railway & Power Company, which proposes to build an electric railway 100 miles long from Fredericksburg to a point on the Rappahannock River. The company is capitalized at $5,000,000. Its officers are: Willis H. Fowler, president; G. D Happer, vice-president, and M. Glennon, secretary, all of Norfolk.

Track and Roadway

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway has secured a permit to extend its Long Beach freight line from Third Street to Ocean Avenue, Long Beach.

Twin City Rapid Transit Company, Minneapolis, Minn.—The Twin City Rapid Transit Company has placed orders for rails, ties and other equipment for the construction of a line in North Seventh Street and loop trackage in the downtown district of Minneapolis.

Salem & Penns Grove Traction Company, Penns Grove, N. J.—A committee of the Chamber of Commerce of Quinton, N. J., has secured a right of way for a proposed extension of the line of the Salem & Penns Grove Traction Company from Salem to Quinton. The extension would be three miles in length.

Cincinnati (Ohio) Traction Company.—The Cincinnati Traction Company recently notified W. C. Culkins, street railway director, that the cost of changing the present double trolley system in Cincinnati to a single trolley system would amount to $523,550. The value of the salvage was estimated at $353,000, making the net cost approximately $170,000.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has ordered 1,000 ties each from the International Steel Tie Company and the Dayton Mechanical Tie Company, for installation in track reconstruction this summer.

Trade Notes

Mono Corporation of America, Buffalo, N. Y., announces that it has purchased the entire stock of Mono apparatus and accessories from the F. D. Harger Company, Buffalo, N. Y.

Trolley Supply Company, Massilon, Ohio, has moved its factory from Canton to Massilon, where the company recently built a new plant for the manufacture of railway supplies. According to F. E. McLain, president of the company, the move was made March 22.

Western Electric Company, New York, N. Y., on March 8 to 12, held its first general conference in five years at the Hotel Chalfonte, Atlantic City, N. J. Managers and sales managers of the company's forty-five distributing houses and executives from the main New York office were present. F. A. Ketcham, general sales manager, acted as presiding officer of the conference, the keynote of which was "A Larger and More Profitable Business."

Rail Welding & Bonding Company, Cleveland, Ohio, formerly the Lincoln Bonding Company, has moved its factory and offices from 634-36 Huron Road to 2336-2400 Woodland Avenue, where it has purchased a large four story building with a two story annex. With this floor space and a large amount of additional equipment this company is making every effort to meet the greatly increased demand for its products.

A. T. Shurick, recently of the business staff of the *Coal Trade Journal*, has been elected vice-president of F. C. Thornley & Company, consulting and constructing engineers, New York. This firm has been identified with the development and construction of some of the largest coal handling and storage installations in the country, such as the Curtis Bay piers of the B. & O. Railroad, and designs, constructs and prepares for operation plants of this character as well as doing other engineering work.

Eastern Asbestos Company, Providence, R. I., has been established with offices at 417 Grosvenor Building, and the company will sell both standard and special asbestos products, including yarn, tape, cord, cloth, twine, listing, gaskets, carded fiber, gasket cloth, friction disks, sheet and high-pressure packing. P. O. Baker, who has been in the electrical industry for the last eighteen years, is manager. Mr. Baker has just resigned as purchasing agent of the D & W Fuse Company, Providence, and was formerly employed by the Western Electric and Simplex Wire & Cable companies.

Curtain Supply Company, Chicago, Ill., has taken over the manufacture and sale of the steam and electric railway articles formerly manufactured and sold by the Forsyth Brothers Company, Harvey, Ill. Among the articles taken over are the metal sash, weather strips, screens, deck sash ratchets, etc. It is planned to market these products henceforth under the regular trademark name of the Curtain Supply Company, namely "Rex." The company is increasing its plant capacity at 350 West Ontario St. to take care of this additional volume of business in order that it will be in a better position to make delivery on the large number of orders which it already has on its books.

Chicago Pneumatic Tool Company, Chicago, Ill., effective March 31, has moved its general offices to New York and will occupy a new ten story structure erected for exclusive use of the company at 6 East 44th Street, New York. The Chicago district sales branch, previously in the Fisher building, has been moved to commodious new quarters on Chicago's new Boulevard link, at 300 North Michigan Boulevard. The service branch, formerly at 521 South Dearborn Street, has been consolidated with the sales branch at the new address, occupying the first floor of the building, while the sales offices will be on the second floor, or boulevard level. J. L. Canby, district manager, will continue in charge of the Chicago office.

Square D Company, Detroit, Mich., manufacturers of electrical safety devices, announces that E. A. Printz, formerly district sales manager at Chicago, has been made sales manager, A. MacLachlan continuing in the capacity of secretary and director of distribution. D. M. Stone, formerly district sales manager of the Pittsburgh trritory, is now in charge of the Detroit territory. J. A. Jaques, formerly district sales manager at New York, was given the Pittsburgh territory, and H. W. Spahn, district sales manager at Buffalo, was placed in charge of New York. D. H. Colcord, formerly of the department of publicity, Westinghouse Air Brake Company, Pittsburgh, Pa., was appointed director of research engineering. The annual sales conference of the company was held at the Hotel Statler, Detroit, February 16, 17 and 18.

New Advertising Literature

Reading Valve Fittings Company, Reading, Pa.: A catalog of steel and iron flanges and screwed fittings and flanges.

Schweitzer & Conrad, Inc., Chicago, Ill.: Bulletin on farm-service equipment, of interest to electric railway companies furnishing industrial power.

Westinghouse, Church, Kerr & Company, New York City: Bulletin on the "cost plus" plan of doing work, under which this concern has done over $100,000,000 worth of work during the past twenty years.

Gold Car Heating & Lighting Company, New York, N. Y.: Bulletin No. 4 issued January, 1920, on its standardized electric heaters with steel or aluminum cases and equipped with interchangeable heating elements.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 55 New York, Saturday, April 10, 1920 *Number* 15

Need for Better Fire Brick Becoming More Pronounced

THE recent experiments with the use of pulverized coal for fuel in large generating stations has pointed clearly to the great need for ceramics research work looking toward the development of a fire brick which will provide a furnace lining capable of withstanding the very high temperatures that can be secured through this manner of combustion. Even with stoker operation, the furnace lining has been a source of great trouble for some years past, particularly in installations where it becomes desirable to force the boilers to about 250 per cent overload. It is highly desirable to be able to force boilers to several hundred per cent of their rating continuously, in some cases, and temporarily in nearly all cases, in connection with the electric railway and central station fields. The fire bricks available today, however, place a limitation upon the permissible furnace temperature. This limitation is more pronounced with pulverized fuel burning than it has been with stoker-fired boilers. In fact, it represents a limitation which mitigates against the best combustion efficiency. In other words, were it not for the limitation of the fire brick lining it would be possible to obtain almost perfect combustion with pulverized coal. This points to the great desirability of development work looking toward fire brick capable of withstanding much higher temperatures than can be permitted at present—a subject which might well be taken up by the fire brick manufacturers, the industrial research laboratories of the universities and other investigatory bureaus.

Are We Being Talked to Death?

GEORGE McMANUS is the author of "Bringing Up Father." Into his work he has packed a great deal of common sense. George pictures one of his characters in a barber shop. The man is being shaved. On his watch fob he has a bear's claw. The barber asks his patron how many shots it took to kill the bear. The patron answers that it didn't take any. The barber asks how many times the patron stabbed the bear. The patron answers none. Finally, the barber, bound that he will know how Bruin met his fate, asks how the patron did kill the bear. Then in desperation the patron replies, "I talked him to death."

Now, the United States is not exactly being talked to death, but it is being talked insensate. Nearly everybody is emulating Mr. McManus' barber. Industry seems to be divided—not equally by any means—into two general classes, those who work and those who pretend to work. They who pretend to work are the culture of courage crowd. Their middle name is Con, with a capital C. The former are too busy to believe in anything. The latter are too talkative to do anything. Their idea of emulating the boss is to convert themselves into a hot-air machine. They are the great pretenders. The human hot-air engine can be endured in politics, but he has no place in business. The sage of East Aurora made Rowan, his hero, the embodiment of action. The lesson of that little booklet had a salutary effect. Its circulation ran into many millions. It ought to be revived and a copy placed in the hand of every employee who has been led astray with the doctrine that appearing to be something you are not is the same as being that person. The culture of courage school will awaken to that fact sooner or later, but it might be well to accelerate the awakening. It would solve one of our national problems and remove a pest.

Don't Economize (?) by Cutting Down on Brain Power

IN GENERAL, superficially at least, the public appreciates brawn more highly than brain when it comes to public service. That is to say, it does so in comparison with the practice of the utilities and especially with that of the manufacturing and constructing companies. For example, a municipality expects to get technical service for a price very much lower than that paid privately for such services. The result is that, excepting under emergency circumstances which appeal to the public spirit of high-grade specialists among the citizens, only mediocre talent is available for public service.

One of the arguments, a specious one, in favor of public ownership and operation of utilities is that administration can thus be conducted more economically as far as the salary list is concerned. This short-sighted economy takes the form of low salaries and inadequate personnel. Mr. Hanson told the Toledo people a few weeks ago that one result of public ownership and management is that "low-priced managers put the business amounting to millions of dollars annually into the hands of wornout employees or young apprentices in electric railway operation." It is interesting to note that in Seattle recent economies on the municipal railway system take the form of the acceptance of resignations of three department heads and the abolishing of fourteen positions, thus saving $2,885 per month. In investigations of utility affairs generally the officials representing the public are usually much shocked by the magnitude of the salaries paid company officers by boards of directors who know that sometimes expensive things are cheapest. Yet these salaries are small measured by the ability of the recipients to save or lose vast sums for their employers.

This note is not an argument against public ownership and operations *per se*. It rather is a note of warning that the cutting down in the brain power of any organization is killing the goose that lays the golden egg. As the Russian Soviet Government learned months ago, and, learning, profited thereby, brains must be had no matter how high they come. And they are coming mighty high in Russia today.

Oregon May Delay, but the Bill Must Be Paid Some Day

IN RATHER sharp contrast to the action of some other commissions, such as Maryland in the case of the Baltimore United Railways and Virginia in the case of the Norfolk City Gas Company, is the action of the Public Service Commission of Oregon in the Port and Railway case. In its opinion of March 23 it holds in suspense for at least two months more its decision on a fare increase which was requested last September. To be sure, the commission admits and proves that some relief must be given the company either by its riders in increased fares or by the public in taxes. But the delay in providing this opportunity to continue as a going concern is deadly.

We were about to add the Interstate Commerce Commission to the list of guilty on the same charge on account of its 120-day postponement of allowing the Hudson and Manhattan 8-cent fare relief requested, when the commission intimated that meanwhile it would allow relief according to an alternate fare scheme of 6 cents from New Jersey to lower New York and 10 cents to upper New York.

The reason Oregon delays its decision is that it would have the people of Portland vote on the commission's scheme of municipal ownership of track, thus transferring part of the fixed charges and maintenance costs of permanent way from the car rider to the general public. This, with the removal of street cleaning and other imposts, is its proposed measure of relief to the company.

There may be honest doubt and there should be careful study as to the best form of fare and other financial relations in each case, but to delay giving any relief at all, at the same time that the necessity for relief is acknowledged, is not fair to either company or public. Commissioner H. H. Corey, in dissenting from the majority opinion, argues forcefully on this point as well as against the ultimate measure of relief proposed.

The community eventually pays for what it gets and a mañana policy merely compounds interest, so that when the bill is eventually settled it is worse than it should be, and, too, it may be the next generation that will pay. While searching for the millennium, we ought to pay our own way.

What Has Norfolk Done?

"WHAT has Norfolk, Va., done out of the ordinary?" This query has been put in response to our article on page 682 of last week's issue, "Is not any community willing to assure capital a legitimate return when invested in public utilities?" The answer to this latter question may be, yes, but apparently Norfolk is the first city in the United States to take official corporate action in announcing a policy or platform assuring an inviting return and protection of capital. This act is a definite invitation to the public utility investor, and Norfolk believes that if this attitude toward public utilities is once appreciated, there will be an even greater attraction toward industrial development in such a community which indicates a real conception of business.

"Was not the whole question one of valuation?" Of course, the determination of the investment which is to be safeguarded presents difficult problems. In this connection, we would point out that the present situation in Norfolk is not one in which the city alone has made concession. It has been necessary for the company to approach the problem from the same standpoint as the city, namely, one of fair business dealings between willing parties of integrity on both sides. There will always be honest differences of opinion on the determination of what is the legitimate investment in any enterprise more than one day old. However, a determination on this question must be reached, and when the city and company get together, both with fair minds, both with the same fundamental conceptions as to justice to public and company, at least a basis of agreement ought to be determinable.

To see the extreme of the other side of this continuous question of dealing between cities and companies it is only necessary to turn to the local New York situation, where it is somewhat difficult, to say the least, to determine what the city's attitude is. If, on the other hand, the city would put itself on record as to a definite policy toward public utilities in a manner as fearless as Norfolk, it would at least be possible for both public and company to know where the city stood and to act accordingly.

That there are other examples toward both ends of the scale is not to be doubted, but we believe that the attitude of Norfolk will eventually prove the more advantageous to the community.

Unscrambling Grouped Properties Held Unsound

THE Pennsylvania Commission adheres to a sound policy of economic transportation in its argument on grouped properties in the Pittsburgh Railways case. There were some sixty-three complaints against some sixteen component parts of the operating property, but the commission groups these all into one case, for, it says, the primary consideration to the community as a whole is satisfactory transportation at the lowest cost consistent with sound financial and operating policy, and this can be accomplished only by maintaining the properties as one system. To allow the disintegration of the property into its various component parts, each with its separate fare and with service not articulating with other service, would be almost suicidal to the economic and social welfare of the Pittsburgh district.

To show its sincerity in this viewpoint, the commission proceeded to establish a basis of financial stability for the company so that it would be possible for it to realize the commission's desire of one system. To prove the present fare not excessive, and this was the point at issue in most complaints, the commission said all it needed was the lowest valuation figure offered by any complaint, namely, $48,000,000. But to stop there and say that the property as a whole is worth not less than $48,000,000 would put the company in so vulnerable a position financially that it could not secure necessary funds and would be liable to ultimate disintegration by a series of foreclosures. This would defeat the very purpose of the commission as stated above, namely, to keep the property together. So the commission, although finding it unnecessary for the purpose of the rate case, made a determination of value for the sole purpose of stabilizing the company's financial status that it might continue as one property, finding the value to be $62,500,000, compared with the company's claim of $70,000,000 and the approximate capitalization of $156,000,000. This, the commission says, tells the company where it stands and allows it to proceed with a constructive program of refinancing and of improving service.

It appears to us that the commission has done a piece of work in line with its constructive policy which we have commended heretofore in these columns.

On one point, however, we wish the commission had been more definite, and that is in its treatment of depreciation and some other details of valuation. As to its subtraction for theoretical depreciation as measured by the physical condition or remaining life of property, the commission does not argue at length, but says it doesn't feel justified in changing its past record and policy. Nor does it say how much it subtracts. If the commission had restated its definite reason for the subtraction and given the amount, even approximately, subtracted for depreciation, it would have faced this issue as squarely as it has the other issues of the situation. We do not criticise the total figure arrived at; it may be perfectly fair. Valuations are hard to determine to any one's entire satisfaction, but it seems entirely probable that more definiteness on the part of commissions as to the exact treatment accorded various items would hasten the day of more nearly complete agreement on valuation methods.

Give the Security Holders Full Information Regarding Operation

THE form of annual report issued by most electric railway companies leaves much to be desired. Usually a condensed balance sheet with brief income statement, in which all operating expenses are grouped in one item, is all that is published. Where the securities of a company are closely held and the company is a small one there is perhaps no reason for the publication of any annual report, because the security holder can get detailed figures of the company's operation by direct application to the company or from its report filed with the Public Service Commission. With a larger company, which prints its reports for circulation among its stockholders, there is every reason why the essential data should appear in its report.

Annual reports, we believe, should contain, first, an income statement setting forth the revenue details and deductions, so as to show the surplus or deficit carried to the balance sheet, with comparative figures for the previous year. The operating expenses should be separated at least into the primary accounts. In the balance sheet the more important assets and liabilities should be detailed and the changes from the preceding year should be shown.

Should the company consider itself in a position to publish a larger report, further interesting information would be data as to the track mileage owned and operated, the different kinds of traffic handled, the number of cars, car-miles and car-hours run, kinds of rolling stock owned, basis of fare schedules and average length of ride and maximum ride possible for the minimum fare. A map is also desirable. If a still larger report is possible there are many ways in which it can be expanded. In fact, we know of one electric railway company which goes so far as to keep a memorandum of a request for information that does not appear on its latest report as a guide to what may be included in the next edition.

Electric railway companies, we believe, have failed to comprehend the advantages that accrue from such publicity. If the report is a favorable one publication of the figures mentioned will increase the company's credit. If the year's operation has been unfavorable the sooner the public knows the facts the better. If there are any persons from whom the company wishes to conceal any facts in regard to its operation they can get the figures, if they desire to do so, at the office of the State Public Service Commission. Hence, the company has nothing to lose and everything to gain by making these figures easily accessible to the general public.

Has Automatic Substation Control Made Good?

INTEREST in the automatic substation would be justified if for no other reason than that it is a real indication of technical progress which promises economy. The electric railway or any other business is stimulating only to the extent that developments are taking place and an improved future service is visualized. The automatic substation is therefore worth while because it meets both of these specifications.

But the automatic substation is more than a promise, more than a harbinger. It has made good—on a small scale to be sure, but on a scale as large as could be expected in six years, half of which were war years. Moreover, the automatic control principle has been found applicable in a field much broader than was originally contemplated.

The automatic control installation most widely heralded, after the pioneer equipments installed on B. J. Arnold's interurban road, was the one in Des Moines, Iowa. Circumstances were propitious there to a remarkable degree for this innovation and the electrical engineer of the local railway property, F. C. Chambers, had the foresight and the courage of his convictions necessary to put the thing over. Back of him was the reputation of a great manufacturing company, staked to the extent to which it was involved in automatic control for electric railways, upon making the proposition a success.

Believing that the time is now fitting for a review of the Des Moines situation, and knowing that its readers want to know, first hand, what has been going on in Des Moines during the four years since the present plan was put into operation, the ELECTRIC RAILWAY JOURNAL asked Mr. Chambers to go over the whole story briefly, stating just what automatic control has done for Des Moines railway service and how it has done it. The response is an article printed this week. Mr. Chambers may later supplement this with more operating detail, and if any questions arise in the minds of the readers of the paper which he does not answer now these might be sent to him or to the JOURNAL so that they can be answered later.

If the automatic substation was desirable before the war it is doubly so now. Attendance costs more than it did; attendants on the average are less efficient, so that it is desirable to turn over all possible operation to automatic apparatus; the equipment has been considerably improved through experience; the limitations and proper fields for automatic control have been discovered, and confidence in the ability of the devices to function properly has been established.

Automatic Substations at Des Moines

Installation of First Two Units Averted Need of New Feeder Cable and Permitted Salvage of Existing Cable—Seven Automatic Stations on City System Installed at Saving of $120,000 in Investment—Equipped with Selector Control

By F. C. CHAMBERS
Mechanical and Electrical Engineer Des Moines City Railway

THE Des Moines City Railway operates 90.43 miles of line, measured on a single-track basis. In the accompanying illustrations are shown the lines composing the system, together with a small portion of the property of the Inter-Urban Railway, which is owned and operated by the same interests but as a separate corporation. The corporate limits of the city of Des Moines include a total of 54 square miles, 9 miles east and west and 6 miles north and south. The lines of the railway company extend outside of the city limits in several directions. The total length outside the corporate limits is 5.2 miles. The business section of the city is somewhat lower than the residence section, so that all cars outward bound from the business section encounter upgrades, the maximum value of these on the different lines varying from 0.5 per cent to 7.6 per cent.

The railway company owns a total of 150 passenger cars, the weights and motor capacities of which are recorded in Table I. A total of 104 cars are operated during the rush hours and during this period as many of the large cars are kept in operation as is possible consistent with carrying out the necessary inspection and repair work on the equipment. The average schedule speed on the entire system is 9.3 m.p.h.

TABLE I—CAR EQUIPMENT DES MOINES CITY RAILWAY

Number of Cars	Weight	Horsepower of Motors
40	31,800 lb.	92
9	35,000 lb.	92
6	42,000 lb.	140
30	41,000 lb.	100
45	36,000 lb.	100
20	36,000 lb.	75
Total, 150	5,409,000 lb.	14,348

Average weight of cars, 36,060 lb.
Average horsepower of motors, per car, 95.6.

For several years previous to Nov. 22, 1915, the company had been operating without a franchise. For this reason it was impossible to secure the necessary capital for extensions and improvements which should have been made in order to keep up with the growth of traffic, which was steadily increasing each year due to the development of the city. The result was that when a new franchise was granted the company in November, 1915, not only was the physical condition of the property as a whole in bad shape, but the amount of traffic which was being handled taxed the car equipment, power generating equipment and distributing system to the limit. The new franchise grant carried with it provisions which not only necessitated the rebuilding of several of the lines, but also the extension of certain lines, the building of a new line 2.2 miles in length and the addition of at least forty cars.

The generating equipment of the power station at that time consisted of one 1,000-kw., 2,300-volt, three-phase, 25-cycle turbo-generator; one 2,000-kw., 2,300-volt, three-phase, 25-cycle mixed-pressure turbo-generator, and two 1,000-kw., direct-current engine-driven generators. Approximately 80 per cent of the power for the system was supplied by the direct-current generators at the power station, the balance being supplied from the substations indicated in Fig. 1 as substations No. 1 and No. 2. These were supplied with three-phase, 25-cycle current at a potential of 23,000 volts from the generating station. The substation No. 2 was owned and operated by the Des Moines City Railway and in addition to supplying power for part of the city system it also supplied direct current to the south end of the Beaver Valley Division and the west end of the Flint Valley Division of the Inter-Urban Railway system. The substation No. 1 was owned by the Inter-Urban Railway and in addition to supplying power to the east end of the Flint Valley Division and the west end of the Colfax Division of the Inter-Urban system it also supplied power to the lines in the eastern part of the city.

Fig. 1 also shows the feeders leading from the power station and the two substations to the various lines, the trolley system and the return feeder system as it existed at that time, amounting to over 650,000 lb. of copper and representing an investment of $162,500, figuring the copper on an average of 25 cents per pound.

Generating Station 25 Per Cent Overloaded—Distribution Loss Also 25 Per Cent

With the generating station carrying an overload of 25 per cent each morning and evening, the instantaneous loads reached a point which reduced the speed of the engines and turbines. The loss in the distributing system amounted to 25 per cent. It was therefore evident that in order to provide an ample supply of power for the system not only would it be necessary to increase the capacity of the generating station, but also to provide additional capacity in the feeder system. This was necessary in order to reduce the excessive line loss and to take care of the increased power demands resulting from the addition of more cars to the system, and from the speeding up of cars which would be possible providing the line potential was maintained at a fairly good value. The average schedule speed at that time was 8 m.p.h.

The problem of selecting the proper equipment for increasing the capacity of the generating station was comparatively simple. It would not have been economical from the standpoint of either first cost or operation to add additional direct-current generating capacity to the power station, as the territory covered by the lines was so great that it would have required a very heavy investment in feeder copper to distribute the additional power, with the attendant loss in the feeder. In addition to this phase of the situation, the demand of the Inter-Urban Railway for power to operate its trains and also for commercial power was constantly increasing and for these reasons a 5,000-kw. turbine unit was installed.

In order to take advantage of the lower water rate of the 5,000-kw. turbine as compared with the other units, it was planned to install two 2,000-kw. rotary converters in the power station. In this way the entire load of both the Inter-Urban and city systems could be carried by the 5,000-kw. unit except during peak loads, the direct-current generators being operated only in case the 5,000-kw. unit was out of service. The plan for installing the two 2,000-kw. rotary converters was, however, abandoned as will be explained later on.

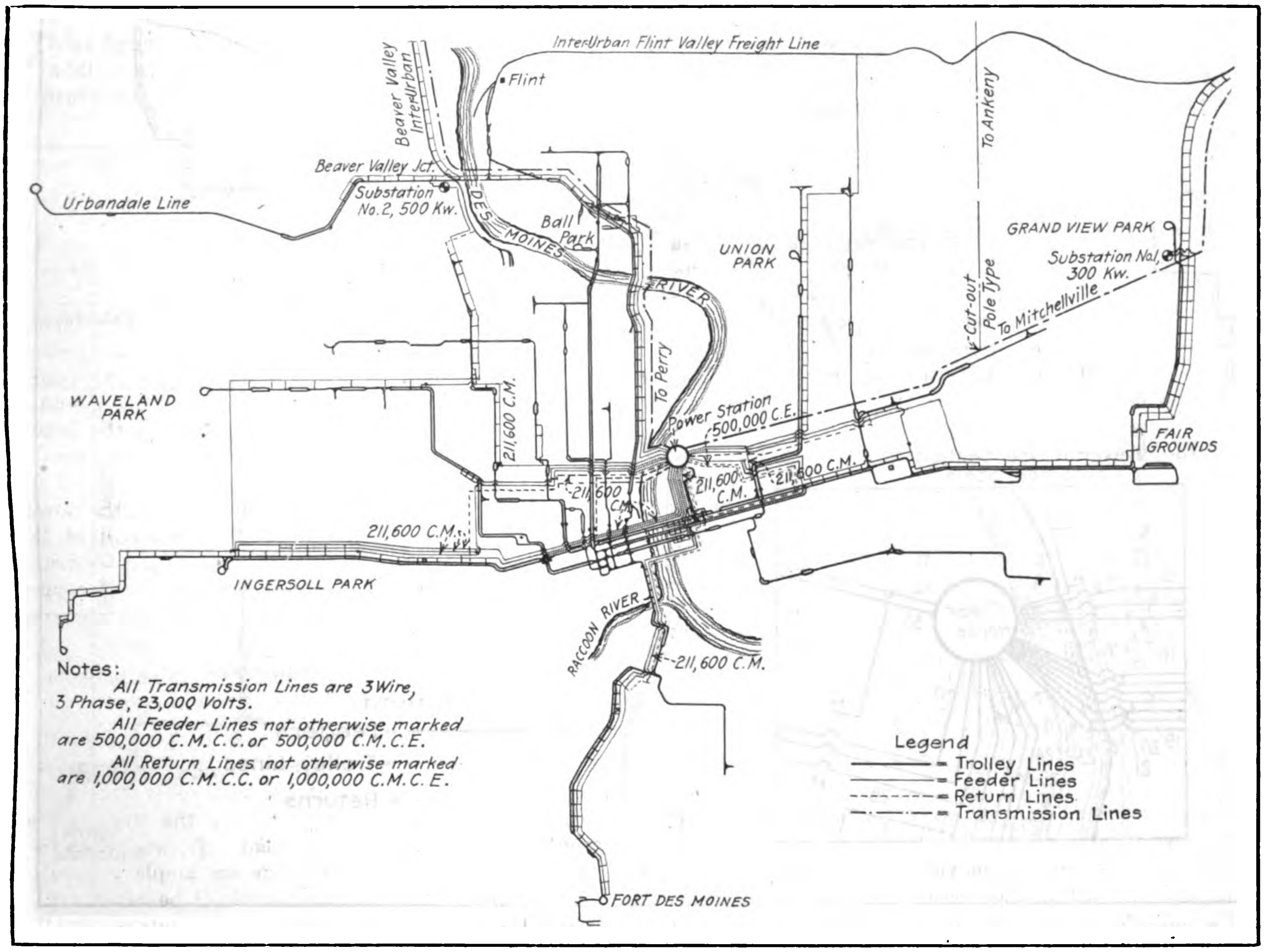

Inter-Urban Flint Valley Freight Line
Beaver Valley Inter-Urban
Flint
To Ankeny
Beaver Valley Jct.
Urbandale Line
Substation No. 2, 500 Kw.
DES MOINES RIVER
Ball Park
UNION PARK
GRAND VIEW PARK
Substation No. 1, 300 Kw.
Cut-out Pole Type
To Mitchellville
To Perry
Power Station 500,000 C.E.
211,600 C.M.
WAVELAND PARK
FAIR GROUNDS
211,600 C.M.
211,600 C.M.
211,600 C.M.
211,600 C.M.
INGERSOLL PARK
RACCOON RIVER
211,600 C.M.
FORT DES MOINES
Notes:
All Transmission Lines are 3 Wire, 3 Phase, 23,000 Volts.
All Feeder Lines not otherwise marked are 500,000 C.M. C.C. or 500,000 C.M. C.E.
All Return Lines not otherwise marked are 1,000,000 C.M. C.C. or 1,000,000 C.M. C.E.
Legend
= Trolley Lines
= Feeder Lines
= Return Lines
= Transmission Lines

FIG. 1—TROLLEY, FEEDER AND RETURN SYSTEM OF DES MOINES CITY RAILWAY ON NOVEMBER, 1915, SHOWING ALSO THE LOCATION OF SUBSTATION NO. 1 AND SUBSTATION NO. 2. TOTAL AMOUNT OF COPPER, 650,000 LB.

The next problem was to provide an adequate distributing system. Despite the fact that there was 650,000 lb. of copper in the overhead system, representing an investment of $162,500 in copper alone, the loss in transmission was approximately 25 per cent. This represented an annual loss of $50,000. In addition to this loss in power an equal if not greater loss was being sustained due to the low schedule speeds resulting from an insufficient amount of feeder cable to maintain a good operating potential on the lines.

The first plan suggested to bring the line loss down to a point which would be considered good engineering and to provide an operating voltage which would permit of increasing the schedule speed of the cars was to increase the capacity of substation No. 1 at Beaver Valley Junction by the addition of a 1,000-kw. rotary converter and to install additional feeder cables from this substation and the power station to the various lines. The investment necessary to increase the capacity of the substation and to cover installation of additional feeders from this station and the power station, together with the installation of two 2,000-kw. rotary converters at the power station as referred to above, amounted to $232,300. Over 40 per cent of this represented the cost of additional feeder cables. Fig. 2 shows the proposed overhead system with the additional feeder cables leading from the Beaver Valley substation and the power station. In Fig. 2 are also shown the proposed negative feeders leading from the various lines back to the substation and power station. The total amount of copper in the system including these feeders would be 1,050,000 lb., requiring an investment of $262,500.

In order to reduce the investment in feeder cables, a second plan was considered. This contemplated the installation of two additional substations and reduced the total investment required for feeders, but when the wages of six operators, three for each substation, were capitalized, the first plan proved to be more economical.

It was evident that the second plan, with the greatly reduced amount of feeder cables and the additional substations, would be advantageous both from the standpoint of investment and of economy of operation providing the cost of attendance could be eliminated. About

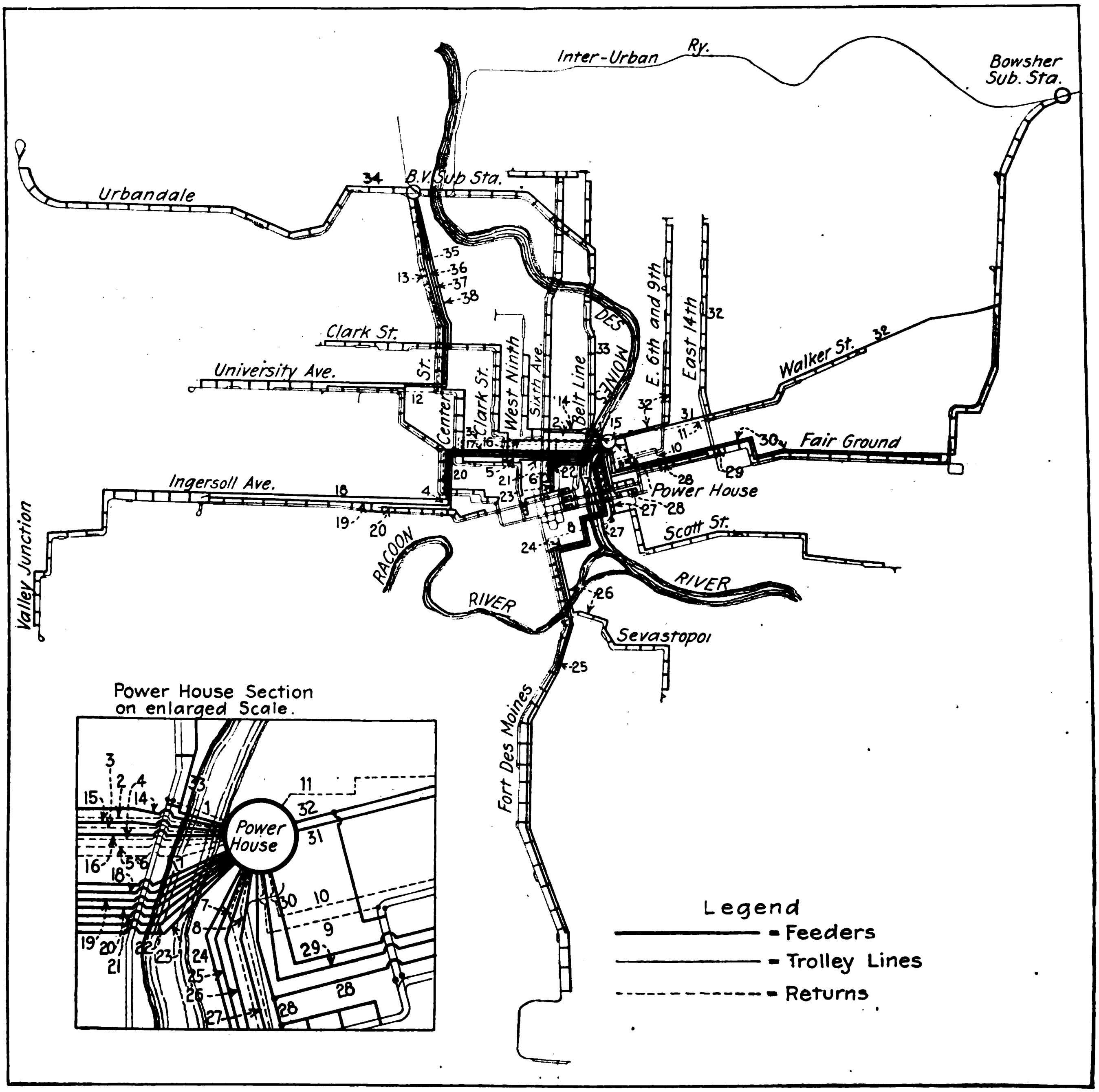


FIG. 2—PROPOSED FEEDER AND NEGATIVE RETURN SYSTEM, SHOWING ADDITIONAL FEEDERS WHICH WOULD HAVE BEEN NECESSARY TO BRING LINE LOSS DOWN AND PROVIDE SUFFICIENT OPERATING VOLTAGE UNDER FIRST PLAN OF INCREASING CAPACITY OF BEAVER VALLEY STATION. TOTAL AMOUNT OF COPPER, 1,050,000 LB.

KEY TO NUMBERS IN FIG. 2

1. Insulated return to power house from Belt line, 500,000 circ.mil insulated wire.
2. Insulated return to power house from Sixth Avenue line, 300,000 circ.mil insulated.
3. Insulated return to power house from University line, 1,000,000 circ.mil insulated.
4. Insulated return to power house from Ingersoll line, 2,000,000 circ.mil insulated.
5. Insulated return to power house from Clark Street line, 500,000 circ.mil insulated.
6. Insulated return to power house from West Side loop, 750,000 circ.mil insulated.
7. Insulated return to power house from East Side loop, 1,000,000 circ.mil insulated.
8. Insulated return to power house from Fort Des Moines line, 1,000,000 circ.mil insulated.
9. Insulated return to power house from East Sixth and Ninth line, 300,000 circ.mil insulated.
10. Insulated return to power house from Capital and East Grand Division, 500,000 circ.mil insulated.
11. Insulated return to power house from East Fourteenth line, 400,000 circ.mil insulated.
12. Insulated return to Center Street line from University line, 500,000 circ.mil insulated.
13. Insulated return to Bowsher Valley substation from Center Street line, 600,000 circ.mil insulated.
14. Feeder from power house to West Ninth line, No. 0000 insulated wire.
15. Feeder from power house to Sixth Avenue line, No. 0000 insulated.
16. Feeder from power house to Clark Street line, 300,000 circ.mil insulated and No. 0000 insulated.
17. Feeder from power house to University line, 850,000 circ.mil insulated, and No. 0000 insulated.
18. Feeder from power house to Valley Junction line, 500,000 circ.mil insulated.
19. Feeder from power house to Ingersoll line, 1,000,000 circ.mil insulated and 800,000 circ.mil insulated.
20. Feeder from power house to Ingersoll line, 800,000 circ.mil insulated and No. 0000 insulated.
21. Connecting feeder power house to Center Street feeder, 250,000 circ.mil insulated.
22. Feeder from power house to West Side loop, 800,000 circ.mil insulated.
23. Feeder from power house to West Side loop, 800,000 circ.mil insulated.
24. Feeder from power house to Ft. Dodge-Des Moines line, 500,000 circ.mil insulated.
25. Feeder from power house to Ft. Dodge-Des Moines line, 500,000 circ.mil insulated.
26. Feeder from power house to Sevastopol line, No. 00 insulated.
27. Feeder from power house to Scott Street line, No. 00 insulated.
28. Feeder from power house to East Side loop, No. 0000 insulated.
29. Feeder from power house to Fair Ground line, 1,000,000 insulated.
30. Feeder from power house to Douglas Avenue line and into Bowsher Valley substation, 500,000 circ.mil insulated.
31. Feeder from power house to Walker and East Fourteenth Street lines, connecting with Douglas Avenue feeder, 350,000 circ.mil No. 0000 and No. 00 insulated.
32. Feeder from power house to East Sixth and Ninth line, 500,000 circ.mil insulated and No. 0000 insulated.
33. Feeder from power house to Belt line and into Bowsher Valley substation, 500,000 circ.mil insulated.
34. Feeder from Bowsher Valley substation to Urbandale line, 500,000 circ.mil insulated and No. 0000 insulated.
35. Feeder from Bowsher Valley to Center Street line, No. 0000 and No. 00 insulated.
36. Feeder from Bowsher Valley to Waveland Park line, 500,000 circ.mil insulated.
37. Connecting feeder from Bowsher Valley substation to University feeder, 800,000 circ.mil insulated.
38. Connecting feeder from Bowsher Valley substation to Clark Street feeder, 350,000 circ.mil insulated.

one year previous to this time the General Electric Company had brought out and placed in service elsewhere three automatic control equipments for rotary converter substations. An investigation of the reliability of operation of the automatic equipments was made and the result of this investigation was such that it was decided to purchase two substation equipments with automatic control. After the equipment for these two substations had been purchased, a complete survey of the traffic conditions on the lines was made and estimates of the probable increase in traffic over a period of five years were prepared. From this information the power which would be required for the different sections of the system during this period was estimated.

These figures disclosed the fact that by the installation of additional substations not only could the expense of providing additional feeder cables be eliminated, but also the greater part of the existing feeder cables of the system could be taken down and disposed of for approximately $90,000. Five additional automatically controlled equipments were purchased during the following year, and the substations were so located at different points on the system that the greatest number of the different sections could be reached with the least amount of feeder cables. Part of these equipments were delayed in delivery due to congestion in the manufacturer's plant, which was also engaged in the manufacture of apparatus for the United States government. Due also to delays in the completion of substation buildings resulting from a strike of the building trades, the last one of these equipments was not put into service until April 1, 1919.

Fig. 3 shows the location of the new substations and also of the Beaver Valley and Bowsher substations

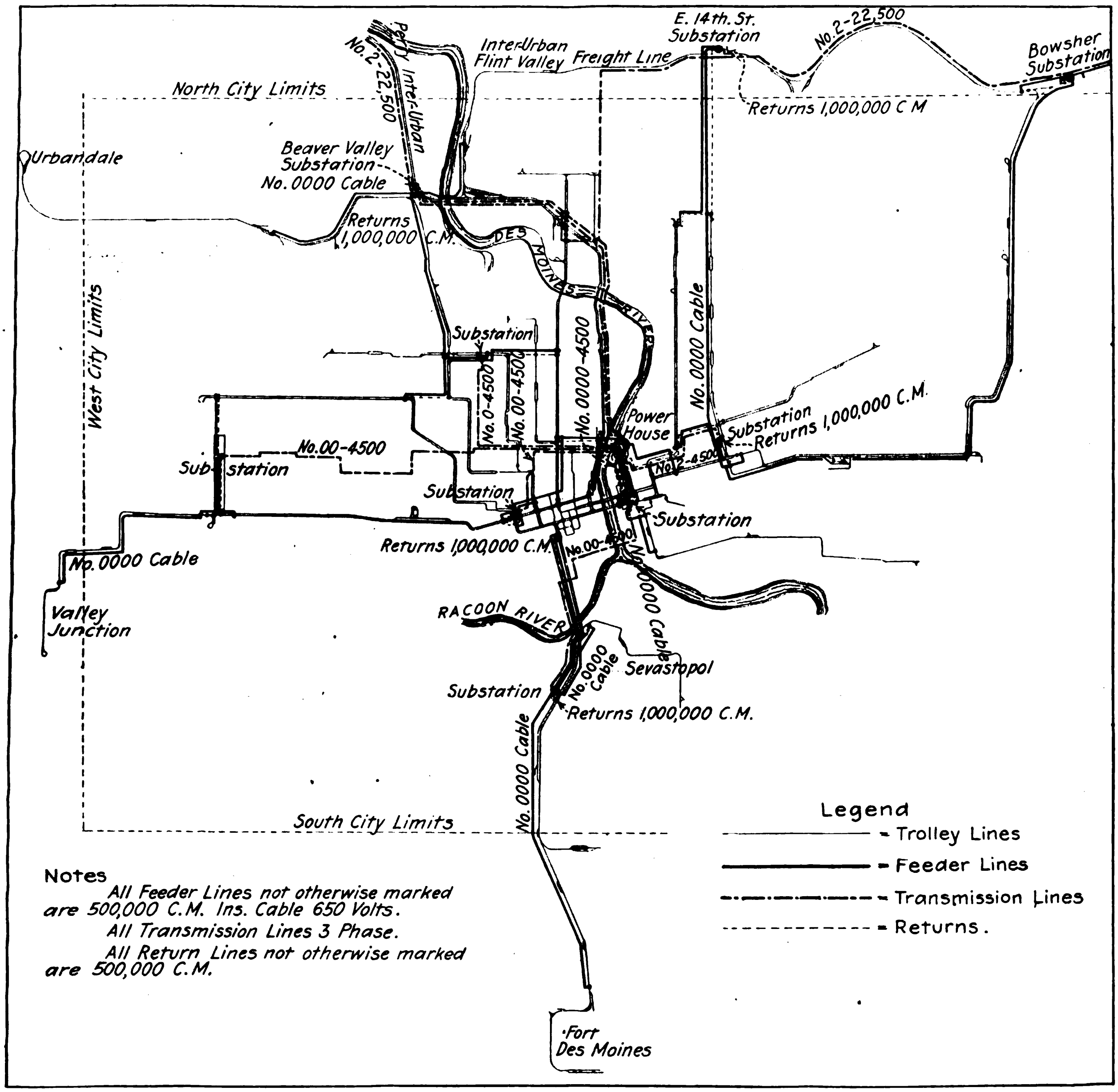

E. 14th. St. Substation
No. 2-22,500
Bowsher Substation
Inter-Urban Flint Valley
Freight Line
Perry Inter-Urban
No. 2-22,500
North City Limits
Returns 1,000,000 C M
Urbandale
Beaver Valley Substation
No. 0000 Cable
Returns 1,000,000 C.M.
DES MOINES RIVER
West City Limits
Substation
No. 0-4500
No. 00-4500
No. 0000-4500
No. 0000 Cable
Power House
Substation
Returns 1,000,000 C.M.
No. 2-4500
Sub station
No. 00-4500
Substation
Substation
Returns 1,000,000 C.M.
No. 00-4500
No. 0000 Cable
No. 0000 Cable
Valley Junction
RACOON RIVER
No. 0000 Cable
Sevastopol
Substation
Returns 1,000,000 C.M.
No. 0000 Cable
South City Limits
Legend
Trolley Lines
Feeder Lines
Transmission Lines
Returns.
Notes
All Feeder Lines not otherwise marked are 500,000 C.M. Ins. Cable 650 Volts.
All Transmission Lines 3 Phase.
All Return Lines not otherwise marked are 500,000 C.M.
Fort Des Moines

FIG. 3—OVERHEAD SYSTEM SHOWING FEEDER AND RETURN SYSTEMS AS ACTUALLY INSTALLED AND NOW IN OPERATION WITH SEVEN AUTOMATIC SUBSTATIONS. TOTAL AMOUNT OF COPPER, 460,000 LB. PRESENT TRANSMISSION LINE SYSTEM IS ALSO INDICATED

referred to above. The sections into which the trolley system is divided and the feeders leading from the substations and the power station to the different sections of the trolley system are also indicated. It will be noted that one of the stations is installed on the Flint Valley Division of the Inter-Urban system and furnishes power for both this division of the Inter-Urban line and the lines in the northern part of the city. In Fig. 3 also is shown the trolley system, location of substations and the return feeders leading from the track system to the substations and power station and the transmission lines. The total amount of copper in the system at present is 460,000 lb.

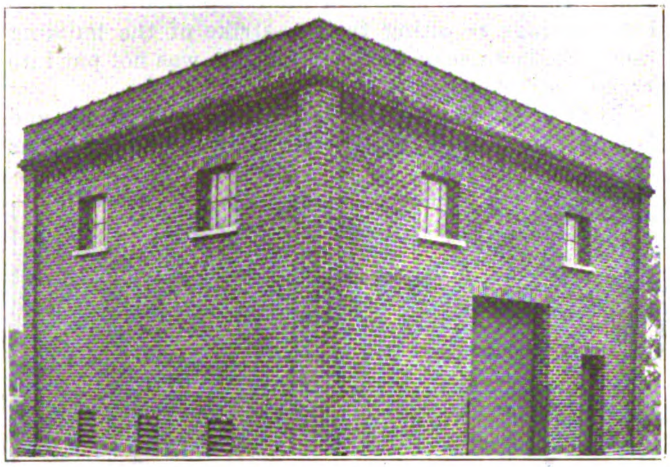


FIG. 4. EXTERIOR OF DES MOINES SINGLE-UNIT AUTOMATIC SUBSTATION

Table II shows the comparative investment required for the two systems designated as A and B. System A includes the installation of rotary converters at the power station and Beaver Valley substation and additional feeders from both of these stations. System B comprises the installation of the automatic substations with transmission lines and the removal of a part of the feeder cables. The item in Table II under system B, covering equipment for changing station voltage from 2,250 to 4,500 volts and amounting to $13,322, was necessary due to the fact that with 2,250 volts the investment in copper in the transmission lines would have been enough greater to more than offset the cost of equipment for changing the station voltage.

TABLE II—COMPARISON OF COST OF TWO PROPOSED SYSTEMS TO INCREASE POWER SUPPLY AND PROVIDE ADDITIONAL FEEDER CAPACITY

	System A	System B
Power station buildings	$15,000	$5,000
Transformers, rotary converters and automatic control equipment, including miscellaneous material and installation	....	130,165
Transformers, rotary converters, switching equipment, including miscellaneous material and installation	76,300	....
Substation buildings	4,000	23,200
Transmission lines	12,000	58,183
Trolley and feeder system (copper only)	262,500	28,961
Rebuilding feeder lines	25,000	....
Switching equipment for transmission lines	......	15,901
Equipment, miscellaneous material for changing station voltage from 2,250 to 4,500 volts	....	13,322
Total	$394,800	$274,732

In giving the comparative cost of the trolley and feeder system of systems A and B, the cost of pole lines, etc., has not been included, as in either case this cost would be practically the same. As the object of tabulating the costs as given in this table is to show the difference in cost of the two systems, the cost of pole lines, etc., for trolley and feeder system was omitted.

The difference in the cost of systems A and B, amounting to $120,068, is approximately $20,000 less than the difference in the cost of the two systems as estimated at the time the first two equipments were bought in 1916. This is due to the increase in cost of the equipments purchased subsequent to that date and the increase in cost of building, miscellaneous material and labor. If the seven equipments had been purchased and installed under 1916 conditions and prices, the difference in the cost of the two systems would have exceeded the original estimate of saving in the initial investment of $140,000 by at least 10 per cent.

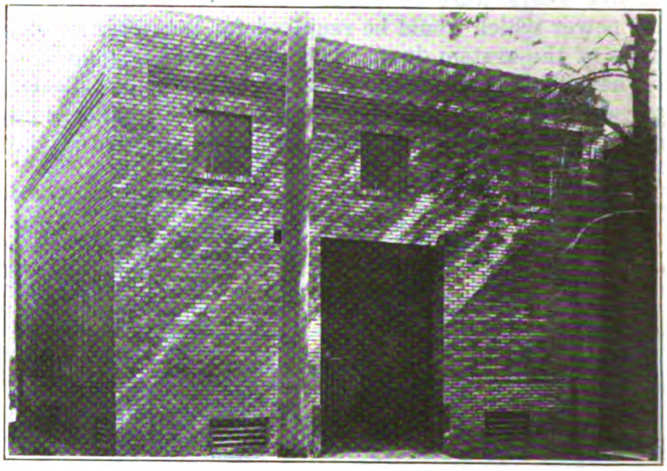


FIG. 5. EXTERIOR VIEW OF DOUBLE-UNIT AUTOMATIC STATION

Five of the seven automatic stations are of the single-unit type, each having a 500-kw. rotary converter, and two are designed for two units, each of 500-kw. capacity, although at the present time only one unit has been installed in each of these two stations. These stations are located at Twelfth and High Streets and East Second and Walnut Streets, which are the east and west limits of what is known as the union loop, comprising all of the tracks in the main business section of Des Moines. All cars of the system enter this loop on each round trip. As the system is extended and additional power is required the second unit will be added to each of these stations.

At the present time, in order to prevent these two stations from being too heavily overloaded during peak loads, and also to bring up the load factor on the stations in the outlying districts, the potential of the latter stations is maintained from 20 to 50 volts higher than it is at the Twelfth and High Streets and East Second and Walnut Streets stations. This difference in voltage equalizes the load between the stations. When the load has reached a point which requires the installation of the second unit in each of these two stations the voltage at all stations will be adjusted to the same value, as there will be no further necessity of guarding against excessive overloads. Due to the increased load in general on the system, all stations will then have a fairly good load factor.

FIVE SINGLE AND TWO DOUBLE-UNIT STATIONS OF SIMILAR DESIGN AND EQUIPMENT

Fig. 4 shows the exterior of one of the single-unit stations and Fig. 5 is a view of one of the stations designed for two units. These buildings, which are lo-

TABLE III—TABULATION OF RESULTS OF OPERATION OF SUBSTATIONS OVER PERIOD OF THIRTY DAYS

Station	Kw.-Hr. to Transmission Line	Kw.-Hr. Input Substations	Kw.-Hr. Output Substations	Hours Operated	Load Factor	Transmission Loss	Conversion Loss	Total Loss
Twelfth and High	119,320	115,400	104,280	261	79.91	3.29	9.70	12.66
East Second and Walnut	175,760	172,100	158,680	335	94.74	2.07	7.80	9.72
Fort Des Moines	288,880	277,000	253,180	572	88.52	4.11	8.60	12.36
East Fourteenth and Des Moines	233,140	225,200	200,880	567	70.86	3.40	10.80	13.83
Sixteenth and Clark	256,950	247,700	222,930	564	79.06	3.60	10.00	13.24
Polk Boulevard	168,270	161,900	141,660	576	49.19	3.78	12.50	15.81
Totals	1,242,320	1,199,300	1,081,610	2,875	75.25	3.46	9.81	12.94

cated in the residential sections of the city and face on streets, are constructed of face brick having struck joints. Buildings located between streets and facing on alleys are constructed of common brick, the brick in all stations being laid in cement mortar. The single unit stations are 25 ft. x 30 ft. over all with 13-in. walls and 20 ft. between the floor and underside of the concrete trusses which form a part of the roof. Each of these stations is provided with an 8-ft. x 12-ft. Kinnear rolling steel door and a 2-ft. 8-in. x 6-ft. 8-in. steel swinging door. On three sides of the building and located 14 ft. 9 in. from the floor are two 3-ft. 3-in. x 3-ft. 3-in. stationary steel sash windows of six panes each.

The double-unit type of station is 25 ft. x 40 ft. over all with the same thickness of walls and same height as the building for single units. These stations are provided with an 8-ft. x 12-ft. Kinnear rolling steel door in each end and one 2-ft. 8-in. x 6-ft. 8-in. swinging steel door. The size, location and number of windows in these stations is the same as in the single-unit stations. Ventilation for all stations is provided for by the installation of louvers at the floor line and glass top ventilators on the roof. The single unit stations have seven 2-ft. 3-in. x 2-ft. 6-in. louvers and one 3-ft. ventilator, while the two unit stations are provided with twelve 2-ft. 3-in. x 2-ft. 6-in. louvers and two 3-ft. ventilators. Figs. 6 and 7 show the interior of one of the single-unit stations.

Five of the automatic stations are supplied over aerial lines from the generating station, with three-phase, 25-cycle current at a potential of 4,500 volts, these lines entering the stations through roof bushings. One station is located in the "underground district" and the lines for this station are carried in a conduit line constructed of 3-in. fiber duct. The station which is located on the Flint Valley Division of the Inter-Urban system is supplied with current from the three-phase, 25-cycle, 22,500-volt transmission lines, which also supply current to other substations and commercial power installations along this line.

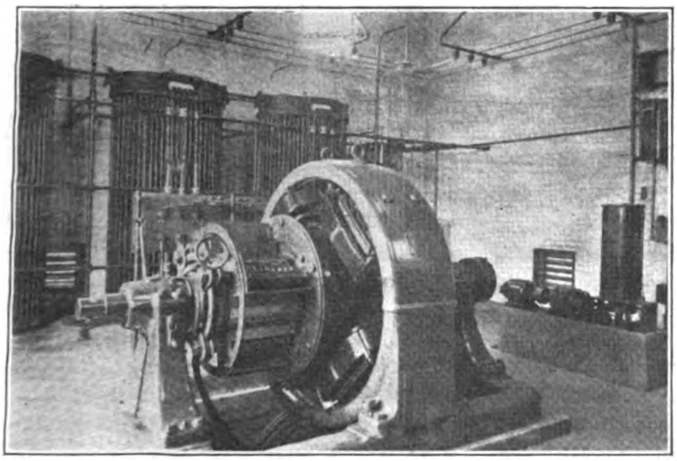


FIG. 6. INTERIOR OF SINGLE-UNIT AUTOMATIC SUBSTATION AT DES MOINES, SHOWING 500-KW. CONVERTER AND MOTOR-OPERATED CONTROLLER

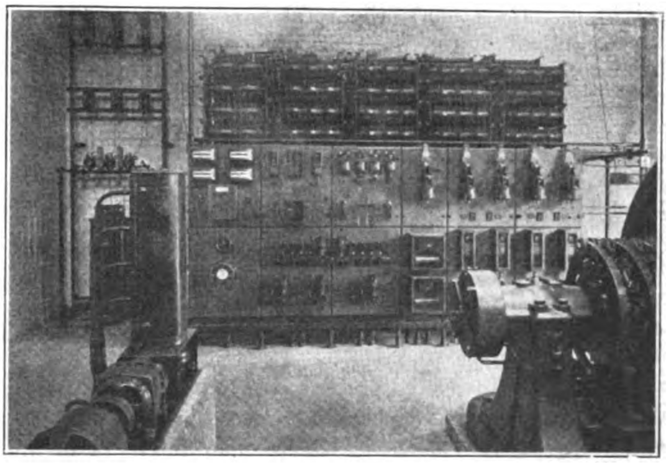


FIG. 7. SINGLE-UNIT AUTOMATIC SUBSTATION, SHOWING MOTOR-OPERATED DRUM CONTROLLER, CONTROL PANELS AND RESISTANCE

The direct-current feeders from all substations are carried underground through either iron or fiber conduit to poles located along the lines adjacent to the substations and terminate in a pothead. Lightning arresters are installed on all direct-current feeders in the substations and at the point where the cables leave the potheads. The automatic control equipment of the stations is what might be called the standard type of control as manufactured by the General Electric Company for operating this type of equipment, and as the control has been fully described in previous issues of the ELECTRIC RAILWAY JOURNAL no further description of the control equipment and the operation of same will be given at this time.

On a system equipped with automatically controlled substations when an overload or short circuit occurs on one of the trolley sections the feeder or feeders from one or more substations supplying current to this section are not disconnected from the direct-current bus at the substation by the tripping of an automatic circuit breaker, but instead a resistance of sufficient value to limit the current to a pre-determined value is inserted in series with these feeders by the opening of the line contactors. These under normal conditions form a short circuit around the resistance.

Under certain conditions, such for instance as quite an extensive break in the trolley system in congested districts or due to conflagration of a serious nature adjacent to the trolley lines, it is desirable to have some means for shutting off the current entirely from these sections without interrupting the supply of power to the other sections. Of course this could be accomplished by calling out the trouble car and having the disconnecting switches in the feeders leading to this section opened, but as some sections are supplied with current from three different substations this would require considerable time and no doubt in some cases the object of killing the line would be defeated before these switches could be opened.

To provide for emergencies of this sort and to be able to disconnect any section at any time, whether it is supplied with power from one or more substations, without delay or interruption to the supply of power to other sections, the feeders leading from each substation are connected to the bus through solenoid operated circuit breakers. These breakers are operated by means of relays located at the substations and by potential wires leading from all substations to a key board located at the power station. This is either opened or closed by the switchboard operator and any number of breakers in the feeders for a given section, whether located in one or more substations, may be operated simultaneously by turning the master key for these particular breakers in the key board located at the power station. With this equipment, the disconnecting or connecting of any section of trolley in the system, whether it is fed by one or more substations, is at all times under the control of the switchboard operator.

Table III shows the kilowatt-hours delivered to the transmission lines, the kilowatt-hours input at substations, the kilowatt-hours output at substations, the number of hours that stations were in operation, the load factor, the transmission loss, the conversion loss and the total loss over a thirty-day period.

TABLE IV—EXISTING OPERATING CONDITIONS DURING SAME THIRTY-DAY PERIOD AS TABULATED IN TABLE III.

Average peak load, kilowatts	3,234
Kilowatt capacity of rotary converters operated	3,000
Load factor (per cent)	108
Total weight of cars operated (tons)	1,826
Total horsepower of car motors	9,703
Kilowatt capacity of rotary converters operated per ton weight of cars	1.64
Kilowatt capacity of rotary converters operated per horsepower capacity of motors	0.309

Table IV shows for this period the average of the one-hour morning or evening peak load, the kilowatt capacity in rotary converters in operation, the total weight of cars (tons), the total horsepower rating of car equipment motors in operation, the ratio of capacity of rotary converters in operation to weight of equipment in operation (tons) and the ratio of capacity of rotary converters in operation to the horsepower rating of motors in operation.

The equipment of the automatic stations is inspected every two weeks. This inspection consists of a thorough examination and cleaning of all apparatus, beginning with the lightning arresters on the alternating current lines as they enter the station and following through to the terminals of the direct-current feeders. During this inspection the contacts of all relays and contactors are inspected and cleaned and if burned they are either filed or put back in good condition by the use of sand paper or emery cloth. The height of oil in the oil wells of the bearings of the rotary converters and the motor operating the control equipment is examined and also the condition of the oil rings. That is, the inspector observes the rings while the apparatus is in operation to see if oil is being fed to the bearings properly. The brushes on the alternating current and direct-current ends of the rotary converter and the brushes on the control motor are removed from the holders and the brushes and holders thoroughly cleaned and all dirt and deposit removed from commutators and collector rings. All relays having time elements are tested for time setting and also to determine if the contactors or switches in connection with which they are used function properly.

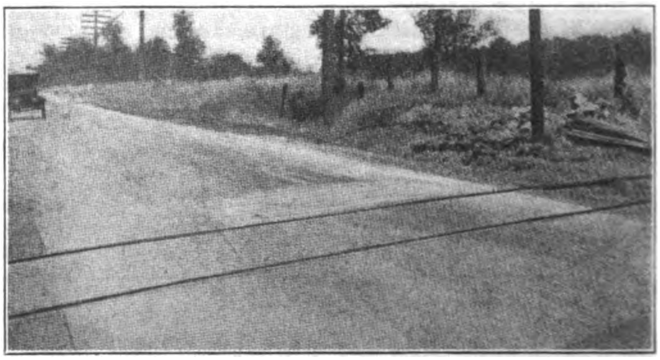
After the inspection has been completed and the apparatus is thoroughly cleaned, the station is put into operation and the operation of the control apparatus during the starting is carefully observed to make certain that all of the apparatus is left in a first-class operating condition. No additional attention is given these stations until the next regular inspection with the exception that the charging of the aluminum-cell lightning arresters is done each day during warm weather and every second day during cold weather by one of the helpers who assists in making the inspection and cleaning of the stations.

The operation and maintenance of these stations together with six similar stations and five manually operated stations on the Inter-Urban system come under the supervision of D. H. Nail. The inspection and cleaning of the automatic stations requires an average of three hours, not including the time required in going to and from the stations. One electrician and two helpers make all inspections and maintain the twelve automatic stations and also take care of the maintenance work on the five manually operated stations.

Concrete Highway Crossings for Safety

AN ARTICLE in the March issue of the *Concrete Highway Magazine* describes the use of concrete highway crossings in Wayne County, Michigan.

Three types of concrete crossing have been used. In the first, the grade is excavated 1 ft. below the bottom of the tie and is filled with concrete. Concrete is also placed between and over the ties to a level with the top of the rails, flangeways being formed in the concrete inside the railhead. In a second type the flangeway is provided by specially cut granite blocks along the inner side of the rail. This is a little more expensive than the first, but is said to have proved satisfactory.



CONCRETE HIGHWAY CROSSING AS BUILT IN MICHIGAN

A third type of crossing is built with pre-moulded concrete slabs, approximately 2 ft. x 6 ft., with a thickness equal to the depth of the rail. These slabs are cast and hardened in a construction yard and then laid like an ordinary plank crossing. An advantage in this type of construction is that the slabs can be removed, the tracks reballasted and the crossing replaced without injury to the slabs.

These concrete crossings have been constructed by the county road forces at the expense of the railroad companies and at crossings where the remainder of the highway is of concrete construction.

Future of the Electric Railway*

The Electric Railway Industry Has Suffered Greatly from Increased Costs of Operation, but Conditions Are Gradually Righting Themselves Through Fare Raises—Essential Nature of the Industry Proved—Better Labor Conditions Follow the Strike in Kansas City—Bright Future Predicted

BY PHILIP J. KEALY
President the Kansas City Railways Company

THE future of the urban electric traction is, in my opinion, based upon the generally accepted premise that urban transportation is essential, since every phase of our social and commercial life is predicated upon its existence. There is today nothing known that can take the place of electrically propelled track units. What is essential must be continued, and to be continued must be adequately supported.

Our electric railway properties in the past four years have weathered storms which an industry less essential could not have survived. It has suffered financially and physically, but I am confident that the silver lining to the dark clouds through which we have passed is just beginning to show itself. We have gained what in the future will prove to be perhaps our most valuable asset—an enlightened public opinion. The industry today stands upon the threshold of a new cycle which will insure its continuation upon a stable, self-supporting basis. The days of large profits and inefficiency are over, and rightly so. However, the new era will mean security and a reasonable return for investors, better rewards for able and efficient management, better working conditions for employees and better service for the public.

Urban transportation depends upon four elements, namely, the investor, the employee, the management and the public. Its success will be directly commensurate with the co-operation of these four essential factors. Mutuality of interest must be secured, not theoretically but practically, in order to sustain that transportation which our cities must realize for their continued growth and development.

The experience of the last four years has held no inducements for investors, but on the contrary, has been a positive deterrent. Those with money already invested have struggled against heavy odds not alone to secure interest, but to prevent the integrity of the principal itself from being further jeopardized.

SHAMEFUL TREATMENT OF RAILWAYS DURING WAR

The treatment of the street railway industry at Washington evidenced a shameful failure on the part of our national government. Calling upon the industry for the utmost to provide an absolutely essential service properly to maintain our feverish war industries, it was driven almost to the breaking point. Yet the fact remains that with this demand for service went no corresponding relief for its exigencies. The industry was in the paradoxical position of being crushed by the very force which it was working night and day to maintain. War prices, exorbitant labor demands, decreased productiveness of man power, immediate and pressing financial obligations, all offsprings of war conditions, were forcing it daily to the brink of bankruptcy. On the other hand, municipal, state and governmental authorities were demanding more and more from the industry. And let it here be said to the credit of every man connected with the business, that this demand was met patriotically and unselfishly. War-time service was given at the actual out-of-pocket expense of those who had made the industry possible. Extensions were built, equipment was purchased, wages were raised, material prices were met, at a time when the operating revenues were not paying the operating expenses. The government, through its various emergency agencies, such as the War Finance Corporation, War Industries Board, Fuel Administration and the War Labor Board, combined to fix increased expenses, but absolutely refused to adjust revenues to meet these emergency prices. With the most extraordinary powers any central government ever possessed at its command, it never used one of them to assist an industry upon whose continued operation depended all the others.

The industry, actively to function, must have at least $500,000,000 in new money annually. There is only one source from which this can come, and that is the pockets of the investors of the United States. The credit of the street railway business must be restored as a condition precedent to its continued existence. The census is showing a tremendous population increase in all of our large centers, ranging from 20 to 50 per cent. There is a certain ratio of actual annual investment needed to this population increase. Unless this money is forthcoming, the transportation systems of our cities cannot grow with their population and our plants will be inadequate to care for the civic demands made upon them.

LABOR PRESENTS INCREASED DEMANDS

The human element in the electric railway industry has presented a pressing problem in the past few years, the solution of which has in many cases not yet been found. Taking advantage of war conditions, street railway employees, aided, inspired and abetted by the activities of the Amalgamated Association of Detroit, made demands, in many cases unreasonable, and which the industry was in no shape to meet. Many companies today are in financial straits due to a wage scale imposed upon them without any consideration other than the demands of the employees by the War Labor Board or some other agency. Intoxicated by its war time successes, the Amalgamated Association is today making increased demands. For example, a contract has been presented to the United Railways of St. Louis calling for a wage scale for trainmen of 85 cents an hour. Less than six months ago the Public Service Commission of Missouri arbitrated the present wage scale and granted a top wage of 60 cents per hour and an 8 cent cash fare to make possible the payment of the scale. To meet the present demands would require approximately $84,000,000 more a year. It is doubtful if the St. Louis company or any other could stand such an increase.

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*Abstract of paper presented at convention of Oklahoma Utilities Association, Oklahoma City, March 9, 1920.

I think I am correct in making the statement that the industry, prior to 1913, in the majority of cases existed and paid its interest only through the fact that its employees were generally underpaid. Labor was plentiful, and the industry presented attractions to the prospective trainman that seemingly made up for low wages. We know now that labor conditions have entirely changed, and rightly so. No industry can successfully maintain a position founded upon low wages. It is its duty and obligation to pay fair wages that will not only attract high class men but will make their living conditions comparable with those in other lines. This obligation comes ahead of interest. It is one that must be fairly and squarely met in the future, and no community has the right to expect or demand service at the expense of the men whose manual labor makes this service possible.

The human element in the electric railway business is perhaps more important than in any other industry, inasmuch as our payrolls approximate 65 to 70 per cent of our yearly expense. And the unfortunate aspect of the situation is the fact that union domination stands in the way of our securing that co-operation and mutuality of interest in the business that we should have with our employees. Aside from the physical and economic reasons that make possible the continuation of a 5-cent fare in Philadelphia, much of the success of the traction company there is due to the co-operation it has been able to secure from its men. The present policy of the Amalgamated, to obtain as much and give as little as possible, to regard the company as its natural enemy and to continue extravagant demands without taking into consideration financial conditions, is a policy, I feel, that must be materially changed.

CO-OPERATIVE COMMITTEES WORK WELL IN KANSAS CITY

I believe that much of our work in the future lies in this direction. As operators, it devolves upon us to change this strained and unnatural condition if we are going to secure that co-operation with our employees that spells success. You will pardon me in this connection if I dwell briefly upon our experiences in Kansas City. I believe today we have there the most favorable labor situation the company has ever enjoyed. It has been secured at the expense of a strike which cost the company more than $1,000,000. Under the leadership of the Amalgamated our men struck three times within a period of eighteen months, on two of which occasions they violated solemn contracts. Due to this union domination discipline was lax and we had anything but a co-operative spirit on the property. On several occasions our employees were instructed by their union leaders not to appear at division meetings called by the officials of the company to discuss matters of operation. Today we have practically an entirely new organization.

With this organization of men not affiliated with any union in any way, we immediately put into effect a new idea, which it seems to me is a large factor in preserving and maintaining proper relations with employees today. I refer to the shop committee system, which has worked so well in Philadelphia, in the Bethlehem Steel Works and in many other large institutions. It insures proper representation of employees on department committees and gives them an active participation in the affairs of the company in so far as they reflect on working conditions, discipline, etc. These committees are elected solely by the employees and represent them on any question that may arise. We have now been operating with this system for a year, and it has proven very satisfactory in every way. In spite of the fact that employees have the right of appeal to the president of the company, practically every case that has arisen has been settled with the division superintendent and the local committee at the barn. Not only does it give the employees a medium for insuring fairness in discipline matters, but it has a tendency to make subordinate officials play the game fairly, with the result that there is a closer degree of contact and better harmony at the very point where trouble formerly originated—that is, where the management directly comes into contact with the employees through subordinate officials.

During the year a number of matters have arisen on which we desired the advice and co-operation of the employees; for example, questions affecting seniority; changes in uniform; changing the method of payment from cash to check, and other matters. When these arose, the employees' committees were called in and the matter explained, and they were then asked to put the various questions up to the men. These committee meetings are also prolific of suggestions, many of which are of much value. They have a tendency to correct minor grievances at the source.

In connection with the work of these committees, we make it a point through the meetings with the committees and the men, and through our employees' publication, to keep the employees well acquainted with the financial condition of the company and its monthly statement in an effort to secure their interest and co-operation.

We also have a local Brotherhood on the property, which has a membership of approximately 2,300. This provides a $15 sick and accident benefit; seven days per month free medical attendance, and a $300 death benefit. The dues are $1.75 per month, in addition to which the company donates 50 cents per month per member.

We have cut out the so-called welfare work as it has been understood in the past. Our employees want their shower baths in their pay envelopes. They have never appreciated welfare activities when given in lieu of wages. I do not mean by this that it is not a solemn obligation of every employer to do everything possible to improve the physical, mental and spiritual side of his employees, but it can be done without handing the agencies for this improvement to them upon a silver platter. Interest the men so that they will provide their own welfare work. When they have done this they will appreciate it. It is something they are doing themselves through co-operative effort, and not presented to them by the company. The company can, of course, in connection with this render financial assistance, but only predicated upon the fact that the men themselves meet it half way in the work. Teach employees the benefits of co-operative activities for their own good will, but at the same time teach them the necessity of co-operating with the management in bringing success to the company.

Although it is still early to count our chickens, yet we believe these methods consistently followed will bring about a feeling of co-operation and mutuality of interest that we have never before enjoyed in our organization. If this is done, a very solid foundation will have been laid for the future progress of the Kansas City Railways. The enthusiastic, whole-hearted support of 4,000 employees is a powerful force in any community, however large.

NEW PROBLEMS ARE BEING SOLVED

From the standpoint of management many new problems have in the past year or two presented themselves, and many more will arise in the future. The day of inefficiency is over. In order to insure a fair return to our investors, good wages to our employees, and proper service to the public, it will require much more exacting application to the finer problems of operation than was necessary in the past.

The day of exploitation with its evils of overcapitalization and lax methods in management is past, and I believe the long train of evil results has worn itself out. The public has taken this matter in hand and through its various governmental agencies has forced square dealing where it was not given willingly. The old bugaboo of watered stock and financial mismanagement is practically out of the public mind, and to some extent the slate has been wiped clean, which in itself augurs well for the future of the industry.

And last, but not least, comes the public, which it is our obligation to serve, and without the co-operation of which we cannot obtain the maximum result. I know that great progress has been made in the past three years. In fact, from the first application for a fare increase there has been a constant campaign of education which has brought the street railway industry more clearly into the public mind. I feel that the necessities for fare increases are now known to practically every one. Furthermore, when the public can feel that the management has been efficient, that a fair valuation has been placed upon a property, and that good service is being maintained, there is little opposition to necessary fare increases. There was of course at first a violent reaction, fostered and supported by antagonistic newspapers and publicity-seeking politicians. This was evidenced by the fact that in practically every city fare increases were followed by a decrease in riding. Thus the Boston Elevated, after raising fares, was barely able for six months to meet its operating expenses. Now, with a 10-cent fare, it has not only been earning its interest, but making enough to wipe out a staggering deficit. The same has been true in Chicago, Cleveland and many other cities, and is also, although more slowly, the case in Kansas City.

These facts refute the stock argument of the politician and the antagonistic newspaper made some time ago that higher fares resulted in decreased riding to the extent that no benefits could result. This has been proved untrue in not only the street railway industry, but in all others. For example, newspapers formerly sold for a cent and now are selling at two, and selling more than they ever did. Automobiles have increased in price from 20 to 100 per cent and more are being produced than ever before. In every other line this is true. The street railway business perhaps suffered most in this respect from the peculiar psychological effect of a fare increase upon the public. Much of this of course was due to the antagonism of politicians and newspapers. Much more, however, can be attributed to the fact that the increased fare was impressed upon the public twice daily. In the case of electric and gas companies where the bill was paid once a month this was not true, and there has been practically no opposition to increased electric and gas rates throughout the country. If the public paid its car fare monthly, even a 10-cent fare would probably result in increased riding just as price increases have resulted in increased business in all other lines.

It now seems, however, that the public no longer connects a street car ride with 5 cents. The cost-of-service plan is more or less firmly fixed in the public mind, and in this step alone we have made a tremendous advance, for any industry that must sell its only output at a fixed price irrespective of its production cost is basically unsound and unstable. Unless that condition change, the industry must fail. There is no more relation between the price of car fare in Oklahoma City, Kansas City and New York City than of milk and eggs in the same communities.

Furthermore, there is an indication of a more direct public co-operation in other ways. Governing bodies and even antagonistic newspapers are beginning to see that if urban transportation in congested centers is to continue adequate for a city's needs every possible help must be extended.

BRIGHTER FUTURE IS AHEAD

I am confident that we are today standing on the threshold of a brighter future for our industry. There are many other evidences of this than those outlined above. After all, our experience teaches us that the pendulum is constantly swinging and action is always followed by reaction. Perhaps for the first time in the last three or four years we have reached a somewhat settled state and are in a position really to operate our properties. We have adjusted fares. The labor situation is settling itself to some extent, and we have to deal with a more complacent and better educated public. The country has partially adjusted itself from the shock of wartime conditions, and on every hand we see evidences that it is the desire of business and labor to settle down and once more go to work. It looks as if the peak of high-price era has been reached, and from now on we may look for declining prices. Europe is again producing, and with a world once more at work, we may confidently look forward in the very near future to a readjustment approximating normal conditions and a resetting of a world thrown out of joint by the catastrophe of a war, a contingency never dreamed of.

The labor problem, it seems, is settling itself. The necessity for production and for an honest day's work for an honest day's pay is becoming impressed upon all classes. Labor is beginning to realize its vital part in the readjustment of the world's affairs.

We have had to fight our own battles without assistance. We have had to take our case to the public and to those governmental agencies that in many instances have not functioned until the very existence of the service upon which our cities depend was threatened. It does look, however, as if our efforts are to be successful and that a stable future is to be assured the street railway business. As stated before, these things have come about not only through the sacrifices and efforts that have been made, but from the outstanding economic fact that as street railway service is absolutely essential to the well being of our cities, what is essential in our civilization must be continued, and what must continue must be adequately supported. The price of service must meet its cost, and for the first time since its inception the industry is getting itself upon a strictly business basis, where its product must be sold for what it cost, plus a fair and reasonable return to those who invested their money to make possible an essential public service.

N. F. P. A. Approves Code Revisions

FOLLOWING the public hearing held in New York City on March 23, the electrical committee of the National Fire Protection Association approved without material change the recommendations of the committee on cars and railways. This committee consists of Martin Schreiber, chairman; R. C. Bird and Ralph Sweetland. The following abstract covers the part of the report of the committee which was approved substantially as given:

NEW CARHOUSE WIRING RULES

The revision of the rules for carhouse wiring, as recommended below, was developed in co-operation with a committee appointed by the A. E. R. E. A. It has been approved by the standards committee of the A. E. R. E. A. as recommended practice and was ratified by the American Electric Railway Engineering Association on Oct. 8, 1919, at its annual convention at Atlantic City. Your committee, therefore, submits these carhouse wiring rules for the approval of the electrical committee and recommends them to be substituted for Rule 41.

COMMITTEE'S COMMENTS ON REVISIONS IN RULE 41

In revising these rules it was our thought to preserve as far as possible the intent of the old N. E. C. rules, but to put them in a form that would meet the wishes of the various parties interested.

(a) Trolley Wires—Intended to cover installations of 1,200 volts and over.

Paragraph 2 is new.

(b) Cutout Switches and Line Breakers — Railway engineers were unanimously opposed to binding themselves to any definite distance for line insulators such as 100 ft. or 50 ft. To cut the wires dead on surrounding streets is all that underwriters need ask for, and usually this can be accomplished by a 50 ft. distance. In some cities with narrow streets insulators must be placed less than 50 ft. from building.

Paragraphs 3 and 4 are new.

(c) New paragraph.

(f) New paragraph.

(h) Voltage raised to 750. Many companies carry 750 volts on their switchboards. This means that at times of no load voltage may go as high as 750.

(7) New paragraph.

THE RULE SUBSTANTIALLY AS IT NOW STANDS

41. Carhouses.

(a) Trolley Wires.

The trolley wires must be securely supported on suitable insulating hangers, designed for the voltage used, and must be placed at such a distance apart that the distance between any two hangers is less than the distance from the trolley wire to the floor or rail.

Wood troughing or sufficient protection to prevent trolley pole forming a contact with any metal part of building shall be provided.

(b) Cutout Switch and Line Breakers.

Must have an emergency cutout switch in an accessible location outside of the building so that all trolley wires in the building may be cut out at one point. Line insulators must be installed, so that when emergency switch is open, the trolley wire leading into the building will be dead at all points, preferably within 50 ft. of the building. In carhouses not used as operating stations, the current must be cut out of the building when not needed for use in the building.

In the feed to the carhouse is underground the emergency switch may be installed inside the building, but must be located at a point as near as practicable to where the underground feeder enters the building.

When carhouse or yard is divided into fire sections, auxiliary cutout switches shall be arranged to control each section independently and may be located inside of building near track entrance.

Trolley wires in car storage yards, or distinctive sections of a large storage yard, shall be controlled by an emergency cutout switch as described above. Yards in conjunction with carhouses shall be treated as a separate section and have auxiliary cutout switch.

(c) Approved lighting arresters shall be installed adequately to protect all overhead trolley wires in carhouses and car storage yards inside of the line insulators (breakers).

(d) Current collectors shall be removed from contact with trolley wire while cars are not in use. Suitable signs posted in conspicuous places are recommended.

(e) Must have all rails bonded at each joint with a conductor having a carrying capacity at least equivalent to No. 0 B. & S. gage annealed copper wire, and all rails must be connected to the outside ground return circuit by a not less than No. 0 B. & S. gage copper wire, or by equivalent bonding through the track.

(f) Power third rails shall be rigidly supported on suitable insulating supports and properly bonded at joints.

Power rails within each fire section of building or storage yards shall be controlled by an emergency cutout switch located in a readily accessible place outside of building.

(g) Except as hereinafter provided in Section h, all wiring and apparatus shall be installed in accordance with approved practice for constant potential systems.

(h) All lamps and stationary motors must be installed in such a way that one main switch may control the whole of each installation, lighting and power, independently of the main cutout switch called for in Section B.

When current for lighting, stationary motors, heating, testing apparatus, etc., is from a grounded trolley circuit, the following special rules to apply:

(1) Voltage from light, heat or power shall not exceed 750 volts.

(2) Approved cutouts and switches must be placed in the non-grounded side of lights and motors they are to protect. Light circuits must not exceed 2,000 watts, dependent upon a single cutout.

(3) Drops to lights shall be flexible rubber covered wire or packing house cable.

(4) In series systems sockets shall be of the keyless type and of a voltage rating for the current used.

(5) Electric heaters to be of standard type.

(6) The main ground, or return wire, shall connect with the rails or negative feeder at not less than two places, and shall be protected against mechanical injury.

(7) All cutouts and switches in grounded systems should be installed in cabinets of non-conducting material. Wooden cabinets shall be lined with ¼ in. fire-resisting insulating material and painted with a non-conducting paint.

(8) All light and power wiring where subject to mechanical injury shall be installed in metal conduit.

(i) All portable testing, lighting and power devices shall be constructed of standard materials, and to withstand hard usage. All pendant cords and portable conductors will be considered as subject to hard usage.

(j) Controlling devices and apparatus for feeder distributing systems for outside distribution must be installed in a fire resisting room or compartment.

Compensation for Engineers

IN a paper on classification and compensation of engineers, read at the Chicago meeting of the American Association of Engineers on March 15, A. S. Tuttle described the investigation made on this subject under the auspices of the Engineering Council. After outlining the duties of engineers of different grades and giving average and suggested salaries for engineers in the employ of municipalities and states, the speaker said, in part:

From the latest statistics available it seems probable that the cost of living is about 80 per cent more than in 1915. This, however, is not to be regarded as the basis for the recommendations of the committee, which are intended to insure to the young unmarried man an income sufficient on which to live, and to provide compensation for men in the higher grades sufficient not only to make up the increased cost of necessaries but also designed to provide for recognition of value not heretofore given. It is conceded that men drawing the major salaries should be the ones to make the sacrifices required to meet the war expense. An argument for increasing their pay in the same or greater proportion as for the men living on the lowest living wage would be fallacious if based on the decreasing value of the dollar. In this case the advance proposed is on the ground that it gives the engineer that to which he is entitled but which has heretofore been withheld.

The needs of the lower grades of service have now been met to some extent, and if the profession as a whole could unite in a movement to indorse every effort put forth to raise the compensation of chief engineers the remainder of the problem would be easy to solve. To secure permanent improvement and attract to and retain in the profession the best men, it is desirable to fix pay at entrance at a rate such as not to bring in men who are without engineering education or who have no natural leaning along engineering lines. Men admitted to the service should be denied advance unless decided merit is shown, in which case promotion should be certain and liberal. In this way standards can be raised and the mediocre men will not remain as a handicap to the progress of those more worthy. Before engineers can reach the very highest places in administrative work they must cultivate an increased breadth of view and accept more responsibility; they must give the business side of undertakings with which they are connected the same thought that they devote to the technical features.

It cannot be questioned that the long period of comparative inactivity in railroad construction and the return of the roads to their owners must be followed by a revival of enterprises of vast magnitude. The comparative freedom from governmental red tape which will now be enjoyed should open up a brilliant prospect to men in this service, and the speaker sincerely trusts that in the new era about to dawn his professional brethren who have in the past devoted themselves to this branch of engineering will realize their long deferred hopes for the day when members of this profession will find a proper financial reward for their services.

Zone Fares Successful in Holyoke

Based on 2-Mile Zones at 3 Cents Per Mile with 6 Cents Per Zone and No Reduced Rate Tickets—Conductors Make Hand Collections Zone by Zone with Overhead Registration—Transfers Unknown

THE zone system in effect since Nov. 9, 1919, on the lines of the Holyoke (Mass.) Street Railway is a model for simplicity, in that the rate of fare in each zone is uniform, free transfers are abolished except at one point in the suburban territory and reduced rate tickets—except those required by law for school children—are unknown.

The result is that the system has proved satisfactory to the company in that it is giving sufficient revenues to meet the cost of service, although it has reduced the fare for the majority of car riders within the city of Holyoke itself, where by far the greater number of people ride. The conductors find the system of collection can be handled rapidly inasmuch as the difficulties of variable fares do not exist, no matter how heavy the traffic.

GATEWAY TO THE CITY OF HOLYOKE

The Holyoke Street Railway is not a city system entirely. It operates about 57 miles of lines radiating from what might be termed the hub of the system, Holyoke City Hall, and serves a population of approximately 120,000, one-half of which is within the borders of the city of Holyoke.

The accompanying map shows the track layout of the system and the length and location of each fare zone.

In general the average length of the twenty-eight zones on the various routes is 2 miles. This with a minimum zone fare of 6 cents gives a theoretical rate of 3 cents per mile. The area included within the first zone from City Hall, as shown on the map, includes practically all of the business district as well as the built up residential section of the city. This zone limit is in several cases at the actual borders of the city, although in laying out the system the plan of following the city boundaries was not the basis used, but instead the limit was placed so as to take care of the greatest number of patrons within certain fixed distances from the center of the fare structure.

This plan gives a symmetry of zones with an average in the city of Holyoke of 1.97 miles, and 2.16 miles in the suburban territory for what is known as the Holyoke division, comprising 63.8 per cent of the total mileage. In the Amherst and Sunderland division, which has 18.84 miles of line, the eleven zones average 2.04 each.

The table on page 750 gives the actual length of each zone.

Cash Fares: The regular rate of fare in any zone shown on the map is 6 cents cash. When accompanied by an adult, one child under five years is carried free, providing, however, such child does not occupy a seat required for a paying passenger. Any other child must pay the regular fare.

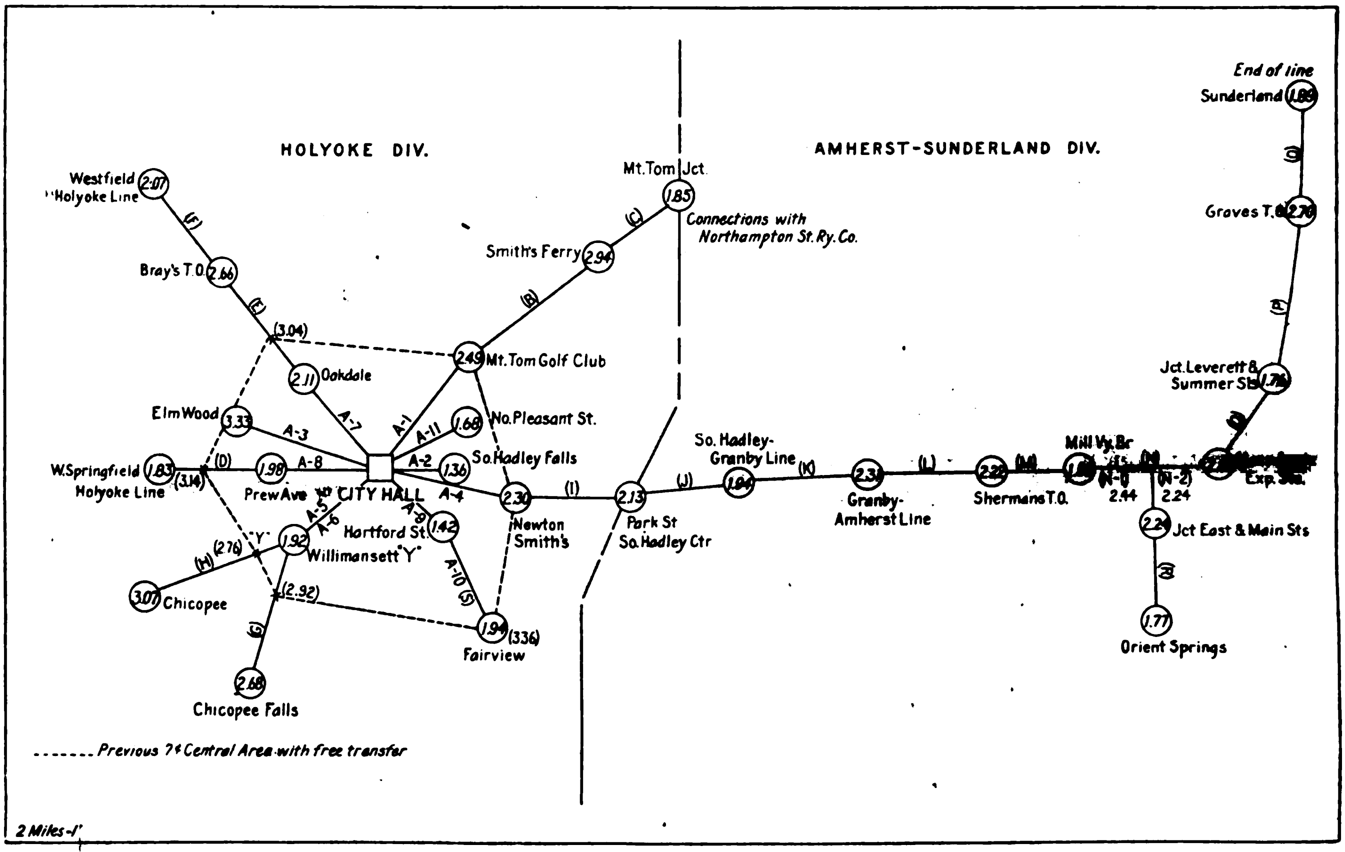
Transfers: No transfers are issued to connecting routes in any zone except the one which includes the center of the town of Amherst, namely, "N." In this case free transfers are issued to enable passengers to change from the Amherst-Sunderland route to the Orient Springs route and *vice versa* without paying two single zone fares.

Ticket Fares: The only reduced rate tickets sold by the company are to school children inasmuch as all electric railway companies in the State of Massachusetts are required to sell such tickets at one-half the regular fare. Coupon tickets are sold in strips of ten for 30 cents at the offices of the company in Holyoke and South Amherst, each coupon of which is good for a single zone ride. Pupils, however, when purchasing such tickets must present a certificate duly signed by the school teacher verifying the signature of the pupil. This certificate becomes the property of the railway company whenever presented for the purchase of tickets. Such tickets are not valid for passage until countersigned by the pupil at the time of purchase. The name of school attended is also stamped in the ticket contract.

Full fare bearer tickets, in strips of five for 30 cents, are sold at the company's offices and also by all conductors when on duty. These tickets were put on sale merely as a matter of convenience to the conductor and the car rider so as to facilitate fare collections and at the same time reduce to a minimum the necessity of making change for a multiple coin fare. These tickets entitle users to the same privileges as the cash fare and have proved popular. Two months after they were put on sale approximately 10 per cent of the daily transportation revenue was derived from the use of these tickets. This percentage is constantly increasing and the company anticipates that during the summer months a far greater proportion of its riders will buy these tickets.

Free transportation is furnished all employees. The same form, however, is not universally used. Permanent employes receive an annual card pass which is good for transportation on any car during the calendar year; temporary employees such as call men in the transportation department, or employees who are regularly employed during certain seasons of the year such as in the company's parks during the summer, receive a sixty-zone monthly card pass, which the conductor punches in every zone, at the time it is presented for fare. The color of this sixty-zone ride card pass is changed each month. A trip pass is also available for issuance to employees not in the service long enough to get a monthly pass. This latter from of ticket must, however, be filled in and punched as required before it will be accepted for transportation.

Special Cash Fares have been established on tripper cars in both the A.M. and P.M. rush hours in certain cases to avoid the issuance of so-called workingmen's or reduced rate tickets. The controlling factor in all such cases is that either the factory or the community settlement is located in the middle of a zone and unless such fares were established passengers would pay in reality


HOLYOKE DIV.
AMHERST-SUNDERLAND DIV.
Westfield Holyoke Line 2.07
(F)
Bray's T.O. 2.66
(E)
(3.04)
Oakdale 2.11
Elm Wood 3.33
A-3
A-7
W.Springfield Holyoke Line 1.83
(3.14)
(D)
1.98
A-8
Prew Ave
CITY HALL
A-1
A-11
A-2
A-4
A-5
A-6
A-9
Mt.Tom Golf Club 2.49
No.Pleasant St. 1.68
So.Hadley Falls 1.36
Smith's Ferry 2.94
(B)
(C)
Mt.Tom Jct. 1.85
Connections with Northampton St.Ry.Co.
Hartford St. 1.42
A-10 (S)
Newton Smith's 2.30
(I)
Park St So.Hadley Ctr 2.13
Willimansett "Y" 1.92
"Y"
(2.76)
(H)
Chicopee 3.07
(2.92)
(G)
Chicopee Falls 2.68
Fairview 1.94 (3.36)
------- Previous 7¢ Central Area with free transfer
2 Miles-1"
(J)
So. Hadley-Granby Line 1.94
(K)
Granby-Amherst Line 2.31
(L)
Shermans T.O. 2.22
(M)
Mill Vy. Br
(N)
(N-1) 2.44
(N-2) 2.24
Exp. Sta.
Jct East & Main Sts 2.24
(R)
Orient Springs 1.77
(O)
Jct. Leverett & Summer Sts 1.76
(P)
Graves T.O. 2.70
(Q)
End of line Sunderland 1.89

HOLYOKE DIVISION

Zone Number	Between Points Applying	Route	Length (Miles)
A-1	City Hall and Highlands (Mount Tom Golf Club)	Northampton	2.49
*A-2	City Hall and North Main Street, South Hadley Falls	South Hadley Falls	1.36
A-3	City Hall and Elmwood	Elmwood	2.33
A-4	City Hall and Newton Smith's (Granby Road)	South Hadley Center	2.42
A-5	City Hall and Willimansett "Y"	Chicopee	1.92
A-6	City Hall and Willimansett "Y"	Chicopee Falls	1.92
A-7	City Hall and Oakdale (Hillside Avenue and Cherry Street)	Westfield	2.11
A-8	City Hall and Prew Avenue	Springfield	1.98
A-9	City Hall and Hartford Street	Fairview	1.42
†A-10	Hartford Street and Fairview	Fairview	1.94
A-11	City Hall and North Pleasant Street	North Pleasant Street	1.68
B	Mount Tom Golf Club and Smith's Ferry	Northampton	2.94
C	Smith's Ferry and Mount Tom Junction	Northampton	1.85
D	Prew Avenue and West Springfield-Holyoke Line	Springfield	1.83
E	Hillside Avenue and Cherry St. and Bray's Turn-Out	Westfield	2.66
F	Bray's Turn-Out and Holyoke-Westfield Line	Westfield	2.07
G	Willimansett "Y" and Chicopee Falls	Chicopee Falls	2.68
H	Willimansett "Y" and Chicopee	Chicopee	3.07
I	Newton Smith's and Park Street	South Hadley Center	2.13

*End of Line. †Otherwise known as Zone S.

Average length of nine Holyoke city zones . . . . . . 1.97 miles
Average length of nine suburban zones . . . . 2.35 miles
Average length of 18 zones — Holyoke Division 2.16 miles

AMHERST AND SUNDERLAND DIVISION

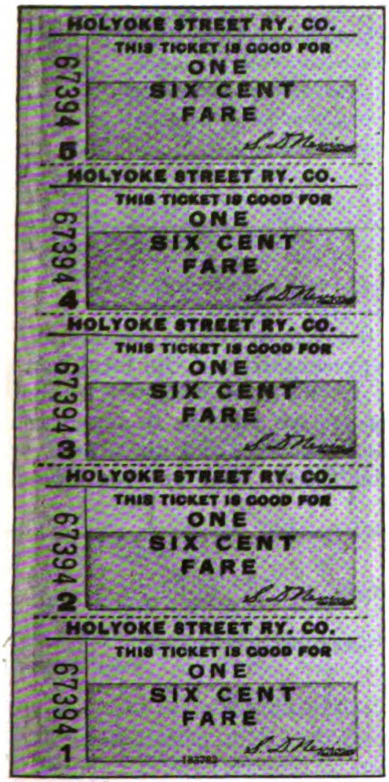
Zone Number	Between Points Applying	Route	Length (Miles)
J	Park Street, South Hadley Center and South Hadley-Granby Line	Amherst	1.94
K	South Hadley-Granby Line and Granby-Amherst Line	Amherst	2.31
L	Granby-Amherst Line and Sherman's Turn-out	Amherst	2.22
M	Sherman's Turn-out and Mill Valley Bridge	Amherst	1.59
N	Mill Valley Bridge and Massachusetts Agriculture Experimantal Station	Amherst	2.66
N-1	or Junction of East and Main Streets	Pelham	2.44
N-2	Junction East and Main Streets, and Massachusetts Agriculture Experimental Station	Amherst-Sunderland	2.24
O	Massachusetts Agriculture Experimental Station and Junction of Leverett and Summer Streets	Amherst-Sunderland	1.76
P	Junction Leverett and Summer Streets, and Graves Turn-out	Amherst-Sunderland	2.70
Q	Grav es Turn-out and end of line	Sunderland	1.89
R	Junction East and Main Streets, Amherst and end of line, Orient Springs	Pelham	1.77

Average length of eleven zones . . . 2.04 miles
Average length of twenty-nine zones — entire system, 2.12 miles

MAP AND KEY SHOWING ARRANGEMENT AND LENGTHS OF ZONES an extra zone fare for which they received nothing in return. Such service of this character as is operated, together with the fare charged and the full fare on regular cars, is shown in the following table:

SPECIAL FARES ON THROUGH TRIPPER SERVICE AND COMPARATIVE FARE ON THROUGH CARS

	Distance (Miles)	Hours	Fare on Trippers (Cents)	Regular Fare (Cents)	Zones
From Fairview to Chicopee Falls....................	5.72	5:45 — 6:30 a. m.	18	24	4
From Chicopee Falls to Fairview.....................	5.72	5:00 — 5:30 p. m.	18	24	4
From Fairview to Willimansett Bridge..............	5.01	5:45 — 6:30 a. m.	12	18	3
From Willimansett Bridge to Fairview..............	5.01	5:00 — 6:00 p. m.	12	18	3
From Fairview to Berkshire Street..................	4.14	6:00 — 7:00 a. m.	12	18	3
From Berkshire Street to Fairview................	4.14	5:00 — 5:30 p. m.	12	18	3



HOLYOKE STREET RY. CO.
THIS TICKET IS GOOD FOR
ONE
SIX CENT
FARE
67394 5

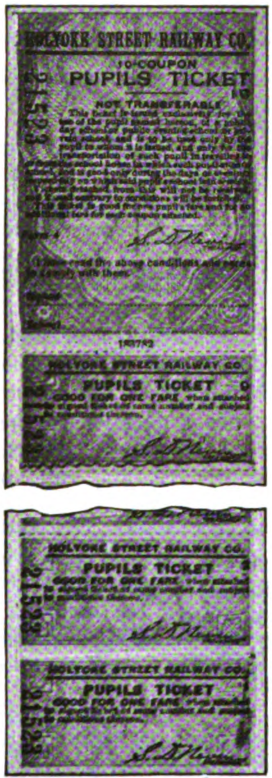
HOLYOKE STREET RY. CO.
THIS TICKET IS GOOD FOR
ONE
SIX CENT
FARE
67394 4

HOLYOKE STREET RY. CO.
THIS TICKET IS GOOD FOR
ONE
SIX CENT
FARE
67394 3

HOLYOKE STREET RY. CO.
THIS TICKET IS GOOD FOR
ONE
SIX CENT
FARE
67394 2

HOLYOKE STREET RY. CO.
THIS TICKET IS GOOD FOR
ONE
SIX CENT
FARE
67394 1

1



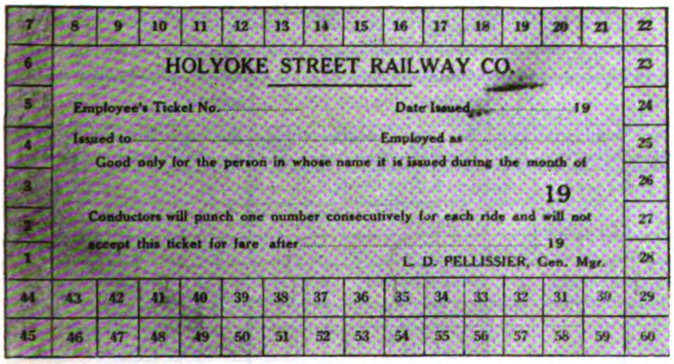
HOLYOKE STREET RAILWAY CO.
10 COUPON
PUPILS TICKET
NOT TRANSFERABLE

HOLYOKE STREET RAILWAY CO.
PUPILS TICKET
GOOD FOR ONE FARE

HOLYOKE STREET RAILWAY CO.
PUPILS TICKET
GOOD FOR ONE FARE

HOLYOKE STREET RAILWAY CO.
PUPILS TICKET
GOOD FOR ONE FARE

2



HOLYOKE STREET RAILWAY CO.

Employee's Ticket No.................... Date Issued............................19

Issued to.. Employed as ....

Good only for the person in whose name it is issued during the month of

19

Conductors will punch one number consecutively for each ride and will not accept this ticket for fare after....................................19

L. D. PELLISSIER, Gen. Mgr.

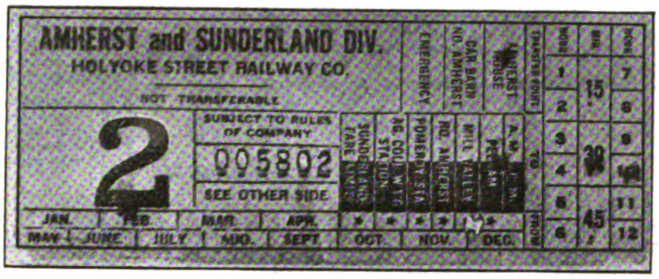
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
6															23
5															24
4															25
3															26
2															27
1															28
44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60

3

All closed and open cars are equipped with a single overhead register. In general, all cash and ticket fares collected in each zone are rung up on the overhead register, which records 6 cents for each registration with the exception of the Springfield-Holyoke Limited cars, where each registration has a value of 12 cents, due to the fact that conductors collect both zone fares between the Holyoke City Hall and the West Springfield line at once. All revenue tickets are rung up on this same register. Transfers and trip passes collected are not registered, but turned in at the end of the day's run in a special envelope.

The company in its accounting keeps traffic records somewhat different from those of other companies, aiming to get the number of zone riders paying cash or ticket fares or riding on free passes. No attempt is made to get the actual number of passengers carried or the number of zones ridden by each passenger.

The form of day card in use, shown in an accompanying illustration, is designed so that the conductor can by straightforward addition get the total zone riders on each trip or run. On the face of the day card is kept a record by trips and a summary for each run. It is essential that a separate day card be kept for each run in order that the accounting department can keep comparative records for each of the several routes operated. This is particularly true where conductors during a day operate over two or more regular runs. The conductor at the time of taking his car posts in the columns in the upper left-hand corner the register



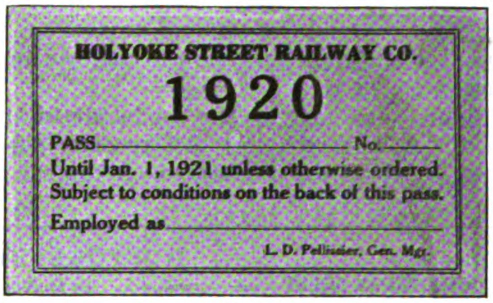
AMHERST and SUNDERLAND DIV.
HOLYOKE STREET RAILWAY CO.
NOT TRANSFERABLE

2

SUBJECT TO RULES OF COMPANY
005802
SEE OTHER SIDE

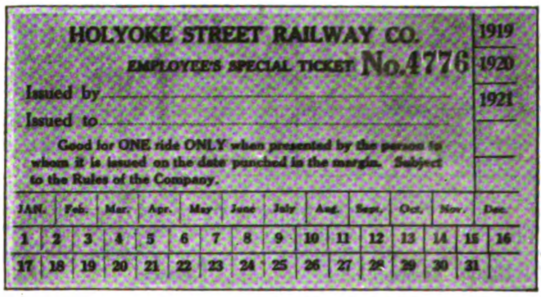
EMERGENCY
CAR BARN NO. AMHERST
AMHERST HOUSE
TRANSFER POINT
SUNDERLAND FARE LIMITS
AG. COLLEGE STATION
POMEROY STA.
NO. AMHERST
MILL VALLEY
A. M.
P. M.
TO
FROM
HOUR
MIN
1
2
3
4
5
6
7
8
9
10
11
12
15
30
45
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.

4



HOLYOKE STREET RAILWAY CO.
1920
PASS.. No..................
Until Jan. 1, 1921 unless otherwise ordered.
Subject to conditions on the back of this pass.
Employed as..
L. D. Pellissier, Gen. Mgr.

5

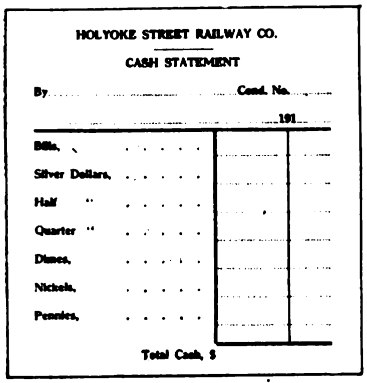


HOLYOKE STREET RAILWAY CO.
EMPLOYEE'S SPECIAL TICKET No. 4776
Issued by...
Issued to...
Good for ONE ride ONLY when presented by the person to whom it is issued on the date punched in the margin. Subject to the Rules of the Company.

1919															
1920															
1921															
JAN.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

6

1. STRIP OF FIVE TICKETS SOLD FOR 30 CENTS
2. PUPILS' TICKETS
3. MONTHLY PASS
4. AMHERST TRANSFER
5. ANNUAL PASS
6. EMPLOYEES' SPECIAL TICKET



HOLYOKE STREET RAILWAY CO.

CASH STATEMENT

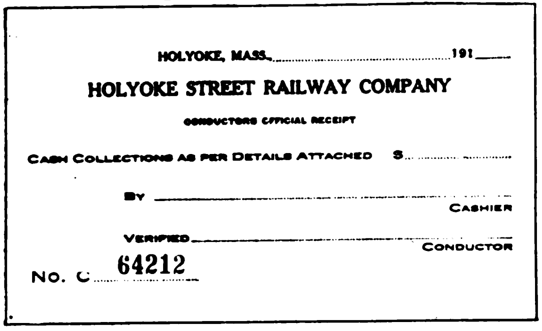
By .... Cond. No. ....

.... 191...

Bills, ...		
Silver Dollars, ...		
Half "		
Quarter "		
Dimes, ...		
Nickels, ...		
Pennies, ...		

Total Cash, $

1



HOLYOKE, MASS., ... 191.....

HOLYOKE STREET RAILWAY COMPANY

CONDUCTORS OFFICIAL RECEIPT

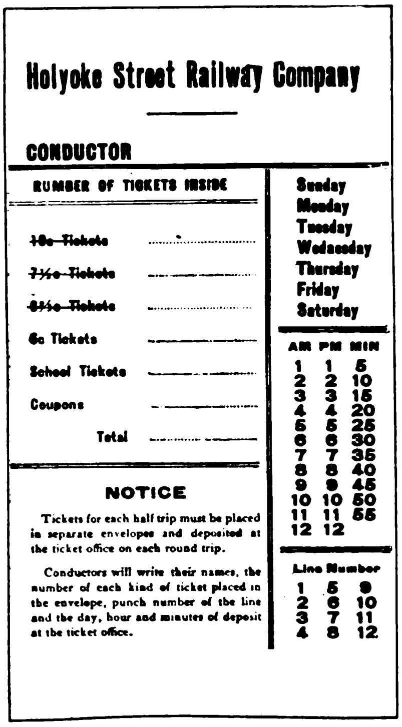
CASH COLLECTIONS AS PER DETAILS ATTACHED $..............

BY ______________________ CASHIER

VERIFIED ______________________ CONDUCTOR

No. C 64212

2



Holyoke Street Railway Company

CONDUCTOR

NUMBER OF TICKETS INSIDE

~~10c Tickets~~ ....

~~7½c Tickets~~ ....

~~8½c Tickets~~ ....

6c Tickets ....

School Tickets ....

Coupons ....

Total ....

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

AM	PM	MIN
1	1	5
2	2	10
3	3	15
4	4	20
5	5	25
6	6	30
7	7	35
8	8	40
9	9	45
10	10	50
11	11	55
12	12	

Line Number

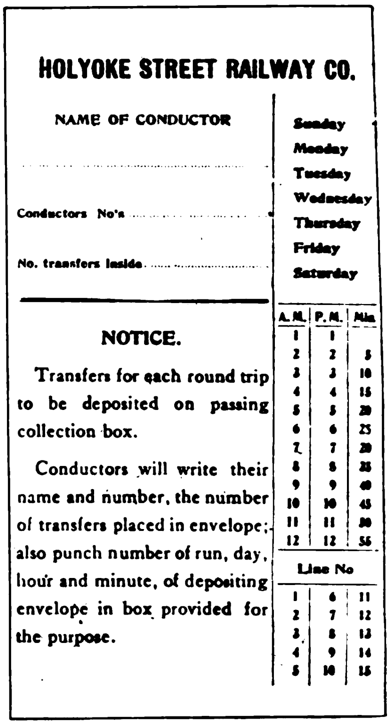
1	5	9
2	6	10
3	7	11
4	8	12

NOTICE

Tickets for each half trip must be placed in separate envelopes and deposited at the ticket office on each round trip.

Conductors will write their names, the number of each kind of ticket placed in the envelope, punch number of the line and the day, hour and minutes of deposit at the ticket office.

3



HOLYOKE STREET RAILWAY CO.

NAME OF CONDUCTOR

....

Conductors No's ....

No. transfers Inside ....

NOTICE.

Transfers for each round trip to be deposited on passing collection box.

Conductors will write their name and number, the number of transfers placed in envelope; also punch number of run, day, hour and minute, of depositing envelope in box provided for the purpose.

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

A. M.	P. M.	Min
1	1	
2	2	5
3	3	10
4	4	15
5	5	20
6	6	25
7	7	30
8	8	35
9	9	40
10	10	45
11	11	50
12	12	55

Line No

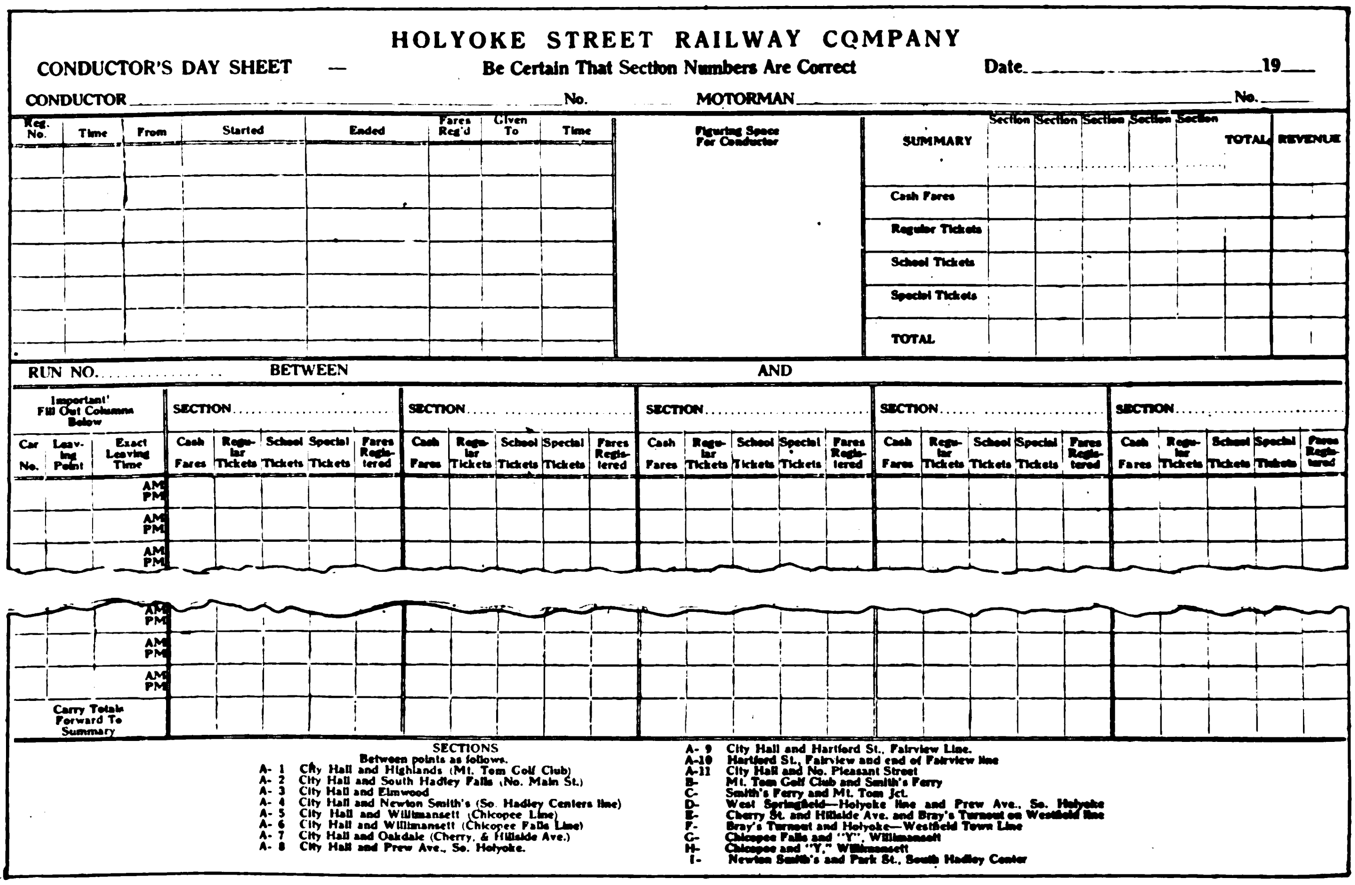
1	6	11
2	7	12
3	8	13
4	9	14
5	10	15

4

1. CASH SLIP. 2. CONDUCTOR'S OFFICIAL RECEIPT. 3. TICKET ENVELOPE. 4. TRANSFER ENVELOPE

number, the time, and the opening number on the register totalizer and then lists the run number and points applying.

Trip figures are kept by the conductor to show collections for each fare zone. All revenue passengers, the fares of whom are registered on the car in each fare zone, are recorded in the column "Fares Registered." This reading, which is representative of the total number of cash and revenue ticket fares collected in that zone, is detailed in the respective columns to show cash fares, regular tickets, *i.e.*, full-fare tickets, school or pupils' tickets, and special tickets that are registered.



HOLYOKE STREET RAILWAY COMPANY

CONDUCTOR'S DAY SHEET — Be Certain That Section Numbers Are Correct Date ______________ 19____

CONDUCTOR ______________________ No. ______ MOTORMAN ______________________ No. ______

Reg. No.	Time	From	Started	Ended	Fares Reg'd	Given To	Time

Figuring Space For Conductor

SUMMARY	Section	Section	Section	Section	Section	TOTAL	REVENUE
Cash Fares							
Regular Tickets							
School Tickets							
Special Tickets							
TOTAL							

RUN NO. .... BETWEEN AND

Important! Fill Out Columns Below			SECTION					SECTION					SECTION					SECTION					SECTION				
Car No.	Leaving Point	Exact Leaving Time	Cash Fares	Regular Tickets	School Tickets	Special Tickets	Fares Registered	Cash Fares	Regular Tickets	School Tickets	Special Tickets	Fares Registered	Cash Fares	Regular Tickets	School Tickets	Special Tickets	Fares Registered	Cash Fares	Regular Tickets	School Tickets	Special Tickets	Fares Registered	Cash Fares	Regular Tickets	School Tickets	Special Tickets	Fares Registered
		AM PM																									
		AM PM																									
		AM PM																									
		AM PM																									
		AM PM																									
		AM PM																									
Carry Totals Forward To Summary																											

SECTIONS

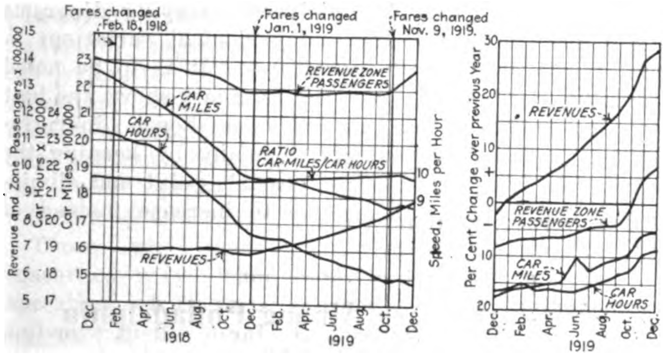
Between points as follows.

A- 1	City Hall and Highlands (Mt. Tom Golf Club)
A- 2	City Hall and South Hadley Falls (No. Main St.)
A- 3	City Hall and Elmwood
A- 4	City Hall and Newton Smith's (So. Hadley Centers line)
A- 5	City Hall and Willimansett (Chicopee Line)
A- 6	City Hall and Willimansett (Chicopee Falls Line)
A- 7	City Hall and Oakdale (Cherry, & Hillside Ave.)
A- 8	City Hall and Prew Ave., So. Holyoke.
A- 9	City Hall and Hartford St., Fairview Line.
A-10	Hartford St., Fairview and end of Fairview line
A-11	City Hall and No. Pleasant Street
B-	Mt. Tom Golf Club and Smith's Ferry
C-	Smith's Ferry and Mt. Tom Jct.
D-	West Springfield—Holyoke line and Prew Ave., So. Holyoke
E-	Cherry St. and Hillside Ave. and Bray's Turnout on Westfield line
F-	Bray's Turnout and Holyoke—Westfield Town Line
G-	Chicopee Falls and "Y", Willimansett
H-	Chicopee and "Y," Willimansett
I-	Newton Smith's and Park St., South Hadley Center

DAY CARD USED BY HOLYOKE STREET RAILWAY

On completing the zone collection or on reaching the zone limit the conductor turns the register "down," and then enters the car and makes the collection for that zone. No particular trouble has been experienced due to complaints on the part of the conductors as to inability to make a collection in the time required for a car to traverse the length of a zone. Cars as a rule have a speed of approximately 12 to 15 m.p.h., and this with stops gives the conductor from eight to ten minutes to make a zone collection and post his day card.

At the end of the day the conductor totals the various columns for each fare zone and makes a summary of his work in the space provided in the upper right hand corner of the day card. He lists the cash and also converts the tickets collected into money so as to arrive at the total money equivalent for the day. Under this plan, it is possible to obtain the approximate previous day's receipts with a minimum of effort in a very short time by simply totaling the figures of the "Total Revenue" columns on conductors' day cards on an adding machine.

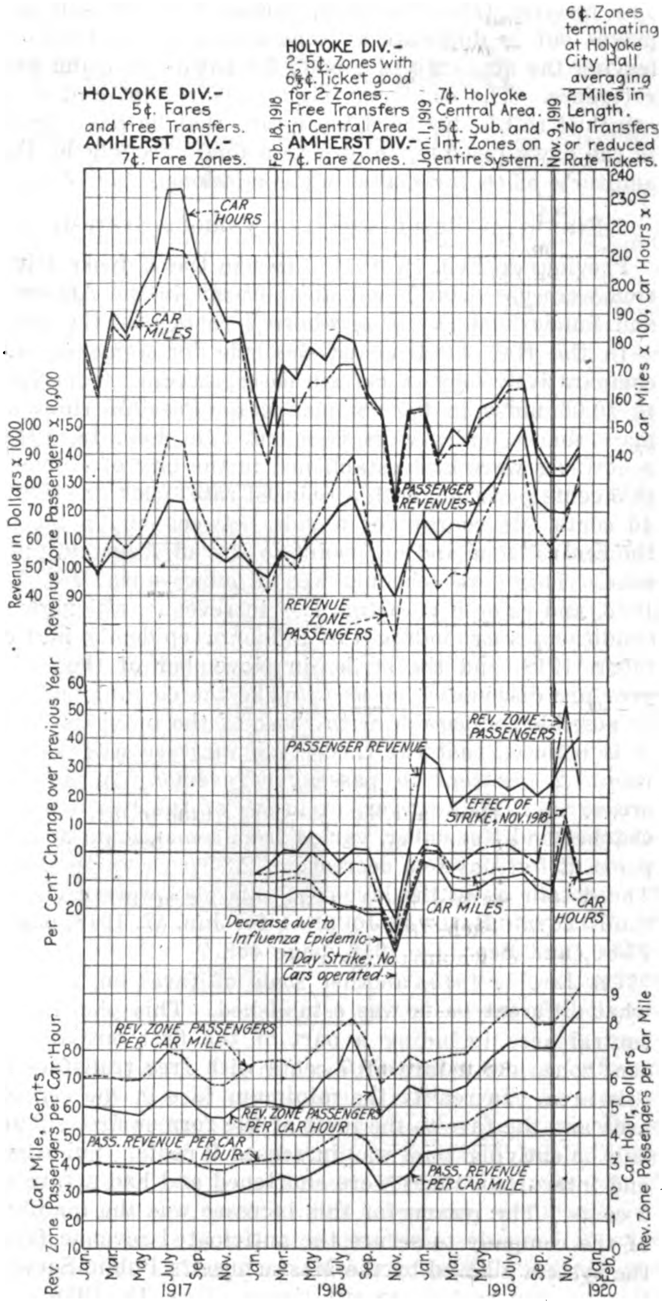


AT LEFT—TWELVE MONTHS' PROGRESSIVE TOTALS. AT RIGHT—PERCENTAGE VARIATION YEAR 1919 OVER 1918

No car register card is used, for all register readings are summarized and reconciled with fares registered and with a special register reading report which is posted each time a car leaves and enters the car house.

CONDUCTOR'S TURN-IN

On completion of a day's work all conductors make a daily turn-in to a receiver at the car house. To facilitate counting the receivers require a regular form of cash statement, showing the amount of cash in the various denominations that accompany the turn-in.



FINANCIAL RESULTS OF THE SEVERAL FARE SCHEDULES IN GRAPHICAL FORM

STATISTICS AS TO VARIOUS FARE SCHEDULES

	Year Ended Dec. 31, 1917	Feb. 18, 1918, to Dec. 31, 1918	Jan. 1, 1919, to Nov. 8, 1919	Nov. 9, 1919, to Dec. 31, 1919
Rate of fare	5-cent central area free transfers 5-cent suburban zone.	5-cent central area free transfers 5-cent suburban zones; 7-cent interurban zones	7-cent central area 5-cent suburban and interurban zones	6-cent zones in former central area 6-cent suburban and interurban zones
Length of ride for one fare, central area	Maximum 10.06	Maximum 6.67; average 2.26	Maximum 6.40; average 2.54	Maximum 2.33; average 1.97
Suburban and interurban zones	......	Maximum 3.77; average 2.58	Maximum 2.94; average 2.07	Maximum 3.07; average 2.18
Number of zones	......	7	18	29
Car-Mile Statistics:				
Passenger revenue (cents)	30.78	37.50	49.81	52.39
Operating revenue (cents)	30.84	37.52	51.54	54.12
Operating expenses (cents)	24.21	31.21	39.71	37.20
Revenue zone passengers	6.20	6.84	7.61	8.91
Transfer zone passengers	0.68	0.83	0.73	0.01
Total zone passengers	6.88	7.67	8.34	8.92
Car-Hour Statistics:				
Passenger revenue	$2.98	$3.56	$4.91	$5.34
Operating revenue	3.00	3.58	5.08	5.51
Operating expenses	2.34	2.98	3.90	3.76
Revenue zone passengers	59.5	65.4	75.0	90.5
Zone passengers	6.5	8.0	7.2	0.1
Total zone passengers	66.0	73.4	82.2	90.6

* Holyoke Division only.

The receiver takes the cash, checks it to the slip and makes out in duplicate a "conductor's official receipt," leaving the duplicate in a book for future auditing and reference. The conductor signs this receipt and it is attached to his day card to signify that he has turned in the day's receipts, subject to a final checking by the auditor's office for errors and omissions.

FINANCIAL RESULTS OF THE VARIOUS SYSTEMS

Previous to Feb. 18, 1918, fares in the Holyoke Division were based on 5-cent units except in the Amherst and Sunderland Division, where 7 cents was the unit.

In the Holyoke Division the ride for a nickel was comparatively long in certain cases, ranging from 7.26 to 10.06 miles in twelve instances. Possible rides of more than 6 miles were frequent. On Feb. 18, 1918, zone fares were first established in the city of Holyoke at 5 cents per zone, with a reduced rate ticket at six for 40 cents (6⅔ cents) for a ride between any point in the central zone and any point in the adjacent outlying zone. This fare schedule was in effect until Dec. 31, 1918, and showed an actual loss in revenue, although if conditions surrounding the influenza epidemic in October, 1918, and the strike in November of the same year are discounted, so as to make the earnings so far as possible comparable with those of the previous year, it is believed that the theoretical increase would have been 1.2 per cent in passenger revenue. Actual increase in 1918, however, exclusive of the two months, October and November, varied from a maximum of 7.38 per cent for May to a decrease of 2.87 per cent for July. The details as to the layout of this plan were given in the ELECTRIC RAILWAY JOURNAL for Jan. 12, 1918, pages 77-80, and Sept. 14, 1918, page 458.

On Jan. 1, 1919, another scale of fares on a somewhat different basis was established. This plan had a central area including a part of the first outlying 5-cent zone, and a fare of 7 cents with free transfers in this area. In reality the minimum fare in the central area and the fare to the limit of the former first suburban or outlying zone was increased 2 cents. Suburban and interurban zones were shortened and had a fare of 5 cents. The reason for this increase was the inability of the company to secure the anticipated revenue from the system allowed by the Massachusetts Public Service Commission to become effective on Feb. 18, 1918.

This system showed a considerable greater earning power than the one superseded, as will be noted by the accompanying curves. The first month's operation showed a 35 per cent increase over the old system of fares, while for the period Jan. 1 to Aug. 1, 1919, the average increase was approximately 32.8 per cent with but little if any traffic loss. The tickets under this system, of which there were three, namely, a 10-cent ticket sold in lots of five for a 12-cent, two-zone ride at any hour of the day; a 7-cent ticket also sold in lots of five for a 10-cent, two-zone ride, during certain hours of the day; and a full-fare 7-cent ticket for use in the central zone, produced 29 per cent of the total passenger revenue. While this percentage may seem small, actual observations would indicate that in the first outlying zone nearly 75 per cent of the passengers rode on 10-cent and 7-cent reduced rate tickets.

In August, 1919, an award was given by a local board of arbitration, increasing the wages of all employees approximately 33 per cent, and inasmuch as the system of fares then in effect failed to earn sufficient revenue to pay this increase it became necessary to seek the additional revenue.

The company believed that the minimum fares should be kept as low as possible and few changes if any made in the suburban fare limits in order that the traffic loss may also be kept at a minimum. Bearing this in mind a rate structure was built up with 2-mile zones with a minimum fare of 6 cents per zone. Actual results from operation have proved that this was the correct diagnosis, for the loss in traffic has been nil and practically the theoretical increase in revenue anticipated has been actually realized.

Car-mile passenger revenues average 51.50 cents in November, 1919, as against 33.39 cents for 1918 and 29.06 cents for 1917, while car-hour earnings that averaged $2.78 in 1917 and $3.32 in 1918 have increased to $5.25 in November, 1919. Against this, operating revenues have also increased from $3 in 1917 to $5.47 in November, 1919.

The table on page 753 and accompanying diagrams show the actual monthly and periodical variations in the four different rate structures. It is to be noted that the schedule in effect on Nov. 9 last shows the best earning power of the four schedules shown—due principally to the fact that the company by keeping the minimum fare at the lowest possible point and eliminating transfers has been able to increase instead of decrease the riding habit.

Welfare Work Among Philadelphia Employees

CO-OPERATIVE welfare work is proving successful in Philadelphia, according to the last P. R. T. report. Last September the membership in the Co-operative Welfare Association had reached 99.51 per cent of the eligible employees. The company in recognition of this record doubled its contribution to the association and, effective Jan. 1, 1920, is contributing $20,000 monthly. This sum is equal to $2 for each $1 of dues paid by the members.

During the first 16 months existence, that is up to Dec. 31, 1919, the association paid $1,000 life insurance to the beneficiaries of 184 employees. Sick benefits were paid to 1645 employees at the rate of $1.50 per day, totaling $75,572.50. Pensions have been paid to ninety-nine employees at the rate of $40 per month. On Dec. 31 the total pensions being paid were at the rate of $47,520 per year.

In October, 1919, a savings fund was opened by the employees and on Dec. 27, 1919, over two-thirds of the membership had opened accounts, with an average of $10 a month to each account. Prediction is made that prior to the next annual meeting, which will be in September, 1920, 80 per cent of the members would have savings accounts and the accumulated total would be more than $1,000,000.

Safety Cars Cheap to Run

THE report of the Committee of One Hundred of the Kansas City (Mo.) Chamber of Commerce indicates that the thirty one-man safety cars have proven economical in operation. The total cost of operation is about 19 cents per car-mile, as compared with 32 cents for the larger cars, even though operators are paid 5 cents more than regular trainmen.

Co-operation in Electrolysis Research

Research Sub-Committee of American Committee on Electrolysis and United States Bureau of Standards Are Working Jointly in Collecting and Digesting Data

FROM time to time the ELECTRIC RAILWAY JOURNAL has discussed the work of the American committee on electrolysis and its predecessors and the researches which have been made by the United States Bureau of Standards. Now that the American committee is taking up its work again actively, with meetings of the research sub-committee held on the last Friday of each month, it is appropriate to review the whole program of research on prevention of electrolysis from stray electric currents as planned by the American committee in co-operation with the Bureau of Standards. The present article has been prepared with this idea in view.

B. J. ARNOLD
Chairman American Committee on Electrolysis

DR. E. B. ROSA
Secretary American Committee on Electrolysis

Those who were concerned with the operation of electric railways in the nineties and the early years of the present century will recall the incredulity and surprise attending the first evidences of stray-current electrolysis, and how this surprise was followed by dismay as increasing numbers of pipes were unearthed showing the ravages of unconfined currents. It was a phenomenon entirely new and unforeseen to the railway engineers as well as the pipe and cable-owning companies, and one for which no effective remedy was known. In those early days the return circuit was not given the attention that it now receives, partly because the importance of the electrolysis problem was not appreciated, partly because of the primitive state of the art of rail bonding and often because the earth was intentionally relied upon to carry the return current, on the assumption that it offered no electrical resistance.

The history of the development of rail bonding is in itself an interesting story and those who are familiar with it know that the number of types of bonds which have been used is legion. The bonded rail joint has been the weakest link in the return circuit and until the adoption of the welded joint, now commonly used in the larger cities, was responsible more than any other one thing for the extremely bad electrolysis conditions which existed in many cities. With the improvement of the return circuit through the use of heavier rails, better bonds, welded joints and supplementary feeders, railway loads also increased and often at a rate far greater than the increase in the return circuit. The result was that with the phenomenal growth of the electric railways those factors which were not vitally and immediately necessary to the operation of the cars were often slighted or entirely neglected. In not a few instances the electrolysis problem was one of the factors neglected during this early period.

From the very first appearance of electrolysis, nearly thirty years ago, there has been no end of speculation and uncertainty concerning the whole subject. The difficulty of observing the extent and progress of damage on underground structures; the rapidly changing conditions resulting from extensions, improvements and abandoned power stations; the great variations in local conditions, as, for example, earth resistance and different types of roadbed, as well as many other factors, all contributed to the difficulty of adequately analyzing and solving the problem. Many methods of correcting the trouble were proposed and used, but no standard practice has ever been agreed upon in this country other than the maintenance of the return circuit to the highest standard practicable. The cable-owning interests early found that a substantial degree of protection could be secured by draining the sheaths of the cables in areas where they were found to be positive to the earth, to the negative railway bus or to some other point on the return circuit, and this practice has been and now is consistently followed. The same method was employed, in some cases by the railways and in others by the water and gas companies, in an effort to protect the underground piping systems. This method of electrolysis mitigation, known as pipe drainage, though widely used, is in disrepute among many engineers and pipe-owning companies.

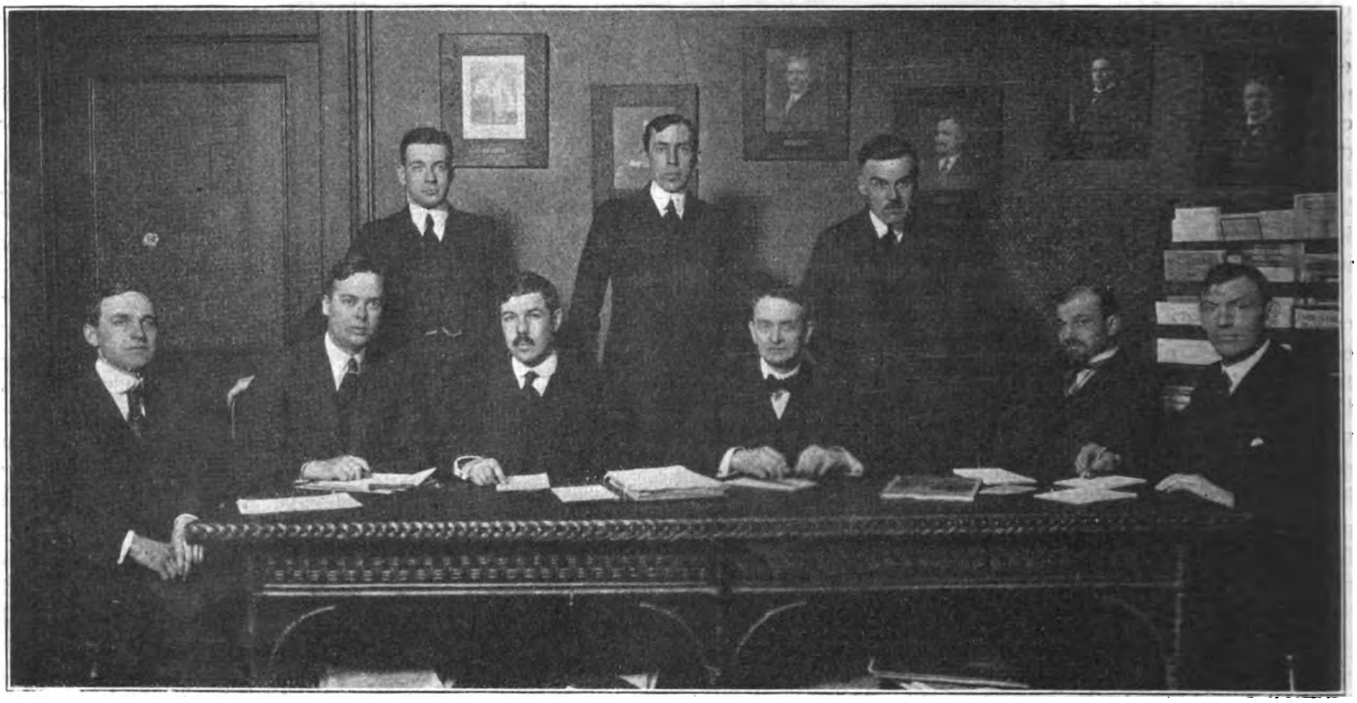
A DECADE OF INVESTIGATION BY THE BUREAU

It was because of the wide divergence of opinion and the lack of engineering knowledge on the subject of electrolysis, as exhibited by many requests for information, that the Bureau of Standards took up a general study of the whole problem in 1910. The first efforts of the bureau in this field were devoted to a study of some of the more important fundamental principles involved. Laboratory and field investigations were carried out and reports were published on many phases of the electrolysis problem. These included electrolysis in concrete; the laws governing the electrolytic corrosion of iron and lead; earth resistance, and its relation to electrolysis of underground structures; leakage resistance of electric railway roadbeds; modern practice in the construction and maintenance of rail joints and bonds, and the principal methods that have been proposed for electrolysis mitigation. Numerous field surveys were also made by the Bureau of Standards and these have not only formed the basis for a publication on the methods of making electrolysis surveys, but have given an opportunity to experiment with different methods of mitigation. The reports of these various laboratory and field investigations have had a wide distribution and have been very helpful to engineers in bringing about better electrolysis conditions.

AMERICAN COMMITTEE ON ELECTROLYSIS FORMED

In 1913 through the activity of some members of the American Institute of Electrical Engineers, the American committee on electrolysis, first known as the joint national committee on electrolysis, was organized, representing the following organizations in addition to that already mentioned: American Electric Railway Association, American Gas Association, American Railway Engineering Association, American Telephone & Telegraph Company, American Water Works Association, National Electric Light Association, Natural Gas Association, National Bureau of Standards. On Feb. 25, 1914, at the second regular meeting of the committee, the following statement was made as the reason for its formation and is evidence that the committee was fully aware of conditions as they existed at that time:

> Electrolytic controversies have in the past given rise to unnecessary and acrimonious disputes, and not infrequently have resulted in litigation between the corporations concerned. The usual procedure in disputes of this kind has been for each side to employ one or more electrical experts who generally disagree as to the cause of the trouble and the remedies therefore. The dispute sometimes gets into the newspapers, occasioning unpleasant notoriety and resulting in more or less drastic municipal action by the city government concerned. Much of this could be avoided if a body such as this committee could be created which would consider broadly the questions covered by the controversy, without attempting to pass upon the questions at issue, but to report back to their respective organizations so that in time the committee would come to be recognized as a neutral body whose decisions would be authoritative, the same as the standards committee of the American Institute of Electrical Engineers in connection with matters of definition and standardization, which is a recognized authority that nobody ever attempts to question. With that end in view the institute initiated the movement to organize a national body to consider the general subject and agree upon any basic principles or methods of procedure to be followed in the case of electrolysis disputes.



MEMBERS AND ALTERNATES OF RESEARCH SUB-COMMITTEE OF AMERICAN ELECTROLYSIS COMMITTEE IN CONFERENCE WITH ENGINEERS OF BUREAU OF STANDARDS

Standing Left to Right—V. B. Phillips, American Electric Railway Association; Burton McCollum, United States Bureau of Standards; Alexander Maxwell, National Electric Light Association.

Seated Left to Right—H. C. Sutton, American Gas Association, secretary; Elam Miller, American Telephone & Telegraph Company; L. A. Hazeltine, American Water Works Association; H. S. Warren, American Telephone & Telegraph Company, chairman; S. S. Wyer, Natural Gas Association; E. R. Shepard, Bureau of Standards.

Missing from Group—Philip Torchio, National Electric Light Association; L. P. Crecelius, American Electric Railway Association; E. E. Minor, American Water Works Association; E. B. Katté, American Railway Engineering Association.

In 1916 the American committee printed a preliminary report for submission to its principals under the following general captions:

I. Principles and Definitions.
II. Methods of Making Electrolysis Surveys.
III. American Practice.
IV. European Practice.
V. Bibliography.

No effort was made to standardize practice or to agree on methods of mitigation.

After the preparation of this report and during the period of the war the committee was inactive. The Bureau of Standards also, except for making a few surveys, devoted all of its activities to military and naval problems for a period of two years or more, so that no material progress in electrolysis mitigation was made during this period.

It thus appears that at the present time, although much valuable research work has been done and the individual utility companies, working independently, have in many cities brought about greatly improved electrolysis conditions, there still remains much difference of opinion as to the applicability of the various methods of mitigation, and the conditions described in 1914 at the organization of this joint committee and which the committee was formed to correct are, in large measure, still prevalent.

SUB-COMMITTEE ON RESEARCH IS NOW AT WORK

In reviving activities a year ago, the American Committee on Electrolysis appointed a research sub-committee to engage actively in technical investigations in co-operation with the Bureau of Standards, for the purpose of securing needed information particularly on controversial questions.

The one subject more than any other upon which engineers have disagreed is pipe drainage. In spite of the wide application of this principle, there is much difference of opinion as to the extent to which it should be used. A number of questions such as, for example, joint electrolysis at high-resistance pipe joints, interchange of current between unequally drained systems, and gas explosions on heavily drained pipes can be settled only by comprehensive study in the field, in co-operation with the local pipe owning companies. The research sub-committee and the Bureau of Standards are accordingly attacking these problems and are receiving the cordial support of a number of water and gas companies. An investigation limited mainly to joint electrolysis has already been carried out in one city and valuable information obtained relating to joint electrolysis and interchange of current between different systems. Similar studies are to be made in a number of other cities and it is hoped that these will form the basis for substantial agreement on the whole subject of pipe drainage. Other methods of mitigation, including the three-wire method of power distribution and reduced feeding distances made possible by the use of automatic substations, will be studied with respect to their applicability under different conditions.

With the street railway and pipe-owning companies and the lead-cable interests all working together in harmony, assisted by the Bureau of Standards, a neutral body, conditions are most favorable for determining the facts relating to electrolysis. It is only by co-operation of this nature that complex problems involving the welfare of so many interests can be adequately dealt with. With this arrangement for co-operation it is not unreasonable to hope that ultimately the American Committee on Electrolysis will be able to report definitely on all methods of mitigation, describing the advantages and limitations of each, and so far as possible recommend suitable standards of practice.

Private Autos Cut Revenue 12 Per Cent

A COMMITTEE of the Massachusetts Legislature appointed to make a study of the cost of operation of motor buses and electric trolley cars has estimated that privately owned automobiles, exclusive of jitneys or motor buses operated for hire, have reduced the income of the traction lines in that State by 12 per cent. If this reduction should be applied to the whole country in proportion to the population the total reduction in electric car earnings would amount to $17,000,000 per year.

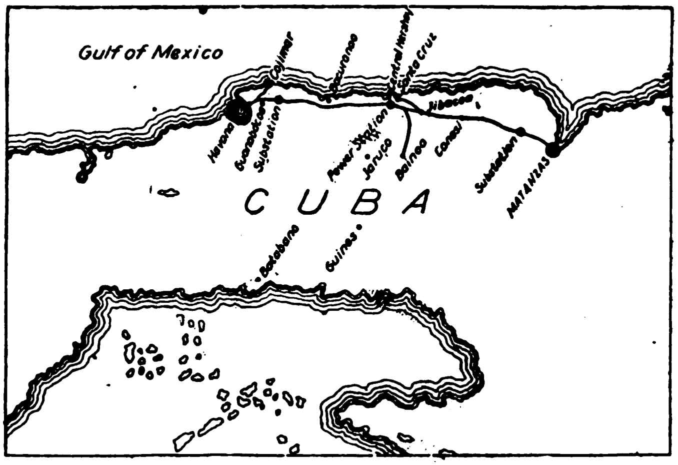
Hershey Cuban Railway Being Electrified

Steam Road Connecting Havana, Matanzas and Santa Cruz to Be Equipped for 1,200-Volt Operation, with Automatic Substations

BY F. W. PETERS
Railway & Traction Engineering Department, General Electric Company, Schenectady, N. Y.

HERSHEY Central, a beautifully situated town overlooking the Gulf of Mexico, is located on the north coast of Cuba practically midway between Havana and Matanzas, some 56 miles apart. The major activity here as well as at numerous other "centrals" on the island is the manufacture of sugar. The mill here is served by the Hershey Cuban Railway, having approximately 35 miles of single track, which is now being electrified and extended. With various extensions, short spurs and sidings, there will ultimately be 80 miles of electrified single track.

The service to be maintained will consist of cane and sugar transportation, besides through and local commodity freight, express service and multiple-unit passenger train service operating on one-hour headway between Havana and Matanzas.



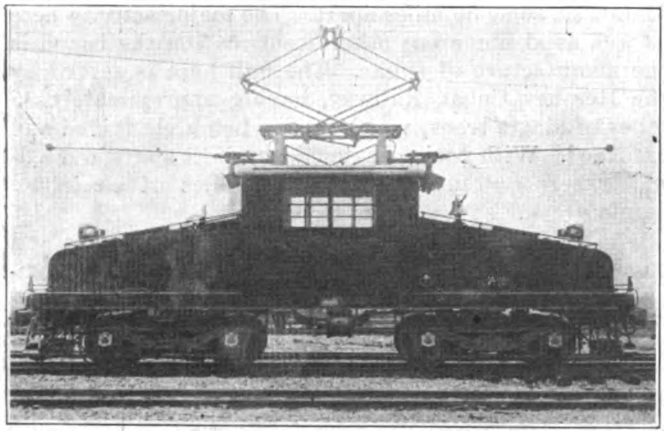
MAP OF PART OF CUBA, SHOWING NEWLY ELECTRIFIED HERSHEY CUBAN RAILWAY

The 1,200-volt direct-current system will be used, with 10-point catenary trolley wire construction. The overhead will be suspended largely from bracket arms on creosoted pine poles, which will carry in addition the steel-cored aluminum transmission circuits and 795,000 circ.mil aluminum 1,200-volt feeders.

The freight motive power comprises seven 60-ton, four-motor locomotives designed to meet American standards, and the multiple-unit cars will be equipped to make a free running speed of 40 m.p.h. and will weigh about 29 tons. There will be ten straight passenger cars seating fifty persons, three combination passenger and baggage cars and two combination express and mail cars.

The power-generating and substation equipment will be as shown in the accompanying table. This equipment and the buildings in which it will be housed are of modern design and construction in every particular. An interesting thing about the power plant is that on account of the mild climate the boilers have been located out of doors, with only a roof over them for protection against the tropical rains. This affords agreeable working conditions for the men, and it insures minimum building cost and reduced operating expense, because the boilers are located adjacent to the sugar mill boilers and one boiler house organization can serve both.

The two outlying automatic substations, one of which is located near Havana and the other near Matanzas, are duplicates, each containing one 1,000-kw. group of synchronous converters, consisting of two 500-kw. 600-volt machines connected in series. A third 500-kw. 600-volt spare converter is provided with change-over switches, so that it may be conveniently substituted for either the high or low machine of the group.*



1,200-VOLT LOCOMOTIVE FOR HERSHEY CUBAN RAILWAY

POWER HOUSE AND SUBSTATION DATA—HERSHEY CUBAN RAILWAY

Generating Station	Number
2,500-kva. turbine alternators	3
35-kw. turbine exciter	1
50-kw. motor-generator exciters	1
600-hp. oil-fired steam boilers	4
3,000-kva. step-up transformer banks	2
300-kva. station auxiliary transformer banks	1
Switchboard	1
Spray pond	1
Main Railway Substation	
1,000-kw. 1,200-volt d.c. synchronous converter groups	2
1,050-kva. step-down converter transformer banks	2
Railway switchboard	1
Each of Two Outlying Automatic Substations	
1,000-kw. 1,200-volt d.c. synchronous converter groups	1
1,050-kva. step-down converter transformer banks	1
500-kw. 600-volt d.c. spare converter	1
350-kva. single-phase step-down spare transformer	1
Automatic control equipment	1

The switching equipment is completely automatic in operation and is similar to those which have proved successful in many parts of the United States.

The power transmission is 33,000-volt, three-phase, and provision is made for carrying two transmission circuits on a single line of poles between the power station and Matanzas. These will serve the railway substation on the Matanzas division as well as certain railway and commercial power applications in Matanzas.

On the Havana division immediate provision is made for carrying one three-phase transmission circuit to serve the Havana division railway substation and supply any commercial power demand along the right-of-way. Forty-five-foot creosoted poles of 150-ft. spacing have been used, and the pole line carries at the top a ¼-in. galvanized steel-strand ground wire and either one or two No. 0 steel-reinforced aluminum 33,000-volt three-phase transmission circuits, mounted on pin type insulators and creosoted wood cross-arms.

The contact wire is No. 0000 grooved trolley wire supported from a 7/16-in. galvanized steel-strand messenger, carried on pin type insulators with galvanized tee-iron and bracket-arms. On sidings and special work cross-span suspension is used.

Steel-terminal No. 0000 copper strand acetylene gas-weld rail bonds are used throughout.

To protect against the rapid deterioration of exposed ferrous metals, so prevalent in tropical countries, all iron parts employed in the transmission system are protected by hot-dipped galvanizing or sherardizing.

French Cautious Regarding Inductive Interference

THE French technical papers have given much space recently to an article by J. B. Pomey, who was a member of the French Electrification Commission which visited the United States about a year ago. The article appeared originally in the issue of the *Annales des Postes, Télégraphes et Téléphones*, for December, 1919, p. 566. While this article covers the general observations of the author made during his visit to this country, it gives special attention to the inductive influence exerted by traction lines on communication circuits.

The principal point in this connection is that conditions in France and the United States are so different that it may not be practicable to apply directly the solutions of the inductive interference problems in France which have been successfully developed in the United States. As to inductive interference from direct current traction systems, he points out that while up to the present time the direct-current system has not interfered with the communication lines, it will not be wise to generalize too much as yet. More sensitive communication apparatus may be used in the future and, on the other hand, the volume of the current used in heavy electric traction will increase.

Mr. Pomey refers appreciatively to the use of the high-speed circuit breaker on the St. Paul electrification, which prevents the increase of short-circuit current to unmanageable values. He recommends that in the choice of a system of electrification for France the characteristic influences of the system upon the neighboring communication circuits be studied by means of the oscillograph. The effect of the operation of high-speed circuit breakers must be included in the study.

Costs Increase 75 Per Cent

THE report of the Committee of One Hundred of the Kansas City, Mo. Chamber of Commerce on the local traction situation shows that the local cost of service per revenue passenger carried has increased 75 per cent since 1915. The accompanying table shows the cost of carrying each passenger, as compared with the fare received, in each of the five years during which the present franchise has been in operation:

	1915	1916	1917	1918	1919	Per Cent Increase Over 1915
Operating ratio (per cent)	69.90	68 21	69.88	86.16	106 34	62 2
Unit rate of fare (cents)	5	5	5	5	6	20 0
Revenue passenger statistics:						
Average fare (cents)	4.87	4.97	4.97	4 98	5 81	19 3
Operating expenses and taxes (cents)	3.57	3 57	3.63	4.47	6.57	84 2
Fixed charges), cents	1.16	0.97	1.08	1.20	1.72	48 1
Operating expenses, taxes and fixed charges (cents)	4.73	4.54	4.72	5.68	8 30	75 8
Profit or loss (cents)	0.14	0.43	0.25	*0 70	*2 49	

* Loss.

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*A photograph of this rotary converter was reproduced on page 515 of the issue of this paper for March 13, 1920. It is the right-hand illustration. The captions for the two cuts at the bottom of page 515 should be interchanged.

Holding Down Load Peaks on the St. Paul

By Automatic and Manual Means a Load Factor of Nearly 60 Per Cent Is Obtained—Load-Totalizing Instruments Play an Important Part

BY J. J. LINEBAUGH
Railway & Traction Engineering Department, General Electric Company, Schenectady, N. Y.

THE power limiting and indicating system constitutes one of the many novel features developed and installed as part of the original equipment furnished by the General Electric Company to the Chicago, Milwaukee & St. Paul Railroad for the electrification of its Rocky Mountain and Missoula Divisions. The railway desired to obtain an equipment which, with heavy trains comparatively few in number, would give the highest load factor consistent with good railroading. The Montana Power Company, which furnishes power to this section of the railroad, desired to prevent excessive peaks, which might cause serious voltage variations which would require the installation of excess-generating apparatus to take care of the railway load. The power company desired also to obtain means by which the total power supplied to the railway transmission line at a number of points could be accurately recorded at one place and on one meter and to obtain proper peak-load data upon which to base the price of power.

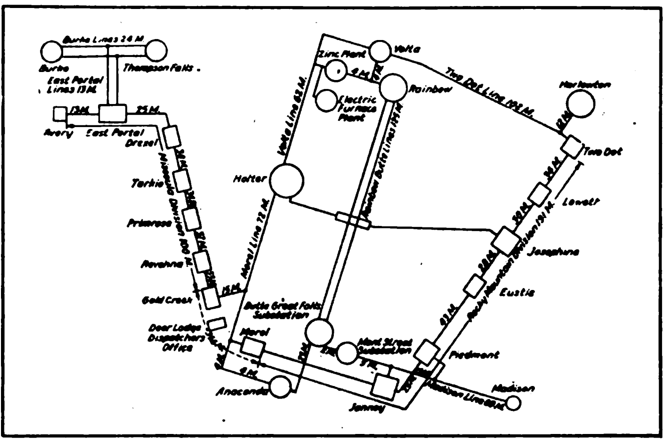
The apparatus described below was built, installed and tried out on the 220-mile Rocky Mountain Division before similar equipment was supplied to the 220-mile Missoula Division.

The equipment for the Rocky Mountain Division as first installed was based on metering the power at the five feed-in points. It was later changed to meter the power at the low-tension side of the motor-generator set step-down transformers in each substation, in order that the high-tension transmission line of the railway company might be employed for emergency power transfer, by the power company. This was not necessary on the Missoula Division, with but two feed-in points.*

NINE FUNCTIONS OF THE CONTROL EQUIPMENT

All of the indicating and recording apparatus for both divisions is installed in the dispatcher's office at Deer Lodge, Mont., the center of the 440-mile electrification. The complete system comprises the distinct functions of limiting the maximum power demand at the will of the train dispatcher and of indicating and recording the total net power. The combination of these two functions accomplishes the following results:

1. Independent of the number of feed-in points, it indicates to the train dispatcher at all times the total net amount of energy being delivered to his division and it makes a permanent record for future study and as a basis for power bills.
2. It automatically deducts regenerated power if returned to the power company's lines or transfer of power from one line to another over the railway company's transmission line.
3. It automatically limits the amount of power supplied to the division by lowering the trolley voltage and slowing down the trains so that the maximum peak load on the system cannot exceed a certain predetermined maximum.
4. Its maximum limit can be changed instantly, easily, accurately and directly by the dispatcher without the necessity of notifying substation operators.
5. It is capable of reducing the peak-power demand by 30 per cent.
6. If desired, the equipment can be adjusted so that the lightly loaded substations will not be affected, thereby providing the highest possible voltage for the operation of passenger trains.
7. If desired, the equipment can be adjusted to reduce the voltage on the most heavily loaded substations at the time of peak demand (above the maximum limit) slightly in advance of the other stations, thereby tending to equalize the load on all the stations.
8. If an excessive demand for power occurs near any one substation the voltage of that substation is automatically lowered without affecting the voltage of the other substations, dividing the load between the substation affected and the stations on either side.
9. The total power fed in at any point or transferred from one power line to another or the amount returned due to regeneration can be easily taken care of by a change in the ratio of the current transformers or by an adjustment of the wattmeter rheostats.



CONNECTION DIAGRAM FOR ST. PAUL ELECTRIFICATION, ROCKY MOUNTAIN AND MISSOULA DIVISIONS

Showing connections of the 100,000-volt system of the Montana Power Co. and transmission lines of the railroad, with location of the 3,000-volt direct-current railway substations.

CONTROL CIRCUIT A GIANT OHM-METER

The system is essentially an ohm-meter on a large scale, consisting of a two-wire pilot circuit, extending the length of the division, connecting in series all of the substations and the train dispatcher's office, with contact-making wattmeters and suitable rheostats at the incoming power points, and contact-making ammeters, with voltage-lowering generator rheostats in each substation.

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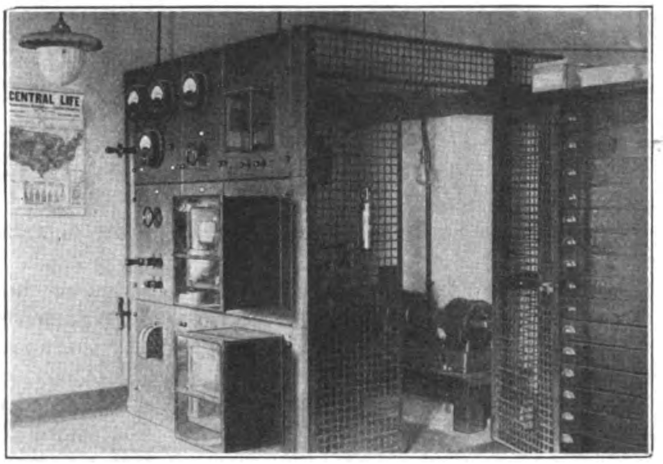
*A brief reference to this system will be found in the abstract of the 1920 report of the committee on electricity of the American Railway Engineering Association in the issue of this paper for April 3, page 695.

A constant source of direct-current potential is applied across the two ends of the pilot wire loop at the dispatcher's office, power being obtained from a 2-kw. 1,200-volt direct-current motor-generator set, the voltage of which is held constant by a standard voltage regulator. The voltage applied to the pilot wire is determined by the length of the division, the resistance of the pilot wire, the number of substations and the power feed-in points.


DISPATCHER'S OFFICE AT DEER LODGE, SHOWING POWER LIMITING AND INDICATING EQUIPMENT

The indicating and limiting feature is obtained by inserting or removing a certain number of ohms of resistance for a definite change in the kilowatt demand, which causes a definite decrease or increase in the current flowing in the circuit when a constant voltage is held across the pilot wire.

The contact-making wattmeter resistances and the pilot-wire contact-making ammeters are connected in series with the pilot wire, as shown in an accompanying diagram.

The apparatus is designed to hold certain definite peak limits in 2,000-kw. steps from 10,000 to 25,000 kw. as indicated.

The power-indicating apparatus in the dispatcher's office consists of a 2-kw. motor-generator set, a milliammeter calibrated in kilowatts, a curve-drawing ammeter, also calibrated in kilowatts; a curve drawing voltmeter, to give a permanent record of the pilot-wire voltage, and suitable indicating instruments and switchboard to control the motor-generator set.

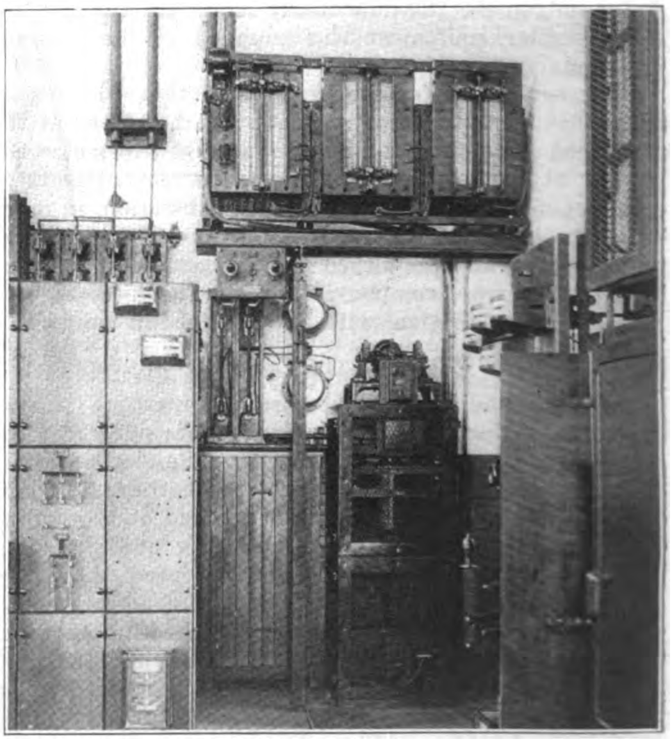
Due to the simplicity of the indicating wattmeters, two of these have been installed for each division, one on the switchboard and the other in front of the trick train dispatcher. With this arrangement the dispatcher can tell at a glance the exact amount of power being taken in his division at any instant, and also can watch the power demand resulting from his orders to the train crews in charge of trains ascending or descending the mountain grade.

Variation in resistance of the pilot wire due to change in temperature is taken care of in the dispatcher's office by a rheostat which can be easily inserted and the total resistance adjusted to 2,000 ohms (the approximate resistance of the pilot-wire loop and the coils of the contact-making ammeters), by holding 1,200 volts and adjusting the rheostat for 0.6 amp.

The contact-making wattmeter equipment consists of a contact-making wattmeter built along standard meter lines, with an indicating pointer equipped with contacts and moving between the two stationary contacts. The spiral spring of the pointer is connected to the shaft of the pilot-wire rheostat located immediately above the wattmeter. This shaft is driven by the motor-driven clutch mechanism at the top of the supporting framework. When contact is made on one side, due to an increase in incoming power, the circuit is completed through the clutch coils, causing the rheostat gearing to engage and inserting a certain amount of resistance in the pilot wire. At the same time the wattmeter spring is wound up due to the movement of the shaft. This action continues until the torque of the wattmeter is offset by the torque of the spring, when a balance is obtained and the clutch circuit is interrupted, thereby causing the rheostat to come to a standstill. This operation is continued for any increase or decrease in the incoming power.

HOW THE PEAKS ARE HELD DOWN

The power-limiting scheme in connection with the indicating equipment consists of a contact-making ammeter for each substation, with its coil connected in series with the pilot-wire circuit, so that when the current in the pilot wire decreases to a certain predetermined point contact is made and resistance is inserted in the exciter circuits supplying excitation to the separately excited direct-current generators by means of a motor-operated rheostat. The rheostats have sufficient resistance to lower the substation voltage to a minimum of 2,100. When contact is made by the contact-making ammeter the voltage of the substation is decreased, and the resulting slowing down of the trains reduces the total input of the substation to a value below the predetermined peak setting. When the total load becomes less than the peak setting the contact-making ammeter will make contact on the other side and bring the voltage of the substation back to normal. A secondary current coil forms part of the contact-making ammeter and is

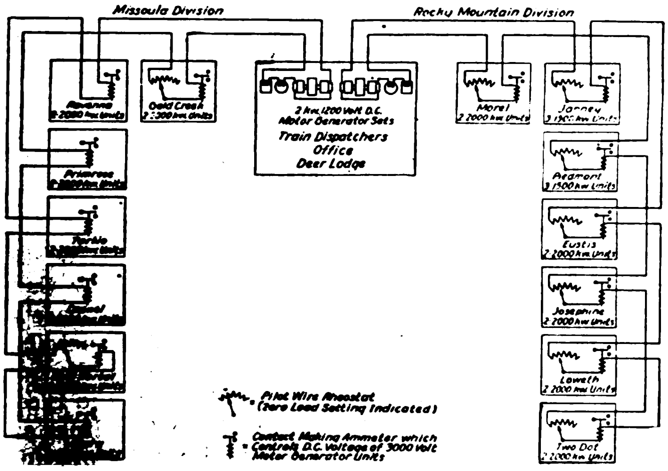

POWER LIMITING AND INDICATING EQUIPMENT INSTALLED IN JANNEY SUBSTATION, SHOWING PLUG-SWITCH PANEL

energized with current from a direct-current shunt in the ground or negative side of the 3,000-volt substation, so that the heavily loaded substations have their voltage decreased slightly before those with lighter loads.

If the total alternating-current input is beyond that covered by the power contract, or limit determined by the train dispatcher, the voltage of all of the substations will be decreased until the total input reaches the amount decided upon.

An overload and an underload relay are also connected across the current shunt. The latter is calibrated to make contact at about one-half load on a substation, so that the limiting equipment is inoperative until the load is greater than this amount. The overload relay is set to take control of the motor-operated rheostats at three times load and prevents the load going above this amount by lowering the voltage independently of the power-limiting equipment which transfers some of the load to the substations on either side.

If the power demand should be greater than the peak limit while a locomotive is regenerating through a substation the reverse-current relay in each substation (primarily used to give correct field connections of the synchronous motor exciters) is also arranged to open one of the control circuits so that the voltage-lowering rheostats are inoperative. With this arrangement the potential is held constant at 3,000 volts. If the voltage should be below normal, due to operation of the power-limiting equipment, and regeneration should occur, the voltage is automatically brought back to 3,000 and held at this value.


Missoula Division
Rocky Mountain Division
Ravenna 2-2000 kw Units
Gold Creek 2-1300 kw Units
2 kw 1200 Volt D.C. Motor Generator Sets
Train Dispatchers Office Deer Lodge
Morel 2-2000 kw Units
Janney 3-1500 kw Units
Primrose
Tarkio
Piedmont 3-1500 kw Units
Eustis 2-2000 kw Units
Josephine 2-2000 kw Units
Loweth 2-2000 kw Units
Two Dot 2-2000 kw Units
= Pilot Wire Rheostat (Zero Load Setting Indicated)
= Contact Making Ammeter which Controls D.C. Voltage of 3000 Volt Motor Generator Units

CONNECTION DIAGRAM FOR THE PILOT-WIRE CIRCUIT AND LOCATION OF CONTACT-MAKING WATTMETERS

The maximum kilowatt peak limit, or kilowatt setting, can be changed at any time by the train dispatcher to take care of unusual congestion or other requirements.

Due to the necessity of reducing the pilot-wire current to the same value, the kilowatt totalizing meters, which are ammeters calibrated in kilowatts, must record correctly the total kilowatts, although finally carrying the same amperes. This is accomplished by gearing the several rheostats together with a common rheostat handwheel. This changes the voltage through the regulator by definite steps and also changes, at the same time, by definite increments the resistance across the coils of the two kilowatt meters, thus altering the current required to give any definite scale indication in the ratio of the change made at the same time in the pilot-wire voltage. By this means the current at which the contact-making ammeter makes contact can be made to represent 10,000 kw., 12,000 kw., etc., up to 20,000 kw., by simply turning the rheostat handwheel to definite points plainly marked, correctly connecting the three different circuits.

LOAD FACTOR IS NOW PRACTICALLY 60 PER CENT

The lowering of the trolley voltage in the substation is accomplished slowly enough, by proper speed of the motor-operated field rheostat, so as not to affect the operation objectionably, the only result being a gradual slowing down of the trains.

Additional power limiting is also obtained by instructing the freight engineers to drop back to series connection of the locomotive motors if very low trolley voltage is indicated by the voltmeters in each locomotive cab.

The peak limit was set at 14,000 kw. for the Rocky Mountain Division on April 1, 1919, and operation has been very satisfactory on this basis. The average load factor from April to September, 1919, inclusive, was 56.8 per cent.

The railway pays 0.536 cent per kilowatt-hour for 60 per cent of the peak, irrespective of whether this amount is actually used or not. The load factor maintained is so nearly 60 per cent that the increase in cost of power, or the cost of power not used, is very slight. With increase in the number of trains the load factor will be raised and no difficulty should be experienced in holding a load factor of 60 per cent or better. If the power-limiting feature is removed peaks as great as 21,000 kw. to 22,000 kw. would result.

One of the great indirect benefits obtained is the valuable assistance the indicating equipment gives the train dispatcher in dispatching trains in such a manner as not to give excessive peaks, and thereby lower the voltage due to the power-limiting equipment. By careful train dispatching, so that one train is ascending the mountain grade while another train is descending, it is possible to assist the automatic equipment in maintaining a good load factor very materially and greatly to increase the efficiency of the general operation of the railroad.

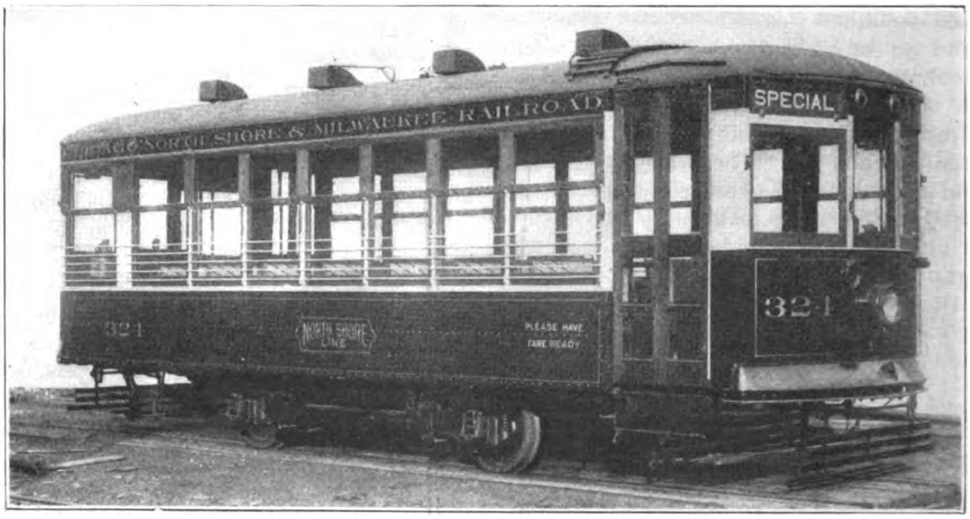
In the development of the apparatus described above great credit is due E. S. Johnson, J. R. Craighead, J. B. Taylor and E. J. Thiele for valuable suggestions, improvements and assistance in working out the details of the great number of new and untried features.

Kansas City Railway Installs Its Own Printing Plant

THE Kansas City (Mo.) Railways has installed a complete composition, printing and binding plant which is adequate to supply all of the company's printing needs except tickets and transfers. It is installed in a modern fireproof building with high ceilings and natural light and occupies 3,400 sq.ft. of floor space. The composing room is equipped with all sizes and faces of type and the necessary type cases, form stones, etc. The equipment of the press room includes a 35 x 47-in. bed Whitlock cylinder press for printing the weekly and monthly editions of the *Railwayan* and other large forms, a 12 x 18-in. Gordon press having a Miller automatic feeder and a 10 x 15-in. Gordon press for small forms. There is also a semi-automatic power paper cutter. The bindery is equipped with a wire stitching machine, a punching machine and a folding machine.

North Shore Line Adopts Safety Cars

Initial Installation of Ten Cars Shows an Increase in Gross Revenue as a Result of the Improved Service—Some Changes in Car Design Are Described



WAUKEGAN SAFETY CAR WITH NEW TYPE OF TRUCK

AN INITIAL installation of ten safety cars has been made in Waukegan, Ill., by the Chicago, North Shore & Milwaukee Railroad. This number is sufficient to equip the North Avenue line completely except for rush-hour service. This line runs from the Great Lakes Naval Training Station through North Chicago to the northern limits of Waukegan, a distance of nearly 6 miles. By the use of these safety cars the headway on this line has been reduced from fifteen minutes to eight minutes. The running time for a trip one way is thirty minutes, which is equivalent to a schedule speed of 11.56 m.p.h., not including lay-overs. The car mileage operated has been increased from 816 per day to 1,778. The safety car operators are paid a bonus of 10 cents per hour, bringing their total hourly rate up to 60 cents.

An interesting feature of this installation is that the safety cars operate over the through Chicago-Milwaukee interurban tracks for about one-half of the distance. They are thus sandwiched in among the local and limited interurban trains, express cars and freight trains. This operation over the interurban tracks necessitated the use of wheels with 4$\frac{11}{16}$-in. treads in order safely to negotiate the special track work and to operate the automatic crossing signals. Also, to meet the interurban requirements, the safety cars were equipped with whistles.

Another feature of the installation is that it embodies a change from two-man, pay-within operation to one-man, pay-as-you-enter operation, employing registering fare boxes. The increase of more than 100 per cent in service noted above has resulted. For the first fourteen days of March there was an increase of 35 per cent in the gross earnings, as compared with the corresponding period last year. Since the number of men at the Naval Training Station is materially less than it was a year ago, officials of the company attribute this increase in growth almost entirely to the better service and to the fact, also, that the pay-enter, fare-box collection has resulted in the men being able to get all of the fares.

The showing thus made after only about three weeks of operation gives rise to the evident probability that Britton I. Budd, president, will order additional safety cars in the near future in order to make the installation 100 per cent complete in Waukegan. As only two cars on a ten-minute headway are required for the Electric Park line, which is the other of the two lines in Waukegan, ten safety cars additional would provide the complete Waukegan service, both normal and rush-hour.

THE SAFETY CAR "SOLD" TO WAUKEGAN

The installation of the safety car in Waukegan was not made without considerable opposition. Speaking of this, Mr. Budd said that the city authorities, the trainmen, the newspapers, and seemingly everybody, were opposed to their introduction. In view of this attitude, Mr. Budd personally met with the trainmen and with the Mayor and other public officials and worked with them until he succeeded in either winning their support or at least a neutral attitude.

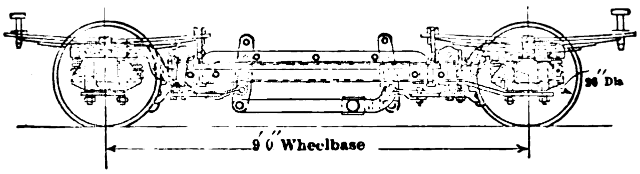
Mr. Budd simply endeavored to "sell" the idea of the cars. He showed the people that the local company had lost a considerable sum of money last year and that this meant either an increase in fare or a reduction in operating expenses. The safety car offered the opportunity to reduce operating expenses. Moreover, Mr. Budd promised a much improved service if the safety cars were permitted, the combination of better service and less expense per car-mile offering the possibility that the net earnings could be increased so that operation could be continued without an increase in fares.

The trainmen were won over through Mr. Budd's efforts and the promise of 10 cents an hour additional pay.

When the cars were finally installed the greatest care and an abundance of supervision were provided to make certain that there should be no bad first impressions. While some of the operators were a little slow the first day or two, the people in general were not only not dissatisfied, but were enthusiastic in their approval of the cars, and particularly of the noticeable improvement in the frequency and speed of the service.

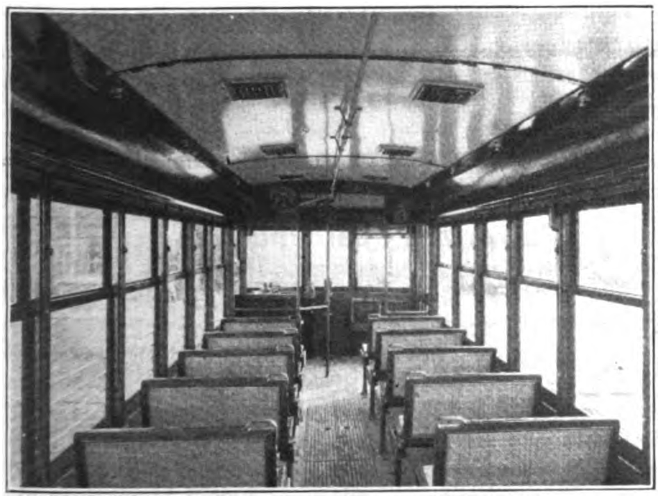
MECHANICAL FEATURES OF THE CAR

The ten safety cars purchased by the North Shore Line were built by the Cincinnati Car Company and mounted on that company's standard safety-car truck, the present design having been used also on the twenty-five safety cars recently shipped to the Birmingham Railway, Light & Power Company. These trucks have a 9-ft. wheelbase. Other details of their construction are shown in the accompanying elevation drawing. The car body is mounted on the outer ends of the semi-elliptic springs, without the use of any intermediary coil springs, as has been customary in other safety-car trucks. The opposite or inside ends of the elliptic springs are connected with the side frame of the truck through a swinging link, and the side-frame members rest on a pair of pedestal springs at either journal box. The substitution of the coil springs at the pedestals for the more usual coil springs at the outer ends of the elliptic spring was made for the reason that it is thereby possible to use a longer spring.



SIDE ELEVATION OF SAFETY CAR TRUCK AS USED AT WAUKEGAN

The wheels used on the North Shore cars are 26-in. rolled steel. The motors are the G.E. 264-A type with friction bearings. The truck journals are also of the friction-bearing type. All bearings in the brake rigging are steel bushed and all pins are case hardened. The brakeshoe and brake rigging wear is taken up by Gould slack adjusters.



HEAD LINING, SIDE SHEATHING AND DOUBLE FLOORING WERE USED IN THE WAUKEGAN SAFETY CARS

The car body differs from the standard safety-car design in several respects. It is standard so far as dimensions and general construction go and as to the seating arrangement and the seating capacity of thirty-two. The underframe has been strengthened to conform to the requirements outlined by H. A. Johnson, superintendent of equipment of the Chicago Elevated Railways and Chicago North Shore & Milwaukee Railroad. Then inside the car, to provide for the cold weather which prevails on the shore of Lake Michigan at Waukegan, agasote sheathing and head lining was put in from the floor to the window sill or arm rest and again behind the advertising racks and over the ceiling. Further provision was made for cold weather through the generous use of electric heaters, each car being equipped with sixteen Consolidated Car Heating Company, No. 303, 500-watt trussplank heaters, which are controlled by a utility thermostat set at 60 deg. A double flooring of $\frac{13}{16}$-in. yellow pine with maple floor strips on top of this in the aisle was used.

Each car is also equipped with an International registering fare box, eight Railway Utility Company automatic ventilators, Golden Glow headlights, curtains doublefaced with pantasote, Economy watt-hour meters, H-B lifeguards, etc.

For coupling purposes a hole was provided down through the dash behind the bumper channel and a longitudinal hole cut through the web of the channel to admit the drawbar. The total weight of the car with this additional metal in the underframe, the inside finishing, etc., runs for the ten cars from 17,100 lb. to 17,400 lb., averaging 17,288 lb.

Letters to the Editors

Lack of Drainage, Shrinkage of Concrete and Difficulty of Repair Are Faults of Concrete Beam Track

DES MOINES CITY RAILWAY COMPANY
DES MOINES, IOWA, March 29, 1920.

To the Editors:

I have noted the article on page 609 of the March 20 ELECTRIC RAILWAY JOURNAL, describing a type of track construction in which the rails are supported on concrete stringers without the use of ties.

In studying this design it first occurs to me that the shaping of the subgrade would not only be difficult but also expensive. It would be impossible to roll it as is advisable in many classes of soil. The inefficiency of present day labor would certainly necessitate extremely close supervision and would result in slow and tedious work in order to secure an accurate cross-section, which must be exact both as to line and grade.

There is no provision for drainage which is so necessary in many soils. I have never actually tried out the concrete beam design, without the use of ties; nor have I had any experience in connection with concrete as a paving surface in tracks. It has been my understanding that these ideas have proved failures in places where they have been used, and I have tried to benefit by the experience of others in this respect.

The article does not describe in detail the method of procedure during construction. It is assumed that the rails are blocked up and the plates, rods, hook bolts and all reinforcing are attached and bolted up, after which the concrete is poured. This would not permit any adjustment or tightening down of clips after first placing and the slight shrinkage of concrete might leave the rails a little loose.

My chief objection to absolutely rigid construction of any kind is, that while it will stay in good condition for a certain length of time, there will be a time when maintenance will be necessary in order to get maximum life out of the rails; and it is almost impossible to do any maintenance on this rigid construction and entire reconstruction is necessary. Where there is a cushion or parting strip between ties and foundation (whether the foundation is concrete or loose ballast) tracks can be overhauled and retamped, gaged or relined without as much expense as entire reconstruction. There is also the objection to rigid construction that it is noisy and harder on equipment.

The statement in this article that concrete presents a wearing surface "far superior to other types of pavement in connection with railway work" is, I am sure, misleading. Either granite block or good brick in my opinion will give better results. A hole in granite or brick pavement can be repaired and placed under traffic almost immediately, whereas with concrete, asphalt or any other surface cast in place, it is necessary to allow a certain length of time for the concrete to set or harden before traffic should be turned over it, and this is very hard to do when cars are in operation.

I believe we had better stick to the old plain rectangular foundation of some kind, continue to use a track tie and provide drainage for the sub-soil and probably more water proofing of paving surfaces to prevent frost from heaving the track in winter and water from churning in wet summer weather.

W. L. WILSON,
Chief Engineer M. of W. & S. Dept.

Book of Instructions for the Track Department

NEW YORK STATE RAILWAYS
ROCHESTER, N. Y., March 17, 1920.

To the Editors:

In the January 17, 1920, issue of the ELECTRIC RAILWAY JOURNAL the writer had an article giving formulas for the solution of compound curve problems and mentioned that these formulas were taken from a "book of instructions" originated by him for use of the engineering department of this railway. Because of the number of inquiries received concerning this book, a general description of form and contents is given here for those who are interested.

These instructions are typewritten on 8½ in. x 11 in. standard correspondence size paper and bound in a loose leaf cover. This size has been found to be the most convenient for all purposes, especially as most of the pages are typewritten and the drawings of the company are made in multiples of this size. For all typewritten pages onion skin paper is used and all typewritten work is backed up with carbon so it may be blueprinted. The book is made loose leaf because it is continually being revised and new matter added. It has not been published for the reason stated above and because much of the information deals with the particular methods and customs used only by this one company. A table of contents is given below showing the sections into which it is divided and the subjects covered under each section. These sections are separated by heavy manila separators having thumb indexes, upon which the subjects covered are printed.

TABLE OF CONTENTS OF BOOK OF INSTRUCTIONS FOR ENGINEERING DEPARTMENT

1. Track measurement—Detail instructions for chaining track for the track report and making up the same.
2. Special Work Renewals—
    1. Detail instructions for special work measurements.
    2. Standard dimensions of switches and mates.
    3. Instruction for special work data sheets (drawings for renewals).
    4. Instructions for ordering special work.
    5. Instructions for recording special work when placed.
    6. Tables of wheel tread data and minimum width of grooves (for special work manufacture).
    7. Special work specifications (for steel companies).
    8. Instructions for hard center and tongue renewals.
    9. Drawings showing method of planing rails, draining switches, etc.
3. Drafting—Gives full directions regarding standard sizes, titles, drawing numbers, conventional signs, etc.
4. Detail rules for filing, recording and indexing plans.
5. Estimating—Detail directions for getting out the company's standard estimates for authorizations explaining difference between additions, betterments, replacements and operating charges (according to N. Y. State P. S. C.) and a table of unit prices and quantities for 100 ft. of track.
6. Engineering data—
    1. Table of logs and middle ordinates for common standard radii.
    2. Table of rail sections in common use on lines.
    3. Compound curve formulas and special problems commonly met.
    4. Table giving drilling, size of holes, bolts, etc., for various kinds.
    5. Super-elevation charts.
    6. Drawings with complete details of company's standard specials.
    7. Loading diagrams of cars.
    8. Small printed maps of all car lines of system.
7. Specifications—All companies' standard forms of specifications and contracts, covering specifications for ties, paving and other materials, painting, building, crossings, licenses, etc.
8. Instructions for making the state tax report including unit prices and tables of depreciation for various constructions.
9. Instructions for Public Service Commission reports giving full details how each blank is filled out and where the information is obtained.
10. Instructions for making the company's annual statistical report.

This "book of instructions" is the outcome of several years' experience and the belief of the writer that written instructions are an important aid to efficiency in engineering as well as in other work.

L. R. BROWN,
Office and Field Engineer.

Pulverized Coal Under Boilers

GREEN ENGINEERING COMPANY
EAST CHICAGO, IND., April 2, 1920.

To the Editors:

In regard to the results obtained with powdered fuel in Milwaukee as outlined in the article by John Anderson on page 473 of the March 6 issue of ELECTRIC RAILWAY JOURNAL, the writer believes it is fundamentally wrong to take coal and prepare it to the most expensive condition (powder) and still burn it in its raw state, *i. e.*, with all its hydrocarbons. A much more fertile field of research and more rational procedure would be to extract some or all of the byproducts, leaving coke and gas for fuel. Ultimately we must come to some such process in this country, and until that time it will be difficult to find a complete analysis of figures that will show anything but a loss for powdered fuel as compared to stoker firing.

The ash carried out by the chimney gases is a serious matter. It is reported as high as 82.8 per cent of the ash content of the coal. This is an item that should not be lightly passed. It is not sufficient simply to state that it is "apparently carried a long distance" or that "no deposit could be noticed in the street." Some accurate way of measuring this discharge should be found before definite statements concerning it are made.

In figuring the cost of coal preparation only the equivalent fuel cost was charged, and that at the rate of 1.5 lb. of coal per kilowatt-hour. This figures 17,826 B.t.u. per kilowatt-hour. Few, if any, stations can assume such economy as this. The correct figure for cost of current should include all items—coal, labor, capital charges, in fact everything that goes to make up the ultimate cost of kilowatt-hour at the point of consumption. The author of the paper is misleading himself by using only partial costs for fuel preparation.

The cement industry has used powdered coal for twenty years and no doubt has much more data on the subject than steam producers. Such plants, with established cost figures, find that it costs in excess of $1 per ton to prepare the coal. If complete costs were figured for the Milwaukee installation, the cost of preparation would probably approach this figure and more than offset the alleged saving.

The stokers with which the comparison was made had a difference of 5.9 per cent between the gross and net efficiency. They were old and have auxiliaries costly to operate, reducing the gross or apparent efficiency to a net figure below that which can be obtained with other stokers. With modern chain-grate stokers, the net efficiency when operating at any such ratings as shown in this report is in excess of 76 per cent. Such a figure shows 5 per cent in favor of stoker firing over pulverized fuel.

From the author's presentation of the subject, the writer believes that the ash nuisance is unsolved and that in order to present even a slight saving in favor of pulverized coal it is necessary to: (a) Use low moisture coal. (b) Omit interest and depreciation on the additional investment. (c) Omit a large part of the cost of preparing the fuel. (d) Compare with underfeed stokers having low net efficiencies due to auxiliaries expensive to operate.

With these items corrected, the showing is in favor of stoker firing. T. A. MARSH, Chief Engineer.

Association News

Active Membership Campaign Planned

THE company membership committee of the American Electric Railway Association will make an extensive campaign for a 100 per cent enrollment of all electric railway companies in the United States this summer. This was the action taken at a meeting of the committee in Toledo on March 30. Each member of the committee will be allotted two or three states and will be empowered to select an assistant and visit personally every company in his district. The committee members were unanimous in the desirability of binding the electric railways into the association at this time when all other factors are organizing. Secretary E. B. Burritt, New York, was present. Others who attended the meeting were L. E. Gould, Chicago; J. P. Barnes, Schenectady, N. Y.; C. A. Hall, Pottsville, Pa.; E. B. Moore, Fairmount, W. Va., and J. W. Welsh, New York. The committee members were guests of President Frank R. Coates of the Toledo Railways & Light Company. They took lunch at the Toledo Club and dined at the Minority Prophets' Club, where Mr. Doherty was also present. In the afternoon they were taken on a tour to the Willys-Overland plant, one of the largest users of electric current in the Middle West. The committee has already begun work, two new members having been secured since the meeting by Mr. Barnes.

Committee for Chamber of Commerce Meeting

SECRETARY BURRITT announced this week the names of the alternate delegates of the association to the meeting of the United States Chamber of Commerce at Atlantic City on April 27-29. The list of delegates and alternates follows:

National councillor and delegate: L. S. Storrs; alternate, Britton I. Budd.

Delegates: J. N. Shannahan, W. A. Draper, P. J. Kealy, B. A. Hegeman, Jr., Charles L. Henry.

Alternates: C. M. Clark, James H. Drew, C. C. Peirce, E. C. Faber, E. B. Meissner, M. B. Lambert, H. W. Blake.

Secretary Burritt is anxious to learn of any members of the electric railway industry who expect to attend the meeting as representatives of their local Chamber or Board of Trade. A gathering of railway men in attendance will probably be arranged to discuss any matters of interest to the industry which may arise.

The preliminary program for the transportation section of the meeting is printed on page 771 of this issue. No special public utility section meetings are scheduled this year, the electric railways being included in the transportation group.

Coming Committee Meetings

THE committee on merchandising transportation of the Transportation & Traffic Association will hold a meeting in New York on April 12.

The committee on way matters of the Engineering Association is to meet in New York on April 15-16.

The committee on express and freight traffic facilities and cost of the Transportation & Traffic Association will meet in New York on April 26.

The committee on heavy electric traction of the Engineering Association is to meet in New York on April 28.

A meeting of the equipment committee of the Engineering Association is scheduled for May 7. It will be held in New York City.

Convention Location Committee

H. FORT FLOWERS finds that it will be impracticable for him to serve upon the American Association convention location committee. William F. Hurlburt, sales manager of the Metal & Thermit Corporation, has been appointed in his place.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

City Ownership Rejected

Wisconsin City Votes Three to One After Tart Campaign Not to Take Over Railway

Municipal ownership has been rejected in Madison, Wis. The voters of that city on April 6 turned down three to one the proposal to have the city purchase the lines of the Madison Railways. The company through paid newspaper advertising led the opposition to the purchase. Labor organizations and labor members in the Common Council led in the fight to buy the lines. It is expected that the City Council will now vote to co-operate with the railway and permit the installation of one-man cars on all lines.

SEVEN YEARS OF UNCERTAINTY

The railway question has been before the people of Madison for seven years. The municipal ownership advocates based their fight on the ground that the company could not make the necessary extensions and provide better service without raising the fares. Since November, 1918, the rate in Madison has been 6 cents. Opponents of the plan pointed to the fact that the Madison Railways purchased "a streak of rust" and converted it into railway; that with reasonable co-operation on the part of Madison citizens the company could build extensions and continue to improve the service.

Two investigations of the service and finances of the Madison Railways were completed recently. One was conducted by a committee of citizens and Aldermen named by Mayor George C. Sayle; the other was conducted by the Wisconsin Railroad Commission.

The citizens-Council committee reported to the Council that with city co-operation in the matter of paving and the installation of one-man cars on all lines the company could continue on a 6-cent fare, build extensions and provide better equipment and service. The Railroad Commission reported to the effect that service could not be improved until practically the entire system was double-tracked, more rolling stock provided and cars operated under closer supervision.

SPIRITED CAMPAIGN CONDUCTED

In the campaign against municipal ownership it was pointed out that should the citizens vote to purchase the lines, it would mean at least two years before the city could take up actual operation, because after the Railroad Commission had fixed a valuation on the property, the matter would probably be carried to the Circuit Court and thence to the Wisconsin Supreme Court. This would mean two years in which no improvements would be made by the railway. On the other hand, it was stated that should municipal ownership be defeated, the city would then take up the matter of putting into effect the recommendations of the citizens-Council committee.

Under a city ordinance, passed in the days of horse cars and still operative, the railway at Madison is forced to pay for paving between its rails. The city now has paving claims of nearly $50,000 against the company, with much more paving in prospect this year. In its report to the Council, the committee urged that the present debt of the company to the city be arranged for payment in annual instalments. Future costs would be met in the same manner, under the committee's plan.

With permission from the Railroad Commission and the City Council, the company has been operating five rebuilt one-man cars. The committee urged that these be replaced by one-man safety cars. The company is building a 2½-mile extension on the Winnebago line to the plant of the Mayer Packing Company at a cost of $40,000. This money was raised by public subscription through the efforts of the Association of Commerce, contributors to the fund receiving preferred stock on which dividends will be deferred for five years. This was made necessary by the refusal of the Mayer company to consider locating at Madison until the railway was extended to the plant.

One-Man Cars Protested

Employees of certain electric railways in New Jersey have asked the Board of Public Utility Commissioners for a hearing on their application in protest against the operation of the one-man cars. In a reply Alfred N. Barber, secretary of the board, points out that the commission cannot compel a company to stop operating such cars in the absence of public complaint and evidence showing their operation to be against the public interest. As the question of the safety of the service is one which concerns the employees of the company it would be the duty of the board to entertain the complaint of the men and afford them a hearing.

The one-man cars are operated by the Trenton & Mercer County Traction Company, Trenton, N. J., and the Morris County Traction Company, Morristown, N. J., and so far no complaint has been made against them. Rankin Johnson, president of the former company, says that it is not the intention of his company to cause a loss of work to any of its employees because of the installation of the cars.

Assist in Track Renewals

New State Law Provides That City Can Do Work and Company Repay in Ten Instalments

Through an amendment to the general code known as Senate Bill No. 211 the General Assembly of the State of Ohio has made it possible for a municipality to finance the renewal, repair or reconstruction of the track of a street railway at the time the street is paved, the cost being subsequently assessed against the company in ten equal annual instalments plus 6 per cent interest. It is understood that the Pennsylvania-Ohio Electric Company, Youngstown, will spend $500,000 on reconstruction this year on this plan.

GOVERNOR SIGNED BILL PROMPTLY

The bill recently signed by Governor Cox provides that a City Council may by ordinance order a street railway to renew, replace or reconstruct its track and roadbed at the time the street is torn up for paving or resurfacing. If a company is dissatisfied with the ordinance provision is made that within ten days after its passage it may file a complaint or appeal to the Public Utilities Commission. The commission is thereafter charged with the duty of hearing and determining the case within thirty days, either approving, modifying, or reversing the action of the local Council. If the railway then fails to notify the local Council in writing that it will do the indicated construction work directed by the commission, or if without appeal, by the City Council, then it is provided that the Council itself may by ordinance contract for such renewal or reconstruction of the track and roadbed. In this case, it is understood that the railway may bid on the work and secure the contract on a competitive basis.

PAVING CHARGE A LIEN

The code provides that the Council shall by ordinance assess the entire cost of the labor and material required for the work against the railway, and upon failure of the latter to pay the assessment in cash it becomes a lien upon all of the property of the company located within the city. This assessing ordinance must provide for the payment of the assessments in ten equal annual instalments with interest until paid at not to exceed 6 per cent per annum; provided, however, that the company shall not be liable for any instalment of the assessment falling due after the expiration of the company's franchise unless the use of the track is continued thereafter by the company.

Municipal Ownership Approved in Detroit

City Decides to Go Into Railway Business for Itself in Competition with Detroit United Railway

Mayor Couzens' plan for the construction and acquisition of street-car lines by the city was approved by the voters of Detroit, Mich., on April 6, by a majority vote of about 64 per cent. A majority of 60 per cent was necessary to carry the election. Contrary to expectations, only about 140,000 votes were cast out of a registration of more than 330,000 voters, owing probably to the bad weather. The election makes possible the Detroit Municipal Railway, to be owned and operated by the people of Detroit through their elected representatives in competition with the Detroit United Railway.

The proceeds of the $15,000,000 bond issue which has been approved will be used in financing the construction of 101 miles of new tracks and in equipping that trackage with 400 new motor cars and 150 new trailers, as well as the taking over of 55.5 miles of lines now being operated by the Detroit United Railway. The total trackage provided for the city system is 156.5 miles of north and south and crosstown lines, with two routes open to the heart of the city, one on Fort Street and one on Woodward Avenue.

As soon as Mayor Couzens was assured that the vote had been decided in favor of his plan, he appeared before the City Council and asked approval of a tentative arrangement to start immediately on the construction of the first line. This the Council granted and included the issuance of $100,000 in public utility bonds.

"CONSTRUCTION" HAS STARTED

Arrangements were made with a local contractor, a permit issued by the Department of Public Works and on the day after the election digging was started for the foundation of the municipal line. Work was begun at Charlevoix Street and Connors Road on the so-called Mack-Myrtle belt line, with the intention of working eastward along Charlevoix Street to the city limits.

In a proclamation to the people, the Mayor states that the people of Detroit have won the greatest victory in the city's history in the approval of the bond issue, and have reaped the fruits of their courageous fight for the past twenty-five years. Under the whip of determined competition, the Mayor states, the Detroit United Railway must now furnish the service it has so long denied the people. The people are thanked by the Mayor for their approval of his plan and complimented for their stability and sound reason.

In studying the returns by wards the fact is revealed that the Couzens plan received the heaviest majorities in the outlying sections, where the residents have gone into the open country hoping that car service would some day be extended into their localities.

The way was paved for the present action when, in 1913, a proposed amendment to the city charter was adopted, providing for the creation of a street railway commission which was to acquire a railway.

In November, 1915, a vote was cast on the proposal to purchase the city properties of the Detroit United Railway at a price to be determined by the Wayne County Circuit Judges. This plan was defeated, it being generally conceded that the main objection of the voters was the fact that no fixed purchase price was named.

The last purchase plan voted on was in 1919, when Mayor Couzens submitted a proposal to take over the Detroit United Railway lines and equipment at a price agreed upon by the railway and the commission, but this was voted down by the people as the price named was believed to be far in excess of the value of the system.

To Mayor Couzens, who did not approve of the Tayler service-at-cost plan, there appeared to be no other recourse but to submit the plan of building a city system and taking over the lines which have been operated by the Detroit United Railway on the day-to-day agreement.

Taking over the Fort Street and Woodward Avenue lines, where franchises have expired, will not be attempted by the Mayor at this time. In consequence the present traffic arrangements will not be disturbed until the city is ready to provide cars and other equipment necessary to operate the lines.

No official statement has been issued by the Detroit United Railway as to what action will be taken next by the company. It is generally believed that further action on the proposed extension ordinance initiated by the Detroit United Railway will be deferred.

Toledo Strike Has Been Settled

New Wage Agreement Signed Immediately After Court Order—Higher Fares Already in Effect

Service was resumed on the railway lines of the Toledo Railways & Light Company, Toledo, Ohio, on April 7 by order of Federal Judge John M. Killits, after a four-day strike, started when the Council refused to grant a fare raise necessary to increase wages. The wage agreements were signed immediately after the order of the court had been entered and the new schedule of higher fares has gone into effect. The judge promised an "open court" investigation to determine "a compensatory return" for the company, which, according to company statistics, will mean a larger increase in fares. Fares are now 7 cents, with 2 cents for a transfer and three tickets for 20 cents.

The strike in Toledo was due to the failure of the City Council to ratify a strike settlement which involved a fare increase. The cars have been in operation only three months since the famous "ouster" ordinance removed them to Michigan for a month.

An improvised bus system was attempted to take care of the transportation needs of the city. The Council regulated the buses by placing them under a city transportation commissioner. The day fare was limited to 10 cents and owl service to 25 cents.

WAGE REQUEST STARTED NEW DISPUTE

After the "ouster" fiasco the cars were brought back to Toledo under the joint protection of the federal court and a city ordinance postponing the "ouster" till May 1. Meanwhile two commissions appointed by the federal court have been busy framing both cost-of-service and municipal ownership ordinances for a permanent settlement of the quarter-century traction fight in Toledo.

The new dispute, which caused a suspension of service, was injected into the traction tangle when car men and electrical workers demanded a wage increase of nearly 40 per cent effective on April 1. The electrical workers received a compromise increase and continued at work.

The conductors and motormen went on strike because the company was unable to meet their demands without an increase of fares. The representatives of the trainmen, the Mayor and officials of the company agreed that the men were entitled to a raise from 42, 44 and 46 cents an hour to 54, 56 and 60 cents. They also secured the advice of accountants to the effect that it was necessary to provide additional revenue to the company for such an increase. The scheme agreed upon by the conference was for a 7-cent fare, 2-cent transfer and three tickets for 20 cents. With this increase it was shown that company revenue would be reduced by $60,000 from what it was last year.

By the adverse vote of six Councilmen the measure ratifying the increases failed to be brought out of committee and at the second meeting of Council the whole railway question was ignored.

The 10-cent fare loomed after the refusal of Council to grant an increase from "6 and 2" to "7 and 2." Henry L. Doherty immediately dispatched the following letter to the Mayor:

> We wish respectfully to notify you that all of the propositions heretofore made by us to prevent a suspension of car service were automatically annulled when they were rejected by a vote of the Council.
>
> Our earnings at present are far below

that necessary to yield a fair return, and our representations that we are making still further sacrifices to prevent a suspension of car service have been verified by your investigators.

We must be released from further obligation under any offers we have heretofore made and be free to insist upon a scale of fares which will yield a compensatory return.

Mr. Doherty declared after sending the letter that he did not have a definite policy in mind for future negotiations. He left that to the citizens and the Council. He said he was determined to be bound by no good efforts of the past after "gratuitous insults" had been handed the company for its sacrifices in trying to effect a settlement.

The transportation system was badly tied up by the Easter snowstorm. Very few buses of any kind were running and only a few had registered.

The Toledo, Ottawa Beach & Northern and the Maumee Valley lines were also tied up by the strike. They are both Doherty lines and are operated by members of the same unions to which the city men belong. Other interurbans continued to operate into the city. This fact made the present strike less severe upon merchants than did the absolute ousting of all cars.

Almost coincident with the strike came the date for the filing of company objections to the cost-of-service plan drafted by the federal commission headed by W. L. Milner. A new ordinance embodying the changes which would make the original ordinance acceptable to the company was sent to the commissioners through Federal Judge Killits on April 8. Along with the ordinance went a forty-eight page typewritten copy of argument taking up the Milner ordinance in detail.

FEATURES OF NEW MEASURE

Among the outstanding provisions in the new draft upon which the commission is now working are these:

1. Scale of fares omits any maximum as foreign to the cost-plus idea.

2. A return of 8 per cent is asked on the stock rather than 7 per cent, with the bond return remaining at 6 per cent.

3. Elimination of the sliding scale of return on stock which provided a reward for efficient and economical operation.

4. No initial rate of fare is stated.

5. The company provides that the whole system of tracks and equipment shall be taken rather than any particular parts the city may desire to purchase in event the people decide for public ownership.

6. No property of the company beyond the city limits is included in the new ordinance.

7. The forfeiture clause of the city charter is included, but provision is made that the company is not bound by it if it should at any time be declared unconstitutional.

8. The Acme Power Company is eliminated as a party to the contract. The Acme company is a Doherty power plant which merely manufactures power and sells to the Toledo Railways & Light Company.

9. The depreciation fund is changed in name to betterment fund and its functions are outlined more clearly, as being for the purpose of maintaining the capital value at the fixed mark.

10. Lease of lines by the city must be approved by referendum and be upon six months' notice to the company.

11. The company is required to raise $1,900,000 within ninety days after the grant is accepted; $1,000,000 is for new lines and rerouting, $500,000 for the betterment fund, $400,000 for the stabilizing fund.

12. Regulations for contracts with interurbans are changed, giving company reciprocal rights with interurban as to examination of books and arbitration regulations.

The commission will attempt to work over the two drafts into an acceptable one so that a referendum vote may be taken about the middle of June.

The advocates of municipal ownership plan have not yet submitted an ordinance. They have asked Mr. Doherty for a cash price.

Hydro Commission Takes Over Border Lines

Detroit United Canadian Lines Taken Over by Cities After Unfortunate Experiences

The Sandwich, Windsor & Amherstburg Railway, a subsidiary of the Detroit United Railway, serving Windsor and seven other border municipalities in Canada, became the Border Cities Railway on April 1 when it was taken over by the Ontario Hydro-Electric Power Commission, culminating negotiations that have been pending for some time. The transfer was made without ceremony. The first car out of the carhouse in the morning was in charge of the newly appointed manager and the only apparent evidence of the change in service was the presence of the new tickets issued by the commission.

Arthur McGill, former engineer and assistant superintendent of the Niagara, St. Catharines & Toronto Railway, has been appointed by Sir Adam Beck, chairman of the commission, to fill the position of general manager of the lines, which will now be operated by the commission.

Howard Brooker has been appointed superintendent of the border municipal lines. He was dispatcher of the Niagara, St. Catharines & Toronto Railway.

Agitation for the taking over of the lines by the municipalities was begun by the Windsor Council members in 1918, but at that time the commission could not entertain the project. Negotiations between the officials of the railway and Sir Adam Beck were started early in 1919.

With these negotiations pending, matters came to a climax last May when the employees on the Sandwich, Windsor & Amherstburg Railway asked for increased wages. The company maintained that the increase could not be granted without a higher rate of fare, a straight 5-cent fare with a 1-cent charge for transfer being asked to replace the six-for-a-quarter fares with free transfers. The men sought to enforce their demands by a strike. This strike lasted about two weeks. It was ended by a compromise, after the railway had made an unsuccessful attempt to resume service by the aid of strike breakers, an attempt which resulted in the necessity for calling troops to maintain order.

The Ontario Railway and Municipal Board was called upon to decide the matter of fares and wages and the board, acting upon the findings of the auditors who examined the financial status of the company, recommended the wage increase demanded by the men and the 5-cent fare asked by the company.

At the election on July 5 a proposed by-law allowing the fare increase was defeated by a large majority of Windsor and Walkerville voters, and another strike resulted immediately.

The Railway Board was asked to take charge of the situation. The company was notified to resume service and when it failed to do so the board seized the lines. A settlement was soon effected and the supervision of the lines was turned back to the company, results of an audit previously made by the Railway Board having shown that the company could afford to pay its men a reasonable increase.

LARGE MAJORITY FOR PUBLIC OWNERSHIP

On Dec. 6, 1919, a special election in the border district resulted in a large majority in favor of the Hydro-Electric Commission's plan to purchase the lines and equipment and improve the system at a total cost of $2,100,000, approximately one-third less than the company first asked. To finance the purchase, the commission was authorized to issue forty-year bonds guaranteed by the municipalities served by the lines. All expenses, both original cost and maintenance charges, will be met by the earnings of the lines and paid by the riders.

The electric light and power plant was taken over by the city of Windsor for $190,000, and will be operated as at present, using steam furnished by the Canadian Salt Company. This power will be used by the Hydro Commission to operate the cars and furnish light and power in Windsor until replaced by power from the Niagara development at Chippewa Falls.

MUNICIPALITIES PLAN EXTENSIONS

The present plans call for an extension inland from the Detroit River to supply the rapidly growing district with service. Thirty new steel cars of the one-man type have been ordered. New equipment is being counted upon by border residents inasmuch as it has been claimed that no repairs or replacements were made by the Detroit United Railway since the vote to take over the lines, with the result that many of the cars are now dangerous to ride in.

No increase in the six-for-a-quarter fare is contemplated. The commission's new tickets are sold on that same basis.

Better service is promised and at the same time a warning is sounded that too much cannot be expected until new equipment can be installed, new tracks laid and schedules rearranged.

Rapid Transit Plan Muddled

Opposition Appears to Be Developing Fast to Cleveland Plan as Now Proposed

Little progress was made toward the organization of a boosting committee to take part in the campaign for the rapid transit or subway bond issue at Cleveland, Ohio, when the second meeting of business and civic organizations was held in Mayor Harry L. Davis' office on April 5. The Civic League presented a report in which it objected to the construction of a subway at this time, but the indications are that a number of other organizations will support the movement, although none of them was ready to report at this time.

C. of C. Favors Project

Inasmuch as the original movement in favor of subways under the Public Square came from the public utilities committee of the Chamber of Commerce, Attorney A. A. Stearns, chairman of this committee, expressed the opinion that a majority of the members will favor the plan. The committee's report was scheduled for completion on April 8. In speaking of the suggestion that economy would dictate a delay in the construction of the subway, Mr. Stearns said that this alternative might prove the worst kind of economy in the end.

The recommendations made by the Civic League are as follows:

1. That the present subway proposal be voted down.
2. That the Rapid Transit Commission join with other civic bodies in having legislation passed which will make possible a metropolitan taxing area for financing future rapid transit development.
3. That the city attempt to relieve congestion without abnormal expenditure of public money: (a) That the City Council take immediate steps to reduce vehicular congestion by passing such traffic regulations as will clear the streets for moving vehicles, particularly in rush periods. (b) That further study be given to the question of rerouting cars in the public square.
4. That the City Planning Commission's proposals for our street difficulties be adequately studied and understood before we undertake other methods of relief.
5. That if none of these alternatives proves adequate to relieve congestion, and, after recommendation No. 2 has borne fruit, that the Rapid Transit Commission present to the voters of the whole district the simple question of a through rapid transit system between the East and West Sides.

The second recommendation is to the effect that the suburban towns be required to pay a portion of the cost of the proposed improvement. The fifth is based upon this condition, but limits the service to an east and west line, which would not be of any advantage to some of the outlying corporations and of little use to others. Unless the subway system can be arranged to accommodate all portions of the city, it would hardly be supported by a majority of the voters.

Civic League Objects

One of the principal objections made by the Civic League, aside from the money consideration, is that the subway does not provide rapid transit. Apparently, the organization does not want to install the improvement by degrees, relieving congestion in all directions, but would prefer a finished road along one line first, others to follow as they may.

Instead of making the Public Square a terminal for all cars, the report suggests:

1. Looping back of many more cars during rush periods as suggested in the report of the engineers.
2. More cars and therefore less crowding.
3. A new routing on the Public Square loops.
4. Elimination of some of the downtown stops.

Other plans suggested for the elimination of congestion are:

1. No-parking rule in the rush hour in the downtown district, and in other congested areas such as Euclid Avenue and East Fifty-fifth Street and East 105th Street, and at East Fifty-fifth Street and St. Clair Avenue.
2. One-way streets when and where necessary.
3. Good pavement for radiating streets such as Prospect, Woodland and St. Clair Avenues, S. E., and Superior, to divert vehicular traffic bound for suburbs.
4. Progress on the opening of Carnegie Avenue, S. E., and Chester Avenue, N. E., downtown.
5. Early construction of the Huron-Lorain bridge. This, according to the engineer's report, will divert a considerable proportion of east and west vehicular and street car traffic from the Public Square.

Boston Men Will Present New Wage Schedule

At the meeting of the union held in Boston, Mass., on March 24 it was voted to raise the schedule of rates for motormen and conductors on the Boston Elevated Railway from 50 cents an hour minimum rate to 73½ cents an hour and from 60 cents an hour, the present maximum rate, to 95 cents an hour.

This schedule, adopted without dissent, is to be presented to the trustees of the Boston Elevated Railway for consideration at an early date to go into effect as soon as possible at the expiration of the present agreement. This latter expires on April 30.

The new schedule, if approved by the trustees, would increase the annual payroll from $7,725,000 to $12,225,000, not taking into account any increase for other classes of labor employed on the system.

The presentation of a sliding rate in reality has no appreciable effect on the total proposed increase as practically all the motormen and conductors now in the employ of the company have been connected with the Boston elevated system long enough to receive the benefit of the maximum rate. Hence the advance from 60 cents to 95 cents an hour would affect the majority of the motormen and conductors and would amount to asking for an increase in rates of more than 50 per cent.

The prospect of wiping out the deficit of $752,342 from the operation of the system under the present arrangements, which appeared very probable by July 1, disappears in view of this new demand on the part of the union.

Ohio Men Demand Increase

Trainmen on Four Roads Present Scales Which in One Case Aggregate 100 Per Cent Rise

Platform employees of a number of electric railways in Ohio are demanding material increases in wages. In most cases, if these demands are granted, an increase in the rate of fare will be necessary to cover them. This means complications, similar to that in Toledo, where the men struck on April 2 because the City Council refused an increase of fare that would enable the railway to pay wages demanded by the men.

Cleveland Men Want 90 Cents

In Cleveland the officers of the local union announced on March 31 that the men had voted unanimously to demand 90 cents an hour. This rate would apply to all, experienced and inexperienced alike. The new Cleveland rate demanded is an increase of 50 per cent over the highest rate in the present schedule, which is graded from 55 cents to 60 cents. In addition to the increased wage, the men demand time and one-half for all time over eight hours a day. A minimum of eight hours is thus demanded to replace the present minimum of five hours. The men further want a rearrangement of schedules to permit 60 per cent of the runs to be completed in eight hours, 30 per cent in ten hours and 10 per cent in twelve and one-half hours.

About two-thirds of the operating employees now work ten hours or more, the other third, consisting of trippers largely, working shorter time. If the demand is granted the company's payroll would be increased between 55 and 70 per cent, according to one of the officials, and it would probably be necessary to increase the rate of fare from 5 cents to 6 cents.

At Youngstown Mayor Fred Wornock offered his services as mediator when the Ohio-Pennsylvania Electric Company and its platform men disagreed on a new wage scale. He thereby prevented a strike planned for March 31. The men are demanding 70, 73 and 75 cents an hour. The company offered to pay 60, 63 and 65 cents. The present scale is 40, 43 and 45 cents. A conference with the union is awaited.

Akron Men Want 80 Cents

Platform employees of the Northern Ohio Traction & Light Company on the local lines at Akron are asking for a wage of 80 cents an hour, with an eight-hour day and pay for ten hours. Negotiations will be taken up within a few days, it was announced by union officials. It is said that employees at Canton are also asking for increased wages.

It is reported that employees of the Cleveland, Southwestern & Columbus Railway at Elyria are preparing to ask for a new wage scale, with $1 an hour as the maximum. The present scale is 42, 46 and 50 cents.

Bills Introduced in New York

A Summary Is Presented of Important Recent Bills, Except the Service-at-Cost Measures

Among the bills affecting the electric railways introduced in the New York State Legislature recently are the following:

Senate Intro. No. 913, Print No. 1019. Introduced March 9, by G. F. Thompson. Amending section 178 railroad law by providing that street surface railroad companies shall keep in permanent repair that part of streets 6 in. in width on each side of rails instead of all the space between its tracks and 2 ft. outside as at present required.

Senate Intro. No. 991, Print No. 1116. Introduced March 11 by Mr. Gibbs. Amending section 66 public service commissions law by providing for suspension of rates of gas and electric corporations for a period not longer than 120 days pending determination by the Public Service Commission.

Assembly Intro. No. 1056, Print No. 1176. Introduced March 9 by Mr. Amos. Adding new section 27-a public service commissions law by providing that no corporation shall charge for transportation of passengers a rate of fare in excess of that specified in its charter, such rate to be a maximum rate until the corporation applies to public service commission for permission to increase same. The commission is empowered to allow such increase provided it is fair and reasonable and in the public interest. The act takes effect Sept. 1, 1919, the date on which the Government control measure becomes inoperative.

Senate Intro. No. 1150. Print No. 1321. Introduced March 18 by Mr. Marshall. Amending section 239 banking law, relative to investment by savings banks in bonds of street railroad companuies.

Assembly Intro. No. 1268. Print No. 1431. Introduced March 15 by Mr. Bloomfield. Amending section 47 public service commissions law, by providing that the first district commission shall report not less than one and the second district commission not less than two accident inspectors. whose salaries shall be fixed by the commission.

Assembly Intro. No. 1313. Print No. 1515. Introduced March 17 by Mr. Healey. Requiring the giving of transfers by surface railroads whose tracks run in southerly or northerly direction for a continuous trip on intersecting lines in Manhattan and Bronx, New York City.

Assembly Intro. No. 1338, Print No. 1540. Introduced March 17 by Mr. Soule. Amending section 53-a railroad law, by placing the jurisdiction of the location and character of crossing signs under the Public Service Commission and striking out the present arbitrary language of the section.

Assembly Intro. No. 1439, Print No. 1660. Introduced March 19 by Mr. Trahan. Adding new section 63-a railroad law by requiring an additional motorman on electric trains of two or more cars.

Assembly Intro. No. 1441, Print No. 1662. Introduced March 19 by Mr. Webb, enacting the public service contract law, to be chapter 72 Consolidated Laws, providing for service contracts of employment between public utilities corporations and their employees and for the enforcement thereof. Such contracts are to be filed in the office of the Public Service Commission. There is provision for a fund for payment of fines imposed on corporations or employees. The Public Service Commission is to appoint boards of award to adjudicate claims arising under service contracts. Service of a public utility is not to be interrupted. There are provisions for injunctions and damages.

Senate Intro. No. 1464, Print No. 1721. Introduced April 1 by Mr. Lynch. Amending sections 242 and 595 greater New York charter, relative to design, construction, purchase and operation of omnibuses in New York City. The comptroller with the approval of the board of estimate and apportionment, is authorized to issue special revenue bonds to meet expenses of maintenance and operation during 1920 of municipal omnibuses.

Assembly Intro. No. 1613, Print No 1935. Introduced March 31 by Mr. Martin. Amending section 240 village law by permitting lighting contracts at an expense not exceeding 5 mills instead of 2½ mills as at present on every dollar of taxable property.

Assembly Intro. No. 1593, Print No. 1915. Introduced March 31 by Mr. Amos. Amending section 20 transportation corporations law, relative to incorporation of stage coach companies by increasing from five to nine the maximum number of directors.

Suggests Service at Cost for Indianapolis

The Public Service Commission of Indiana on March 30 called a conference of the officials of the Indianapolis Street Railway and of the city of Indianapolis for the purpose of considering the establishment of a "service-at-cost" plan of railway operation. It is hoped by this means to place the company on a sounder financial basis, enable it to earn sufficient revenue to pay a fair return on invested capital and establish credit to provide sufficient funds for the purchase of additional cars and equipment.

The officers of the railway expressed their favor of such a plan. The Corporation Counsel of the city of Indianapolis stated that in the past the city had taken the position that the Public Service Commission did not have jurisdiction over the local company, but that the courts had decided otherwise. He said that if the company was entitled to relief when the commission issued the 5-cent fare order, it certainly was entitled to relief now, as prices have not declined (as was anticipated by the commission when the order was issued over a year ago) and the emergency still exists. In speaking for the city, he said it was essential the company obtain more cars to keep pace with the city's growth.

E. I. Lewis, chairman of the commission, remarked that during the last two years there has been a marked change in the attitude of the public and the city toward the company.

Pittsburgh Men Want Still More

The motormen and conductors of the Pittsburgh (Pa.) Railways on March 29 presented demands to the receivers of the company for a wage increase of 70 to 75 per cent, an eight-hour day and time and a half for overtime, effective on May 1. The wage demands are: First three months' service, 86 cents an hour; nine months' service, 89 cents an hour, and, after the first year's service, 91 cents an hour. At the maximum rate and under the eight-hour day platform men, after one year's experience, would receive $7.28 a day. Under the existing agreement, in which the rates were fixed by the National War Labor Board, the men received 49, 52 and 54 cents an hour.

Announcement was made on April 6 that negotiations between the receivers of the Pittsburgh Railways and the trainmen would not begin until the week commencing April 11. The present wage scale of the trainmen calls for a maximum of 57 cents an hour.

The receivers issued a statement in which they deny that an increase is contemplated in the present fare of 10 cents cash or 7½ cents when buying disks. The Public Service Commission has just handed down its long awaited decision in which it holds that the present fare is legal.

The receivers say they are not making a great amount of money now, but that the increase in fare several months ago has given them sufficient revenue to keep going under the present overhead and general expenses.

On April 1 a voluntary increase of 10 per cent for all its hourly men, announced some time ago by the receivers, went into effect, making motormen's and conductors' wages 54, 57 and 60 cents an hour, but the new demands are 60 per cent, about 31 or 32 cents an hour, higher than these. The eight-hour day would succeed the present working day, which averages nine hours.

Hearing April 13 on Service-at-Cost Measure

There is to be a public hearing on April 13 before the judiciary committee of the Assembly on the following measures:

Assembly Print No. 1961, entitled: "An act to authorize cities and incorporated villages and towns of the state to enter into agreements with street surface and rapid transit railroad corporations for transportation upon a service-at-cost plan and empowering the public service commissions, in certain cases, to order temporary or permanent changes in the rates, fares and charges of such corporations."

Assembly Print No. 1962, entitled: "An act to amend the public service commissions law, in relation to liability for violations of chapter."

Assembly Print No. 1963, entitled: "An act to amend the public service commissions law, in relation to transportation rates, fares or charges."

These three measures were introduced on April 1 by Assemblyman Edmund B. Jenks of Broome County and are companion bills covering the service-at-cost plan of operating street surface railroads. It is the consensus of opinion that the measures have more than an ordinary show of passage, especially as the judiciary committee of the Assembly voluntarily set the date for the hearing on the measures. The bills have not as yet been introduced in the Senate, but if the action of the Assembly on them be favorable there is little doubt of their passage.

The opposition to the measures is expected to come principally from those members who are opposed to conferring upon the Public Service Commission arbitrary franchise-giving powers now vested in the Legislature itself as a constitutional right and from those members of the Legislature who are fearful that the immediate result of the passage of the bills would be to raise the rate of fare paid in New York City. It is anticipated that the hearing on the bills will be largely attended. Already the interest in the bills has caused the printed supply to become exhausted, but it is hoped to have additional copies printed in time for the hearing.

Receiver Seeks $2,000,000 for Reconstruction

Rolla Wells, receiver of the United Railways, St. Louis, Mo., is seeking permission to spend $2,000,000 for the purchase of about 160 new cars, $917,380 for track reconstruction within the city and $140,200 for track reconstruction on the St. Charles line in St. Louis County. A hearing on the merits of the application of the receiver for permission to make these expenditures was begun on March 30 by Special Master Henry Lamm. Albert T. Perkins, manager for the receiver, stated that he desired to rebuild about 31 miles of city tracks. Henry S. Priest said that some track reconstruction was necessary, but that in view of the present high prices only such work should be done as was absolutely essential. He and Richard McCulloch, president of the company, had fixed 25 miles as the amount of reconstruction to be carried forward at this time. It was planned to do this work gradually.

Anti-Strike Bill in Massachusetts

A bill to prevent strikes on the electric railways in Massachusetts now owned or controlled by the State is before the Legislature. The measure is identical with the recommendations of the special committee on street railways brought before the special session last November. Briefly it provides for continuity of service on all publicly owned or controlled lines, making it unlawful for any agents, officers or persons in the service of the companies to prevent the continuous operation of the lines.

The bill further provides for the arbitration of differences of opinion or disputes regarding compensation, hours of labor or working hours and proposes the establishment of a board for this purpose.

The penalty for violation of the provisions of the bill is discharge from the service of the company in which the violator works and the prevention of re-employment of the offender by the railway company for a period of one year.

Carhouse and Cars Destroyed

Fire destroyed the storage carhouse of the International Railway, Buffalo, N. Y., in the Riverway, Niagara Falls, N. Y., on March 21 with a loss of eight passenger cars, three snowplows and a sweeper. The loss is estimated at $60,000. The cars were of an old type and were used during the rush hour periods on the local lines. The storage carhouse was formerly a roller skating rink. It adjoined the Riverway terminal of the Niagara Falls interurban lines. The main terminal was not damaged by the fire. The company proposes to enlarge the terminal by erecting a new building on the site of the storage sheds that were burned.

News Notes

Jitney Regulatory Bill Passed.—The bill giving the Board of Public Utility Commissioners jurisdiction over the jitneys in New Jersey has been passed by the Legislature.

Retroactive Pay Award—Employees of the Western New York & Pennsylvania Traction Company, Olean, N. Y., have been granted a wage increase retroactive to Oct. 18, the date when the lines of the system were tied up by a general strike. The men will receive an advance of 5 cents an hour, making the new scale from 32 to 38 cents an hour.

I. T. S. Not Seriously Damaged.—The property of the Illinois Traction System, Peoria, Ill., was not seriously damaged by the recent hurricane. A total of 150 poles was blown over by the high winds of March 25 and trains were delayed from three to five hours during the day and the following night. The worst breaks were north of Lincoln, Ill.

May Change Its Voltage.—The British Columbia Electric Railway, Vancouver, B. C., is thinking of changing the voltage on the Fraser Valley line from 600 to 1,200 volts to help get freight trains over the grade. The lengthening of freight sidings is also contemplated in order to take care of the long trains which are now being handled on the line.

Wage Hearings Postponed.—Action on the demands of the employees of the New York State Railways, Rochester, N. Y., for increases in wages has been postponed. A meeting is scheduled for the week commencing April 11. As explained in the ELECTRIC RAILWAY JOURNAL for April 3, page 720, the men are seeking an advance of 100 per cent.

Wages Raised by West Penn Company.—A wage increase of approximately 10 per cent has been granted by the West Penn Railways, Pittsburgh, Pa., to all trainmen and shopmen, effective immediately. About 600 men are affected. The advance makes the rate for trainmen 55, 58 and 60 cents an hour, the top figure being paid to employees after one year's continuous service. The old rate was 50, 53 and 55 cents an hour.

Worcester Men Want More.—The carmen's union of the Worcester (Mass.) Consolidated Street Railway have presented to Clark V. Wood, president of the company, a demand for an eight-hour day for all conductors and motormen, a 40-per cent increase in wages for all miscellaneous employees and $6.40 for an eight-hour day for all uniformed men operating two-men cars and 15 cents an hour above the regular schedule for all men operating one-man cars. They call for $5.20 a day for beginners for the first three months of service and $5.30 a day for the remaining nine months of the first year, pay thereafter to be $6.40. The employees of the Springfield (Mass.) Street Railway have presented similar demands to the officials of that road. Their present contract with the company will expire on June 1.

Programs of Meetings

Arkansas Utilities Association

The convention of the Arkansas Utilities Association will be held at the Arlington Hotel, Hot Springs, Ark., on April 26, 27 and 28.

Central Electric Railway Accountants' Association

The next meeting of the Central Electric Railway Accountants' Association will be held at the Lincoln Hotel, Indianapolis, Ind., on April 24.

National Safety Council

The Spring conference of the Engineering Section of the National Safety Council is to be held at the Engineering Societies Building in New York City on April 27. The morning session will first take up the relationship of safety and engineering efficiency—the question whether, apart from its human values, safe operation of a factory or a railroad is in truth inseparably connected with efficient operation. The afternoon session will be devoted to safety standards: first, the present movement for uniform standards; second, the National Safety Council's part in this movement.

Chamber of Commerce of the United States

The main topic to be considered at the eighth annual meeting of the Chamber of Commerce of the United States, to be held in Atlantic City April 27-29, is "Increased Production." The delegates will consider this topic from six points of view, namely, the relation to increased production of government, transportation, international finance, research and efficiency, immigration and Russia's part. In addition, there will be group meetings of various industries. The program of the transportation meetings is as follows:

Tuesday afternoon, April 27: Report of committee on railroads, George A. Post, chairman; "Railroad Consolidation," by John E. Oldham of Boston; "Car Supply and Car Service," by Charles E. Lee, Ford, Bacon & Davis, New York.

Wednesday morning, April 28: "Transportation in Relation to Production," (a) "Railroads," by George A. Post, and one other speaker, probably a member of the Senate or House committee on railroads; (b) "Merchant Marine."

Financial and Corporate

Reorganization Terms Stated

Committee Representing Security Holders Gives Details of Security Exchange Following Wheeling Sale

A reorganization plan has been announced for the West Virginia Traction & Electric Company, Wheeling, W. Va., the property of which was sold recently under foreclosure as noted previously in the ELECTRIC RAILWAY JOURNAL.

TWO NEW COMPANIES

It is proposed by the committee in charge of the reorganization to create two new companies. One of these companies will be known as the Wheeling Company. To it will be transferred the Wheeling-Elm Grove properties subject to existing underlying liens. The other company will be known as the Morgantown Company. To it will be transferred the Morgantown properties subject to the Union Utilities lien, under which bonds of $874,000 are outstanding. There will also be transferred to the Morgantown Company the stock of the Wheeling Company and all the two-year notes represented by the committee, together with all of the outstanding bonds of the old company, the deficiency claims, etc.

The proposed Morgantown Company will be organized with a total authorized common capital stock of $1,000,000, of which the present issue will be $500,000. No dividend is to be paid on this stock for two years and the net income for that period is to be carried to surplus. Moreover, not more than one-half the sum which subsequently becomes available for dividends is to be paid as such. The balance is to be carried to surplus with protective provisions for maintenance and depreciation.

There will also be a total authorized issue of $1,500,000 of 7 per cent cumulative preferred stock by this company. Of this amount $862,733 is to be issued at present. The cumulative preferred stock is to have equal voting power, share for share, with the common stock. It is to be preferred both as to dividends and assets and is to be redeemable at the option of the company, all or in part, from time to time at 105 and dividend.

DETAILS OF SECURITY EXCHANGE

Ahead of both issues of stock will come an authorized issue of $5,000,000 for fifteen-year 6 per cent general mortgage bonds. Of this issue $1,136,400 will be issued at this time. These general mortgage bonds will constitute a second lien upon the Morgantown properties and a first lien upon the stock of the Wheeling Company. The securities received by the committee will be distributed as follows:

1. To the committee for the account of the noteholders in the sum of $1,800,000 face value: (a) Bonds in 60 per cent of face of defaulted notes, $1,080,000; (b) preferred stock, 40 per cent of face of defaulted notes, $720,000; (c) preferred stock for interest at 6 per cent of the defaulted notes from May 1, 1919, to Jan. 1, 1920, $72,000.

Upon consummation of the plans, therefore, the holders of the notes deposited will receive for each $1,000 note, $600 in bonds and $400 in preferred stock of the new company, with $40 of additional preferred stock for account of the accrued interest from May 1, 1919, to Jan. 1, 1920.

2. To holders of the outstanding $94,000 of bonds of the West Virginia Traction & Electric Company. (a) Bonds in 60 per cent of face value of bonds of the old company, $56,400; (b) preferred stock in 40 per cent of face of bonds of the old company, $37,600; (c) preferred stock for interest on bonds of the old company from May 1, 1919, to Jan. 1, 1920, $3,133.

(3) To bankers in consideration for $30,000 in cash, for underwriting $10,000 of the new securities, for the loan of $40,000 to the committee, for the assignment of $591,098 of proved claims in the receivership representing cash advances to the owners of the company: (a) preferred stock, $30,000; (b) common stock, $500,000.

DIVIDENDS LIKELY FROM START

The receiver estimates that the operating income of the Morgantown property alone for the year 1920 after providing for normal maintenance, but before reserve for the depreciation and after deducting from earnings all expenses for new drillings will be well over twice the interest on the bonds of the new company and the outstanding bonds of the Union Utilities Company, and that, after paying interest charges on these bonds, the balance will be approximately three times the sum required to pay dividends on the preferred stock. It is probable that the company will be able to begin paying dividends on its preferred stock at once. These estimates the committee deems to be reliable, but it does not guarantee their correctness.

$1,500,000 for Chicago

The city of Chicago will receive nearly $1,500,000 as its share of the earnings of the local railways for last year. This is more than two and a half times the city's share for the previous year. Under the contract ordinance by which the city gets 55 per cent of the net earnings of the companies $1,005,259 will be derived from the Chicago Railways and $443,588 from the Chicago City Railway.

Municipal Line Going Behind

San Francisco Has a Deficit or Not, Depending Upon the Shade of Observer's Glasses

The San Francisco (Cal.) Municipal Railway has reported for January. Actually the road is making money; theoretically it is losing money. Or theoretically the road is making money; actually it is losing money. It all depends. Those who favor municipal ownership see the matter one way; those who oppose it see the matter another. The receipts for January were $229,030. The expenditures were $180,711. Thus the excess of receipts over expenditures appears to be $48,319. But against this amount of $48,319 there remain to be charged up depreciation of $40,974, or 18 per cent of the gross passenger revenue, interest of $19,458 on outstanding debts and $2,410 for injury insurance. Thus the apparent surplus of $48,319 becomes a deficit of $14,524.

Supervisor Ralph McLeran, chairman of the finance committee, says the idea of increasing fares has not been discussed seriously. He is quoted as follows:

> The lines are being operated at a profit. The gain is in the 18 per cent depreciation fund, which takes care of all the deficits in the operations fund and leaves a surplus besides. It is claimed by some that 18 per cent is excessive, but from what we have gathered it is not advisable to change the method at this time. It will not be long before the city is taking other traction arteries and then other methods of maintaining the funds may be decided upon.

Paving Very Burdensome

Setting forth several paving projects in Atlanta, Ga., this year that will cost the Georgia Railway & Power Company more than $200,000, the current issue of *Two Bells*, published by the company for general distribution, explains one of the principal items of overhead expense the company, or any other railway, has to contend with. It shows very clearly why it is so difficult to develop railway service into a paying proposition.

Under the charter of the city of Atlanta the company is assessed for a width of 16 ft. on all paving or repaving done where it has double tracks and 11 ft. where it has single tracks. This assessment is, in reality, a forced contribution, the company points out, because every kind of a vehicle uses the streets. During the recent strike the public was impressed by the great volume of the traffic.

The repaving of Juniper Street recently cost the company $25,204. This single item required 420,077 6-cent fares to pay for it, and this is but one small item of the paving expense the company is required to meet. On this particular assessment the company petitioned the Railroad Commission for authority to pay it one-fourth cash and the rest on promissory notes because of the company's financial condition. Furthermore the company has asked the same privilege in paying future assessments for paving or repaving.

Milwaukee Income Increases

Income Statement Indicates Property in Fair Financial Condition—Bulk of Revenue from Railway

The recently issued annual report of the Milwaukee Electric Railway & Light Company for the year ended Dec. 31, 1919, shows operating revenues of $14,888,446, an increase over 1918 of $2,878,175, or 23.96 per cent. The railway department earned $8,273,989, or 56.6 per cent of this amount. Operating expenses, including taxes and reserves, amounted to $11,552,374, an increase of $1,987,751, or 20.78 per cent, leaving $3,336,072 as the net operating revenue. Non-operating revenues were $145,539. Interest charges, including interest on depreciation reserve balances, totaled $2,016,343, leaving a net income for the year of $1,421,269. Gross income available for payment of interest and dividends was $3,481,612.

In February, 1919, the Milwaukee Electric Railway & Light Company acquired and now operates the property of the Milwaukee Light, Heat & Traction Company, comprising an extensive system of suburban and interurban railways within a radius of about fifty miles of Milwaukee, the local railway system in Racine and the electric power transmission and distribution system throughout the territory served by the suburban and interurban railway lines.

The earnings and expenses of the Milwaukee Electric Railway & Light Company as reported above for the year 1919 accordingly include those of the property formerly owned by the Milwaukee Light, Heat & Traction Company. For the purposes of comparison the earnings and expenses of both companies for the year 1918 have been combined.

The operating revenue of the railway utility was $1,669,650, or 25.28 per cent, more than during 1918. This is attributed partly to the effect of the discontinuance on June 1, 1918, of the sale of reduced rate tickets in the single fare area and an increase effective on Nov. 2, 1919, in the fare in the Milwaukee single fare area and partly to increased zone fares on the suburban and interurban lines which became effective in July, 1918, and on Nov. 2, 1919. The traffic has increased to a marked extent. Expenditures during the year for additions, extensions and betterment to the plants and systems of the railway amounted to $289,086, equivalent to 20.5 per cent of the total of $1,4410,384 for property additions.

Four quarterly dividends, each of 1.5 per cent, were declared during the year on the $4,500,000 of outstanding preferred stock. In the railway department 25.6 per cent of the operating revenues was appropriated for maintenance and depreciation. Any balance of this appropriation remaining after providing for maintenance was carried to the credit of the depreciation reserve, which at the close of the year amounted to $3,595,781.

Following the statement by the company of its inability to meet the request of its trainmen for an increase in wages and earn a fair return on the capital invested in its railway utility property, an investigation was undertaken upon request of the company by the Board of Conciliation appointed under a new Wisconsin law. The findings of the Board of Conciliation disclosed the necessity of an increase in the trainmen's wages. These findings, under which the trainmen were awarded an increase of nine cents per hour, were referred to the Railroad Commission of Wisconsin. The commission issued an order increasing the rate of cash fare in the single fare area from 5 cents to 7 cents and providing for the sale of tickets at six for 35 cents and eighteen tickets for $1, and directed the company to thereupon make effective the increase in wages awarded by the Board of Conciliation. The order of the commission affecting both wages and fares became effective on Nov. 2, 1919.

The accompanying tables pertain entirely to the operation of the railway department and indicate that the recent fare increases have had a marked effect on increasing the revenues from transportation.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY
(Railway Operations Only)

Income Statement		1919	1918	Per Cent Change + Inc—Dec.
Revenue from transportation		$8,041,458	$6,436,169	+ 24.10
Revenue from other railway operations		232,531	177,358	+ 31.10
Total railway operating revenue		$8,273,989	$6,613,527	+25.20
Maintenance and depreciation appropriation (25.76 per cent. operating revenue)		2,125,000	(a)	......
Additions to property		$289,086	(a)	......
Roadway and track	$185,044			
Revenue cars	13,680			
Elec. eq. of rev. cars and locomotives	768			
Railway utility equipment	19,004			
Miscellaneous utility equipment	31,935			
Other expenditures	38,655			

(a) Not shown in report.

STATISTICAL STATEMENT OF MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

Owned and leased:	1919	1918	Per Cent Change + Inc.—Dec.
Total mileage	403.45	403.79	+ 0.083
Average total miles operated	381.05	380.26	+ 0.207
Car-miles (active)	20,681,252	20,014,231	+ 3.33
Car-hours (revenue)	2,165,972	2,140,300	+ 1.20
Ratio car-miles to car-hours (per cent)	9.56	9.41	+ 1.59
Revenue passengers	146,208,335	129,240,334	+ 13.10
Transfer passengers	51,287,831	46,560,391	+ 10.17
Total Passengers	197,496,166	175,800,725	+ 12,32
Ratio transfer to revenue passengers (per cent)	35.08	36.03	
Gross passenger revenue	$8,041,458	$6,436,169	+ 24.95
Average fare:			
Per revenue passengers (cents)	5.50	4.98	+ 10.42
Per total passengers (cents)	4.07	3.66	+ 11.22
Car-mile statistics:			
Operating revenue (cents)	40.01	33.00	+ 21.22
Passenger traffic (total)	9.12	8.82	+ 10.95
Car hour statistics:			
Operating revenue	3.83	3.09	+ 23.62
Passenger traffic (total)	95.4	87.80	+ 8.77
Mileage statistics:			
Gross passenger revenue per mile of track operated	$21,100	$16,910	+ 24.75

Fort Scott Road Scrapped

The railway portion of the property of the Fort Scott Gas & Electric Company, Fort Scott, Kan., about 9 miles, has been abandoned and dismantled and the rails are being torn up. The other divisions are to be continued as the Fort Scott Public Utilities Company.

The troubles of the railway at Fort Scott date back to 1918. Early in that year receivership proceedings started. Even that early the railway in Fort Scott sought relief from municipal restrictions as a way out. Conferences looking toward that end were arranged, but proved unavailing. In April of that year the company reported operation had been discontinued.

Operating Managers for Ohio Electric Railway

Day & Zimmerman, Philadelphia, Pa., have taken over the Ohio Electric Railway, Springfield, Ohio, as operating managers. They will conduct the property in the interest of Drexel & Company, Philadelphia, and the bondholders' protective committee. Interest is understood to be in default on certain bonds of the company secured with the bankers by pledge of stock as collateral. Rather than foreclose, the bankers enter the active management of the company, through Day & Zimmerman, in complete understanding with W. Kesley Schoepf, president of the company, and the interests which he represents.

F. A. Healy, secretary and treasurer of the Ohio Electric Railway, attributes the present unsatisfactory financial condition of the company to the increased cost of operating the road in comparison with increases in revenue. This, he said, is due to the high cost of labor, the taxes which the company is forced to pay on its holdings and the vast amount of paving which the railway has been forced to do.

$6,000,000 Equipment Trust Proposed

In submitting the ordinance giving approval of City Council to the issuance of $6,000,000 of equipment trust certificates by the Philadelphia (Pa.) Rapid Transit Company, W. C. Dunbar, vice-president of the company, stated that the notes would bear interest at the rate of 6 per cent per annum, maturing in equal semi-annual instalments during a period of not more than ten years and secured by the lease of 1,500 surface and 97 elevated-subway cars. Mr. Dunbar said:

> This proposed equipment trust certificate issue is required to finance immediate necessities and supply increased car carrying capacity. The financing of new lines and extensions is planned to be accomplished by the formation of new companies issuing first mortgage bonds to cover the cost of construction, to be guaranteed by P. R. T., which company will also be the sole owner of such nominal issue of capital stock as may be required. Plans for the issuance and sales of these bonds will be presented from time to time, for your approval.

It is pointed out in the letter that the sum of $2,400,000 is urgently required to meet immediate necessities, covering reconstruction of 20 miles of track, power plant and sub-station improvements; modernizing 700 cars, and for additional shop facilities.

Demand Made for Forfeiture of Charters

Arguments in the quo warranto proceedings brought by David I. McCahill, Pittsburgh, Pa., for forfeiture of the charters of twenty-one district electric light and power companies in Beaver, Lawrence and Butler Counties are being heard by Attorney-General William I. Shaffer of Pennsylvania. The companies are held by the Mahoning & Shenango Railway & Light Company, the Pennsylvania Power Company, the New Castle Electric Company and the Zelienople Electric Company.

It is contended by Mr. McCahill that none of the companies has started construction work or made effort to show existence as operating concerns during two years following incorporation. Plans of works of competing companies are being gone over and efforts being made to establish physical existence of the companies involved. Among those who appeared against the concerns were Lieutenant-Governor Beidleman, David I. McCahill, H. Etheridge, H. J. Van Buren and Clyde Ferris. Banking Commissioner John S. Fisher, Ralph E. Baker and T. E. Coleman appeared for the companies.

Key Route Holders Respond to Call for Deposits

With respect to the proposed reorganization of the San Francisco-Oakland Terminal Railways, Oakland, Cal., it is stated that no definite plan of reorganization has been decided upon, but that under the suggestion of the State Railroad Commission of California it has been deemed advisable to ask for the deposits by the various bond and note holders, partly for assisting in the reorganization and partly for the purpose of learning to what extent the various security holders appreciate the necessity of action to conserve their various interests.

The reorganization committee is said to have received approximately $6,500,000 of the $20,000,000 of bonds of the company, representing some eighteen different issues.

It was explained by the members of the reorganization committee last December that since 1916, the East Bay communities had been giving serious consideration to the question of a resettlement franchise for the company. The voters have passed an enabling act and have taken initial steps for the submission of the franchise question to the people for final decision. In this connection, the Railroad Commission, with the co-operation of the municipalities and the company, is engaged in placing a valuation upon the company's property.

Municipal Railway Operation Segregated

At the instance of Hugh M. Caldwell, Mayor of Seattle, Wash., an ordinance has been passed by the City Council assuring the complete segregation of the operation and maintenance of the Seattle Municipal Railway from the Department of Public Utilities. The ordinance as passed creates a department to be known as the Division of Municipal Railways, to be under the direction of a general superintendent.

As heretofore reported, David W. Henderson has been appointed to this position. The ordinance provides that the operation of the municipal railway, including cars and trains, carhouses and shops, and the maintenance of way and structures be placed in an administrative section of the Department of Public Utilities, to be known as Division of Municipal Railways.

Need $6,625,000 for Repairs

New York City's surface lines need about $6,625,000 to put their tracks, cars and other equipment in first-class operating condition, according to testimony of witnesses at a recent hearing before the Public Service Commission for the First District. In some instances the deferred maintenance charge covers paving along the right-of-way, which some of the roads in the hands of receivers have frankly stated their inability to repair.

Paving repairs are being made by the city, and the cost charged against the companies, to be later liquidated. In some cases the testimony showed that the cars of several companies need repairs to the extent of from $500 to $1,000 each. Cars, tracks and equipment generally, it was stated, however, are at the present time in safe operating condition, but if repairs are much longer neglected the margin of safety will be decreased.

Financial News Notes

New Director at Charleston.—W. King McDowell has been elected a director of the Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C., to succeed William M. Bird, deceased.

Three-Year Notes Called for Payment.—The Empire State Railroad Corporation, New York, N. Y., has elected to call for payment on May 1 all of its three-year 6 per cent mortgage notes then outstanding.

Bond Issue Approved.—The Department of Public Utilities of Massachusetts has approved an issue of $500,000 twenty-year 5 per cent mortgage bonds by the Middlesex & Boston Street Railway to refund a similar amount of 4½ per cent bonds maturing April 1, 1920.

Two-Year Notes Offered.—Bonbright & Company, New York, N. Y., are heading a syndicate which is offering $2,000,000 of two-year 7 per cent gold notes of the United Light & Railways Company, Grand Rapids, Mich. The notes are dated April 1, 1922. They are being offered at a price to yield more than 8 per cent.

Hyde Park Line Continued. — The Public Trustees of the Eastern Massachusetts Street Railway, Boston, Mass., on March 28 announced the continuance of service in the Hyde Park district. Plans are being devised for the installation of one-man cars and the purchase of electricity for this district, thereby shutting down the Hyde Park power house. The terms of operation remain to be fixed.

Manufacturer Offers to Buy Road.—As a solution of the higher fare controversy in Poughkeepsie, Norman Milliken, head of the Mohawk Plow Works in that city, has offered to buy out the Poughkeepsie & Wappingers Falls Railroad at its appraised valuation. The railroad, which is now charging a 6-cent fare, has an application pending for an increase to 8 cents, but thus far the city officials have refused this concession.

Tide Water Stock Offered.—The First National Trust Company, Durham, N. C., and Durfey & Marr, Raleigh, N. C., recently offered for subscription 7 per cent cumulative preferred stock of the Tide Water Power Company, Wilmington, N. C. The proceeds from the sale of the preferred stock will be used to liquidate current liabilities, retire $350,000 of bonds and to make betterments and additions to plant. Included in the company's properties are the railway lines in Wilmington.

Interest Payment Arranged.—J. D. O'Keefe, receiver of the New Orleans Railway & Light Company, New Orleans, La., notified holders of the 4½ per cent general mortgage bonds of that company that the coupons due on Jan. 1, 1920, would be paid on March 30 upon presentation at the office of the New York Trust Company, or at the Hibernia Bank & Trust Company, New Orleans. In addition to the coupons, 26 cents per coupon representing interest thereon was paid.

New Bond Issue for Massachusetts Road.—The Middlesex & Boston Street Railway has been authorized to issue twenty-year bonds to the value of $500,000 to bear interest at a rate not exceeding 4½ per cent. These bonds will be used for paying and refunding a $500,000 issue of the Lexington & Boston Street Railway which expired on April 1, 1920.

Discharge of Receiver Expected Soon.—It is reported from Binghamton, N. Y., that Receiver W. G. Phelps of the Binghamton Railway and his attorney, Thomas J. Keenan, of Curtiss, Keenan, Brink & Harrison, are making all needed legal preparations for paying off, within the next six months, $400,000 in outstanding debts and obligations against the company, and also meeting $75,000 in loans obtained by Mr. Phelps upon receiver's notes. It is expected that the receivership will be lifted in six months.

More Massachusetts Lines to Suspend.—P. F. Sheehan, manager for the Eastern Massachusetts Street Railway at Brockton, Mass., announces the Rockland-Braintree depot line will no longer be operated and that, in view of the loss of patronage, the Queen Anne's corner route will probably be discontinued, although the decision so to act will be left in the hands of the Brockton division service board at its next meeting. The decision with regard to the Rockland-Braintree line grew out of the controversy with the Weymouth town officials, who have allowed the jitneys to run again.

Readjustment of Securities Abandoned.—The stockholders of the North American Company, New York, N. Y., have abandoned the plan calling for a rearrangement of the capital stock of the company as outlined recently in the ELECTRIC RAILWAY JOURNAL. William Nelson Cromwell has been elected chairman of the board of directors of the company to succeed the late George Sheldon and Albert D. Boardman has been elected a director. The resignation of James D. Mortimer as president of the company, effective on Nov. 1, was referred to at length in the ELECTRIC RAILWAY JOURNAL for April 3.

Jersey Senate Approves Valuation Measures.—The New Jersey Senate has passed the measure of President Clarence E. Case providing for an independent appraisal of all electric railway properties in New Jersey. The Governor, State Treasurer and State Comptroller, under the provisions of the measure, are to compose a commission which will supervise the work having to do principally with the valuation of the Public Service Railway, Newark, N. J., property by expert engineers and make a report, which will form the basis for fixing fair and equitable rates of fare. An appropriation of $100,000 is provided to carry on the work.

Illinois Road Sold to Bondholders.—The Galesburg & Western Railroad, formerly the Rock Island Southern Railroad, Galesburg, Ill., has been sold for $151,000 to W. S. Hammons, Portland, Me., acting for the committee of the bondholders, said committee consisting of W. S. Hammons, Portland, Me., chairman; Frank S. Wingate, Hallowell, Me., and M. O. Williamson, Galesburg, Ill. There was one other bidder at the sale, C. C. West, said to represent Walsh Brothers, owners of the majority of the stock of the railroad. The sale to Mr. Hammons will now go before the Circuit Court of Knox County for confirmation by Judge Thompson.

Recommends Bonds Be Extended.—At the hearing in St. Louis, Mo., on March 30 before Special Master Henry Lamm to inquire into reconstruction work to be carried out by the United Railways, St. Louis, Judge Lamm took up in informal discussion the question of the means to be adopted to meet the bonds of the St. Louis Railway, an underlying company of the United Railways, when they fall due on May 1. Henry S. Priest suggested that it might be well to seek the consent of the holders of the bonds to an extension of them at a higher rate of interest rather than to issue receiver certificates to refund the bonds. Judge Lamm said that he thought well of this plan. He recommended it to the receiver.

More Time Allowed for Shore Line Report. — In the case of Old Colony Trust Company, Boston, Mass., vs. the Shore Line Electric Railway, Norwich, Conn., Judge Kellogg has granted Receiver Robert W. Perkins until May 15 to file his semi-annual statement. Ordinarily it should be filed by April 5, but Attorney Charles B. Whittlesey stated that the report was voluminous and more time was required. Judge Kellogg has also approved the application authorizing the receiver to pay the interest due on the bonds of the Groton & Stonington Street Railway, as it was represented to the court that paying the interest would prevent default and perhaps permit the receiver to dispose of the road to better advantage.

Receivers for Rock Island Southern Company. — Federal Judge Martin J. Wade of the Southern District of Iowa has appointed C. N. Abbott, vice-president of the Central Trust Company, Chicago, and C. H. Bacon, vice-president, in charge of operation of the Chicago, Rock Island & Pacific Railway Company, as receivers for the Rock Island Southern Railway Company. Judge Fitzhenry of the Federal Court at Peoria has concurred in the action of Judge Wade. The Mississippi Valley Railway & Power Company, controlled by Walsh Brothers, owns more than one-half of the outstanding bonds of the Rock Island Southern. Under government control steam trains were substituted for electric cars.

Last Traces of Municipal Railway Removed.—The last traces are being removed of the Yazoo (Miss.) Municipal Railway, which suspended operation in November, 1918. The Meridian (Miss.) *Dispatch* of March 18 under a date line from Yazoo City said: "The last remnant of the Yazoo City street car line has been disposed of, the Goldstein Hide & Fur Company having sold the old cars and trailers to Helena, Ark., to be rebuilt and used. The doing away with the line is a source of regret to many, and even though the railway did not make expenses the other utilities were making money and it all belonged to the city and the loss was nothing short of taking money from one pocket and putting it in the other."

An Offering That Is Different.—The Carolina Beach Railway, Wilmington, N. C., is seeking to finance itself through the sale of securities direct to the public. The company is offering $500,000 of 6 per cent ten-year gold coupon bonds "secured by a first mortgage on all the property owned by the Carolina Beach Railway." The company is described as building a railway from the city of Wilmington to Carolina Beach, which is located on the mainland and only 13 miles south of the city. No mention is made of the offering price, but "a bonus of 10 per cent of the common capital stock is offered to the purchaser of each $1,000 bond on the first $100,000 of these bonds sold." There is also a land exchange feature.

Will Sell Additional Stock.—Henry J. Davies, treasurer of the Cleveland (Ohio) Railway, has notified stockholders that it is now necessary to sell the remaining 10,000 shares of stock in the treasury in order to make needed improvements in the way of buildings, track and power equipment, as well as purchase land for its purposes. The requirements are that this stock must be sold at par or above, although it has been around 96½ and 97½ on the market for the past few days. Mr. Davies points out that the Cleveland and Lakewood franchises have been extended to May 1, 1944, and that an increase in the maximum permissible fare to 6 cents or nine tickets for 50 cents has been made. The quarterly dividend due on April 1 was based upon the new 7 per cent annual rate, granted by the Council some time ago, although an attempt is being made to have the ordinance increasing the rate from 6 to 7 per cent submitted to a referendum vote. Additional petitions for this referendum were certified to the City Council by City Clerk C. J. Benkoski on April 5. Councilman Henry C. Gahn, in charge of the fight for a referendum, will prepare a resolution for submitting the question to a vote and this will be acted upon at the next meeting of the Council.

Traffic and Transportation

Columbus Fares Advance

Go to Six Cents Under Provisions of Weinland Ordinance—Men Receive Pay Increase

A 6-cent cash fare with five tickets for 25 cents went into effect in Columbus, Ohio, on April 3. On that date the new franchise for the Columbus Railway, Power & Light Company, granting the company an increase in fare, became operative. The wages of the company's employees have been increased to a maximum of 50 cents an hour.

Under the terms of the franchise ordinance, which was passed by the City Council on Feb. 9, the 6-cent cash fare will continue for a six-year period. During the first two years tickets will be sold at the rate of five for 25 cents, and during the remaining four years at the rate of six for 25 cents. Free transfers and 10-cent owl car service are also provided. Children under six years of age will be carried free. Three cents is to be the rate for children between the ages of six and ten years.

$2,400,000 FOR IMPROVEMENTS

In return for the higher fare the company is required to spend $2,400,000 during the six-year period for extensions, street paving and repaving and the laying of new tracks. Expenditures are limited to $750,000 a year. The Council, when it deems necessary, can order the company to extend its lines in North High Street, West Mound Street and other thoroughfares, such extensions not to exceed five miles within the next six years. The company is not to be compelled to build more than two miles of new track in any one year.

A wage advance amounting to 5 cents an hour in the case of carmen and to 12 per cent in the case of shopmen has been awarded the employees of the company by the board of arbitration which has been considering their demands. The arbitration of future disputes between the company and the union is also provided for in the board's report. Platform men for the first three months will receive 45 cents an hour, for the next nine months 48 cents and thereafter 50 cents.

The new scale was effective April 1 and is retroactive to Jan. 1 and is to run until March 31, 1921. Extra platform men receive a minimum wage of $18 a week. Following is the wage scale of all other employees: Train dispatchers, $128 a month; pitmen, 50 cents an hour; track laborers, 40 cents; trackmen, 45 cents; curve cleaners, 40 cents; truckmen, 57 cents; helpers, 47 cents, and machinists, carpenters, blacksmiths, electricians and painters, 67 cents.

Enactment of the fare measure, known as the "Weinland bill," resulted from the need on the part of the company for an increase in revenue to meet these wage advances. The men struck last year, demanding a substantial raise in pay. S. D. Hutchins, of the Westinghouse Traction Brake Company, chairman of the board of arbitration, appeared before the City Council several months ago and asked that the company be permitted to raise its fare so that it would be in a position to meet the terms of the arbitrators' award.

COUNCIL'S AID SOUGHT

Mr. Hutchins stated on that occasion that the arbitrators would withhold their award pending action by the city authorities on the question of granting the company financial relief. Presenting a statement of the company's financial condition, he declared that, unless a higher fare were allowed, the company could make no further increase in wages. The company subsequently presented a tentative draft of a bill providing for a 6-cent cash fare and in other respects similar to the ordinance later enacted by the Council.

Opponents of the fare increase made a concerted effort to defeat the Weinland measure through the medium of a referendum. Petitions to submit the question of allowing the higher fare to the voters at a referendum election were circulated. More than 16,000 names were signed to these petitions. However, the City Clerk rejected 8,783 signatures. The petitions therefore lacked 1,256 signatures of the 8,740 necessary to certification.

The fare increase will, it is estimated, give the company additional revenue of $1,100,000 a year.

Rhode Island Appeals Heard

The Rhode Island Supreme Court has taken under advisement the appeal of nine municipalities from orders of the State Public Utilities Commission authorizing the Rhode Island Company, Providence, to increase its fare. The fare increase that gave rise to the appeals went into effect May 5, 1918, when a central 5-cent fare and transfer zone of 2½ miles air line radius about the Providence traffic center and of 2 miles air line radius about the traffic centers of Pawtucket, Woonsocket and Riverpoint was established. On Sept. 23, 1919, by order of the commission a 6-cent fare was authorized in all zones and a 2-cent charge for transfers. At the hearing before the Supreme Court the towns contended that the commission exceeded its authority in permitting the company to raise its fare on these occasions.

Merchants Promise Aid

State Chamber of Commerce of Connecticut Recommends Legislative Relief Previously Refused

A special committee of the State Chamber of Commerce of Connecticut engaged on a study of electric railway conditions in that State has decided to recommend to the chamber that that organization ask the 1921 session of the Legislature to relieve the electric railways of all paving and bridge assessments, as well as taxes on gross income which are payable to the State.

The Connecticut Company, which is petitioning the Public Utilities Commission for the retention of a zone fare collection system, put into effect on Nov. 2 last, will be the greatest gainer if the proposed legislation should be adopted, as it operates over 90 per cent of the electric railway mileage in the State. The utilities commission is expected to make public its decision in the matter of the zone fare system within a few days.

The special committee of the chamber which conducted the investigation consists of Attorney Arthur M. Waitt. Sharon, chairman; J. B. Milliken. president of the Yale & Towne Mfg. Company, Stamford; Morgan B. Brainard, federal trustee of the Connecticut Company and vice-president of the Aetna Life Insurance Company; Robert W. Perkins, receiver of the Shore Line Electric Railway; George T. Kimball, secretary of the American Hardware Corporation, New Britain; Attorney Lucius J. Stevens, Clinton, and Ira M. Ornburn, secretary of the State Federation of Labor.

DETAILS OF REPORT WITHHELD

Roger W. Davis, Hartford, who attended the hearings on the zone fare system in behalf of the committee, has issued a report to the members, but details of this report are withheld pending the decision. The 1919 session of the Legislature was asked to pass legislation of the nature recommended by the committee of the Chamber of Commerce, but refused to do anything to help the overburdened companies. Since that time the companies have fallen into worse straits and it was in an effort to save the lines that the state chamber named the committee of inquiry.

In addition to the other assessments the Connecticut Company must pay, the city of Hartford levies upon it 2 per cent of the gross income on lines within the city.

Safety Suggestions Accepted

As a result of the safety work being conducted on the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., the employees have made 1,700 suggestions for improving safety conditions during the last three years. Of these 90 per cent have been accepted and put into force by the company with the result that the number of accidents has been materially reduced.

Zone System in Connecticut Modified

Commission Convinced System Is Correct in Principle—State Relief Suggested—Changes Effective May 9

The zone fare system of the Connecticut Company is sustained in the decision of the Public Utilities Commission made public April 9, but important modifications in the scheme will force the company to change over all its zone limits, issue commutation and school tickets and generally rearrange its accounting methods. The rates imposed by the commission will go into effect on May 9, but if "after a reasonable time" they are found to be unfair to company or public, the commission promises that it will reopen the case. The mileage system which the company placed in operation on Nov. 2, of last year, and which was attacked by representatives of nearly a score of towns, is declared a fair method of fare collection by the commission. The commuters of the town of Manchester, who had been arguing that a commutation rate of twenty years' standing should not have been shelved last November, won their point, the commission deciding that the daily riders in towns having a population of 25,000 or more shall have a lower rate.

Salient points in the decision are:

All zones throughout the company's lines are to be 1 mile in length, instead of present system, which makes initial zone in four largest cities of State 1½ miles, with second zone 1 mile. Smaller towns at present have 1.2 miles initial zone, 1 mile second zone. Country places at present have all zones 0.625 of a mile.

Cash fare is 6 cents for smallest two zones or any portion thereof, as at present, with 3 cents for each additional zone.

Zone ticket books containing fifty tickets sold for $1, with not less than three tickets to be collected for a ride in three zones or less and one ticket for each additional zone.

Monthly commutation tickets good for daily rides between traffic centers of cities and boroughs having a population of 25.000 or more and points five zones distant from the traffic center, the tickets to be at rate of 1.75 cents per zone.

School tickets to be at rate of 1 cent per zone, with initial charge of 3 cents for ride of three zones or less, with charge of 1 cent for each additional zone after the first three.

Present transfer system, which requires payment of 2 cents per zone if passenger has traveled more than two zones on first initial ride, is continued with modifications to meet the new system of fare collection.

The decision does not apply to the portion of the Shore Line Electric Railway, Norwich, recently acquired by the company.

LEGISLATIVE RELIEF RECOMMENDED

The commission recommends that legislation be enacted to relieve the company of present street paving taxes, bridge building taxes and unfair jitney automobile competition.

The company officials had no comment to make on April 9 on the decision.

The hearing on the protests of the towns against the present system of fare collection started in December, and when final oral arguments were made on March 2 the commission told a representative of the ELECTRIC RAILWAY JOURNAL that the decision would be announced early in April. The commission is composed of Richard T. Higgins, Winsted, chairman; Charles C. Elwell, New Haven, and Joseph W. Alsop, Avon. The towns which appeared in opposition at the hearing were New Haven, Meriden, Bridgeport, Norwalk, Stamford, Milford, Hamden, New Britain, Orange, Newington, Berlin, Bloomfield, Plainville and Southington.

Portions of the commission's findings of especial interest follow:

It is a recognized fact, admitted by all the evidence in this case, that street railways supply a necessary public service not only for urban but for suburban and inter-urban transportation, and their suspension would be a public calamity. Some of the elements producing the precarious street railway conditions in this State are beyond the power of this commission to overcome, and can only be remedied by legislative enactment. Statutory burdens such as street paving, bridges, taxes and unfair automobile competition are among these elements. The labor competition of industrial enterprises which are unrestricted in the selling price of their commodities is an economic condition which the carriers themselves must work out.

LAW OF DIMINISHING RETURNS A FACTOR

The depreciated purchasing value of the dollar and the high and increasing cost of producing service are factors which should naturally be met by corresponding increases in rates, but there is a limit at which increased rates will produce increased revenue.

The duty of a utility company is not only the rendition of a public service, but the rendition of good and adequate service. This commission is fully aware of the fact that to render such service a company must have sufficient finances, sufficient gross revenue to pay all its operating expenses, fixed and overhead charges, set aside by a proper depreciation reserve, and pay a fair return on the investment. We feel that any order of the commission not based on this general policy would work not only an injustice to the company but to the public entitled to receive such service.

Street railway service is a direct benefit not only to its patrons, but to the communities, business industries, property owners in the localities served; and yet under present conditions all the expense of supplying such service, including statutory and collateral obligations, is borne by the car riders, they being the only source of revenue to the company.

The company, whose public duty is to carry passengers over and along the highway, is required to expend large sums of money for cleaning the snow and ice off the streets, for the construction of highway bridges and for paving and maintaining a large portion of the street area. No other individual or corporation using the highway is required to perform or directly pay for such work. The more of these expenses the company has to pay the greater will necessarily be the rates of fare for the car rider.

PAVEMENT COSTS A SERIOUS BURDEN

The demand for improved and expensive pavement in our public highways and the very expensive care and maintenance of that pavement are due largely to automobiles, jitneys and trucks constantly using the highways, and in the case of the heavily loaded truck, using pavement destroying chains or other worse forms of non-skid devices.

The car rider is not only called upon to maintain the tracks and roadbeds of the particular company which affords him transportation, but is required to assist in maintaining a free roadbed and expensive type of pavement for the limousine, the numerous pleasure and touring cars, the constantly increasing number of heavy trucks and for the so-called public service automobiles or jitneys running in competition with his own company.

The person using the automobile in any and all of its various forms and types has the right-of-way provided, built and maintained by public taxation and by direct contribution of the street car rider.

A rate sufficiently high to meet all such expenses and afford a fair return on the value of the property or the actual investment therein, taking into consideration the nature of existing competition, would have a tendency to lessen street railway travel disastrously and destroy the usefulness of the carrier in supplying what should be a cheap, convenient and reliable form of transportation available to all the people.

It has for some time been a recognized fact in street railway operations that the old system of flat fares with its flagrant inequalities and numerous long haul rides at an absolute loss to the company must be abandoned if the company is to be self-supporting. It is unquestionably true that the long zone or flat rate system is popular and convenient and that it contributed materially in the building up of suburban sections and in relieving city congestion, but the inability of the company to continue such a system longer makes it imperative for the preservation of service to adopt a more business-like policy, unless aided by the State or municipalities served. Such aid cannot be forthcoming at the present time and it becomes necessary to adopt some other system or a radical modification of the system.

It seems to the commission that the most equitable policy thus far suggested or adopted is the zone or distance tariff system, and accordingly the commission will retain the general basic principle of the zone or distance tariff system adopted by the company in the rates which it may prescribe hereunder. . . .

CO-OPERATION ESSENTIAL

To make any rate or policy established by the commission satisfactory requires acquiescence and an honest endeavor on the part of the company and its employees to render good service, and a spirit of co-operation and good will on the part of the public. The enterprise and degree of service rendered by the respondent company during the past winter months, which were almost unprecedented in the severity of weather, affecting all kinds of transportation, were indeed commendable and we believe helped to awaken public sentiment to the necessity and importance of sustaining and preserving the street railway service. The commission, being firmly convinced of the equity and fairness of the rates herein proposed and decreed under present conditions, earnestly requests the assistance and co-operation of the company and of the general public in making them a success or at least of giving them a fair trial. If at the end of a reasonable period of time it is demonstrated that the rates or system are unfair, either to the company or to the traveling public, this commission, upon proper presentation will unhesitatingly and without prejudice by the reason of anything herein stated or decreed, consider and revise such rate or system in accordance with facts then presented.

One-Man Car Order Rescinded

Unless the Wisconsin Railway Light & Power Company, La Crosse, Wis., is permitted to install one-man safety cars on its lines in that city it will be compelled to ask the Railroad Commission of Wisconsin for authority to increase fares, according to the company's answer to the protest of the city of La Crosse against use of one-man cars.

The state body recently granted the company permission to install eight one-man cars—a permission that was later rescinded when the protests of La Crosse citizens began pouring in to the commission in Madison.

The company sets forth in its answer that it is at present operating without a reasonable return on its investment despite the fact that a 6-cent fare is being charged.

The company planned to purchase eight new cars at once and convert the present rolling stock from two-men to one-man type.

The Railroad Commission will shortly hold a public hearing on the matter in La Crosse.

Transportation News Notes

Wants 10 Cents in Portland.—Ten-cent cash fares are asked in a petition filed by the Cumberland County Power & Light Company, Portland, Me., with the State Public Utilities Commission. The company proposes to increase the ticket rate from 7 cents to 8 cents. The cash fare is now 9 cents.

To Probe Phoenix Service.—A committee representing the City Commission and local business interests has been appointed by Mayor Corpstein of Phoenix, Ariz., to make a thorough study of the condition of the Phoenix Railway. The request for an investigation of the company's service took the form of a petition signed by a large number of citizens.

More Cars Asked for St. Louis.—Hearings were begun on March 30 before Special Master Lamm on the application of Rolla Wells, receiver for the United Railways, St. Louis, Mo., to spend $2,000,000 for the purchase of 160 additional cars, $917,380 for track reconstruction within the city and $140,200 for track reconstruction on the St. Charles line in St. Louis County. The company proposes to rebuild about 31 miles of city line.

May Raise Cincinnati Fare.—It is reported that the platform employees of the Cincinnati (Ohio) Traction Company will ask for an increase in wages from a maximum of 50 cents an hour to a maximum of 75 cents an hour, when their contract is readjusted on July 1. If this increase should be granted, it is believed that the rate of fare will have to be increased ½ cent to cover it. The rate is now 7 cents, with universal transfers.

Seven Cents Asked in Austin.—The Austin (Tex.) Street Railway has filed a petition with the Austin City Council asking authority to increase its fare from 5 cents to 7 cents for adults and from 2½ cents to 3½ cents for children. The Chamber of Commerce after an investigation of the earnings and operating expenses of the company has recommended that the increase be granted for a period of five years. The City Attorney has been instructed to draft an ordinance giving the company the requested increase.

Traffic Survey at Springfield.—The City Council of Springfield, Mass., has voted $3,000 for a survey of traffic conditions in that city. Peter Witt, Cleveland traffic expert, has agreed to conduct the investigation on condition that he will have the co-operation of the Springfield Street Railway. Assurances have been given that such co-operation will be forthcoming and that any reasonable suggestions for speeding up service will be carried out.

Deprecates City's Attitude.—The attitude of the city of Pittsburgh, Pa., toward the decision of the Public Service Commission of Pennsylvania, in regard to the valuation of the Pittsburgh Railways property, recently announced in these columns, was deprecated by A. W. Thompson, president of the Philadelphia Company, the holding concern of the traction company, speaking at the weekly dinner of the Current Topics Club in the Knights of Columbus Clubhouse on April 5. Mr. Thompson charged that a lack of interest on the part of the public was responsible for the failure of the public utilities companies to give proper service.

Commission Ouster Bill Fails.—A bill which, had it been enacted, would have automatically removed the members of the New Jersey Board of Public Utility Commissioners from office was defeated on April 5 in the State Assembly. The bill proposed to take from Governor Edwards the power to appoint a new board. Under the bill as originally drafted the members of the proposed new commission would have been elected by the Legislature in joint session, but when the measure was placed on third reading it was amended to provide for their appointment by the Chief Justice of the Supreme Court.

Wants Buses in Dallas.—Would-be jitney operators of Dallas, Tex., have appealed to the State Court of Civil Appeals in an effort to obtain a franchise to operate a bus route in competition with the lines of the Dallas Railway. Petition for a franchise from the city was presented to the City Commission by Currie McCutcheon and Marion S. Church. This was denied by the City Commission. Mandamus was then sought in the District Court to compel the city authorities to submit the proposed franchise to a referendum vote. The District Court declined to issue the order prayed for. Notice of appeal has been given from the ruling of the District Court and the question will soon come up for hearing before the Court of Civil Appeals.

Would Lower Worcester Fare.—A 5-cent initial fare with a 3-cent charge for a transfer would solve the difficulties of the Worcester (Mass.) Consolidated Street Railway, in the opinion of Mayor Peter F. Sullivan of Worcester. Mayor Sullivan has addressed an open letter to Clark V. Wood, president of the company, urging the adoption of the "five-and-three" plan. The Mayor contends that this plan would best serve the company's interest and at the same time would benefit the people of Worcester. Under the fare system now in effect the city is divided into two zones with a 7-cent fare in each and with no transfer privilege. If the "five-and-three" plan failed to supply adequate revenue, the Mayor states that he would advocate a 6-cent fare with a 4-cent transfer charge. Under the zone plan the fare in each zone was originally 5 cents. It was then raised to 6 cents and subsequently to 7 cents.

Will Reroute Los Angeles Lines.—Sweeping plans for the rerouting of its lines have been announced by the Los Angeles (Cal.) Railway. The rerouting program was worked out by the company at the suggestion of the State Railroad Commission, and will be put into effect about May 1. The commission recommended the adoption of drastic measures for the relief of congestion in the city's business district. The City Council has already passed a "no-parking" ordinance, as previously announced in the ELECTRIC RAILWAY JOURNAL, which becomes effective on April 10. Under the terms of the ordinance the parking of vehicles within the congested area is barred between the hours of 11 a. m. and 6.15 p. m. As a result of the rerouting of car lines and the enforcement of the anti-parking rules, the company hopes to decrease the present car headway by 50 per cent.

Favors Zones for Hudson Tubes.—The Interstate Commerce Commission has suspended a tariff filed with it by the Hudson & Manhattan Railroad, New York, N. Y., under which the company proposed to charge a straight 8-cent fare. In a letter to Oren Root, president of the road, the commission stated in effect that it would grant an increase on a zone system rather than the straight 8-cent fare requested by the company. It was indicated by the commission that the company was entitled to a 6-cent fare from Hoboken and Jersey City to the Hudson Terminal and a 10-cent fare from the Jersey terminals to uptown New York. The letter gave permission to file tariffs on these increases and intimated that the increases would be allowed. The company asked for a straight 8-cent fare, which would have given it an increase of $3,213,117, or 4.7 per cent, while the proposal of the commission would increase the revenues by $2,344,012, or 4.32 per cent on its allocated debt of $70,263,300. The company will file the new rate.

Acute Car Shortage in Dallas.—The Dallas (Tex.) Railway is losing $400 a day because of shortage of cars to handle passengers, according to Richard Meriwether, vice-president and general manager. This estimate is based on the number of persons passed up by the cars of the company during the morning and evening rush hours because of the lack of cars to haul them. During the rush period in the morning an average of 19,640 persons are carried every day. Of this number, approximately 13,960 are seated. The others are forced to stand. During the rush period in the evenings an average of 21,665 are carried daily, of which number 14,233 are seated. An average of 36.2 per cent of the passengers hauled stand up in the evenings and 32.2 per cent of those hauled stand up in the mornings. Investigation discloses that fully one-half of those persons passed up by the cars during the rush hours either walk to work or seek some other conveyance.

Personal Mention

Mr. McClure at New Post

Made Vice-President in Charge of Operation of Ohio Electric Railway

J. Harvey McClure, general manager of the Citizens' Traction Company, Oil City, Pa., has been selected by Day & Zimmerman, utility managers, to operate the Ohio Electric Railway, Springfield, Ohio, of which they have taken charge. Mr. McClure has been given the title of vice-president of the Ohio Electric in charge of operation. He has already taken up his new duties, making his headquarters at Lima, Ohio.

Mr. McClure's new position, by enlarging the scope of his duties and responsibilities, will give him further opportunity to demonstrate his methods, which have met with marked success in Oil City for several years. As manager of the Oil City properties of Day & Zimmerman he has not only proved his ability to operate the lines in his care in an efficient and economical manner, but has made for himself a name for fairness and square dealing among the people of Oil City and Franklin.

His new duties will call for exercise of these qualities on a much larger scale. The Ohio Electric Railway operates 530 miles of city and interurban line in both Ohio and Indiana. The road connects Toledo, Lima, Defiance, Springfield, Dayton, Union City, Columbus and Zanesville, in Ohio, and Fort Wayne and Richmond in Indiana. The road was placed under the direction of Day & Zimmerman on April 1.

Mr. McClure has been connected with the Citizens' Traction Company since 1913. At that time he had already been in the service of Day & Zimmerman for several years. In 1914 he was made general superintendent of the Oil City and Franklin lines, and was subsequently advanced to general manager. He has also served as general manager of the Citizens' Light Company and the Monarh Park Hotel Company. In 1918 he was appointed vice-president in charge of operation of the Youngstown & Suburban Railway, Youngstown, Ohio. Since receiving his appointment with the Ohio Electric Railway he has resigned from these companies.

Co-operation and harmony have characterized Mr. McClure's tenure of office at Oil City. Upon assuming his duties there he adopted a policy of candidness and fairness toward the public as well as toward the company's employees. Constantly adhering to this policy, he set out to build up the property. Under his direction numerous improvements and extensions have been made. The results of his methods are seen in the fact that, although the company has increased its fare twice, first to 6 cents and more recently to 7 cents, the rate advances have not evoked a public protest.

New Seattle Manager

David W. Henderson, Superintendent of Transportation, Placed in Charge of Municipal Railway

David W. Henderson, superintendent of transportation of the Seattle (Wash.) Municipal Street Railway, has taken up the duties of general superintendent of the system. Mr. Henderson, who assumed the direction of the municipal lines following the resignation of Thomas F. Murphine, has been permanently appointed to the position of general superintendent by Mayor Hugh M. Caldwell.

D. W. HENDERSON

In his new capacity Mr. Henderson will have charge of the entire municipal railway system, comprising 235 miles of track. He does not, however, succeed Mr. Murphine as director of public utilities and thus has no control over the other utilities of the city. Mayor Caldwell, who during the mayoralty campaign attacked the methods of the municipal departments, has since his election divorced the railway from the public utilities department. E. D. O'Brien has been placed in charge of the latter.

Mr. Henderson has been connected with the Seattle traction system, at first under private and later under public ownership, for the past eighteen years. At the time of the purchase by the city of the Seattle lines of the Puget Sound Traction, Light & Power Company a year ago, he was superintendent of transportation. He entered the employ of the company in 1902 as a motorman. In 1907 he was advanced to the position of inspector and in 1911 he was promoted to assistant superintendent of transportation, serving under Guy A. Richardson, then superintendent of transportation. In May, 1912, Mr. Henderson was advanced to division superintendent. In November of the same year, he was appointed to the position of superintendent of transportation. He retained this position until April, 1919, when the lines were transferred to the city of Seattle.

Mr. Henderson was born in Dumferline, Scotland, on Feb. 24, 1873. His parents came to the United States in 1881, settling in Randolphe, Wis. He received his early education in Randolphe, completing a teacher's course at Valparaiso, Ind. For the next eight years he taught school in Wisconsin, after which he went to Seattle and entered the employ of the Puget Sound Traction, Light & Power Company.

Merritt Strahan has assumed the duties of division superintendent of the Union Traction Company of Indiana, Anderson, Ind., with headquarters at Indianapolis. Mr. Strahan has been connected with the company since 1910.

William H. Tobin has been appointed chief inspector of the Berkshire Street Railway, Pittsfield, Mass., to succeed Thomas E. MacDonald, resigned. Mr. Tobin has been in the company's employ for the past twenty years. Prior to his new appointment he served as an inspector.

Harry H. Adams, superintendent of shops and equipment of the Chicago (Ill.) Surface Lines, has been given the same title under the new organization plans of President Henry A. Blair, but he will report to the general manager instead of to the chief engineer as heretofore.

George W. Wells, who has been director of exhibits for the American Electric Railway Association, has joined the staff of the International Exposition of Industries, Grand Central Palace, New York City. He will have charge of the electrical division of the mechanical department.

F. J. Tew, who for the past seven years has been master mechanic of the Manila Electric Railroad & Light Corporation, Manila, P. I., is about to return to the United States. Mr. Tew expects to arrive in San Francisco during the present month. He has not yet made definite plans for the future.

John D. Wells, former director of publicity for the International Railway, Buffalo, N. Y., and former president of the American Press Humorists' Association, has become associated with William A. Morgan, financier, as advertising counselor. Mr. Wells was at one time managing editor of the Buffalo *Evening News*.

Henry M. Brooks, who has for a number of years been connected with the Insull interests, most recently as manager of the bond and stock department of the Middle West Utilities Company, Chicago, Ill., has resigned to go with W. G. Souders & Company, an investment house, and will be located in its New York office.

Changes in Chicago Elevated Organization

Changes in the organization of the Chicago Elevated Railways were announced by President Britton L. Budd on March 30, as follows:

Bernard J. Fallon, engineer maintenance of way, was appointed assistant general manager.

Edward J. Blair, organization engineer, was appointed assistant to the president.

H. A. Johnson, superintendent of shops and equipment, was appointed organization engineer, having the duties of analyzing all operating methods, costs, etc., preparing statistical information and from time to time making recommendations as to improved or more efficient methods, practices or processes in all departments. He will report to the general manager.

R. N. Wade, track engineer, was appointed engineer maintenance of way and structure.

Adolph H. Daus, assistant to the superintendent of shops and equipment, was appointed superintendent of shops and equipment.

E. C. Davis, general manager of the Burlington County Transit Company, Hainesport, N. J., has resigned.

Thomas E. MacDonald, chief inspector of the Berkshire Street Railway, Pittsfield, Mass., has resigned.

Frederick Isaacson, superintendent of transportation of the Ottumwa Railway & Light Company, Ottumwa, Iowa, has resigned.

L. E. Hollar, superintendent of transportation of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has resigned.

C. U. Peeling has resigned as general manager of the Cornwall Street Railway, Light & Power Company, Cornwall, Ont.

G. C. Miller, manager of the light and power departments of the Aurora, Elgin & Chicago Railroad, Elgin, Ill., has resigned to engage in the electrical merchandising business in Kokomo, Ind.

W. L. MacFarlane has been appointed general manager of the Cornwall Street Railway, Light & Power Company, Cornwall, Ont., succeeding C. U. Peeling, resigned.

Richard Kelly, general passenger agent of the Pacific Electric Railway, Los Angeles, Cal., has been made general passenger agent of the Southern Pacific Railroad, reporting to Vice-President Paul Shoup.

Elvin L. Hoffier has been appointed an assistant superintendent of the Wilkesbarre (Pa.) Railway. Mr. Hoffier has been employed as a bookkeeper in the auditing department of the company for the past fourteen years.

W. W. Waterson, superintendent of transportation of the Chicago, Ottawa & Peoria Railway, Ottawa, Ill., has succeeded L. E. Hollar as superintendent of transportation of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind. Mr. Waterson joined the Illinois Traction System in 1904 as a trainman. Shortly thereafter he was promoted to train dispatcher. In 1912 he was appointed superintendent of the Peoria division of the St. Louis, Springfield & Peoria Railroad and five years later he was made superintendent of transportation of the Chicago, Ottawa & Peoria Railway.

F. E. Smith, Comptroller

Former Auditor of Chicago Union Traction Company Joins McGraw-Hill Staff

F. E. Smith, for fifteen years auditor of the Chicago Union Traction Company and of its successor, the Chicago Railways, has joined the McGraw-Hill organization with the title of comptroller. He entered actively upon his duties on April 1, 1920. Since May, 1918, and up to within the last month or two, Mr. Smith has been connected with the United States Shipping Board, Emergency Fleet Corporation, first as local auditor at Hog Island, where he built up a large auditing staff, and later at the headquarters in Philadelphia in the comptroller's office and in the department of cancellation, claims and contracts, which dealt with the claims arising from cancellations.

F. E. SMITH

Mr. Smith's professional career has been largely with railroads, particularly electric railways. A native of Connecticut, his first railway experience was gained with the Hartford, Providence & Fishkill Railroad, now a part of the New Haven system. Two years later, or in 1884, he moved to Akron to join the accounting force of the Cleveland, Akron & Columbus Railroad, leaving that company in 1889 to become auditor for the receiver of the Zanesville & Ohio Railroad. During the five-year period in which he was connected with this company, he made numerous investigations of the financial condition of the properties of the Hollins-Clark Syndicate, the representatives of the bondholders of the Zanesville property.

In April, 1894, he was transferred to the position of auditor of the Lynn & Boston Railroad, which had passed into the control of this syndicate, and in 1899, when this property became a part of the Massachusetts Electric Companies, he was appointed by the new interests general auditor of the consolidated lines. In July of the same year, when the Hollins interests assumed control of the North and West Chicago Street Railways and organized the Chicago Union Traction Company, Mr. Smith was appointed its auditor, a position which he retained, as mentioned, until 1914, when the Chicago Surface Lines took over the operation of the surface lines in Chicago. He then moved to Florida and engaged in raising grape-fruit until his return north in 1918 to join the Emergency Fleet Corporation.

While connected with electric railway companies, Mr. Smith took an active part in association work. For two years he served on the executive committee and for six years on the committee on the standard classification of accounts of the Street Railway Accountants' Association of America, and in 1903-1904 was president of that organization.

W. S. Anderson has been appointed assistant to H. L. Mitchell, vice-president of the West Penn Railways, Pittsburgh, Pa. Mr. Anderson was formerly chief clerk in the company's Connellsville (Pa.) office. At the time of his promotion to his new position his fellow employees presented him with a gold watch as a token of remembrance.

Horace E. Miller, who was recently appointed chief dispatcher of the Pacific Electric Railway, Los Angeles, Cal., joined the company as a towerman in 1908. In 1910 Mr. Miller was promoted to dispatcher on the south division. He became assistant trainmaster in January, 1919, continuing in that capacity until his advancement to chief dispatcher.

W. H. Evans, assistant to the claim adjuster of the Wilkesbarre (Pa.) Railway, has been promoted to the newly created position of assistant superintendent. Mr. Evans entered the employ of the company nineteen years ago as a trainman. He served both as a conductor and a motorman, and was later advanced to inspector. He became assistant to the claim adjuster three years ago.

F. S. Welty, purchasing agent of the Omaha & Council Bluffs Street Railway, Omaha, Neb., has been promoted to assistant general manager of the company. In his new capacity Mr. Welty retains supervisory authority over the purchasing department, of which he has been in charge for the past thirteen years. He joined the company twenty-two years ago. For eight years he was connected with the transportation department. He was then transferred to the claim department, where he served for one year, at the end of which he was made purchasing agent.

A. B. Cronk has succeeded O. B. Gothlin as chief of the tariff bureau of the Indiana Public Service Commission. Mr. Cronk has for some time been serving as a deputy in the office of the Attorney General of Indiana.

William P. Burr, corporation counsel of New York City, has been appointed a Justice of the State Supreme Court. Mr. Burr has taken a prominent part in the New York City Board of Estimate's traction inquiry, conducting the case for the city.

O. E. Sterner has been appointed superintendent of transportation of the Ottumwa Railway & Light Company, Ottumwa, Iowa, to succeed Frederick Isaacson, resigned. Mr. Sterner has been connected with the company for the past twelve years.

A. M. Evans, assistant to the chief engineer of the Chicago (Ill.) Surface Lines, has resigned to accept a position in the organization of the Geyser Electric Company, Chicago, manufacturers of washing machines. Mr. Evans has been with the Chicago City Railway and the Chicago Surface Lines since 1906. During the war he served under Colonel Peter Junkersfeld as an officer in the construction division of the Quartermaster's Corps.

O. P. Gothlin, chief of the tariff bureau of the Indiana Public Service Commission, resigned on April 1. Mr. Gothlin will resume the practice of law. He will specialize in transportation matters, handling only cases relating to railroad rates and service. Mr. Gothlin was formerly chairman of the Ohio Public Service Commission. He has been with the Indiana commission since June, 1917, as chief of the tariff bureau, in which capacity he reorganized the tariff department.

C. H. Crooks, whose election as president of the Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, was noted in the ELECTRIC RAILWAY JOURNAL for April 3, was born in Iowa in 1874. Mr. Crooks entered the traction business in 1893 as a ticket agent with the Des Moines Union Railway. Two years later he was made agent of the Des Moines, Northern & Western Railway at Fonda, Iowa, leaving that position in 1898 to become agent of the Chicago, Milwaukee & St. Paul Railway at Boone. Shortly thereafter he was appointed chief clerk to the division freight agent of the latter road at Des Moines, serving in this capacity until 1904. In that year he resigned to become chief clerk to the division freight agent of the Chicago, Rock Island & Pacific Railway at Des Moines. He was subsequently advanced to the position of commercial agent of the road at Des Moines, but resigned after a short term of service to join the Fort Dodge, Des Moines & Southern Railroad as general freight and passenger agent at Boone. In March, 1911, he was promoted to traffic manager. In October of the same year he was made general manager of the company.

Wisconsin Association Elects Mr. Lounsbury

William C. Lounsbury, general manager of the Superior Water, Light & Power Company, Superior, Wis., was elected president of the Wisconsin Electrical Association at its meeting at Milwaukee on March 25. Mr. Lounsbury had served as the association's president during the greater part of last year. When Raymond C. Smith, who was chosen president a year ago, resigned last June on removing from the State, Mr. Lounsbury, as first-president, was advanced to fill the vacancy.

Mr. Lounsbury's fine sense of humor was well demonstrated by the able and pleasing manner in which he presided over the meeting of the association recently. This sense of humor may also be seen in what follows, which is the result of a request made upon him for the details of his training and experience. He is quoted verbatim, for a man's autobiography is not often so readable as his. This is what Mr. Lounsbury has to say about himself:

W. C. LOUNSBURY

> I was born, through no fault of my own, on Friday the thirteenth day of February, 1880. After a few years, most of which I presume were spent in making as much noise as possible, I was taken under protest to Boston at the age of five and subsequently lived there long enough to receive as much public school education as is ordinarily given. After some strenuous effort I was graduated from the Massachusetts Institute of Technology in 1904. The subsequent few years were spent in Worcester, Washington and New York, doing what I then thought was extremely valuable work for my employers. This I have since found to be quite contrary to facts, but there is no doubt it was profitable to myself.
>
> Coming to my present company some thirteen years ago, I made a very creditable record in lessening costs in the water department and in connection with the construction work, over which I had general charge. In 1912 I was made general superintendent, with supervision over the operation of our water, gas and electric departments. Since 1918 I have been general manager.
>
> I have the honor of paying dues to the National Electric Light Association, American Water Works Association, New England Water Works Association, American Public Health Association, and for some reason still a mystery to me I was elected a fellow in the American Association for the Advancement of Science. I have been more or less active in several Wisconsin State associations, including the Wisconsin Society of Engineers and the Gas & Electric Association. I am a member of the local Rotary Club and for several years have been a member of the Superior Park Commission, serving as its president in 1917 and again this year.

Obituary

Francis S. Williams, for a number of years connected with the legal department of the Interborough Rapid Transit Company, New York, N. Y., died on April 1.

A. N. Hargrove, formerly foreign sales manager of the J. G. Brill Company, died suddenly on March 27, in Philadelphia. Mr. Hargrove joined the Brill staff in 1905 and was widely known in the export trade. He was forty-one years of age.

Richard D. Simms, treasurer of the Capital Traction Company, Washington, D. C., died suddenly on March 31, at Asheville, N. C. Mr. Simms was commander of the District of Columbia National Guard, with the rank of brigadier-general. He was born in Washington fifty-one years ago. For twenty years he was employed by the District of Columbia. In 1905 he resigned his position as purchasing agent of the district to become treasurer of the Capital Traction Company. He was active in the affairs of the National Guard for many years. Joining that organization twenty-three years ago, he was made a major in 1899 and in 1909 was promoted to colonel. He retired in 1911.

G. A. Humphrey, superintendent of shops of the Sacramento Northern Railroad, Sacramento, Cal., died on Feb. 26. Mr. Humphrey was born in England in 1851. Coming to the United States at the age of sixteen years, he went to work for the Missouri Pacific Railroad as an apprentice in the mechanical department. He remained in the employ of the Missouri Pacific for more than thirty years, serving successively as mechanic, car builder and master mechanic. He later worked for the Père Marquette System as master car builder. He joined the Sacramento Northern Railroad as superintendent of shops in 1907.

Thomas J. Nicholl, who for many years was vice-president and general manager of the old Rochester (N. Y.) Railway is dead. Mr. Nicholl had made his home in Rochester for several years before his death. He was seventy-four years old. Mr. Nicholl was born in England, the son of Thomas E. Nicholl, who was associated with Sir I. K. Brunnel in the construction of the Great Western Railway of England and later assistant engineer in the construction of the Grand Trunk lines in Canada. Mr. Nicholl was the first member of the first Street Railway Young Men's Christian Association. He was associated with many of the big steam railways before taking charge of the Rochester traction lines and the Rochester & Sodus Bay Railway. He was a brother of H. A. Nicholl of Anderson, Ind.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER. SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Insulation Material Prices Higher

Cotton and Silk Goods and Varnishes Higher by from 5 to 20 Per Cent—Shipments Long

Insulating materials are characterized by longer shipments and higher prices. Spot cotton in New York is quoted at 42.50 cents. Prices on cotton webbing, tape, tubing, varnished cambric and friction tapes advanced the last week in March about 5 per cent. The demand for cotton insulations is heavy and shipments from the factory are about three months. Finishing mills are hard put to it to get yarns for electrical uses because of the heavy demands on this material from other sources.

The auomobile industry is using greater and greater amounts of long staple cotton in the manufacture of cord tires and in the upholstering and in tops. Consequently the electrical trade feels the reaction in higher prices and longer deliveries. At the same time labor turnover in the mills is rather too rapid for economical operation.

Varnished silk cloth and tape is reported 20 per cent higher than two weeks ago. Shipments are in general longer than for cotton goods because of a greater shortage of the semi-finished product. One producer of silk insulation is still shipping on orders of last June.

Within the last ten days insulating varnishes have advanced about 5 per cent.

Railways Face Long Deliveries on Insulators

Increased Export Demand and Malleable Shortage Responsible for Present Conditions

As the result of heavy ordering of high tension insulators by foreign interests and unimproved factory conditions in the malleable industry, railways now entering the market are being quoted from four to seven months on large orders of high tension insulators.

Large orders are coming from outside the country and payments are being made on the basis of cash on bill of lading, although some European countries are seeking longer terms. Italy and France are active in this field. The high cost of fuel in these countries is undoubtedly a great factor in the expansion of high-tension lines at this time. An order of 70,000 suspension units is being filled for shipment to Japan, for operation on 154,000 volts. It may be interesting to note here that an order for 10,000 units for this development has been placed in Japan. Among the orders for South America is one for 30,000 units of the 70,000-volt suspension type, destined for the Andes. Inquiries, too, for export trade are received in good volume.

Railways and power companies are ordering for maintenance purposes except in a few instances where extensions are being made.

These orders, however, are running into good volume as is witnessed by the long shipping dates quoted. These orders are increasing in volume and number and from the inquiries coming in give evidence of much work under contemplation.

Manufacturers of high-tension insulators have their hands full taking care of orders for shipment during the next six months. In general quotations are being made on a basis of shipment in four to six months, but there is still a certain amount of capacity, small, it is true, which can be turned over to care for special rush orders by moving ahead short time orders on which a slightly longer shipping date would make no difference to the buyer.

Factory production is reported at a little higher rate than earlier in the year. Labor is still regarded as the controlling factor in production, and its turnover is still rather high. Malleable shortage is giving considerable trouble in some plants, although at least one manufacturer reports a good supply coming from the foundry which has been his source for a good many years.

Prices on high-tension insulators were advanced from 10 to 20 per cent by at least one manufacturer, while others have reported no advance since early in the year.

1,376 Safety Car Equipments Ordered During First Quarter

Number of Equipments for First Three Months of 1920 Practically Equivalent to Number of Safety Cars for All of 1919 — 25 Per Cent of Railways Have Purchased Safety Cars

Safety car sales continue with a rush. Insistent increased demand from all sections of the country has resulted in the placing of 1,376 sets of safety car equipment during the months of January, February and March, 1920. This is one-half of one per cent less than the total number of safety cars ordered during the entire year, 1919.

Recent estimates made by electrical manufacturers, carbuilders and others place the number of safety cars to be built during the year at from 3,000 to 4,000 and the above total for the first quarter is conclusive evidence that these figures are conservative.

According to reports received from three of the four carbuilders who are manufacturing safety cars, production schedules are being increased and standard cars are being turned out as fast as they can be built regardless of the number on order. Lack of certain much-needed material, including sheet steel and equipment such as motors, control and airbrakes, is the only drawback which might seriously curtail production.

The purchasing power of the railways is another important factor which will directly affect production this year. At present, however, under the car trust certificate plan, purchases of safety cars are more easily arranged than for any other type. This is partly due to the marked economies that have been shown in the operation of safeties.

RAPID INCREASE IN SALES

Production of safety car equipments was commenced during 1916 and in that year forty-nine sets of equipment were ordered. This must not be confused with apparatus used on many so called one-man cars which were not safety cars. Only those cars are included which were equipped by the Safety Car Devices Company. In 1917, 520 sets of equipment were ordered and 518 during 1918. Of course, both of these were war years and the railways bought fewer equipments than during a normal period. Last year, 1919, showed an increase in sales of equipments of about 240 per cent over 1918, a total of 1,791 sets of equipment having been ordered during the

SAFETY DEVICES ORDERED SINCE 1915

	1916	1917	1918	1919	First Quarter 1920
Equipments	49	520	518	1791	1376
Safety Cars	187	280	644	1383	*545
Number of Railways	41	44	52	100	70

*Safety cars ordered during January and February, 1920.

year. The difference between this number and the total number of safeties for 1919 represents the equipments ordered by manufacturers for future delivery and also those equipments which have been placed on old cars, reconstructed in the railways' shops.

No estimate has been made for the number of sets of equipment for the entire year 1920, but if the pace which has been set so far continues throughout the year, more than 5500 sets will have been ordered by Jan. 1, 1921. Up to the present time more than 200 different railways in the United States, Canada and Cuba have placed orders for safeties, showing the duplication of railways ordering this type of car to be about 33⅓ per cent. According to the latest McGraw Electric Railway Directory, dated February, 1920, there are now in operation 798 trolley and third rail properties in addition to the cable, storage battery, gas-electric and electrified steam lines. Hence, at this time more than 25 per cent of the railways on which it is possible to operate safety cars already have in operation or have purchased this type of equipment.

Rolling Stock

Chautauqua Traction Co., Jamestown, N. Y., recently lost a snow-plow and a freight car in a fire at Stow, N. Y.

Beloit Traction Company, Beloit, Wis., according to reports has placed an order for two safety cars.

Pennsylvania & Ohio Railway, Ashtabula, Ohio, is reported in the market for ten city cars.

Sunbury & Susquehanna Railway, Sunbury, Pa., is reported to have purchased several cars.

United Railways, St. Louis, Mo., through its receiver, Rolla Wells, has asked permission to spend $2,000,000 for the purchase of 160 new cars.

Iowa Railway & Light Company, Cedar Rapids, Iowa, is reported to have placed an order for six safety cars.

Franchises

Knoxville Railway & Light Company, Knoxville, Tenn. — The Knoxville City Commission has granted the Knoxville Railway & Light Company a franchise for a line in Jessamine Street and Pratt Avenue.

Track and Roadway

Edmonton (Alta.) Municipal Street Railway. — This company will install 7,000 No. 2 ties.

British Columbia Electric Railway, Vancouver, B. C.—The British Columbia Electric Railway plans to construct a new line at a cost of $25,000.

Sacramento Northern Railroad, Sacramento, Cal.—The Sacramento Northern Railroad is building a siding ½ mile in length in West Sacramento.

Sacramento Northern Railroad, Sacramento, Cal. —The Sacramento Northern Railroad will build a standard gage single-track line with overhead trolley system from its branch track in Yolo County, Cal., to serve the mills and warehouses along the Sacramento River.

Illinois Traction System, Peoria, Ill. —The Illinois Traction System is contemplating the installation of 20 miles of additional track circuit signal.

Dauphin, Man. — The municipality of Dauphin plans to build a railway line.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway plans to extend its line in Water Street, Lawrence, Mass.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway will repair the tracks of its Quincy division at a cost of $130,000.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway will rebuild 25,000 ft. of track in Fall River, Mass. It is planned to expend approximately $140,000 on the work.

Columbus Railway, Power & Light Company, Columbus, Ohio.—Under the terms of an ordinance which became effective on April 3, the Columbus Railway, Power & Light Company must spend $2,400,000 on track extensions and other improvements within the next six years.

Philadelphia (Pa.) Rapid Transit Company. — The Philadelphia Rapid Transit Company proposes to build a line through Adams Street, the Boulevard, Courtland Street, Windrim Avenue, Twentieth Street and Wingohocking Street, Philadelphia.

Steubenville & Wheeling Traction Company, Wheeling, W. Va.—The City Council of Steubenville, Ohio, has passed an ordinance under which the Steubenville & Wheeling Traction Company will be required to relay its tracks on Third Street, Steubenville.

Power Houses, Shops and Buildings

Los Angeles (Cal.) Railway — The Los Angeles Railway has begun work on a ten-story office building at the corner of Broadway and Eleventh St.

International Railway, Buffalo, N. Y. —A carhouse, eight passenger cars, three snow-plows and a sweeper belonging to the International Railway were destroyed by fire on March 21. The loss is placed at $60,000.

Toledo Railways & Light Company, Toledo, Ohio.—A substation belonging to the Toledo Railways & Light Company was destroyed recently, the loss amounting to $50,000.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—The Niagara, St. Catharines & Toronto Railway plans to make extensive improvements in the St. Catharines district during 1920. The construction program calls for a total expenditure of $500,000. The plans include the erection of a new car shop at St. Catharines, to cost $50,000.

Trade Notes

Southwestern Engineering Company, Hutchinson, Kan., has opened a branch office at Fort Worth, Tex., with Harvey R. Rankin in charge.

Hydraulic Pressed Steel Company, Cleveland, Ohio, announces the consolidation of all of its interests under the name of the Hydraulic Steel Company of Cleveland.

Horace L. Fritschle has been placed in charge of the Chicago office of the Square D Company, at 431 South Dearborn Street, Chicago. Mr. Fritschle was formerly located in St. Louis.

Edward M. Burd and William C. Giffels have opened an engineering office in Grand Rapids, Mich. Both are University of Michigan graduates and were formerly connected with the Consumers' Power Company, in Michigan.

E. P. Palmer, formerly resident engineer of the Rapid Transit Subway Construction Company, has become associated with Warren, Moore & Company, New York City, as engineer directing the company's contracts in the New York territory. As captain of Engineers he served in France in the Transportation Department, A. E. F.

Metal & Thermit Corporation, New York, N. Y., has appointed James G. McCarthy, manager of its Canadian branch, with headquarters in Toronto, and has transferred Robert L. Browne from the New York office to Boston. Mr. Browne is to have charge of sales in New England States.

Clarence Goldsmith, who has been on the engineering staff of the National Board of Fire Underwriters, 76 William Street, New York City, for the past twelve years and late a major in the Construction Division of the United States Army, has been placed in charge of the branch engineering office recently established by the National Board at 234 South La Salle Street, Chicago, Ill.

W. A. Lodge is now connected with the Bussmann Manufacturing Company, St. Louis, Mo., in the capacity of research engineer. He will be in full charge of the engineering department, devoting his time to research and the technical development of the Buss fuse. Mr. Lodge has for the past four years been with the Underwriters' Laboratories of Chicago as research engineer. Previous to his connection with the Underwriters' Laboratories, he was professor of electrical engineering in two universities in the United States and Canada.

Inquiry 32,389.—A firm of merchants in Italy desires to purchase and to secure an agency for the sale of electrical supplies, etc.

Inquiry 32,372.—A company in India desires to be placed in touch with dealers and manufacturers of electrical supplies.

D. & W. Fuse Company's name has been changed to the D. & W. Fuse Works of the General Electric Company, Providence, R. I.

Union Insulating Company, Parkersburg, W. Va., is planning to erect a new plant, 80 ft. x 216 ft., to cost about $100,000.

Hazard Manufacturing Company, Wilkes-Barre, Pa.: A booklet giving a general description of the manufacture of its rubber-insulated wire.

Crescent Insulated Wire & Cable Company, Trenton, N. J., has awarded a contract for a three-story addition to its plant, 50 ft. x 150 ft., on North Olden Avenue, to cost about $40,000.

Westinghouse Lamp Company, New York, N. Y., has awarded a contract for the construction of an extension to its factory at Milwaukee, Wis., to cost about $400,000.

M. B. Austin Company, Chicago, Ill., announces that the Factory Mutuals Fire Insurance Companies have approved Trico renewable fuses in all capacities up to 60 amp., 250 volts.

Ideal Electric & Manufacturing Company, Mansfield, Ohio, is planning to increase its factory facilities materially this summer and to extend its standard line of machines to include also synchronous machines.

Charles F. Overly has recently been appointed general manager of sales of the Structural Tool Company, Cleveland, Ohio. For years Mr. Overly was connected with the manufacture of pneumatic tools and formed the Overly Industrial Tool Company.

W. E. Herring, formerly Pacific Coast industrial agent of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has been transferred to the engineering department in the Boston office of Stone & Webster. Mr. Herring formerly was chief engineer of the United States Forestry Service.

Brown Instrument Company, Philadelphia, Pa., manufacturer of pyrometers, thermometers, tachometers, indicating and recording instruments, is erecting two new buildings, one for the manufacture of recording thermometers, the second for a research department, at a cost of $100,000.

Kentucky-West Virginia Engineering & Electric Company, Ashland, Ky., has been organized to do a general engineering construction business, utilizing an armature and machine shop and engaging in wholesale and retail sales of electric supplies. Thompson Pierce of Bluefield, W. Va., is president; C. Biddison of Ironton, Ohio, vice-president and R. F. Carpenter of Ashland, Ky., secretary and treasurer.

Electrical Manufacturers' Export Corporation, New York, N. Y., was recently incorporated in New Jersey as a holding company of the Electrical Manufacturers' Export Association, a New York association. Capitalization is given as $100,000. The association has offices in fourteen principal cities of both hemispheres and is opening up three more offices. It acts in the interests of American electrical manufacturers only.

Edward P. Sharp, Buffalo, N. Y., manufacturer of the Ideal trolley wheel, has sold the business to L. E. Harmon, who will continue to manufacture the Ideal trolley wheel which was designed, manufactured and sold by Mr. Sharp for the past twenty years. The shop will be moved from its present quarters on Elliott Street to 308-314 Terrace in Buffalo, where better and more suitable quarters have been secured for manufacturing purposes.

Herbert Rice, who has been a member of the sales organization of the Cutter Electrical & Manufacturing Company and who has for some years past been its general sales manager, has resigned to enter the real estate business. Harry F. Darby, who was for many years in charge of the Cutter Company's Chicago office and who more recently has been sales manager of the Ward Electric Vehicle Company, will rejoin the Cutter organization as sales manager with headquarters in Philadelphia. These changes are effective about April 1.

Rome Wire Company, Rome, N. Y., has recently authorized an increase in capital stock to $4,000,000 7 per cent first preferred and $5,650,000 common, the shares in each issue being $100 par value. Kidder, Peabody & Company of New York and Boston are offering to the public $1,400,000 of the preferred issue. The proceeds of the sale of $1,400,000 of preferred stock will furnish additional working capital to care for the growth of the plant in Rome and to pay for plant and carry on the business of the Diamond branch of the Rome Wire Company in Buffalo, N. Y. The total quick assets of the company amount to $3,997,680, and the company's surplus is $2,033,118.

Charles C. Phelps recently became associated with the Uehling Instrument Company, 71 Broadway, New York City, combustion engineer, as well as manufacturer of CO_2 recording equipment and other fuel economy apparatus. He is devoting most of his attention to research work in connection with the efficient combustion of fuel oil in boiler furnaces. Mr. Phelps, a mechanical engineer from the Stevens Institute of Technology, has spent several years studying power-plant problems and for five years of this period he was connected with the Ingersoll-Rand Company, manufacturer of power-plant fective as of April 1.

New Advertising Literature

Star Brass Works, Chicago, Ill., manufacturing engineers, 3114-28 Carroll Avenue, Chicago: A twenty-four-page bulletin, No. 4-A, covering spray-cooling equipment for the cooling of water from steam and ammonia condensers.

Sanford Riley Stoker Company, Worcester, Mass.: A 48-page second edition of its general catalog on "Riley Underfeed Stokers," which describes every phase of stoker operation. Several pages of valuable engineering data are also contributed by the company's service department.

Locomotive Superheater Company, 30 Church Street, New York, N. Y.: Bulletin T-5, covering the use of superheat steam in operating engines and steam turbines. It contains "steam consumption" curves and "superheat" curves for various types of steam prime movers.

Benjamin Electric Manufacturing Company, New York, N. Y.: Bulletin No. 15, describing the Benjamin dome reflector, R-L-M standard, for shop lighting. Bulletin No. 17 covers its different methods of industrial lighting and gives illustrations of its different reflector units, etc.

Green Fuel Economizer Company, Beacon, N. Y.: A 44-page, illustrated bulletin, No. 152, on "Hi-Efficiency, Hi-Speed Radial Flow Fans—Forced Draft Service." The development and design, pressures and capacities developed of these fans are all fully described. Added are twelve pages of dimension sheets and nineteen pages of capacity tables.

Federal Machine & Welder Company, Warren, Ohio: Bulletins describing different types of its welding machinery as follows: Bulletin No. 31 covers Federal electric butt welders, Bulletin No. 32 Federal junior type spot welder, Bulletin No. 33 Federal "Universal" spot welders, Bulletin No. 34 Federal butt welders, and Bulletin No. 35 Federal No. 22-A electric tube welder and roller.

B. F. Sturtevant Company, Hyde Park, Boston.: A sixty-page illustrated catalog, No. 264, covering its motors from fractional-horsepower sizes up to 50 hp. Generators up to 600 kw., steam-turbine sets, gasoline-engine generating sets, commutating pole turbo-generators, inverted rotaries, balancer sets, propeller fans and many special applications of electrical apparatus are illustrated and described.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.: Annual catalog of electrical supplies for 1920. The book is cloth-bound, contains 1,456 pages and is thumb-indexed. A general outline of the company's industrial motors, controllers, railway equipments and power and marine machinery is also included. This catalog replaces all catalogs issued heretofore on details and supplies

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 55 New York, Saturday, April 17, 1920 Number 16

Association Standards Are Gaining a Foothold

THERE are good reasons for the belief that the American Association standards are gaining in use and popularity. As evidence of this, a recent visit by the writer to a large plant where special trackwork is manufactured disclosed the fact that the association standard girder guard rails are being specified for the major portion of the current orders passing through the plant. Incidentally, it was noted that the 7-in., 140-lb. section predominated.

Our talks with manufacturers representing other lines indicate that a similar situation exists with respect to the use of many other standards which bear the approval of the association. The long-standing tendency toward individual design seems, at last, to be giving way to the publicity which has been given to the standards. With this foothold gained in the strongholds of "personality" and "local conditions," the association should quicken its efforts to sell its standards to the industry, and the aid of the manufacturers should be asked to a greater degree. They should be reminded that their catalogs and advertisements should place emphasis upon every product which bears the approval of the association. There should be no let-up in the campaign of education which the committee on standards organized at last year's convention to advertise and popularize the several standards of the association.

"Count Ten. You're Blowing Up"

AS a maker of phrases Mr. Curran, president of the Borough of Manhattan, New York, is getting quite a reputation. In the early stages of the New York investigation Mr. Curran remained quiescent. As the investigation continued on its interminable way the thing began to get under Mr. Curran's skin. One day he arose and wrote himself down in local history by saying, "While the Mayor talks, the people walk." More recently in the traction inquiry he suggested to one of his fellows on the board that the alderman "Count ten. You're blowing up."

These are not weasel words. We know some people not in public life who could afford to count ten occasionally. One such is the manager of an electric railway who said in a newspaper interview that it was no further from the Mayor's office to the general manager's office than it was from the manager's office to the Mayor's. Of course, things which are the same distance apart are equally distant from each other. The Mayor to whom this quip was addressed probably didn't know the difference between Euclid and Mary Garden. Mayors don't have to be discriminating; managers do.

The manager's statement was foolish. It was not foolish because it was a fact, but because it was a fact it was foolish. That, perhaps, sounds Shavian, but it is not so Shavian as it sounds. The manager's act was courageous but foolhardy. The Mayor didn't count ten. He didn't have to.

Mr. Curran's advice is like that given by old Gorgon Graham. Summed up, old man Graham said that when you're in the right you can afford to keep your head and when you're in the wrong you can't afford to lose it. It would pay some electric railway men as well as others to paste this truism in their hats for reference. A man may be right in the convictions which he holds, but his attitude may be wrong. Count ten, gentle reader. You, too, may be blowing up.

Communities Are Acquiring the Sense of Responsibility

THE present strike of certain steam railroad employees may be worth all that it has cost and is costing the country if it establishes a proper sense of responsibility by the community for its own welfare.

The present day is eminently one of specialization in industry. This plan has many advantages, but it brings about a condition where a small group in any essential service can seriously inconvenience every one else by suddenly refusing to work. This is what is happening now, because while the firing of locomotives is only a very small part of our industrial life, reckoned in number of men employed compared with the total, yet it is a necessary cog in the machinery of industry.

How then can the community protect itself in this age of specialization from the unreasonable demands of a small but essential group of workers? It must obviously do something, because otherwise it would be completely at the mercy of any group anxious to increase its proportion of returns for services rendered.

One remedy is compulsory arbitration, but another, which was initiated during the Boston policemen's strike, continued in some parts of the Central West during the soft coal strike and is being extensively employed by the commuters about New York during the present firemen's strike, is the continuation of the work by volunteers.

All of us have specialized for so large a portion of our lives that we sometimes think it difficult or impossible to carry out any radically different task, even if only temporarily. But this difficulty has been found to be largely imaginary during this past week about New York, where prominent business men have been acting as volunteer firemen and crews on trains placed at their disposal by the steam railroad companies. Needless to say the affair has had a tremendous influence in developing a sense of community responsibility for its own welfare and there has been no scarcity of volunteers, either among the professional and business men or the students at the neighboring technical schools and colleges. The attitude taken by these citizens is that transportation is a necessity which must be continued during the time that the strikers and the railroads take to settle the points at issue.

The average American citizen is pretty adaptable and the war has developed a knowledge of the power of community action. It has also shown the reserve strength at its command and that the organization of this strength is not a difficult task. If unions are wise they will see the meaning of all this.

Rolling-Stock Equipment Suffers From Severe Weather Conditions

THIS is the time of year when the mechanical man wishes the equipment of the cars under his charge could be mounted inside the cars or on the roof. Few persons outside of the operating and maintaining forces of an electric railway realize the great amount of work that is necessary in order to keep the equipment on the road during the winter season. To keep the tracks clear from snow is a large task added to the usual work of running the road, but probably the greatest difficulties from the equipment man's standpoint come when the snow commences to melt and spring rains cause high water all along the line. To keep the tracks clear of ice the water must actually be swept off before it freezes. Frequently cars are required to operate through water from a foot to two feet in depth. Of course, part of this water enters the motors, carrying with it large quantities of dirt and other refuse.

Water produces harmful effects on the motors in two ways. One of these is by weakening the insulation. The damp mud remaining inside the shell soon deteriorates the field windings and grounds and short circuits continue for a considerable time after the extreme conditions cease.

The second way in which harm results is from ice. Some of the water which enters the shell freezes. This ice reaches the armature and even the commutator. In addition constant effort is required to keep the bearings from becoming hot, as water gets into the bearings and waste and this freezes and entirely prevents lubrication. Hot armature bearings inevitably result in rubbing of armatures on the pole faces, with resulting serious damage to windings and wire bands. It sometimes happens that the tracks on which cars are laid up out of service become flooded and freeze overnight, so that the cars actually "freeze in" and cannot be moved. Not only does this water and ice cover the tracks and form ice around the wheels, but it also enters the motors, so that they are also firmly frozen in.

The department of electrical repairs of a railway is a very busy place at this season. Hundreds of armatures come in for repairs and field coils are sent in on account of grounds due to water conditions. Many are water soaked so that they require drying out before repairs can be made. The motors are not the only part of the equipment to suffer either. Grid resistors become overheated from slow and severe operation and then they are suddenly splashed with water or slush. This causes the grids to break and an open-circuited grid usually means a "dead car." During storms and sudden thaws of the present winter some roads have reported a majority of their cars as crippled at one time. No wonder the repair men are busy fellows.

Illumination Has Close Relation to Maintenance Costs

A CONTINUAL question is, "Am I doing all I can to reduce maintenance costs?" In this connection, a topic often overlooked is the relation of good illumination of repair shops and carhouses to the subject of maintenance cost. If it were shown that by doubling the lighting costs a railway company could save from three to twenty times the added expense in reduced maintenance charges there is no master mechanic but would be interested. Yet this condition may exist in any shop.

Good illumination for mechanical work does not mean merely enough light to see objects worked on and tools worked with. It means that illumination which will allow the most efficient use of time, equipment and material in doing a certain job. Many elements enter into good illumination, and in this connection illuminating engineers have been getting some new results, due to their researches. One of these is that ability to see satisfactorily for work is a function, not of amount of light alone, but of amount of light multiplied by time, at least up to a certain "saturation point." That is to say, by changing the illumination from 5 foot-candles to 10 foot-candles, for example, the operator can select the correct tool twice as quickly, he can locate various parts of the machinery more quickly, can move about the shop faster. In short, equipment can be put through the shop in less time and that means at less cost. And, too, better vision means less equipment going out poorly or not fully repaired, only to fail again in service.

Another effect of improved illumination is a physiological or psychological reaction upon the workers in the shop, causing them to be in better spirits, to want to move faster. It invigorates or instills "pep." The beneficial effects of improved illumination are cumulative. Of course, the lighting units must be installed with judgment as to intensity and distribution to get the best effects. An illuminating engineer can help, but much can be done by trying.

Take a look at your own shop. It may be that you can do something in this line to reduce its costs.

More "Bouquets" for the Givers of Good Electric Railway Service

AS THESE words are written, steam railroad transportation in several parts of the country is badly tied up. Fortunately the electric railways have been "on the job" and have demonstrated their ability to handle a vast emergency traffic and thus to perform an unusual public service. This is the second occasion within a few weeks on which the electric railways have justly earned the praise of their patrons, the earlier one being the occurrence of the heavy snowstorms which visited several sections during the past winter. The writer happens to live on one of the lines of the Public Service Railway of New Jersey and can speak from experience of the splendid way in which that utility has helped to fill in the transportation breach caused by the defection of railroad switchmen, brakemen and others in the vicinity of New York City. Although reasonably familiar with the local transportation system he has gained much new information as to the possibilities of getting about at very creditable speed, even with the suburban steam lines in a state of almost complete paralysis. And the same fact is illustrated by other electric railways in the New York territory and in other parts of the country as well.

The bus has also played an important part in relieving congestion, often at prices which are several times the electric railway fares for the same lengths of ride. While the buses have done good service (at very profitable rates) they could have done much better for the public, and at lower cost, if they had formed a part of the rolling stock of the electric railway systems. A combined railway and bus system would prove to be a wonderful transportation machine, especially in times of stress, but also under normal conditions.

This paper has referred before to the essentiality of electric railway service. The point cannot be overemphasized. Under ordinary conditions the service is taken as a matter of course like air and water, except as a target for occasional shots of criticism. When trying times come round and transportation deprivation is the order of the day, then the inherent virtues of the service stand out prominently. And the people generally are becoming less reticent in expressing their encomiums. "Hurrah for the trolleys!" they say. "With all their faults we're glad they are still with us."

Tilting at Pavement Windmills Is Quixotic but Impractical!

CAN it be that our ever zealous civic officials are getting afraid that the goose which has so long laid the golden eggs of free pavements and perpetually free maintenance thereof is about to die an untimely death, strangled, as it were, by the generosity of the public officials in their refusal to grant a sufficient fare?

Can it be possible that they realize how proportionally large is the railroad "free" pavement area as compared with the total paved areas in their cities? We ask this question because in some cities the railways pave from 10 to 20 per cent of all the paved area in service, and were these cities to add such areas to those already maintained by them there would be a burden of cost which would surely make the taxpayers howl. For every mile of track in a paved street it is safe to say that the railroad pavement area now costs about $25,000, and in some large cities railroad pavements have been valued as high as $6,000,000.

These comments are elicited because of a statement which has recently come to our attention in which the argument is put forth by a city engineer that the common charge against the railway company for paving is just, and should even be increased, in spite of the fact that the car wheels do not touch the paving. As the thoughts expressed may be held elsewhere it is worth while to answer them in some detail.

To begin with, he says that car weights have vastly increased since horse car days and that these increases cause more vibration, which is detrimental to pavements. We grant the weight increases, but we can show him tracks and pavements over which 40-ton cars are operated without a tremor in the rails or pavement. He cites the fact that many roads are required by law to operate cars continuously, which prevents their cessation while pavements are under construction, as being detrimental to pavements. That all depends upon circumstances. Again, we can show him first-class track pavements over ten years old which were laid under constant car operation of say a 5-minute headway.

Our champion states that pavement surfaces should be impervious to water and that water cannot be prevented from getting down to the foundation in track pavements. Well, we can take him on a trip to many cities where the street railway engineers have succeeded in doing that very thing.

Our Sir Galahad then takes a tilt at costs. He says the presence of tracks requires a special and more expensive pavement construction. We can show him track pavements which are in far better condition than adjacent roadway pavements, and these track pavements not only did not require any more concrete than that in the roadways, but the track pavement actually cost less than the roadway pavement laid by the city. In connection with the special construction he claims as necessary, he says the rails require special types of brick at the gage side of the rails. Not so. Regular brick, properly laid, will serve as well or better.

Our expert, who hails from a rural city of 12,000 souls, calmly states that the presence of tracks requires an increased width of pavement in order to provide for the traffic on both sides of a car. He wants a 36-ft. curb width for a single track street. Well and good, but many real cities here in the East, where there are almost as many traffic cops as there are inhabitants in our up-state city, find that a great deal of business is done under dense traffic in streets of from 34 to 36 ft. curb width, and these streets have two car tracks.

He says a 24-ft. curb width is plenty for his borough, if car tracks be omitted. Very likely. But he misses the point when he says that his 36-ft. street, widened, as he says, for car tracks, costs the city any more for pavement. He forgets that the railway, with two tracks in the street, could be called on to pay for 18 ft. of pavement, leaving 18 ft. for the town, which is 6 ft. less than the 24-ft. width which he says is needed for a street without tracks and for which the town must pay all.

Next, on any street where there are tracks the burden of maintenance is partly, and in some cases almost wholly, borne by the railway companies. Railroad streets are usually main arteries and they attract traffic to them, which in turn takes greater toll in wear over the whole street. To that extent the city must suffer with the railroad and be glad that it does not have to maintain all of the pavement.

As a final argument in favor of the perpetuation of the uneconomic Section 178 of the New York railroad law, which requires the installation and maintenance of pavements by the street railroads, our gladsome knight solemnly affirms that the life of pavements on streets where tracks are located will be reduced 50 per cent. This is a broad statement to be based on such a large sphere of action as a town of 12,000. Again, we can show him pavements in tracks which will outlast the tracks and pavements laid fifteen years ago.

We have commented on this subject in a somewhat facetious vein the more to emphasize the principal fallacies in the views of so many engineers who are in charge of pavements in small cities. They do not get around enough to know what is going on elsewhere, and their opinions, formed from improper local conditions of track and pavement construction, are very apt to be wide of the mark. Yet our railway companies have to pay the price of such provincialism. It seems that there is a need for a campaign of education for the benefit of city engineers, with the object of proving to them that tracks and pavements can be made to work together successfully.

Safety Devices of the Safety Car[*]

Facts Regarding the Fundamental Characteristics of Safety Devices and the Principles of Operation of the Various Air-Operated Parts That Constitute the Equipment

BY JOSEPH C. MCCUNE
Assistant to District Engineer Westinghouse Traction Brake Company, New York, N. Y.

SAFETY devices which include the air brake and safety car control equipment have universally been accepted as necessary for the Birney safety car. But the necessity for safety devices does not arise from the structural features of such a car nor from any conditions of car construction, but rather from conditions of car operation. The fact that a car is double truck or single truck, light or heavy, single or double end does not in itself indicate whether safety devices are essential, but it is the method of car operation, whether the car is operated by one or by two persons, that determines this. Safety devices should be considered as a means whereby car operation by one person is made feasible and practicable. Probably such operation will be most successful both from an operating and a financial viewpoint with the standard Birney safety car.

Foreword to the Series

THE extension of the use of safety cars and the constant broadening of the field for them suggest the importance of familiarity with the various parts that constitute an equipment. Safety devices are essential to insure easy, safe and efficient operation of the one-man type of car. The cost of maintenance and the number of irritating troubles and delays which occur when such cars are introduced are influenced to a large extent by the familiarity which the operator and maintainer have with the new equipment. Most railways are unfamiliar with the new types of apparatus developed for this service until they actually have them as an addition to their rolling stock.

The subject of safety car equipment is therefore timely, hence with a view of giving the present or prospective user as clear an idea as possible of the functions of the various parts and the care that should be exercised in their use and maintenance the *Electric Railway Journal* has arranged for a series of articles covering this subject. This, the first of the series, takes up the fundamental characteristics of safety devices. Others will deal with the care necessary in the equipment installation, troubles that may occur and their remedies and a systematic outline of the best maintenance practice, together with equipment tests.—*Eds.*

Safety devices are demanded fundamentally because complete reliance cannot be placed upon human capabilities. If the mental man functioned correctly in every instance, automatic devices could be omitted; if the physical man had greater capacity, labor-saving devices would be superfluous; if mental and physical functions were properly co-related invariably, interlocking of operations could be dispensed with. But since some of these contingencies exist actually, the conditions of operation must be such that provision is made not only for outright man failure but also for the ordinary physical limitations. It is the function of the safety devices to furnish such provision.

To sum up, the safety devices provide for successful operation of the safety car because they insure that the operation shall be safe, proper and easy; safe, because man failure is provided for; proper, because the operator's movements are so interlocked that they must be taken in the proper sequence, and easy, because the operator's labors are reduced to the minimum by the use of air-operated devices.

The particular features that make operation safe, proper and easy are:

1.—The car cannot be started with the doors open because the brakes cannot then be released.

2.—The doors cannot be opened without causing a brake application sufficient to stop the car.

3.—Unintentional removal of the operator's hand from the controller handle will cause an emergency brake application.

4.—The brakes cannot "leak off" while the car is standing with the doors open.

5.—An automatic emergency application results if either of two pipes (emergency and safety control), running from platform to platform, is ruptured.

6.—The doors are changed from air-operated to hand-operated whenever an emergency application is made by the brake valve.

7.—The power is cut off, sand is applied and doors become hand-operated whenever an emergency application is caused by releasing the controller handle.

8.—If excessive cylinder leakage causes a service application to "leak off" while changing ends an emergency application will result.

9.—If the platform piping be ruptured by a collision an automatic emergency application will be obtained and the damaged piping will be so cut off as to prevent exhaustion of the main reservoir.

10.—After a stop the controller handle must be pressed down before the brakes are released.

11.—Ends cannot be changed without making a brake application before the operator leaves the operative end, or an automatic emergency application results.

12.—The sand is automatically applied in an emergency.

13.—The safety features are obtained without increase in the number of manipulative handles.

14.—The doors are air-operated.

15.—Sanding is accomplished by air without the use of a special handle.

16.—Provision is made for intentional and temporary release of the controller handle without emergency application resulting.

To determine how these various features are secured the principle of brake operation should be first understood.

It is believed that an explanation of the principle of operation will contribute to the reader's ease of understanding the detailed description to follow. All know that an air brake stops a car because compressed air admitted to a brake cylinder forces out the brake cylinder piston, which piston, through the medium of the levers making up the foundation brake rigging, presses the brakeshoes against the car wheels and so develops a retarding force which brings the car under control or to rest. If the brake equipment is such that air is admitted directly to the brake cylinder from the reservoir by means of a brake valve and no other means for such admission exist, then the equipment is said to be "straight-air" equipment. That is, the distinguishing characteristic of straight-air equipment is that the brake can only be applied by conscious manipulation by the operator. If, however, the brake is automatically applied under certain conditions, independent of the operator, then the equipment becomes an "automatic equipment." For an automatic brake the triple-valve principle is employed.

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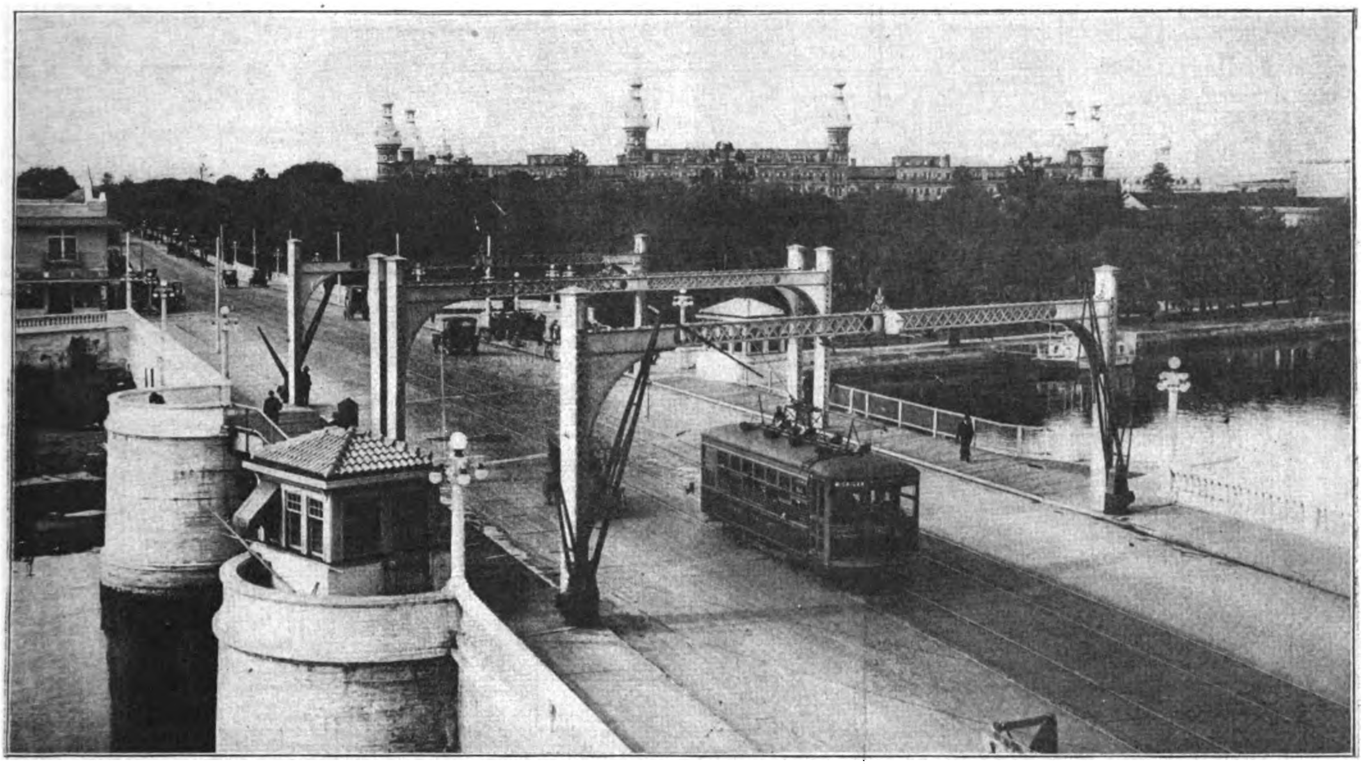
[*] The writer desires to express his appreciation of the courtesies tendered him by the Safety Car Devices Company and the Westinghouse Traction Brake Company.

A triple valve is a device in which a piston operates in a bushed cylinder. To the stem of the piston is attached a slide valve which travels back and forth over a flat slide-valve seat, covering and uncovering various ports in its movements. The slide-valve side of the piston is connected to a reservoir. The other side of the piston is connected to a pipe leading to a source of air supply. When air is admitted to this pipe the pressure built up on the pipe side of the triple valve piston forces the piston to move toward the reservoir until it encounters a stop. This position is known as "release," and in release position the reservoir and pipe are connected by a small feed groove in the piston bush. Consequently air flows by the feed groove and eventually pipe and reservoir are brought to the same pressure. Now if the pressure in the pipe be reduced very rapidly by allowing air to escape from it, since the pressure in the reservoir reduces less rapidly because of the slower rate at which reservoir air flows by the feed groove into the pipe, a pressure differential is built up upon the piston, which forces it and its attached slide valve away from the reservoir. This movement connects the slide-valve ports in a different way from that existing in release position and thereby causes the brakes to apply.

From this explanation it is evident that when the pressure in the pipe is reduced with sufficient rapidity the brakes will apply, whether or not this be brought about by the operator. That is, the brakes apply automatically whenever a rapid reduction of pressure in the pipe is obtained. If both service and emergency application are brought about by reductions in pipe pressure the equipment is said to be "automatic" brake equipment. If, however, only the emergency applications are so brought about the equipment is "semi-automatic." An emergency application is distinguished from a service application by the inability of the operator to limit the cylinder pressure attained.



SAFETY CAR CROSSING DRAWBRIDGE IN TAMPA

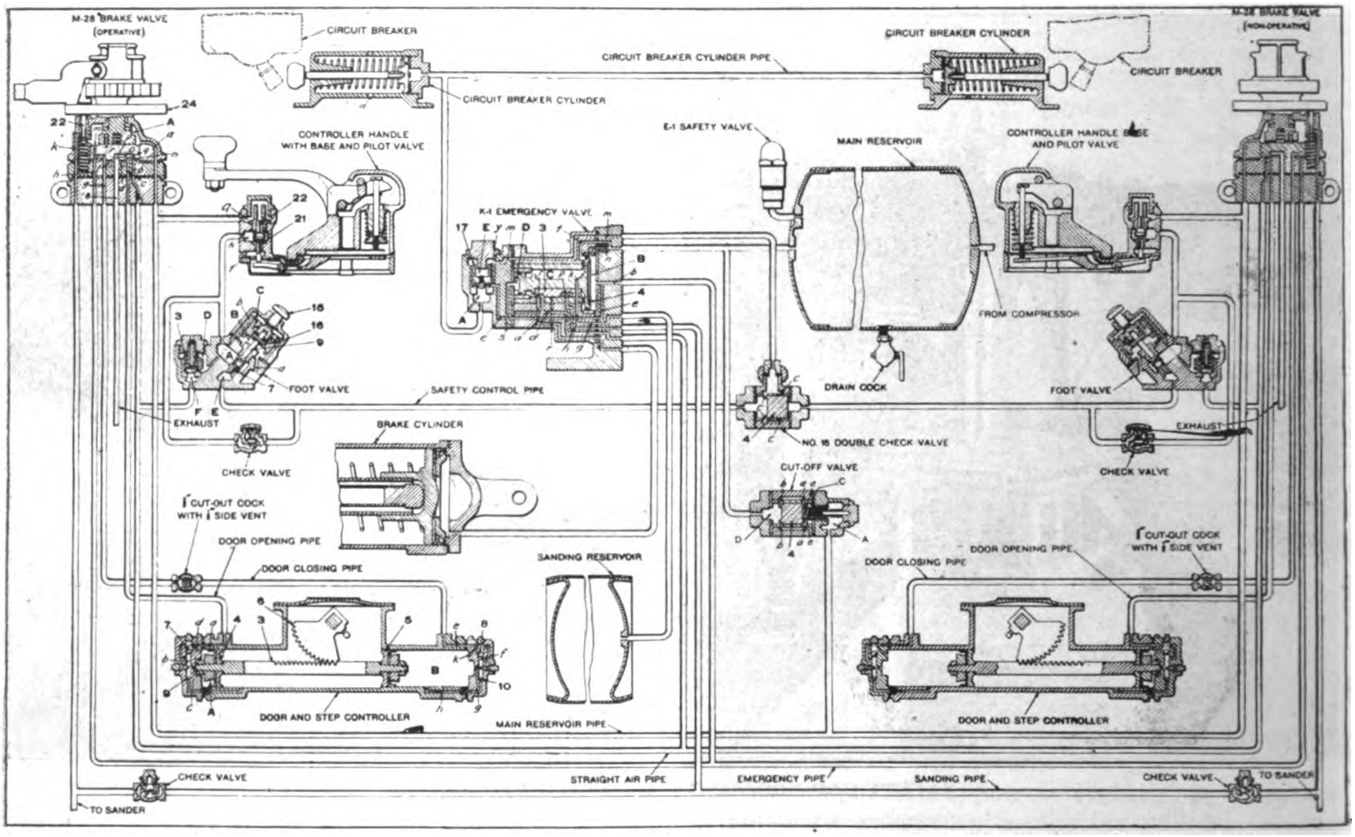
The equipment on the safety car is semi-automatic. Obviously it requires a valve of triple-valve type, this valve being designated the "emergency valve," and a pipe, called the "emergency pipe," normally charged to reservoir pressure, connected to it. It should be noted for use later in the description that when the pressure in the emergency pipe is rapidly reduced, regardless of how the reduction is brought about, an emergency brake application will be obtained. With the general principle that the reduction of pressure in a charged pipe may be utilized to cause movement of a piston, as explained above, in mind, the operation of the individual devices will now be explained.

OPERATING PRINCIPLES OF THE SAFETY DEVICES

The safety devices, by which throughout the description is intended the air brake and safety car control equipment, comprise the following (see diagram):

(1) One motor-driven air compressor, (2) two main reservoirs, (3) one safety valve, (4) one compressor governor, (5) two brake valves, (6) one emergency valve, (7) two controller bases with pilot valves and controller handle, (8) two combined foot and cut-off valves, (9) one double check valve, (10) one main reservoir cut-off valve, (11) one sanding reservoir, (12) two circuit-breaker cylinders, (13) one brake cylinder, (14) two door and step controllers and (15) sundry cocks and check valves. In addition to these devices, there should be mentioned five pipes running the length of the car: (1) The main reservoir pipe, (2) the emergency pipe, (3) the safety control pipe, (4) the straight air pipe and (5) the sand pipe.

Of the above devices it is considered that, since they are so well known, the compressor, safety valve, governor and brake cylinder require no description. The other devices will be taken up in order. When reference is made to the diagram it should be remembered that this is simply an illustrative drawing and does not show the true construction of the parts.

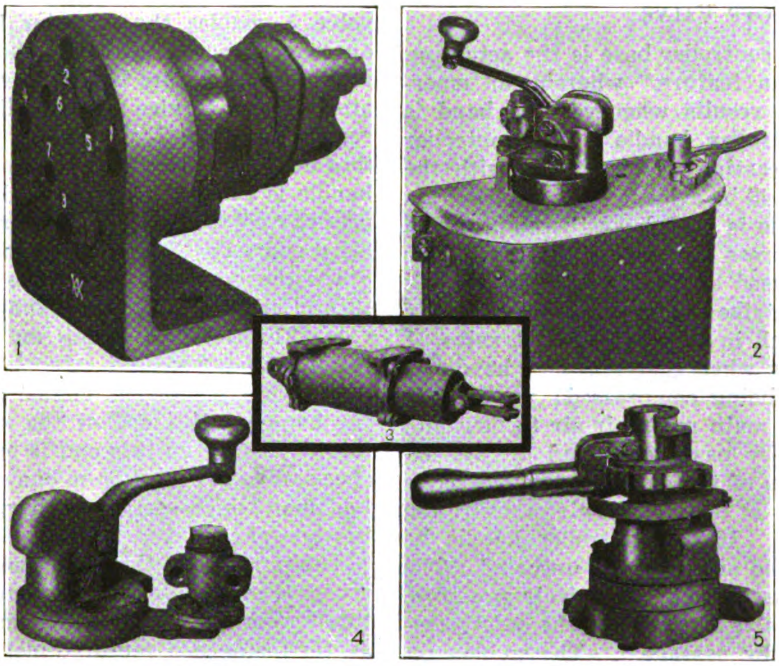

M-28 BRAKE VALVE (OPERATIVE)
CIRCUIT BREAKER
CIRCUIT BREAKER CYLINDER
CIRCUIT BREAKER CYLINDER PIPE
CONTROLLER HANDLE WITH BASE AND PILOT VALVE
K-1 EMERGENCY VALVE
E-1 SAFETY VALVE
MAIN RESERVOIR
CIRCUIT BREAKER CYLINDER
CIRCUIT BREAKER
M-28 BRAKE VALVE (NON-OPERATIVE)
CONTROLLER HANDLE BASE AND PILOT VALVE
FROM COMPRESSOR
FOOT VALVE
SAFETY CONTROL PIPE
DRAIN COCK
FOOT VALVE
EXHAUST
BRAKE CYLINDER
CHECK VALVE
NO. 16 DOUBLE CHECK VALVE
EXHAUST
CHECK VALVE
CUT-OFF VALVE
CUT-OUT COCK WITH SIDE VENT
DOOR OPENING PIPE
DOOR CLOSING PIPE
SANDING RESERVOIR
DOOR OPENING PIPE
DOOR CLOSING PIPE
CUT-OUT COCK WITH SIDE VENT
DOOR AND STEP CONTROLLER
MAIN RESERVOIR PIPE
DOOR AND STEP CONTROLLER
CHECK VALVE
TO SANDER
STRAIGHT AIR PIPE
EMERGENCY PIPE
SANDING PIPE
CHECK VALVE
TO SANDER

PIPING DIAGRAM OF AIR BRAKE AND SAFETY CAR CONTROL EQUIPMENT—RELEASE POSITION, DOORS CLOSED

The brake valve has six positions: (1) Release, (2) lap, (3) service, (4) handle-off, (5) door-opening and (6) emergency. To the brake valve are connected seven pipes (the numbers referring to raised figures cast on the pipe bracket): (1) door-opening, (2) emergency, (3) door-closing, (4) straight-air, (5) sanding, (6) brake-valve-exhaust and (7) main reservoir. To realize how these pipes are connected in the various brake-valve positions it is first necessary to understand their functions. A constant supply of air at the brake valve is required. This is provided by the main reservoir pipe, which makes permanent connection between the main reservoir and the chamber above the rotary valve in each brake valve. Pressure is required to open and to close the doors, as explained later. Consequently air flows into the door-opening pipe when doors are to be opened and into the door-closing pipe when doors are to be closed. The function of the emergency pipe has been explained. The pipe is normally at reservoir pressure. Since the equipment is semi-automatic, air in a service application is admitted directly to the brake cylinder by the brake valve. The pipe by which this air is conducted is the straight-air pipe. The function of the sanding pipe and of the brake-valve exhaust pipe is self-evident.

Three conditions should be noted in considering the brake valve. First, pressure to hold the doors closed is obtained from the emergency pipe rather than the main reservoir pipe, in order that the doors may be made hand-operated in an emergency, the manner in which this is accomplished being described later. Second, as a safety provision the doors are held closed by air pressure in all brake-valve positions except door-opening and emergency. Third, the emergency pipe must be cut off from chamber *A*, above the rotary valve, whenever air is flowing from this chamber. If the emergency pipe is not cut off, since the air in the pipe is at reservoir pressure, it will flow into chamber *A* and thence by whatever outlet the rotary valve has opened. This will bring about a reduction of emergency pipe pressure and possibly at a sufficiently rapid rate to cause an emergency application. To prevent such an occurrence the pipe must be cut off by the rotary valve. With these three conditions given it is apparent that: (1) In release the emergency pipe is open to the main reservoir, the door-closing pipe is connected to the emergency pipe and the door opening and straight-air pipes are connected to atmosphere (brake-valve exhaust pipe). (2) In lap the emergency and straight-air pipes are lapped, the door-opening and closing pipes remaining as in release. (3) In service the emergency pipe is lapped, the straight-air pipe is opened to the main reservoir, the door-opening and closing pipes remaining as in release. (4) In handle-off, same as lap. (5) In door-opening the emergency pipe is lapped, the door-closing pipe connected to the atmosphere and the door-opening and straight-air pipes to the main reservoir. (6) In emergency, the emergency door-closing and door-opening pipes are all connected to the atmosphere and the straight-air pipe to the main reservoir.

It has been stated that the door cannot be opened without obtaining a brake application and that the cylinder pressure is maintained so long as the door is open. By referring to the above it will be noted that when the brake valve is in the position (door-opening) which will open the door by air the straight-air pipe is connected to the main reservoir, so that the compressor pumps directly into the brake cylinder.



SAFETY CAR CONTROL EQUIPMENT

No. 1—Emergency valve. No. 2—Safety control group. No. 3—Brake cylinder. No. 4—Controller handle with base and pilot valve. No. 5—Motorman's brake valve.

In normal operation the piston 4 and the slide valve 3 of the emergency valve are in the position shown in the diagram. That is, the emergency piston does not move except in emergency operation. That this is so will be evident when it is considered that the pressure in chamber *B*, connected to the emergency pipe, is not reduced during a service application. Consequently, pressure differential sufficient to move the piston is not built up. The pressure on the piston is balanced, in so far as minor fluctuations in the emergency pipe are concerned, by means of passages *n* and *t*. The choke *n*, since it checks the flow of main reservoir air into the emergency pipe, permits the building up of a differential on the piston when the emergency pipe pressure is rapidly reduced. Chamber *D* is permanently connected to the atmosphere by passage *s*. Since chamber *C* is always at main reservoir pressure, a pressure differential, tending to hold the piston in release position, always acts on the small end of the emergency piston. This arrangement provides that slight differentials on the piston will not move it to emergency position, which is desirable in that it prevents undesired emergency application. In the ordinary service application air admitted to the straight-air pipe by movement of the brake valve to service position flows to the brake cylinder by the straight-air pipe and passage *d*, cavity *f* and passage *a* in the emergency valve. That is, as noted, the emergency valve does not operate in service operation, air to and from the brake cylinder merely passing under the slide valve.

In an emergency application, however, the pressure in the emergency pipe is very rapidly reduced. This means that the pressure in chamber *C* becomes considerably greater than that in chamber *B*, which obviously results in the piston with its attached slide valve moving toward the right. Main reservoir air then flows directly through the emergency valve into the brake cylinder by means of passage *t*, chamber *C* and passage *a*, and thereby applies the brake. Evidently the brake-cylinder pressure will be immediately built up almost to that of the main reservoir, and since connection between reservoir and cylinder is not cut off the capacity of the compressor is available toward preventing the brakes "leaking off." At the same time the sanding reservoir (which is normally maintained at reservoir pressure by means of passage *t*, chamber *C* and passage *g*) is connected to the sanding pipe by cavity *p* and passage *h*, which causes air to flow to all sand traps. Moreover, since pressure for holding the doors closed is obtained from the emergency pipe and since the air in the emergency pipe has been vented to the atmosphere the pressure on the doors is removed, which allows them to be opened by hand. Relay valve *E* is the valve by which an emergency application is brought about upon releasing the controller handle. As will be explained later, chamber *E*, connected to the safety-control pipe, is normally maintained at reservoir pressure. The annular space on the lower side of the valve is likewise maintained at reservoir pressure because it is connected to the emergency pipe through passage *e*. Chamber *A* is normally at atmospheric pressure because it is connected to the circuit-breaker cylinders, in which pressure cannot long be maintained because of the drilled opening in the circuit-breaker cylinder piston. If, therefore, the pressure in the safety-control pipe and chamber *E* is suddenly reduced the higher pressure acting upon the annular space on the lower side will force the relay valve upward. The emergency pipe is then connected to the circuit-breaker cylinders by passage *e*. A sudden drop in emergency pipe pressure results, with a consequent emergency brake application. In addition, the air vented to the circuit-breaker cylinder builds up a pressure therein which moves the pistons outwardly, causing them to strike the circuit-breaker handle and open the circuit breaker. Of course the power is then cut off. It will be noted then that a sudden drop in safety-control pipe pressure opens the relay valve, which causes an emergency application of the brakes, the sanding of all wheels, the cutting off of power and the release of air pressure on the doors. That the relay valve may not be opened by slight differences in safety control and emergency pipe pressures passage *y* through the relay valve is provided. which permits the equalization of such differences.

The reader should observe that to cut off power it is necessary that the relay valve open. It may be caused to open by "letting go" the controller handle. On the other hand, if the emergency application be brought about by the brake valve (reduction in emergency, but not in safety-control pipe pressure) the relay valve does not open. The first operation assumes an automatic emergency application because of man-failure, the second a conscious emergency application by the operator. In the former case the power must be cut off automatically; in the latter, it is done by the operator. Consequently, since no need exists, power is not automatically cut off when an emergency application is obtained with the brake valve.

SAFETY CONTROL GROUP AND COMBINED FOOT AND CUT-OFF VALVE

The pilot valve of the controller base is the actuating agency of the "dead-man feature," whereby an emergency brake application results whenever the hand is removed from the controller handle. The controller handle is pivoted in a casting which rotates with the handle's movement. It will be evident from the diagram that so long as the handle is held down the bolt, upheld by the handle. will compress the spring. If the handle be released the compressed spring will cause the bolt to move downward and strike the lever in the bottom of the controller base, which in turn will unseat valve 21 and seat valve 22. Now when the controller handle is held down (the spring being compressed) valve 22 is unseated, which permits main reservoir air to flow into the safety-control pipe by passages *a* and *h*. As explained in the description of the emergency valve, when the safety-control pipe is at main reservoir pressure the relay valve *E* is seated. If the controller handle be released valve 22 is seated and valve 21 unseated. The seating of valve 22 cuts off main reservoir pressure, while the unseating of valve 21 connects the safety-control pipe to atmosphere by passage *f*. The sudden reduction in safety-control pipe pressure resulting causes the relay valve to open and brings about an emergency application with a cutting off of power, a sanding of the rails and a release of door pressure, as explained above.

Any unintentional release of the controller handle will cut off the supply of main reservoir air to the safety-control pipe and at the same time connect the pipe to atmosphere. The resultant drop in safety-control pipe pressure will of course cause an emergency application. That the operator may at times desire to release the controller handle is obvious, in which case an emergency application is not desired. The emergency application is prevented in such an event by the combined foot and cut-off valve. Before the hand is released from the controller handle knob 15 (see diagram) is pressed in by the operator's foot. This causes valve 7 to seat and cut off the safety-control pipe from the pilot valve. Therefore, when valve 21 opens upon the release of the controller handle escape of safety-control pipe air does not result. It is consequently obvious that the operator's foot may relieve his hand whenever desired.

In the above description the case considered was where the operator held his foot on the knob while the car was in motion until such time as he again desired to press down the controller handle. At a stop where the operator is occupied in collecting fares it would be inconvenient for him to be compelled to hold down knob 15 continuously. Such a necessity is obviated by cut-off valve 3. When a brake application has been made brake-cylinder air enters chamber *F* and when a pressure of approximately 30 lb. has been attained valve 3 is forced upward, permitting brake-cylinder air to flow to the top of valve 16 and force it downward. This downward movement seats valve 7 and thus cuts off the safety-control pipe precisely as though knob 15 had been pressed in by the operator's foot. When the cylinder pressure has been reduced during the release to about 12 lb. the compressed spring above valve 3 will cause it to close. Chamber *C* is then immediately exhausted to atmosphere by way of passage *b* and the vent port above valve 3. Safety-control pipe pressure acting on valve 7 causes it to move to its upper seat and again connect the safety-control pipe to the pilot valve.

In addition to the function described above, cut-off valve 3 enables the operator to change ends without an "emergency" resulting when the controller handle is removed. Before leaving the operative end the operator makes a service brake application. This application results in valve 7 closing, as previously explained, so that an "emergency" does not occur when the controller handle is released. If the brakes "leak off" before the operator assumes control at what has been the non-operative end valve 3 closes, which causes valve 7 to open. Since the controller handle is not held down safety-control pipe pressure is exhausted to atmosphere by valve 21, thereby causing an emergency brake application.

The function of the double check valve is to cut off the non-operative end of the safety-control pipe, since the pilot valve on this end is open to atmosphere. The check valve is moved from one seat to the other, depending upon which section is charged and which connected to atmosphere.

The purpose of the main reservoir cut-off valve is to conserve main reservoir pressure in the event of a ruptured main reservoir pipe beyond the cut-off valve itself, as, for instance, a ruptured platform pipe. Without this valve a main reservoir pipe rupture would involve a very serious drain on main reservoir pressure. In service, air flows by passages *b* and *a* (see diagram) at such a rate that sufficient differential is not built up on valve 4 to compress the spring. In the event of a broken pipe, however, pressure in chamber *A* is so rapidly reduced compared with that in chamber *D* that a differential is built up sufficient to move valve 4 to the right and thereby cut off further outflow. The broken pipe is in this way disconnected from the main reservoir.

DOOR AND STEP CONTROLLER

The sanding reservoirs and circuit-breaker cylinders require no special description. The door and step controller (see diagram) is of the double-acting piston type with the pistons connected by a rack. The rack operates a segmental gear attached to a shaft, which shaft in turn actuates the rods and levers which open and close the doors and steps. With this type of controller the door is held closed by air pressure. When it is to be opened the door-closing pipe is connected to atmosphere and the door-opening pipe to the main reservoir. When it is to be closed the process is reversed, except that the emergency pipe is substituted for the main reservoir. Slamming is prevented by a cushioning effect, produced by a special porting arrangement. Air is admitted to the double-acting controller cylinder by large ports such as passages *f* and *k*; exhausted by smaller ports, *h* and *g*, reduced to *g* only after the piston has traveled about half of its stroke. Passage *g* may be regulated by the choke plug to make the door closing that desired.

A special ⅜-in. cut-out cock with side vent, in connection with which the brake-valve handle is used, is located in the door-closing pipe so that the motorman may, independently of his brake valve, take the air pressure off the door, thus making it hand-operated. This arrangement provides for those cases where the motorman may be forced to leave his car to turn a switch, etc.

The foregoing description applies to the latest design of safety devices. Many cars are in operation equipped with safety devices which do not include all those shown in the diagram, or perhaps may include some of the devices in different form. From the operation as explained, however, it is hoped that no difficulty will be encountered in understanding the functioning of these slightly different devices, since it has been the aim of the writer to explain the principles of operation rather than the particular detailed functioning of a specific device. He trusts that this exposition of principles has been of interest to the reader.

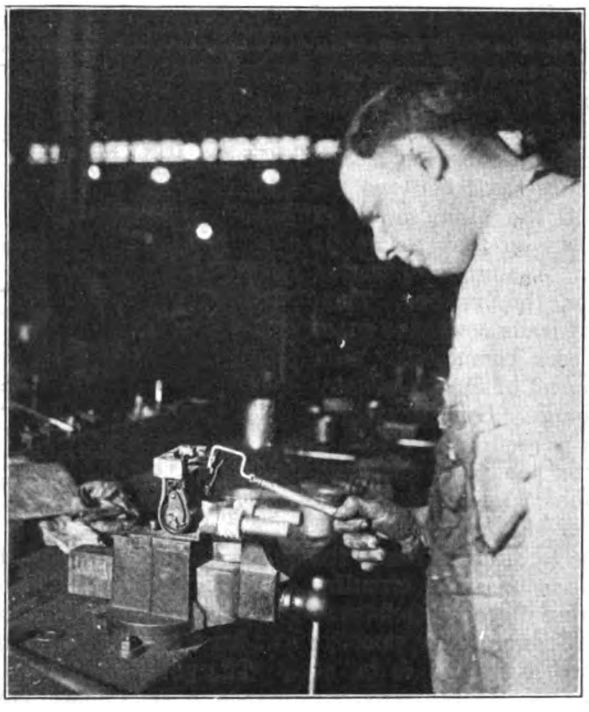
Maintaining Electric Railway Motors—I

Rewinding Armatures, Smoothing and Slotting Commutators and Correct Brush Methods Are Discussed in Detail

By JOHN S. DEAN
Industrial & Railway Motor Engineering Department, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

If SYSTEMATIC inspection and maintenance of car motors was ever necessary for the successful operation of an electric railway, it certainly is a paramount issue now. In fact, every piece of apparatus must be fully utilized if the railway is to give adequate service at the lowest possible cost.

The very nature of the service to which electric cars are subjected entails considerable wear and tear on the various parts of the car and constant and systematic care and attention are required to keep it in good operating condition. This is especially true of the motor, due to its position under the car, where it is exposed to outdoor weather conditions, and also on account of its rigid mounting on the car axle it is subjected to very severe mechanical shocks and vibration. Some of the precautions taken and methods used to keep the apparatus in good condition are outlined below.



TESTING STRENGTH OF BRUSH SPRINGS BY MEANS OF AN INDICATING SPRING BALANCE

Care Necessary In Winding Armatures

To insure the best life from an armature extreme care should be used when rewinding to see that every point that might cause failure is guarded against in a satisfactory manner. First of all, any sharp corners and any roughness in the slots that might damage the coils should be filed down and all chips and filings removed from the slots before the insulating material is applied to the core. The coils should fit tightly in the slot and be wound so that the tops of the coils are 1/32 in. above the band groove. Fillers should be used between the coils if necessary to meet the above conditions. The core bands will then pull the coils down to a tight fit on the iron, which reduces the movement of the coils in the slot to a minimum. If the coils are wound too high the bands will not rest on the iron, and when the insulation dries out in service looseness of the bands will result. Care should be used not to twist, bend or abuse the coils any more than necessary during the process of winding. The necessary crossing of coil leads, if not properly arranged, will cause short circuits when the pressure of the band is applied. The coils on the end windings should have a solid foundation for the bands, but pounding should not be carried to the extent that the coils or leads become damaged. Protecting pieces of insulating material should be inserted at all points where the coils cross and where there is danger of short circuits occurring. It is good practice to weave braid between the leads directly back of the commutator, on both top and bottom layers.

All leads should be tinned in such a manner that there will be no untinned copper in the commutator neck. The cotton sleeves on coil leads should not be permitted to extend into the commutator slot, as they may obstruct the flow of solder, which will result in poor commutation. The tool used in driving the leads into place should be free from sharp corners and edges, for a nicked wire might be the cause of a broken lead.

The following winding facts and rules will be of assistance:

The wave or two-circuit winding always requires an odd number of commutator bars.

When an even number of coils per slot is used there will always be an idle or dead lead.

When an odd number of coils per slot is used and there is an even number of slots in the armature there will always be an idle or dead lead.

When an odd number of coils per slot is used and there is an odd number of slots in the armature there will never be an idle or a dead lead.

CARE OF COMMUTATORS

The band over the front V-ring of a commutator should be wiped off clean every month. After cleaning, painting with an air-drying varnish makes cleaning easier the next time. Painting every six months is advisable.

Flat spots, high or low bars, ridges, burned spots, etc., should be smoothed up. Where these are not bad the motor need not be removed from the car. A tool can be made by mounting a block of wood on a stick, one face of the block being cut to the radius of the commutator and lined with sandpaper or stone. As the car is run by the other motors this tool, held against the commutator, will smooth the rough spots.

The armature should be removed from the car and placed in a lathe for the turning of the commutator if its face is very rough. After turning, the grinding of the surface with a fine abrasive stone gives a very smooth and true surface and improves commutation. Holes left by defective mica or pits in the side of bars can be filled with commutator cement.

In removing leads from the commuator neck a thin "drift," driven toward the armature shaft between the side of the commutator neck and the filling piece or wedge, will loosen the filling piece so that it can be easily forced out with a gouge. A similar operation on the leads will remove them from the first bar. Then with one commutator neck free of leads clearance space is available for the bending of each commutator neck consecutively, permitting the removal of all the remaining coil leads by means of the gouge. By this method no heating of the soldered joints is required.

The commutator slots should be kept well undercut, 3/64 in. maximum; 1/64 in. minimum; the front V-ring clean and well painted; the edges of commutator face rounded, 1/16 in. radius front, 1/16 in. radius rear; the commutator free from oil, grounds or short circuits; the rear of commutator sealed from dirt and moisture; the commutator tight; the face of commutator smooth; the neck full width, and the mica extending 1/16 in. at rear.

The commutator should be re-undercut before it is worn flush, since the groove left will guide the saw and make the work much easier. After slotting is completed the face of the commutator should be thoroughly polished and cleaned of all particles of copper by means of sandpaper.

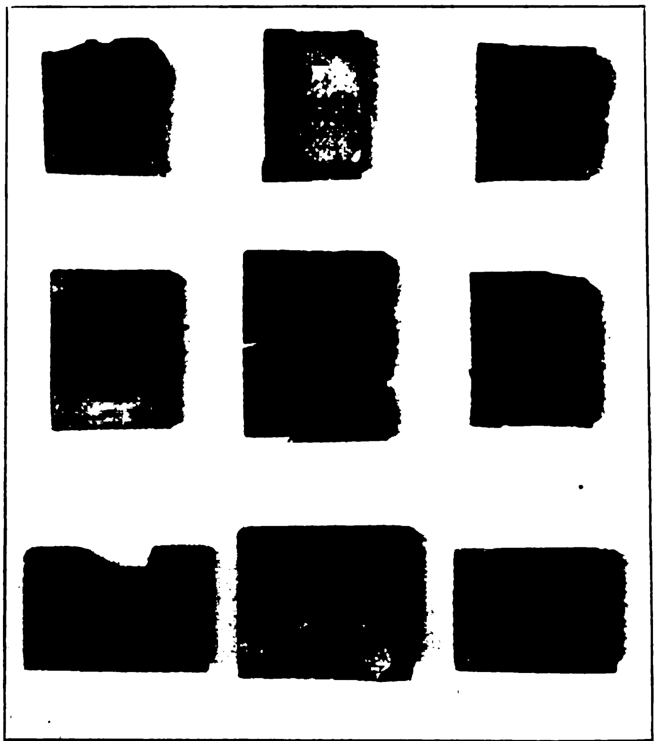
It is essential that all particles of mica be removed from between the segments by this operation, so that it is advisable to use a saw about 0.005 in. thicker than the thickness of the mica to be undercut. A small-diameter saw must be used in order to cut the slot to the proper depth and at the same time not cut into the neck of the commutator. After the slots are sawed it is sometimes necessary to go over them with a small hand-cutter, or scraper, to remove all remaining particles of mica.

Where commutation trouble is frequent it is good practice to use a V-shaped hand tool to round the edges of the under-cut grooves between bars to about 1/32 in. radius. This can be done without removing the motors from the car.

Clean undercutting of commutators eliminates high mica, thus reducing burning of the commutator bars and giving extended life to carbon brushes. By this means practically all flashing is prevented and maintenance costs are greatly decreased.

MAKING BRUSHHOLDER REPAIR

To care for the brushholders of the railway motors intelligently it is necessary for the maintainer to be familiar with the construction and purposes of their parts. In repairing and replacing a modern railway motor brushholder of the insulated-pin type the following points should be considered:



CONDITION OF RAILWAY MOTOR CARBON BRUSHES AFTER BEING USED IN VARIOUS TYPES OF SERVICE

The brushholder castings and mechanism should have at least 3/4 in. air clearance from the motor frame.

The porcelain insulators give sufficient creepage distance over smooth corrugated surfaces to keep the brushholders from becoming grounded to the frame and should always be kept tight on the pin by putting pieces of treated linen between the porcelain and tube. They should be kept free from carbon dust and dirt to prevent current from leaking over the surface. It is a question if porcelain insulators are necessary, and in some cases they have been left off with satisfactory results in service.

Railway motor frames, as built today, have machined pads for supporting the clamping blocks of the brushholders exactly in the neutral position. On replacing brushholders the clamping blocks must be seated properly. The carbon box should be parallel with the commutator bars and the distance from the center line of one box to the center line of the other box on a four-pole machine should be equal to one-fourth the number of commutator bars. The coil short-circuited by the brush should be midway between the main poles. Ordinarily this means that the brush will be opposite the middle of the main poles. Brush spacing is adjusted by the manufacturer and will be correct if the clamping blocks are always seated properly. Care should be exercised to see that the brushholders are those belonging to the motor and that they are not damaged.

The underside of the carbon box should be kept within 1/8 in. to 3/16 in. of the commutator surface, so as to prevent breakage of carbons. This adjustment is made by loosening the clamping block which allows the brushholder to move until the correct setting is obtained. The nut which holds the clamping block should be carefully tightened so that the brushholder will not come loose. A piece of fiber, tapered from 1/4 in. to 1/16 in. thick, makes a handy gage for use in securing the desired setting.

About 5 lb. of spring pressure per square inch of contact surface is generally considered good practice. This will give a range of pressure on carbons from 4 lb. to 7 lb., depending upon the size and grade of carbon. Other factors that govern this pressure are the amount of sparking, the play in the armature bearings and the track conditions.

To prevent breakage and side wear of the carbons the fit in the box must be made as snug as possible without binding. This clearance should never be allowed to exceed 1/32 in.

The shunt formerly used on the carbon has been replaced by a shunt on the brushholder which connects the contact tip on the finger and the main casting. This shunt must be large enough to carry the current, and the connections at the ends of the shunt where fastened must make good contact and be made permanently secure. The ends may be brazed, soldered or riveted. If a good electrical path is established for the current through the shunt much of the side wear of the carbons and burning of the carbon box is prevented. Therefore it is very important to keep the shunts in good condition.

The object of the contact tip is not only to transmit the pressure to the top of the carbon, but to conduct current from the shunt to the carbon or from the carbon to the shunt. The shape of the contact tip should be such that it will do the least damage to the top of the carbon and provide a large contact area to carry the current. A flat tip about 1/16 in. thick gives very good results in service.

Cable leads should be supplied with sleeves or terminals and connections should be kept tight by means of jam nuts and lock washers on the set screws to secure a good electrical as well as mechanical contact.

Carbon dust and dirt in the working parts of a brushholder usually cause it to work stiffly. These parts should, therefore, be kept clean and occasionally lubricated. If neglected they either become tight and do not provide enough pressure or they become so badly worn that the parts get out of line, causing the tips to press on the carbon box instead of the carbon.

CARBON BRUSH SELECTION IS DIFFICULT

It is difficult to select a grade of carbon brush for railway motors by a casual inspection or any simple tests. To secure the right brushes requires a thorough knowledge of the various grades of carbon, backed up by long experience in service, and even then unsatisfactory applications are sometimes made. When a selection is being made a few fundamental operating conditions should be considered, such as commutation, life of commutators, life of brushes, frequency of inspection, current density and cost per car mile.

These factors will vary more or less with the design of the motor, the brush tension, the design of the brushholder, the location and spacing of the brushes, the condition of the roadbed, the condition of the equipment, armature bearings and commutator surface, the weight of the car, the number of motors per car, the scheduled speed and many other conditions.

Since all of these factors must be taken into consideration, the best and most reliable results are obtained by making a test of recommended grades in service under actual operating conditions. Carbon brush manufacturers generally are willing to assist the operator in making such service tests. The following general information regarding carbons will help the operating man more intelligently to select carbons for service tests.

CLASSES OF CARBON BRUSHES

By the use of carbon in the form of graphite and coke the following general classes of brushes are manufactured and available for railway work: Carbon brushes made of crushed coke and binder, graphitized brushes made of carbon and then electrographitized, and graphite brushes with natural graphite and binder.

For the modern commutating-pole railway motor having commutators undercut, with due consideration of costs per car-mile, brush end wear, side wear, breakage, life, commutation, life and maintenance of commutator, etc., the brushes which are best suited for railway motor service are graphitized brushes, which give the best all-around results. Carbon brushes are next best, while graphite brushes have very special and limited uses.

For use in the more modern brushholders the carbons should not be over 2 in. long when new and they should not extend above the top of the carbon box. If longer they are subjected to a greater side pressure, due to the action of the contact tip, which increases the side wear, tends to bind the carbon in the box and reduces the direct pressure on the surface of the commutator. This excessive side wear causes them to be discarded before the added length can be used up in end wear. Approximately the same mileage can be secured from the shorter carbon, and hence, since the carbons are bought on a cubic-inch basis, the first cost is less.

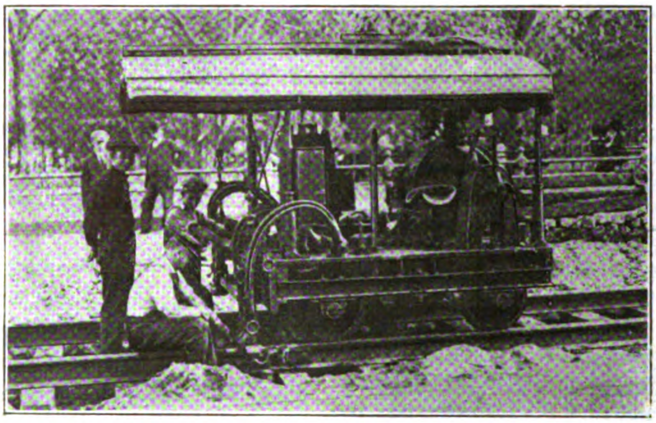
The width of brushes is not so important; they can have as much as 1/16 in. clearance in the box without causing any trouble in service. The thickness, however, is very important, for if the initial clearance between carbon and carbon box is much less than approximately 0.006 to 0.008 in. the carbon will tend to stick in the box and bind. If it is greater, rattling in the box will ensue, quickly wearing away the sides of the carbon, which will also tend to chip and break, thus reducing its life.

Mr. Masuda, the newly appointed chief of the street car section of the Municipal Electrical Bureau of Tokyo, Japan, is having his hands full of labor problems. The men want improved working conditions, but so far the proceedings have consisted largely in exchange of words, and demonstrations by the men.

Using Brazed and Welded Bonds

The Various Methods Used with Contact Resistance, Arc Weld and Gas Weld Rail Bonding Are Described and Some of the Troubles Experienced Are Detailed

BY G. H. MCKELWAY
Engineer of Distribution Brooklyn Rapid Transit Company



WELDING BONDS WITH ROTARY CONVERTER MOUNTED ON CAR

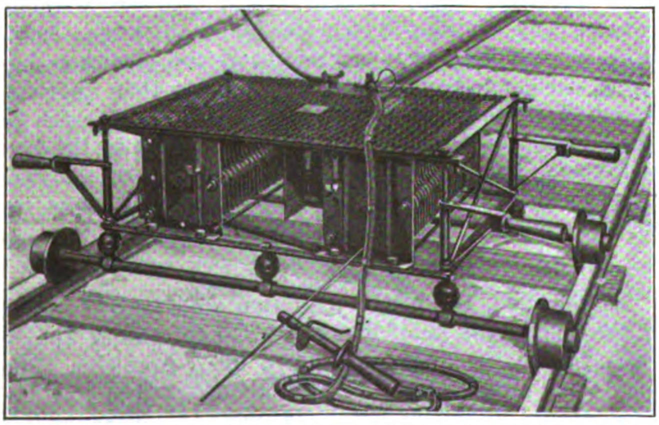
WHILE the troubles experienced with bonds have been many and varied, few if any of them can be laid to high resistance of the conductor. That trouble disappeared with the general use of copper as the metal from which the bonds are made. The breaking of the strands or ribbons of the bonds is still a source of considerable trouble, but in most cases this is due to poor design of bonds which are necessary to fit some special condition, due to unsuitable joint plates or drilling, or to the installation of bonds of proper design on poorly maintained rails. Excessive movement causes breakage, but it is necessary to protect the bonds from theft, and so they must be placed under the plates.

The strands of some bonds are broken soon after installation, because although the bonds have been suitably designed for normal conditions they are used on installations where the bond holes cannot be drilled the proper distance apart, and as a result the bonds have to be squeezed into all sorts of queer shapes to make them fit into the space assigned to them. An accompanying illustration shows one such installation where, on account of its temporary nature, it was not thought worth while to purchase bonds of the right length, but instead those that were in stock were used.

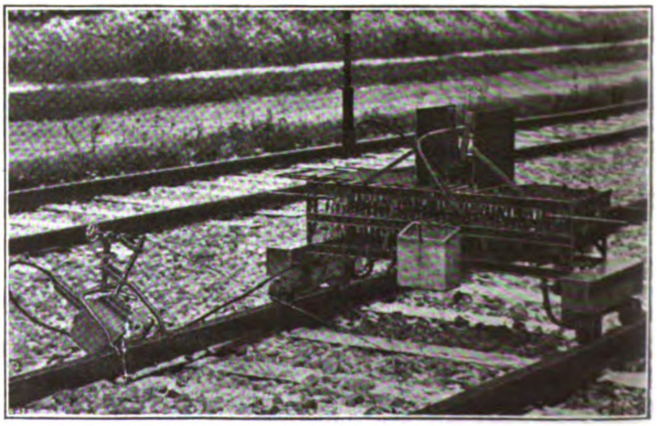
The great trouble, however, has not been with the conductors connecting the two terminals of the bond nor with the terminals themselves, but rather with the deterioration of the contact between the terminals and the rails. The most intimate contacts are obtained by fusing or welding the terminals to the rail. This results in what is practically an alloy of the two metals where they touch each other and an attachment is produced which is almost impossible to separate. If the bond is pulled away from the rail it will be damaged and part if not all of the terminal will be left adhering to the rail.

Such a connection would appear, at first thought, to be the ideal one, but, like all other methods of bonding, it is not perfect, although for much work it is more nearly perfect than any of the other forms. In the first place the equipment required to install the bonds is much more bulky than that needed for any of the other bonding processes. The class of labor represented by the bonders must be at least as high and preferably higher than that required for the installation of the soldered bonds and much higher than that needed for putting on the expanded terminal bonds. Furthermore the temperature to which the bond and the rail both have to be raised is much higher than that needed for sweating on the soldered bonds, and there is danger of overheating and making either the copper in the bond brittle or the steel of the rail so soft that it may be deformed by the blows from the wheels passing over the joint. The head of the rail receives hard service under any condition, and where the receiving ends of the rails are low conditions are rapidly aggravated if the composition of the steel is changed by overheating.

There is, however, no danger of overheating if care-



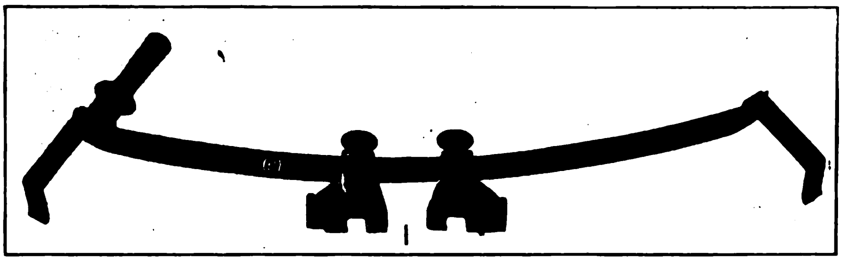
600-VOLT RESISTOR OUTFIT FOR ARC WELD RAIL BONDING

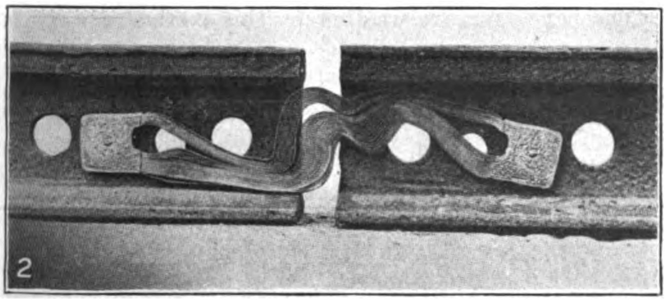


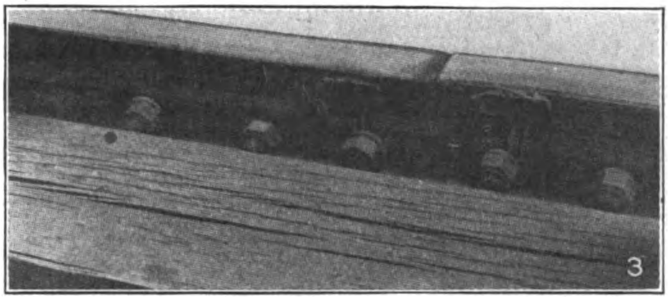
RESISTANCE GRID MOUNTING FOR USE IN CONTACT WELDING ful, competent bonders are employed, as has been proven by results from many thousands of bonds installed by this process. The danger, however, is always there.

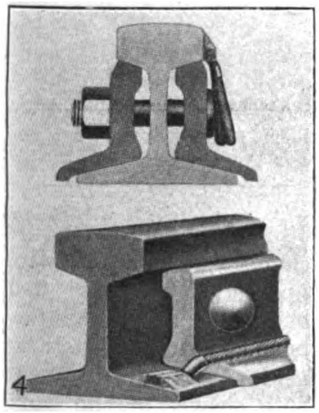
There are two general ways of generating the heat needed to apply the bonds. In one the passing of current at low voltage through the bond and the rail heats both of them to such an extent that the copper bond can be brazed to the steel rail. In the other method the heat is applied by means of an arc, the arc being made either with electric current or with burning gases.

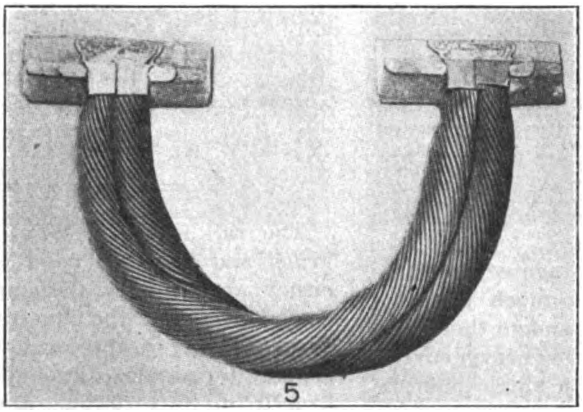
Of the two methods the one using the resistance of the contact between the rail and the bond is the older, but requires more cumbersome apparatus than the arc method, especially when the low-voltage current is produced by an "inverted" rotary converter mounted on a car. This changes direct current at railway voltage into single-phase alternating current at a voltage which is reduced through a step-down transformer.











No. 1—Clamp for holding bond in position while it is being welded.
No. 2—Bond shaped to meet special conditions in temporary track.
No. 3—Welded terminals adhering to rail after conductors have been torn away.
No. 4—Installation of bonds on ball and base of rail.
Nos. 5 and 6—Gas-weld bonds with steel terminals.

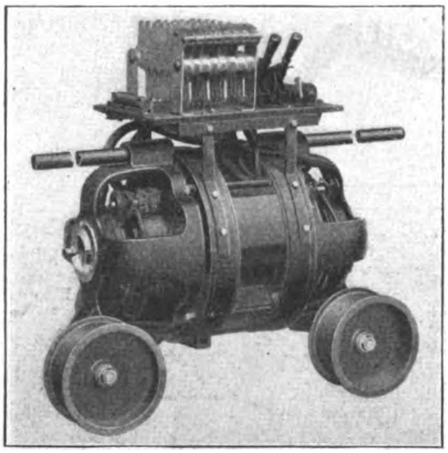
TYPES OF WELDED AND BRAZED BONDS

Two sizes of rotary converters are used, one of 18-kw. capacity and capable of welding bonds up to 350,000 circ.mil section and the other of 30-kw. capacity, which can be used with 500,000 circ.mil bonds or with bonds of even greater section. When it is desired to move the car from point to point the rotary can be used as a motor, a clutch and chain being provided for transmitting the power to the wheels. For covering long distances it is claimed that speeds up to 30 m.p.h. can be obtained. With such speeds there is no reason why the line should be blocked or traffic delayed while the car is traveling to and from the point where it is working.

While welded bonds can of course be applied to any portion of the rail, it is much more common to install them on the head than anywhere else. Those portions of the head against which the terminals rest are first cleaned with a motor-driven grinder. The terminals, covered with a piece of sheet brass folded around each one, are first painted with borax and then placed against the rail and held there by being clamped between the carbons. Current is then applied, heating the rail and the bond terminal and also melting away the piece of strip brass which is used for brazing the terminal to the rail. To fasten one terminal of an ordinary No. 0000 bond securely to a rail requires about 2,000 amp. at 5 volts for a period of approximately one minute. The time taken for welding both terminals is two minutes plus an allowance for the time spent in moving from one bond to the next and in getting the carbons accurately located at the points where the terminals are to be installed. There is also a little time lost in clamping the bond onto the rail. As a result, the time required to put on a bond will vary from four to six minutes and the latter rate of ten bonds per hour is a good standard for straight undisturbed work covering several hours.

The welding cars are equipped with a turntable jack attached under them, so that, if necessary, bonding can be done under traffic and the car can be removed from the tracks when a passenger car approaches. When bonding is done by this method only about half the number of bonds can be applied in the same time that can be put on if the car is worked continuously. To remove the car from the tracks it is jacked up, turned at right angles and then pushed off the track by using two pieces of channel iron as temporary rails. Large cars, however, are too heavy to be handled in such a manner by their ordinary crew, so that they must work continuously.

When this outfit is used on lines that have not as yet been electrified and that are being bonded in anticipation of such electrification, instead of the rotary converter being mounted on the car its place is taken by a low-voltage generator driven by a gasoline engine. In order to render the welding outfit lighter and more easily handled, one company has designed a welding equipment with resistance grids mounted on a frame running on four wheels of small diameter or placed on a cart. The frame is light enough to be lifted off the track and the clamps are not attached directly to it, but receive the current through flexible leads running from the grids to them. This arrangement makes it unnecessary for the frame to be kept on the tracks while the terminals are being welded to the rail.



DYNAMOTOR FOR APPLYING BONDS TO RAIL

This apparatus has the great advantage of lightness, but has the disadvantage of wasting much power in the resistance and of being liable to damage the trolley wire by overheating, on account of the heavy current being drawn from the single wire at a single point by means of a contact that is not always a good one.

TWO METHODS OF ARC WELD BONDING

The methods of welding the bond terminals to the rails by the use of an arc can be divided into two general classes, depending upon whether the arc is made by electricity or by the flame from a gas torch. The electrical method can be still further subdivided into arcs drawn from current supplied by a low-voltage dynamotor or motor generator and those in which the trolley current is used and resistance is placed in series with the welding terminals.

When the dynamotor is used a specially constructed light-weight type furnishes the current. This machine is mounted either on a light cart or on a low carriage normally resting on the rails, but so light that it can be picked up and placed at one side of the track out of the way of traffic when desired.

The bonds are merely copper ribbons bent into U-shape, with the ends of the ribbons surrounded by strips of copper to hold them in place. Bonds are applied vertically to the head of the rail, being held there temporarily before and during the process of welding by clamps which act as both clamps and molds and are kept in place on the rail by a thin steel strap which acts as a spring. An arc is drawn between the rail and the carbon electrode. The copper terminal of the bond is fused with the steel of the rail and additional copper besides that in the bond itself. The heat not only welds the copper to the rail but melts the copper in the ends of the ribbons into a solid mass, so that when the mold is removed there is a lump of copper at each end of the bond fused directly to the rail and into which all of the ribbons are fused.

When neither a rotary converter nor a dynamotor is used for reducing the voltage the reduction is obtained by placing resistance in series with the arc and so cutting down the voltage that at the arc it is only a small proportion of the trolley voltage, although even then at the arc the voltage, with the use of resistance in series, is much higher than when the dynamotor is used. A typical resistor is shown in one of the accompanying illustrations.

The bonds for arc welding by this method are much similar to the ones made for use with the dynamotor, but are made in two general types, one all copper and the other with copper strands but with steel or steel-covered terminals. If the all-copper bonds are used they are brazed to the rail by means of a special flux wire, as is done when the revolving machinery is used to transform the current. However, the better method is to make use of the steel or steel-covered terminal and then to attach the terminal to the rail by melting down an iron rod used as a welding terminal and combining that iron with the steel of both the rail and the bond terminal. A pure iron rod, such as the "Armco" iron, is needed and the rod should be about $\frac{3}{16}$ in. in diameter. With such a rod a current of approximately 150 amp. will give the best results.

CLEANING IS ESSENTIAL

The rail is first cleaned with a grinder or a wire brush and then the bond is clamped in position with either an ordinary C-clamp or one shaped like that shown in one of the illustrations. The bond manufactured by one of the large bond companies consists of copper terminals surrounded by Armco iron shells brazed to the terminals and with sleeves of the same material to protect the wires where they leave the terminals. The welding of the copper to the steel is done at the factory, which insures a better job than when the work is attempted in the field. After the bond has been clamped to the rail it is welded there by the arc and the metal melted from the rod is deposited so as to form a triangular mass above the top of the terminal. The sloping form of the metal above the terminal not only adds strength to the attachment of the bond to the rail but prevents the bond from being sheared off if struck by the wheels of wagons or automobiles, and is a patented feature of this bond.

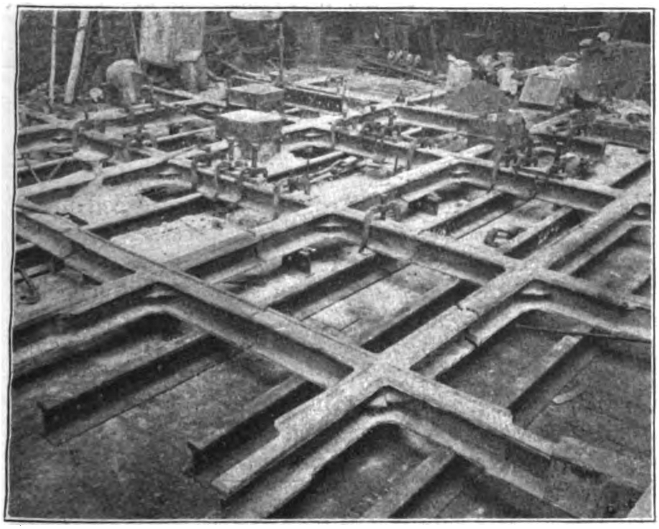
The electric arc is not the only one used for attaching bonds to the rail and many bonds are put on by the use of oxy-acetylene torches. These torches do not make so hot an arc as does the electric current, but it is hot enough for bond welding, and as it is more easily controlled than the electric arc it is for that reason preferred by many engineers, even when they can use electricity for welding. It is, of course, the only type of arc welding that can be used on new track before it has been electrified, unless one of the few gasoline engine driven units which have been manufactured is used.

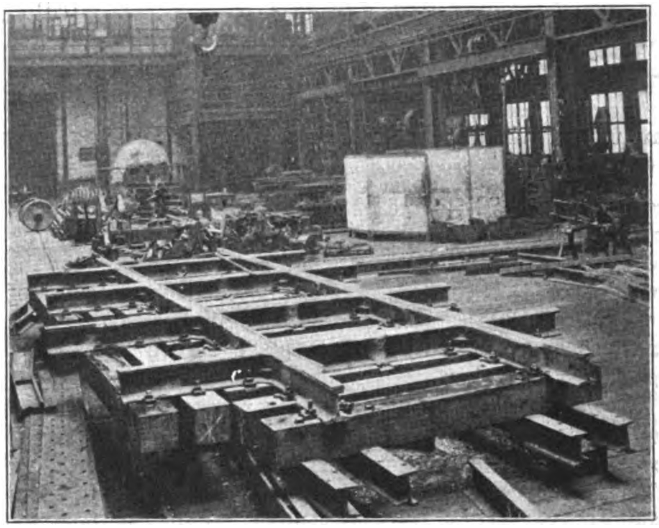
With this equipment the scale on the rail is first burned off with the arc or removed with a grinder or brush, and then one end of the bond is clamped to the rail by means of a C-clamp. While the scale can be burned off very quickly, probably a cheaper job can be made if a grinder is used. Both all-copper bonds and copper bonds with steel terminals are applied by this method and both types of one make are so shaped that there will be a little room between most of the terminals and the rail so that the fused metal can run down between the rail and the terminal and join them. This also permits the gases to escape.

Another type of steel terminal bond used has the head beveled off. With this type the apex and not the base of the triangle is placed next to the rail and metal is filled in until the terminal assumes a rectangular shape. When a bond of this later type is used there is no necessity of having two kinds of bonds in stock, one to be attached vertically and the other horizontally to the head of the rail, as the one bond can be placed in either position, which permits of bonding "Weber" joints as well as those with the other types of joint plates.

Solid Chrome Nickel Steel Special Trackwork

Milwaukee Company Developed This Type of Construction During the War as a Substitute for Solid Manganese—It Has Some Advantages and Apparently Good Wearing Qualities


ASSEMBLING THE CHROME NICKEL STEEL CAST CROSSES, AFTER MACHINING, FOR WELDING THE JOINTS


A HALF DOUBLE-TRACK, DOUBLE-TRACK CROSSING WELDED IN ONE PIECE AND MOUNTED ON FOUNDATION TIMBERS AND RAILS AT THE SHOP

During the war, when solid manganese steel special work became very expensive and very difficult to get at any price the Milwaukee Electric Railway & Light Company undertook to develop a substitute. The investigation was carried through considerable experimentation, out of which was evolved a chrome nickel steel having a composition which seemed to offer the desired qualities. To date three double-track crossings made up from solid chrome nickel steel castings have been installed and a fourth one is now being made. These embody a number of unique features in connection with the method of construction and installation.

The formula finally determined upon for this special work steel was as follows: Carbon, 0.35 per cent; manganese, 1.00 per cent; phosphorus, 0.03 per cent (max.); sulphur, 0.04 per cent (max.); silicon, 0.15 per cent; chromium, 0.55 to 0.60 per cent; nickel, 2.30 to 2.50 per cent.

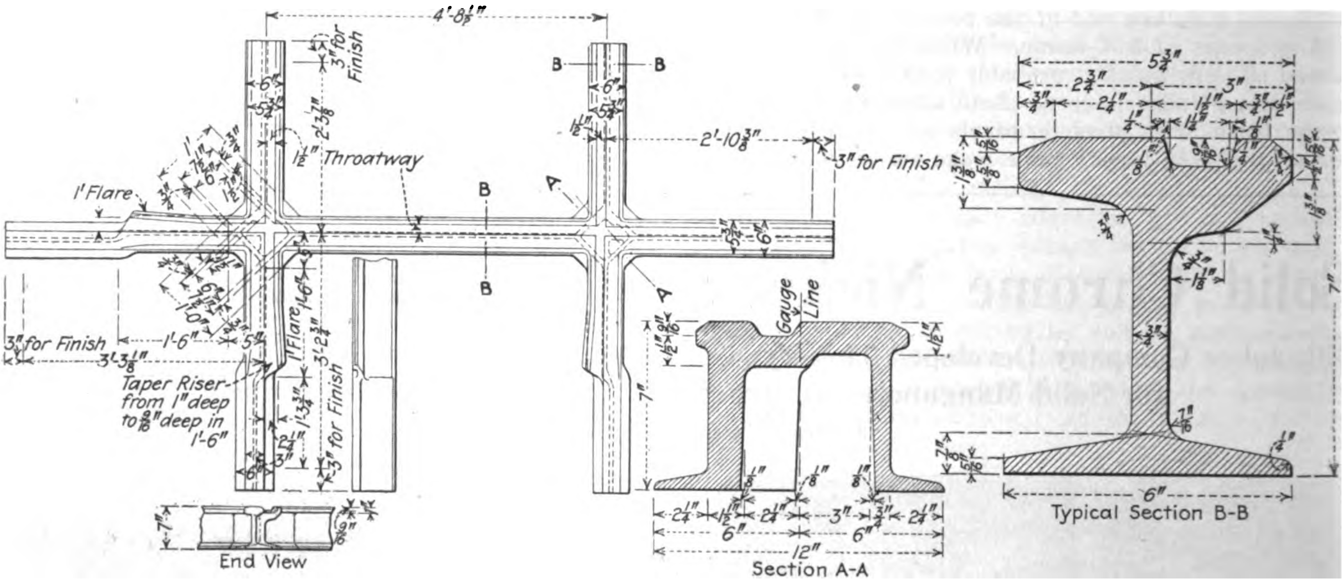
The crossing for each single track was cast in four pieces (four crosses) in order that the machining could be done on the largest planer available in the company's shops. If a large enough planer were available it would be desirable to cast each single-track crossing in only two pieces, thus avoiding two joints. The castings were made in a local steel foundry in basic electric furnaces and all machine work was done in the company's own shops, though now that the development work has been completed an effort will be made to have future special work built by manufacturers.

After the machine work was completed the four pieces for one single-track crossing were thermit welded together in the shop at the four joints and then two of these complete crossings welded together at their two joints. This half-double crossing was then through-bolted in the shop to 8-in. x 8-in. and 8-in. x 12-in. white oak timbers, the larger timbers being used for those positions coming directly under the rails, in order to give a width outside the rail base sufficient for the bolt holes and rail clips. A double-track, double-track crossing with its foundation was thus made up and transported to the location at which it was to be installed in two pieces, so that of the forty joint welds to be made only twenty had to be made in the field.

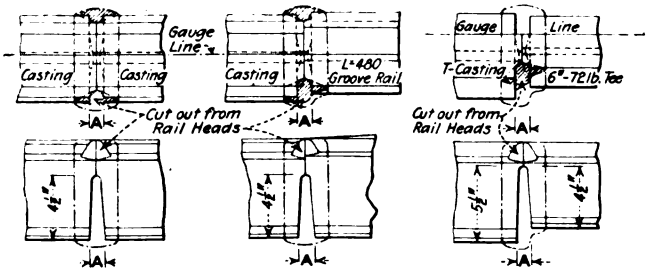
Upon reaching the job the two pieces forming the complete intersection were set in place by means of a derrick car, blocked up to grade and alignment and concreted in. On some of the intersections thus made up additional foundation strength was provided by bolting several sections of old rail, inverted, to the bottom of the timbers, fastening them by means of separate through bolts and clips. Where these were used they were also bolted in place before the special work left the shop.

It will be noted that all joints were thermit welded and that no bolted joints whatever were used. This is considered one of the material advantages offered by this new type of solid special work, for it has been the experience of the Milwaukee company that the difficulty of matching up and grinding joints between solid manganese special work and the adjoining rails in order to secure a perfect joint, and, further, the dependence on heat-treated bolts to hold the joints in place are the principal sources of trouble. In other words, it is necessary to use materials in the joints that are inferior to those in the special work.

An interesting feature in connection with the chrome nickel steel crossing is that the crossings were made with flange bearings entirely across the special work. Sufficient metal was left in the flangeway to permit a wear of ¼ in. before the tread of the standard wheel will touch the rail head. One of these crossings installed at West Water and Sycamore Streets, which is one of the heaviest intersections in the city, showed a wear in the flangeway of 1/32 in. after being in service eight months. It will be noted from an accompanying drawing that the cast rail section used in the special work casting is not standard, but is reinforced under the flangeway to provide for the stresses incurred through the flange bearing.



DRAWING SHOWING STRUCTURAL MAKE-UP OF THE SPECIAL WORK CASTING AND SECTIONS THROUGH THE ACTUAL INTERSECTION AND THE GROOVE RAIL



METHOD OF PREPARING RAIL ENDS FOR THERMIT WELDING TO ELIMINATE THE INSERT

While these nickel chrome steel layouts have not been in service long enough to determine their wearing qualities relative to those of solid manganese steel special work, the first one having been installed in April, 1919, there are certain observations which may be made now in comparing the two. The nickel chrome steel special work has the threefold advantage that it can be machined instead of ground, that it can be welded at the joints instead of bolted and that it may be built up with an electric welder at the intersections without destroying the hardness of the metal and producing brittleness, if repair work becomes necessary. As to the relative cost, that for the metal alone is about the same. There is probably some saving to be realized in the machining process as compared with grinding. And if the wearing qualities of the nickel chrome steel prove to be somewhere near as good as those of the manganese steel, it may be assumed that the maintenance cost will be materially lower because of the elimination of the bolted joints.

CHROME NICKEL STEEL SPECIAL WORK SHOWING COMPLETE FLANGE BEARING AND NO BEARING ON RAIL HEAD

With the adoption of the nickel chrome steel special work for heavy traffic locations the Milwaukee company will have standardized upon two types of construction. Cast steel-bound special work without manganese plates is made use of very generally except at the heaviest traffic locations, where the solid-steel crossings are used. Very good success has been had with the steel-bound type, not a single break having occurred in three and one-half years, with a good many installations in use. The Milwaukee company is using thermit welds to a limited extent in making repairs to special work and has made up some frogs by this method, as described in the ELECTRIC RAILWAY JOURNAL for Dec. 20, 1919, but it is continuing to use the steel-bound construction for the bulk of its replacements.

In conection with the use of the thermit process of welding joints in special work an interesting scheme has been devised to eliminate the necessity for the insert which is commonly employed. The need for this insert has been overcome by cutting away the ends of the two rails at the base and underneath the head, as shown in an accompanying drawing. This permits the metal to flow into and become an integral part of the web, assuring a positive weld without the insert.

Illinois Utilities Committee Report on Valuation and Return

IN ORDER to encourage the necessary investment in public utility securities two things must obtain: First, a fair valuation of property and, second, rates sufficient to pay an adequate return over and above expenses. This is the fundamental statement of the committee on valuation and return of the Illinois State Electric Association, Illinois Electric Railways Association and Illinois Gas Association, acting jointly. It is claimed that more than $40,000,000 is needed to pay for the extensions and improvements which should be expected from purely local public utilities of Illinois, and if the cities and communities are to thrive and prosper the public utilities must expand to meet the increased demand made upon them.

In making recommendations the committee starts with commendation for the report of the valuation committee of the American Electric Railway Association. It states as a necessary fundamental that a utility is entitled to a just and reasonable, as distinguished from a merely non-confiscatory, rate, and urges the development of this point in the presentation of all public utility rate cases.

The other recommendations of the committee are that in all cases the evidence be fully presented; that utilities should submit appraisals of physical property based on the cost to reproduce new at prices prevailing at the date of inventory, and that the commission be urged to adopt the same as the present value of such physical property; that if the commission or any other party submits an appraisal based on the original cost or cost to reproduce at any other period than the present, the utility should produce evidence showing the difference between the purchasing power of the dollar used in such appraisal and the purchasing power of the dollar current at the present time; that there should be no deduction for accrued theoretical depreciation; that a full and fair allowance should be made for going value; that the item of income taxes be considered a deductible expense; that all valuations should be itemized and that commissions should itemize their findings accordingly; that a sufficient amount of working capital should be shown necessary and that replacements and contingent reserves be set up.

The committee also suggests that each utility file copies of all briefs submitted to commissions with the secretary of the Public Utility Association, in order to encourage full co-operation and also a complete understanding.

Storms Increase Motor Failures

A General Analysis of Some Equipment Failures Occurring in Parts of New England Visited by Heavy Storms of Past Winter

BELIEVING that the experiences of a few typical electric railways as to the effects of the recent snowstorms upon equipment would be of assistance and interest to master mechanics and others, the editors of the ELECTRIC RAILWAY JOURNAL have made a special effort to obtain such information. The reports received indicate that the equipment failures in those parts of the country which were visited by the heavy storms were most severe. Many railway properties have tabulated the various equipment failures for the purpose of study, and in the accompanying table the numbers of armature failures that occurred on four New England electric railways are given. The total number of failures for the several weeks from Jan. 3 to March 6 are given, with the ratio per cent that this number of failures bears to the total number of armatures in service. The total number of failures for this period varies from 24.5 per cent to 52 per cent. Perhaps the most interesting feature brought out by this comparison is that, while the first trouble is due to overload and the roasting of insulation, by far the greatest trouble comes from the fact that the deteriorated insulation becomes wet and easily breaks down, thus causing grounds and short circuits.

The greatest number of failures occurred during February. At the beginning of the month there was in the New England district a considerable accumulation of snow and ice on the ground, which had resulted from the weather conditions during January. No unusual difficulties, however, were experienced on account of the January storms, but the storm which commenced Feb. 4 and continued all through the next day and until the middle of the afternoon of Feb. 6 resulted in the greatest percentage of failures. Several other storms which were not quite so severe but which added greatly to the difficulties of operation followed this initial storm. The storm which began on the night of Feb. 4 consisted of semi-frozen slush which became saturated shortly after falling. Before nightfall on Feb. 6 the snow turned to a cold rain and then froze to almost solid ice. This storm was accompanied by a wind of nearly 32 m.p.h. velocity, and in spite of its wet condition the snow drifted badly.

FAILURES OCCURRED WITH ALL TYPES

In the tabulated results which have been received by the ELECTRIC RAILWAY JOURNAL so far the number of troubles with each type of motor is given. An attempt was made to group these failures according to the age of the equipment, but this did not bring out any information which would lead to definite conclusions. The number of failures even with the same general type of equipment varies through a wide range, due to the various conditions which are encountered. Thus one road or even one line of a particular road may have used up its motors and burned out the windings by bucking snow. Another line or road may have been forced to operate its equipment through water to an excessive depth, and this, entering the motors and bearings, causes grounds and short circuits. When cold weather follows the thaw the water which has entered the bearings becomes frozen and shuts off lubrication. This results in the bearings becoming hot and the armatures are let down so as to rub the pole faces, thus damaging the windings and tearing off the bands.

Another factor which ultimately makes itself evident in the number of equipment failures is the amount and type of vehicular traffic which operates on the car tracks. In removing snow some roads clear to the pavement, while others prepare a snow roadway. The effect on the equipment must necessarily be different in the two cases. The drainage conditions of the various railways also have an important bearing upon the amount of water which accumulates on the tracks through which the equipment must operate. Some roads experience difficulty with the lifting of the tracks or pavements by frost. This results in damage to the motors and gear cases from rubbing. Other roads do not encounter this trouble. The diameter of the wheels on the cars is another factor which must be considered in connection with the failures resulting from snow conditions. One road reports no trouble on cars with 33-in. wheels, while it had considerable trouble with motors on cars with 26-in. wheels. In this case it was found that the insulation on the motor windings was roasted out. This was caused by bucking snow, but more particularly by the dragging of the motors over the high surface of ice that accumulated between the rails.

In considering the troubles which have occurred to the ventilated motors of the latest type it appears that several roads have had considerable trouble due to drawing in of snow by the fans. This snow is deposited in the motor frame and around the brushholders. After a thaw the accumulation freezes and forms a solid cover of ice. The application of covers to the motor in several instances has proved of great advantage. By far the greatest trouble experienced with ventilated motors, however, has been caused while bucking snow. The ventilated motor does not have the same capacity for overloads as the older non-ventilated motors, and as most snow bucking is done at low speed the advantages of the fan ventilation are lost. There is no doubt that the amount and quality of snow-clearing equipment which the various railways have in operation has a considerable effect on the number of failures which occur in the operating equipment. If railways can keep their lines properly cleared of snow the resulting equipment troubles are not excessive.

SEVERE PROBLEM OF KEEPING LINES OPEN

The problem of keeping a line free from snow and keeping cars running during a storm on most systems resolves itself into keeping the snow-clearing equipment in operation. In the storm which began in the New England section on Feb. 5 the snow contained considerable moisture and packed readily. Even the breaking down of a truck on the track in front of a snowplow for a short time was sufficient to cause the snow ahead of the snowplow to become packed by vehicular traffic, so that its removal could only be accomplished by the use of picks in the hands of a gang of laborers. Another one of the storms was accompanied by a storm of sleet and rain which froze as it fell. The trolley wires became laden with this ice and a large number of breaks occurred, so that power was actually cut off from the line and the snow-clearing equipment could not operate. Such conditions as these give the operating companies the greatest amount of trouble.

ARMATURE FAILURES CAUSED BY EXTREME WEATHER CONDITIONS

		Road No. 1		Road No. 2		Road No. 3		Road No. 4	
		Number Armatures	Per Cent Failure to Total	Number Armatures	Per Cent Failure to Total	Number Armatures	Per Cent Failure to Total	Number Armatures	Per Cent Failure to Total
Armature in service		4,297	.....	2,554	.....	1,324	.....	1,012	.....
Failures for Weeks Ending:	Jan. 3	32	0.75	26	1.0	18	1.35	8	0.79
	Jan. 10	111	2.6	32	1.24	21	1.58	26	2.6
	Jan. 17	79	1.85	26	1.0	41	3.1	29	2.9
	Jan. 24	189	4.4	45	1.75	72	5.4	36	3.6
	Jan. 31	216	5.0	48	1.87	77	5.8	43	4.3
	Feb. 7	168	3.9	52	2.03	124	9.3	41	4.1
	Feb. 14	182	4.2	94	3.65	99	7.5	55	5.5
	Feb. 21	260	6.1	107	4.15	84	6.3	69	6.9
	Feb. 28	303	7.1	92	3.58	91	6.9	92	9.2
	Mar. 6	293	6.8	105	4.1	69	5.2	55	5.5
Total failures, Jan. 1 to Mar. 6		1,833	43.0	627	24.5	696	52.0	454	45.0

While the damage done to armatures is the most expensive to repair, still the trouble caused by grounded or short-circuited field coils is quite as annoying. In this connection road No. 3, which is shown in the accompanying table as operating 1,324 motors, used 1,263 field coils during January, February and March, and road No. 4 with 1,012 motors used 900 field coils. This is nearly a field coil for each motor.

In connection with other equipment defects one road reports a large amount of trouble from grid resistors becoming open-circuited, caused by the overheating of the grids from the slow and severe operation and consequent splashing with water or slush. This causes the grids to break and the open circuit occurs, usually resulting in a "dead car," which has to be pushed to the terminal with overloading of the equipment of another car. The breakage of gears, pinions, axles and wheels during cold weather is also considerably increased and adds to operating difficulties.

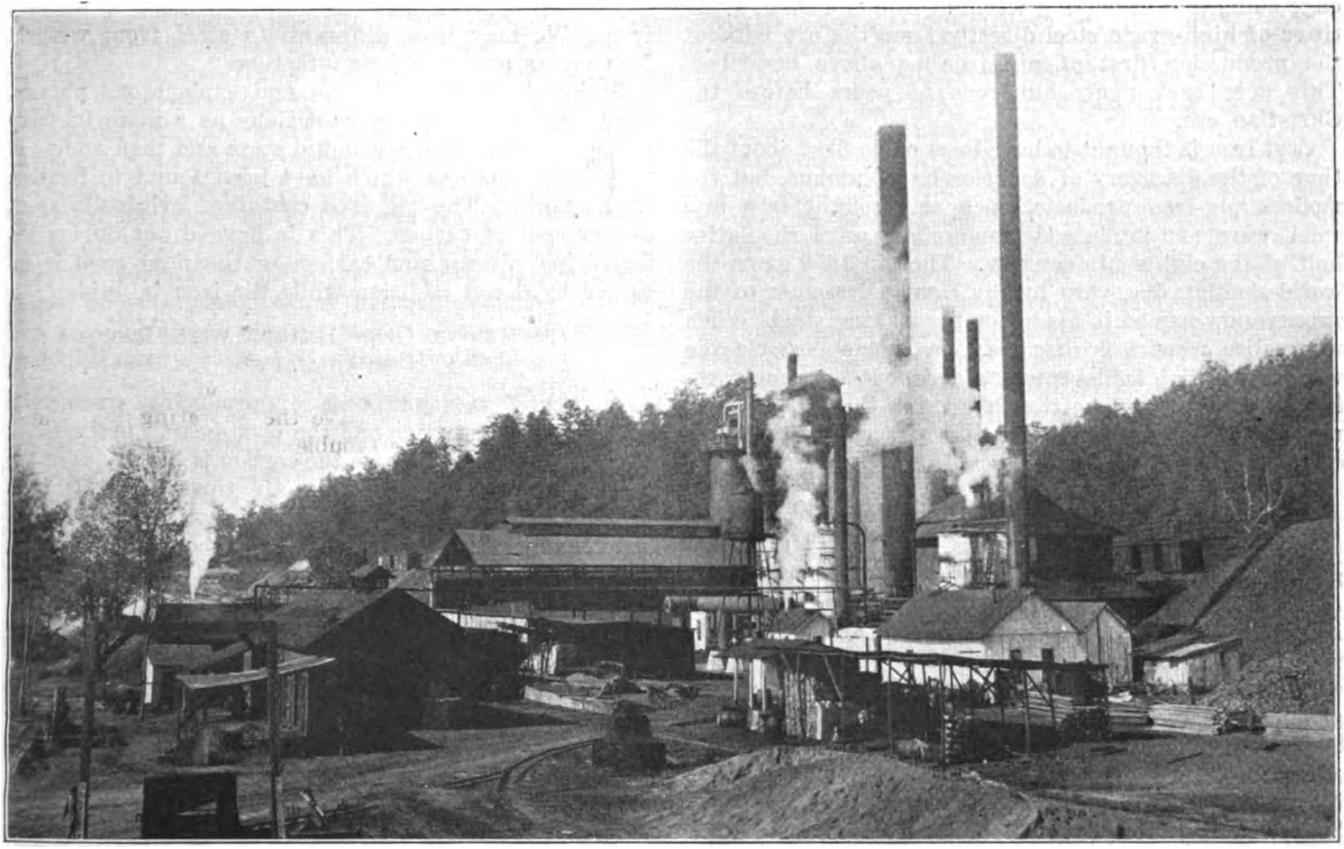
If benefit is to be derived from the experiences of the past winter it must come in the nature of improvements which will prevent the various parts from failing under the extreme conditions of winter service. While a mere enumeration of the troubles that have resulted and a knowledge that others have had as much or even greater trouble may be consoling to some roads, still if desirable results or improvements are to be obtained they must come through the electrical manufacturers.

No Labor Shortage in Kansas City

IN THE trainmen's instruction school of the Kansas City (Mo.) Railway there are from 150 to 200 men at all times to care for the turnover among the 2,600 employees of the transportation department. The labor turnover for the period from December, 1919, to April, 1920, inclusive, following the last strike, was about 300 per cent. Records show that 5,128 men entered the service and 2,881 left. The turnover has now gone back to a point as low as, if not lower than, that in most of the large industries in the city. The present wage, which provides a maximum of 50 cents per hour in the fourth year of service, is attracting men from other industries and there is practically no shortage of man-power to operate the cars.

Railway Car Materials—Steel—I

BY NORMAN LITCHFIELD



STEEL MANUFACTURE BEGINS AT THE BLAST FURNACE

A Comprehensive Statement of the Standard Steel-Making Processes Is Given to Promote a Better Understanding of the Qualities to Be Expected in Steel

The Manufacture of Steel

THE mechanical man of a railroad upon turning to the ordinary text-books for information on the nature and properties of iron and steel finds himself confronted with a mass of information which is confusing. This confusion is unavoidable, because a text-book must cover all of the various fields so that the general student may become informed, or rather that he may be provided, as it were, with a reservoir of knowledge from which he may draw as occasion demands.

There are a number of other sources to which the reader may turn if he desires a more intimate knowledge of the subject, but the writer has felt that a fairly clear idea of the salient characteristics of these materials could be presented briefly and in such a way that the information would be of interest and have reference value. This article is the result. It is not designed to present any strictly new matter but simply to review the subject of steel and to present a general picture of the present situation regarding its production and its utilization in the electric railway field.

To obtain a clear understanding of what is commonly known as iron and steel, it should be borne in mind that all of the varieties of iron and steel, whether cast iron, cast steel, wrought iron, steel in the form of plates, bars and structural shapes, however complex, all start fundamentally from the same source. The initial stage of manufacture of all is the same, namely, the iron ore, which of course is not metallic iron, but the oxide of iron mixed with silica, sulphur, phosphorus, etc., is heated in a blast furnace with coke and limestone. Here the high temperature breaks up the oxide of iron into metallic iron and oxygen gas, the latter immediately combining with the sulphur and other elements. Mixed in with the pure metallic iron are the impurities that were present in the ore, sulphur, phosphorus, etc., although not in as large quantities. Some of these have been given off as gases and others have been fused and, being lighter than the iron, float on top of the molten iron and are drawn off before the iron is poured into molds. The iron so cast contains from 3 to 4 per cent of carbon and is known as "pig iron."

It is impossible to "run" the material in this state, and it is from this point on that the methods of manufacture of the various commercial materials begin to differ. Here the reader should remember that iron and steel get their various qualities not inherently, as in case of the woods, treated in a previous article, but through the processes to which they are subjected during manufacture.

These processes have been worked out by centuries of experiment, the earliest process of which we have knowledge being that of making wrought iron and small quantities of high-grade steel directly from the ore without the production first of pig iron as above described. This goes back many hundreds of years before the Christian era.

Cast iron is thought to have been made first about the time of the discovery of America by Columbus, but the modern pig-iron products, such as wrought iron and steel, were not produced commercially until the latter half of the eighteenth century. Then in 1856 came the world-shaking discovery by Sir Henry Bessemer of the process now named in his honor for making steel. When we realize what this discovery has made possible the wonder of that achievement stands out as simply colossal. Since that time the advance in the art has been rapid and has made possible the marvelous structures of the last century.

MAKING WROUGHT IRON FROM PIG IRON

In the manufacture of wrought iron from pig iron of proper grade, the latter is heated in a reverberatory furnace with a fluxing cinder (oxide of iron) until both iron and flux melt into a pasty mass. The flame of the reverberatory furnace impinges upon the contents and oxidizes the impurities. The purified metal collects in globular masses which are turned over and assembled by the puddler, then removed from the furnace and a portion of the slag squeezed out. It is then rolled into bars, which are called "muck bars." These bars still contain a great deal of slag and hence are never used commercially, but they are cut up and the pieces are piled and bound together with wires, the bundles being reheated to a white heat (not melted) and again rolled into bars, known as "merchant bars." This is the usual "bar iron" of commerce. When a purer metal is desired, the merchant bars are cut up, repiled, reheated and rerolled into bars, thus forming "double-refined" iron.

To review, then, it will be seen that wrought iron is essentially a material that has been produced by melting the iron to a pasty state in a bath of slag, then removing the pasty iron and rolling it before it solidifies. It consists of practically pure iron mechanically mixed with slag. As it is rolled out into bars the slag is also rolled and gives to the wrought iron its characteristic fibrous appearance.

STEEL IS MADE IN "57 VARIETIES"

While wrought iron is a simple substance, consisting, as above stated, of pure iron with which a certain amount of slag is mechanically mixed, steel is a complex material consisting mainly, of course, of iron, but this iron has crystals of various other substances imbedded in it, and in some cases the iron is chemically combined with these foreign materials. Furthermore, while in wrought iron the slag is practically inert, in steel the foreign substances exercise a controlling effect on the qualities, which will be considered later. But at the outset we would impress upon the reader the fact that whereas when we say that an article is made of wrought iron the name itself signifies a material whose properties are fairly well defined, on the other hand to merely assert that an object is made of steel means little or nothing, inasmuch as there are as many varieties of steel as there are of pie, and the effect of a poor variety of one is about as deleterious as the other.

In steels which contain but a small amount of the foreign substances, the chemical composition and the physical properties begin to resemble those of wrought iron. We may then differentiate steel from wrought iron by its process of manufacture.

Stripped of all qualifying and explanatory phrases, steel may be considered essentially as a material made by melting pig iron to a liquid state and then adding to it other substances which have been found to increase its strength. The pig iron contained originally about 3½ per cent of carbon. This is burned out during the liquefying process and carbon in the final steel is obtained by direct addition while the iron is fluid.

BESSEMER VS. OPEN HEARTH WITH RESPECT TO QUALITY

The chief two processes of producing commercial steel are the bessemer and the open-hearth processes.

In the bessemer process the carbon is burnt out of the melted pig iron by blowing air through it at high pressure, until the iron contains practically no carbon at all. The desired percentage of carbon is obtained by adding "spiegeleisen," after the metal is decarbonized. This process does not remove any of the phosphorus and sulphur in the iron, and bessemer steel can only be used in places where a fairly high percentage of these impurities will not matter. On the other hand the bessemer process is the cheapest and the quickest method of making steel.

In the open-hearth process a mixture of pig iron, wrought iron, cast iron and steel is melted in a so-called "regenerative" furnace, for the details of which the reader is referred to any standard works on metallurgy. In this furnace a flame impinges upon the surface of the mixture of metals, melting them but not burning out the carbon except to a limited extent, which may be controlled more or less at will by varying the temperature in the furnace. As the heat progresses samples are drawn off from time to time and the percentage of carbon present is determined either by visual examination of the fracture or by quick analysis in the laboratory. The amount of phosphorus in the finished steel, while not reduced in any way by the burning out process of the open-hearth furnace, can be controlled by selecting the proper proportions of steel, cast iron, etc., in relation to the pig iron. However, by adding lime to the charge the amount of phosphorus can be reduced, and when this is done the operation is termed the "basic open-hearth process," and merely as a matter of distinction (for otherwise the term is meaningless) the process in which lime is not used is called the "acid open-hearth process."

At the present writing it is becoming somewhat the practice of steel manufacturers to use what is known as the "duplex process," in which the process is first started in a bessemer converter and then, before decarbonization is complete, the molten liquid is discharged into the regenerative furnace and the making of the steel is completed by the usual open-hearth process. This cuts down the total time of the melt considerably and thereby reduces the cost of the steel.

Experience with the chief two processes, bessemer and open-hearth, has conclusively shown that the latter is much more reliable in every way than the former, and hence bessemer steel is used only in places where the conditions do not require a high-grade material. As between the basic and acid open-hearth processes there is probably but little inherent difference, as it is possible to produce good steel by either process.

The foregoing gives but the barest outline of the main features of the manufacture of steel, and is offered simply to indicate in the most general way that ordinary steel is divided roughly into two classes, first, that made by the bessemer process and, second, that made by the open-hearth process, and further that the inherent nature of the processes is such that the open-hearth produces a better and more reliable grade of steel than can be produced by the bessemer process. A considerable amount of electric furnace steel is now being produced, but the large bulk is still open hearth or bessemer or one of its varieties.

Certain factors influence the character of the steel, no matter what the process of manufacture. These are: 1. Chemical composition. 2. Care taken in the manufacturing process. 3. Heat treatment.

CHEMICAL TREATMENT IS ONLY ONE FACTOR

It will be noted that chemical composition is listed as only one of these fundamentals of the character of steel. We emphasize this point on account of the tendency of many to assume that a mere statement of the composition will define the characteristics of the steel, which is not the fact. It is, however, the basic factor. From a chemical standpoint steels are grouped roughly into two classes; carbon (or ordinary) steels and alloy steels.

By "carbon steels" are meant those steels whose physical properties are determined largely by the proportion of carbon which they contain, while "alloy steels" are those in which the effect of the carbon is replaced or supplemented by that of other metallic elements such as nickel, chromium, manganese, vanadium, tungsten, etc.

Considering first the carbon steels, it must be recognized at the outset that the presence of carbon plays a part totally disproportionate to its numerical content. That is to say, the total percentage of carbon even in the so-called "high carbon" steels will not run, except in rare instances, over 1 per cent, whereas the tensile strength of the material will have been increased from about 45,000 lb. per square inch at 0.05 of 1 per cent carbon to more than 150,000 lb. at 1 per cent.

In all carbon steels there is present a small amount of manganese from 0.3 to 0.6 of one per cent, which has been added during the process of manufacture to prevent what is known as "red-shortness," or brittleness of the steel when hot. It further has the effect of causing an increase of about 10,000 lb. per square inch in the tensile strength with the high percentages, but this effect is somewhat incidental. Hence the steel is called "carbon steel" on account of the preponderating effect of the carbon on the strength of the steel.

Silicon from the slag is always present in carbon steel up to a maximum of about 0.4 per cent. It has the effect of increasing the fluidity of the steel, and in small quantities has but little effect on the physical qualities of the steel. Except in some particular instances, such as springs, therefore, the user is not particularly concerned in the amount of silicon which is present.

We now come to the question of the so-called "impurities," sulphur and phosphorus, the presence of which in any large quantity is very undesirable.

Sulphur makes the steel "red-short," causing small, fine cracks in the process of forging, which remain when the metal becomes cold. For this reason manganese is added to the steel, which combines with the sulphur, forming manganese sulphide. While this overcomes the red-shortness, it introduces a new danger, in that the sulphide is apt to collect in streaks which, as it were, break up the continuity of the steel and impair its strength. Hence it is desirable that the sulphur content be kept reasonably low, and fortunately for the user the manufacturer is as a general thing anxious to do so in order to avoid difficulty in the forging and rolling of the material into its finished shape.

Phosphorus, the other impurity, is one in which the user is vitally interested in that any considerable quantity of it reduces the ductility of the metal and lessens the resistance of the steel to shock.

Granting that both sulphur and phosphorus are objectionable elements in steel, the next question is to determine how much or how little can be allowed in the steel without hurting it.

The A. S. T. M. specifications for structural steel for cars, A-11-16, require as follows:

		Structural Steel and Pates for Cold Pressing	Rivet Steel
Phosphorus	Acid	Not over 0.06 per cent	Not over 0.04 per cent
	Basic	Not over 0.04 per cent	Not over 0.04 per cent
Sulphur		Not over 0.05 per cent	Not over 0.045 per cent

The foregoing all apply to open-hearth steel, the use of bessemer steel not being permitted by the specification for car material. In such specifications as those for structural steel for buildings, which allow bessemer steel, the limit for phosphorus is 0.1 per cent, there being no specified limit for sulphur.

Just how the limits given for open-hearth steel were arrived at is not entirely clear, although it seems probable that they were the results of commercial rivalry. It had become evident that the high percentage of impurities as found in bessemer steel was bad from the users' standpoint, and as each improvement was made in the open-hearth steel art it gave the originating manufacturer an opportunity to offer to his customers a product which he and they felt was better than that of his competitors.

As time went on, these competitors made their own improvements, and so the limits of impurities were beaten down to the point where they now rest in the various existing standard specifications.

In fact, during times of slack demand for steel products, manufacturers have been able to offer a much lower limit of impurities, and users are sometimes tempted to feel that because they have been in the habit of receiving this high-quality material, they are justified in incorporating a very low limit for impurities in their specifications. The steel makers claim, and it would seem justly, that such a course is unfair, inasmuch as with an existing top limit of 0.04 per cent, it is necessary for them so to select their materials that they will "aim at," say, 0.03 or 0.35 per cent. In other words, if a specification calls for 0.04 per cent as a top limit, it is probable that a large part of the material will run down to 0.03 per cent or lower. This all requires care and attention in the process of making the steel and often the selection of certain heats or melts, as against others which must be thrown out. Hence, if the user pushes his prerogative too far, and demands a very low upper limit for impurities, he is apt to force the manufacturer into a position where he must charge a higher price, and the user should therefore be quite certain in his own mind that his service demands an extra special grade before embodying excessive restrictions in his specifications.

WAR-TIME LIMITS FOR IMPURITIES

During the period of the war the tremendous shortage in materials made it well-nigh impossible for the manufacturer to maintain his previous standards, and therefore the upper limits of impurities were quite generally raised, the A. S. T. M. specifications in many instances bearing the following notation: "In view of the abnormal difficulty in obtaining materials in time of war, the rejection limits for sulphur in all steels and for phosphorus in acid steels shall be raised 0.01 per cent above the values given in these specifications. This shall be effective during the period of the war, and until otherwise ordered by the society."

It will be noted that, as far as phosphorus is concerned, this tolerance applied only to acid steels, and inasmuch as by far the greater proportion of steel made in this country is now made by the basic process, the matter really comes down to a consideration of the sulphur content.

During the last meeting of the American Society for Testing Materials considerable discussion was had in regard to this matter along two lines, on the one hand whether the time had not now arrived when it was entirely feasible to drop the war tolerance from the specifications of the society and on the other hand whether the extra point of sulphur did not harm the material. As a result of this discussion it was decided "that the forty-three specifications to which this note has applied be divided into two classes: (1) Those specifications from which the note is to be removed at the present annual meeting, as of July 1, 1919; (2) those specifications from which the note is not to be removed at this time, and consideration of its removal is to be deferred until the annual meeting in 1920."

Among the latter group is the specification for car material, and the tolerance therefore still stands.

The second question, that of a general study of the influence of sulphur and phosphorus in steel, is now the subject of joint investigation by a committee representing the A. S. T. M., the United States Bureau of Standards, and representatives of consumers and the railroads. It is planned to gather data both from the mill and laboratory and also from materials in service. This investigation, it is hoped, will throw some light on this subject, which has ever been one of doubt and often of dispute. For the present it may be said, however, that the A. S. T. M. specifications, even with the war tolerance, cover materials which if properly made are suitable for ordinary requirements.

The percentage of sulphur and phosphorus mentioned above are those obtained by analysis made from a test ingot taken during the pouring of the melt. It is generally specified that the purchaser may make analyses from finished material representing each melt. Some specifications, such as that for car material, allow the phosphorus and sulphur content so determined to exceed that of the ladle analysis by not more than 25 per cent. This means that steel made to a specification calling for 0.04 per cent phosphorus might contain in the finished material as high as 0.05 per cent and with the war tolerance of 0.01 per cent as high as 0.0625 per cent. Other specifications require the check analysis to agree with the ladle analysis. In making any comparison of the specifications, therefore, careful note should be taken as to this particular provision, for it is the check analysis which is really controlling.

Further treatment of the chemical composition and physical properties of steel will be given in an ensuing article.

Inspecting Contactors on Multiple-Unit Equipment

IN order properly to inspect the contactors of multiple-unit equipments it is necessary to operate them. This usually requires two men, one to operate the control from the master controller and the other, under the car, to inspect the operation of the various switches to insure that this is proper and in the right sequence. Where repairs or adjustments are necessary a considerable amount of time is wasted by requiring the presence of the operator when his services are not actually needed. Also on multiple-unit equipments which use line voltage in the operation of the contactors it is necessary to have the main switch in and to cut out both sets of motors to prevent the car from moving. Also, during work on the switches, if the main switch is kept in there is an unnecessary waste of power from the current passing through the resistors and an element of danger to the inspector, as the parts are "alive."

In this connection Rowland Hubbard, master mechanic Philadelphia & Western Railway, has found it convenient to have his inspectors operate the switches themselves without requiring the assistance of a man at the master controller. The holding-in circuit for the pick-up coils of the contactors is energized through the line relay contacts. In order to make operation possible without operating the master controller a 10-amp. knife switch has been installed alongside the No. 1 contactor arcing box. When this switch is closed it short circuits the contacts of the line relay so that the pick-up wire is energized for operating the contactors. The location of this switch is handy for the inspector when he is opening up the contactor covers. The line connection for operating the contactors is provided by tapping in on the trolley connection going to the line relay. With this arrangement operation will be accomplished with the main switch out and the motor cut-out switches left in. This arrangement of connections has now been in use for over three years and has proved very satisfactory, as well as providing an additional safety precaution for the inspector.

Paving Charges Keep Up Fares

PHILADELPHIA'S first modern pavement of consequence was provided at the expense of the car riders. Paving costs, including interest payments on the original cost, and maintenance and renewal payments under the agreement of 1907 now total $1,750,000 per annum. This is equal to a 6 per cent return on the outstanding capital stock and must be paid by the P. R. T. patrons as their contribution toward something they themselves never use as car riders. In other words each revenue passenger transported during the year 1919 paid 0.26 cent tax for paving.

Connecticut Zone System Revised

Commission Upholds Principle of Zone Fares, but Disregards Density of Traffic—Makes All Zones Equal—Raises Cash Fare 30 Per Cent and Establishes Two New Ticket Rates—Some Doubt as to the Financial Result

THE Connecticut Public Utilities Commission on April 9 decided that the present system of zone fares in use by the Connecticut Company is discriminatory. The commission pointed out that the zones are of unequal length and that all of the increase in revenue has been at the expense of the suburban rider, inasmuch as the minimum fare for the majority of riders in the larger cities had remained unchanged. This decision was handed down after public hearings extending over several months.

Under the decision the cash fare was increased to 3 cents per zone, with a minimum cash fare of 6 cents for two zones or less. Heretofore, the cash rate in the cities of Hartford, Waterbury, New Haven and Bridgeport averaged 2 cents per mile, while in the suburban and interurban territory the rate was 2.5 cents. The minimum fare for two zones or less was likewise 6 cents.

The order also provides for a reduced-rate zone ticket, which is to be sold in lots of fifty for $1, in order that the regular riders may obtain a lower rate than the casual patrons. These tickets, however, provide a minimum fare for a three-zone ride, but do not allow the passenger to ride at less than the minimum cash fare, because three coupons are the minimum that can be surrendered for a ride.

Commutation ticket rates likewise are established at 1.75 cents per zone between traffic centers having a population of at least 25,000 and the surrounding territory, providing, however, that the points are five zones or more distant.

ABSTRACT OF DECISION

The decision was the outcome of thirteen petitions and protests from several cities, towns and community organizations. The primary questions involved were as to the reasonableness of the rates, the fairness or practicability of the particular zoning and the system of making fare collections thereunder as had been established and put into effect by the Connecticut Company on Nov. 8, 1919.

Prior to the establishment of the zone system the rate structure had been developed around a flat fare for the larger cities, with multiple zones on the suburban and interurban lines, the rate, however, being the same for all zones, which varied in length from 1.8 to 10.8 miles. On Oct. 1, 1917, the unit rate of fare per zone was increased from 5 to 6 cents, with a proportionate increase in commutation and school ticket rates.

On Nov. 2, 1919, the company established an entirely new schedule of rates based on the length of ride, and at the same time put into effect a new method of fare collection. All tickets, commutation and otherwise, with the exception of the half-fare school tickets, were abolished. Full details of this plan were given in the ELECTRIC RAILWAY JOURNAL for Nov. 8, 1919, page 852.

PETITIONERS' CLAIMS

The petitioners claimed that the zone rates as established in certain cases increased the fare from 50 to 200 per cent over the previous rates; that these rates were discriminatory in the arbitrary establishment of unequal-length zones and caused abnormal and unequal increase in certain sections and to certain patrons over the long-established flat-rate system under which the communities were developed; that the necessary increase in revenues was undertaken to be collected and obtained from only 33 per cent of the company's total patronage; that the zoning system was inequitable and unfair, and that the method of fare collection was unnecessarily annoying and tended to delay and congest traffic.

The city of Bridgeport also claimed that the railway system should not be treated as a whole, but that the city lines should be segregated from and treated independently of the interurban lines on the assumption that the former were profitable and the latter otherwise.

THE COMPANY'S CLAIMS

The company controverted the several claims and maintained that it was necessary for the life of the company and to enable it to render proper service materially to increase its revenues over the previous flat 6-cent rate. While no attempt was made by the company to estimate the increase which the zone system would produce, it did maintain that but little if any more revenue would be secured than would be needed to meet the increased operating costs.

The company also raised several points of law, among which were: (1) That the burden of proof was upon the petitioners; (2) that in considering whether the rates are unreasonable it is necessary to consider the earnings of the company as a whole and not by segregated divisions or routes; (3) that the rate schedule is not unreasonable if the receipts are insufficient to pay the operating expenses, fixed charges and taxes, to set aside a proper sum for depreciation and renewals, and to pay a reasonable return upon the investment; (4) that a schedule of rates is not discriminatory if all patrons similarly circumstanced are treated alike; (5) that if by the imposition of the regular cash rates upon all patrons the receipts are or will be insufficient to violate this principle of reasonable rates then any reduction from the regular cash rate is confiscatory, and (6) that no evidence had been introduced before the commission to warrant a finding that the rates as inaugurated are unreasonable, inequitable or discriminatory against any portion of the system.

THE COMMISSION COMMENTS

On the above the commission had this to say:

Burden of Proof. In the 6-cent fare case a similar point was raised in which it was held "that inasmuch as the old rates had been in effect for a considerable period prior to those now complained of, and as all of the material facts pertaining to the reasonableness of such rates were more or less exclusively within the knowledge and possession of the respondent, it should proceed by offering whatever evidence it had in justification of its present rates. While the burden of supplying the facts may be imposed upon the respondent, the burden of establishing its material allegations from all the facts submitted still rests upon the petitioner. The very nature, origin and source of the evidential facts relative to the reasonableness of the rates must modify to an extent the rules of evidence and the burden of proof under the common law. This necessity has also been recognized by Congress in the enactment of the law terminating federal control, in which it is held that the burden of proof is upon the carrier to show that fare increases sought are just and reasonable."

The commission based its conclusions and finding on this theory, holding that inasmuch as the company had submitted without reservation evidence pertaining to the necessity for the increase in rates it should determine, after due consideration of all these facts, as to whether the rates complained of were just and reasonable, and if not to determine what were just and reasonable maximum rates and charges.

Rate Schedules. Claims 2 to 5 inclusive of the company, the commission held, may be fundamentally correct as abstract propositions, but were subject to modification by injection of conditions appearing in this case but apparently not contemplated in the specific claims presented. The sixth claim involved a conclusion of fact based upon all of the evidence submitted.

In the judgment of the commission it is not practicable or even desirable to segregate the several physically connected lines of the company for the purpose of establishing different rates, based upon the respective earning powers of such lines. The intercommunity of social, business and general industrial relations of the State requires that the paying lines should to a reasonable extent help to support the non-paying lines.

The non-paying lines, however, must of necessity have poorer or less frequent service, and a careful study of the traffic on such lines should be made with a view to service curtailment in keeping with the reasonable traffic demands. On certain lines that possibly never should have been built, however, the limited traffic demands and revenue returns may necessitate absolute abandonment unless the lines are subsidized by the towns and districts served.

Commutation or Reduced Rates. The company held that under the State law the commission could establish only a maximum passenger rate, because: (1) The former commutation rate was a privilege voluntarily granted by a predecessor company which the company was at liberty to withdraw at its discretion; (2) the power delegated to the commission to prescribe maximum rates did not include the right to grant any reduction from a reasonable maximum rate; (3) the Legislature itself has no such power; (4) no legal right ever existed on the part of the commuters to a retention of this rate; (5) so far as a moral right is involved, the equities are in favor of the rest of the system that never has enjoyed a cut rate; (6) the discrimination in favor of the commuters was properly abolished by the board of directors, and (7) if the regular rate charged to all is insufficient to pay a reasonable return, no reduction in rate or special privileges can be justified in favor of any particular community.

The commission ruled, however, that the powers and duties delegated by the State Legislature gave it the right to fix railway rates (Turner vs. Connecticut Company, 91 Conn., page 697) and that, under such conditions, it should have at least as much power, latitude and discretion as the company previously had in fixing its own rates. The right of transportation companies to establish reasonable commutation and special rates, unless discriminatory for the particular service, has long been recognized and is also followed by the Interstate Commerce Commission. The principle of commutation fares has also been approved by the State Legislature in the somewhat arbitrary provisions of Section 3,775 of the general statutes, which prohibit railway companies from altering or abolishing such fares after they have been in effect four years.

The United States Supreme Court, it was pointed out, had in several cases also approved of special or commutation rates (see P. R. R. vs. Towers, 245 U. S., page 6). The company contended that street railway service was short-haul transportation and provided a special service for short, almost daily rides, and that a uniform rate was in fact a special or commutation rate and, further, that there should be no cut rates for any class of service. The commission disagreed and held that whatever merit there may have been in this claim under the long-zone or flat-fare system, it was very largely eliminated by the adoption of straight mileage tariff.

Again, if the company's claim was correct, then the commission had no power other than to establish a single maximum rate, irrespective of the amount of service used, and the rate structures of practically every water, gas and electric company in the State would have to be changed, if passed upon by the commission. The commission, however, assumed that the statute did not prohibit the classification of service and for that reason interpreted the statute as authority to determine and prescribe just and reasonable maximum rates and charges for classified services affecting all persons similarly circumstanced, providing such classification was justifiable. The classification of passenger service and the application of a special maximum rate for each classification, it was held, was justified by custom of long standing. It was also in keeping with the principles applied to nearly every successful business enterprise to consider the daily rider, who depended upon the cars as a regular means of transportation, as the purchaser of service at wholesale. As a business proposition such patrons are entitled, the commission held, to better rates than the casual rider, the itinerant who infrequently utilizes the special service provided, or the man who travels in his private automobile or a jitney in good weather, but on stormy days and at times when the automobile is unable or unfitted to negotiate the journey is willing and only too glad to patronize a service that is bound to operate in all kinds of weather.

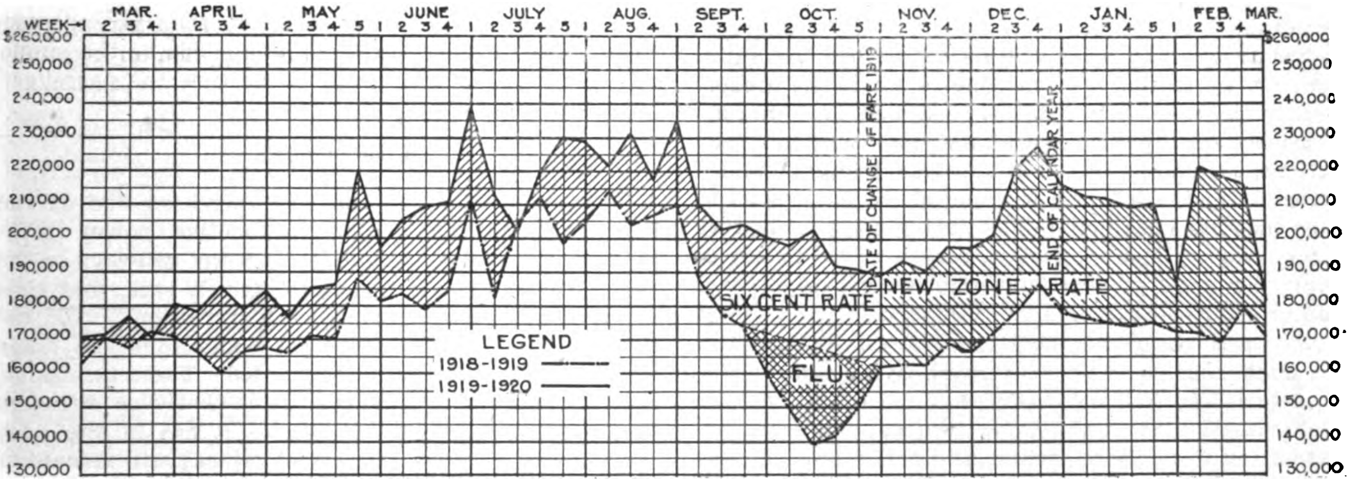
GENERAL STREET RAILWAY CONDITIONS

In discussing the question of a proper solution for the almost insurmountable problems confronting the industry the commission recognized that the respondent company had not wholly escaped the chain of circumstances and the countrywide difficulties which have driven many street railways into receivership and have even threatened the continued existence of others.

It was a recognized fact and admitted by evidence that street railways supply a necessary public service and that their suspension would be a public calamity. The commission also recognized that some of the elements that produced the precarious street railway situation in the State of Connecticut were beyond its present power and could only be remedied by special legislation. Statutory burdens such as street paving, bridge assessments, taxes and unfair automobile competition were among those elements. The labor competition of industrial enterprises, it held, was an economic condition which the carriers must work out for themselves. The depreciated purchasing value of the dollar and the increasing cost of producing service, however, were factors which could and should naturally be met by corresponding increases in rates, but there was a limit at which increased rates would produce increased revenue.

The commission recognized that to perform the duty of any utility company to render good and adequate service the company must be sound financially and any order not based on this general policy would work an injustice not only to the company itself but to the public entitled to receive such service.

A street railway is of direct benefit not only to its patrons but to the communities, business industries and property owners in the localities served, and yet it developed that under existing conditions the car riders were called upon to pay all of the expense of supplying such service. The more indirect taxes a company has to pay to the cities, the towns and the State the greater the fare that must be paid by the car rider. It was obviously unfair, the commission held, to demand that the car rider should assist in maintaining pavements for others when such users contribute little or nothing toward their own comfort and convenience.



WEEKLY PASSENGER REVENUES FROM MARCH 1, 1918, TO MARCH 1, 1920

To make a rate sufficiently high to cover all such present-day expenses and afford a fair return on the value of the property, taking into consideration the nature of existing competition, would have a tendency disastrously to lessen street railway traffic, even to destroy the usefulness of the carrier in supplying what should be a cheap, convenient and reliable form of transportation available to all the people.

The respondent company even disavowed that its rates were sufficiently high to afford a fair return on the value of its property or upon its investment, but claims it was necessary to increase its rates over the 6-cent flat fare to enable it to meet its present financial obligations, exclusive of dividends. While taking this position the company also claimed the legal right to establish rates that would produce a fair return on the value of the property, and any rate that would not do that could not be found to be unreasonable by the commission.

Rates established either by the company or the commission that fail to produce sufficient revenue to put the company on a paying basis should promptly be increased, assuming, of course, judicious and economical management. Undoubtedly the railway company's board of directors is best qualified to establish a system of rates and collections for its own property, for it has accurate knowledge of the company's needs and an estimate of the results to be obtained by the rates thus established. However, when such rates are admittedly established on an experimental basis, to be demonstrated by public patronage, the directors' prerogatives are materially lessened. Rates established by the commission under such conditions would be as favorable to the company as those established by the directors could lawfully be, for the commission has recognized that in order for a company to render good service it must be on a financially sound basis. Any rates, therefore, as established by the commission that are found to be insufficient should promptly be increased to a maximum such as the traffic will bear, and if such maximum then proves to be insufficient the only alternative is state or municipal aid or abandonment.

REASONABLENESS OF PRESENT ZONE SYSTEM

It cannot be found from the facts presented, the commission stated, that the present rates as a whole produce a greater revenue than the company is entitled to, although such a conclusion might theoretically be deduced, due to the fact that a surplus net income after paying interest charges on funded and unfunded debt is shown by the company for the past three years in its income exhibits.

While the company did not present any estimate of the percentage increase in revenue due to the new zone rates for the entire system, it did show that on certain lines and in certain sections it was more than 100 per cent, whereas in other sections there was a loss.

In the mind of the commission, it is a question as to what increase in gross revenue, if any, the present increase in rates has produced over the corresponding period of the previous year, when the 6-cent flat fare was effective. An analysis of the accompanying graph indicates that the 20 per cent increase in fare on Oct. 1, 1917, from 5 to 6 cents, resulted in practically no increase in passenger revenue for the first year. During the second year, however, a gradual increase in revenue is recorded and for the two months just prior to the adoption of the present rates the chart indicates that the 6-cent fare was producing nearly as great an increase over the previous year (eliminating the effect of the influenza epidemic) as the first three months of the present zone rates.

The commission, therefore, holds that the present increase in revenue is not commensurate with the increase in rates and that the added burden on the public is not relieving the company of its financial embarrassment. Hence, there is no question but that the company must have a greater revenue than is now being obtained. However, in establishing higher rates for the purpose of increasing revenues, the effect upon the public as to the usefulness and reasonableness of the service provided, as well as the interest of the company, must be taken into consideration.

Notwithstanding that the present rates fail to provide a reasonable return for the entire system, the commission holds that they are inequitable and discriminatory and to that extent unreasonable. They are inequitable (1) by reason of failing to give any concession to the daily rider who travels beyond the initial fare; (2) by reason of attempting to obtain the greater part of the necessary increased revenue from a comparatively small percentage of its patrons in suburban sections, (3) and by reason of abnormally high increases to certain of the patrons over and above the system of rates that has been maintained during the past history of the company and upon which they were led to rely as being the more or less universal system which was maintained by nearly all street railways in the country.

The rates are held to be discriminatory by reason of the establishment of unequal-length zones under a distance tariff, particularly the second and third zones, on lines radiating from the same city, and by reason of attempting to measure certain arbitrarily selected suburban zones by the density of traffic while treating the system as a whole and opposing the right or policy of segregation.

Zones. The commission held that the most equitable policy thus far suggested or adopted for street railway fares is the zone or distance tariff system, and accordingly will retain the general basic principle adopted by the company. The evidence, however, presented in the hearings showed considerable dissatisfaction with the zone system, not so much as a measure of rates as the annoyance and delay to traffic. It was admitted, however, that the annoyance and delays were gradually decreasing as the system became more familiar to the trainmen and the traveling public. Most witnesses also testified that the basic principle of charging on the mileage basis for the amount of service actually rendered was more equitable and on a sounder basis than the old flat-rate system with its flagrant inequalities and numerous long-haul rides at an absolute loss to the company. It is true that the long-zone or flat-fare system was more popular and convenient and that it had contributed materially in the past to the building up of suburban sections. The inability of the company longer to continue such a system makes it imperative for the preservation of service to adopt a more businesslike policy, unless the State or municipalities served extend aid. Such aid is not forthcoming at present, and it, therefore, becomes necessary to adopt some other system or a radical modification of the old system.

Opposition to the pay-leave system of fare collection now in effect is based on the theory that it takes longer to unload passengers by reason of the time required in making change, with consequent holding up of street traffic and disarranging of the railway's schedules. Any new and improved system of fare collection is liable to cause annoyance and delay at first, but if practicable will ultimately iron out the minor defects and meet with general approval. Such appears to be the history of the respondent's present system, although the complaint relative to making change still remains to a modified extent. If passengers but knew the correct fare and would have it ready when leaving the car all unnecessary delay would be eliminated.

Statistics as to loading and unloading times per passenger for the pay-enter and pay-leave systems were submitted by the company and these were favorable to the pay-leave plan. The commission is of the opinion that the use of its zone tickets instead of actual cash would very materially expedite the unloading of passengers and assist in the better maintenance of schedules. Comment is also made that under a distance-tariff system no policy of collection thus far adopted or suggested appears to be as practicable as the single collection for the whole ride at the time the passenger is leaving the car.

CONCLUSIONS

Claims are advanced that the increased use of the internal-combustion engine for motive power foreshadows the disuse of the electric street railways in the near future. Even if this were literally true, that time is not at hand, and during such a transition period the absolute needs of the traveling public must be taken care of and the investor safeguarded. The commission, however, has reached the conclusion that even although the motive power may change, as it has in the past, the essential features of a street railway will remain.

Motor vehicles, moving at the will of an operator over the entire surface of the already congested streets, have not yet been recognized or even demonstrated to provide a satisfactory system for carrying all or the maximum number of persons desiring public transportation through the city streets. Consideration must also be given to the fact that such streets are public ways and must be used for other purposes. The public inconvenience and serious consequences resulting from the abandonment of street railway service during the past two years have clearly demonstrated the absolute necessity of preserving and protecting the street railway industry, especially for urban transportation. The commission is, therefore, thoroughly convinced that the street railways render a necessary public service and that any determination of the issues should be made with a view to the proper maintenance of such service, having in mind the respective rights of both the company and the public.

To meet the rapidly changing conditions promptly it is important to have a flexible system of rates that can be varied on short notice without a radical change in the rate structure itself. The commission believes also that the casual rider should pay a greater percentage of the "standby" charge than he now does, and further that the regular rider should be able to purchase transportation at a discount. The sale of tickets at a substantial discount in moderate quantities should invite increased riding, improve the service and promote the interest, usefulness and good will of the company, increase its revenues and bring to its treasury more nearly 100 per cent of the actual transportation charges.

In establishing a commutation rate, care should be taken not to discriminate, and in no case should the rate be less than the initial cash fare, nor greater than the regular ticket fare for the same distance. To avoid conflict with this theory no low-rate tickets can be sold for short riding. One of the principal reasons for a commutation rate is to enable people working in the larger centers to live outside of the congested area and enjoy the benefits of healthful environment for domestic life. For this reason the commission holds that commutation rates should be limited to lines that radiate from populous, incorporated manufacturing and employment centers of 25,000 population or more. These rates will apply to all points on such lines more than five zones from such traffic centers. The commuter is also entitled to ride, on connecting routes leaving the traffic center, one or more zones in either direction for the regular zone cash fare, irrespective of the initial fare.

PROPOSED ZONING AND RATES

The new rate structure prescribed by the commission contains four different rates applying to zones, each one mile in length. The order follows in full:

Zone System. Establish all zones one mile in length as the track runs, starting from traffic centers and varying the length of the zones only to the extent necessary to absorb or equitably to adjust, by neutral zones or otherwise, a fractional part of a mile occurring in measurements between traffic centers or to line terminals; any dispute as to such variation or adjustment to be referred to the commission.

Cash Fares. Initial cash fare for two zones or less 6 cents, and each additional zone 3 cents.

Zone Tickets. Good on all lines, sold in lots of fifty for $1 or in larger quantities at the same rate if desired. Not fewer than three tickets to be collected for a ride of three zones or less and one ticket for each additional zone in excess of three zones.

Commutation Tickets. Good for a round trip daily between the traffic center of any incorporated city or borough having a population of 25,000 or more and points more than five zones distant therefrom on all lines radiating from such traffic center, for the number of days in any month less Sundays and legal holidays; said commutation tickets to be sold at the rate of 1.75 cents per zone, to be issued to the individual commuter, to be non-transferable and to expire at the end of each month. The rate beyond such traffic center to or from the commuter's place of business as one continuous journey to be at the regular zone rate.

School Tickets. To be issued at the rate of 1 cent per zone, not fewer than three tickets for three zones or less and one ticket for each additional zone. Other conditions relative to school tickets to remain the same as at present established by the company.

Transfers. Free directional transfers shall be issued: (1) On cash fare, entitling the passenger to ride through two zones for the initial cash fare of 6 cents without additional charge and the regular cash fare for each additional zone. If the cash fare passenger has ridden through two or more zones before transferring, he shall be entitled to a transfer entitling him to ride through the next zone or zones at the regular rate of 3 cents each. (2) On zone tickets entitling the passenger to ride through three zones for the initial fare of three tickets without additional charge and the regular ticket fare for each additional zone. If such passenger has ridden through three or more zones before transferring he shall be entitled to a transfer, allowing him to ride through the next zone or zones at the regular ticket-zone rate.

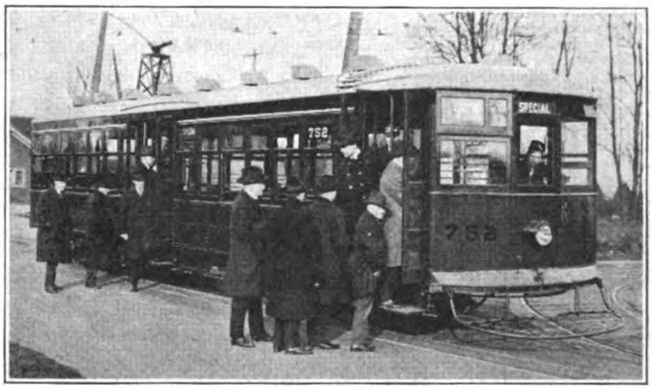
In no case shall a transfer entitle a passenger to ride through more than two zones on such transfer.

To relieve the shortage of rolling stock likely to be caused by the inability to operate the pay-leave system of fare collection on cross-bench open cars, the commission advocates the use in summer of such open cars for special holiday and peak service only, first on lines not exceeding two zones in length having only the initial fare charge; secondly, when these cars are used for special service on runs exceeding the initial fare, a flat rate may be charged not exceeding the maximum fares under the zone ticket rate for such runs. Transfer privileges may also be eliminated at the discretion of the company when open cars are operated.

The commission asks for full co-operation on the part of the company employees and good will on the part of the public, and states that if at the end of a reasonable period of time it is demonstrated that the rates or system are unfair either to the company or to the traveling public it will, upon proper presentation, unhesitatingly and without prejudice, by reason of anything herein stated or decreed, consider and revise such rates or system in accordance with facts there presented.

New Car Arrives in Seattle

THE sample car ordered for trial by the Seattle Municipal Street Railway has been placed in service. This is a single-end, double-truck, front and center-entrance car for one-man, two-man or multiple-unit train operation. It weighs 34,600 lb. equipped and has a seating capacity of sixty-eight. The equipment consists of four Westinghouse 40-hp. interpole motors, type 514, with Westinghouse H.L. control. Helical gearing is used, with a gear ratio of 15 to 58. The wheels are 24 in. in diameter and of rolled steel. The airbrake equipment is straight air, with emergency and safety features.



TRYING OUT SEATTLE'S NEW CAR

In an attempt to prevent trouble in operation due to unfamiliarity with the equipment special instructions have been issued regarding the handling of the equipment.

Motor Trucks Used for Conveying Freight

A system of conveying l.c.l. freight between different railroad terminals in Cincinnati, by means of motor trucks and containers of 5-tons capacity each, has recently been put in operation in that city by the Motor Terminals Company. In May, 1917, the Cleveland, Cincinnati, Chicago & St. Louis Railroad made a trial installation of the system, which proved so successful that it has now been extended to the other terminals. The containers are brought to the railroad freight houses by automobile. When they reach there they are lifted by electric hoists and carried close to the freight cars, where they can be loaded at minimum cost. They are returned by mechanical means to the automobile, then carried to destination. A material saving over former methods is claimed.

Philadelphia Fares Analyzed

Reports Give Statistics for Last Nine Years—Deadlock Over Operation of Frankford Elevated Line — New Capital Required

RECENT transportation history in Philadelphia in connection with the proposed lease of the municipally built Frankford Elevated Railway to the Philadelphia Rapid Transit Company is summed up in two reports just issued by William S. Twining, Director of the Department of City Transit, Philadelphia. Various proposals and counter-proposals have been made by the city and the company for the operation of this line by the company, the last proposal of the company, that it pay a nominal rental only for the structure, being withdrawn last November because of opposition to it in the Council.

Construction on the Frankford Elevated Line was begun in 1916 and the city's present investment is shown in the following statement:

FRANKFORD ELEVATED RAILWAY — FIRST OPERATING SECTION

Class of Outlay	Total Estimated Cost	Money Expended by City Cost to March 1, 1920	Per Cent of Present Cost to Final Cost
Real Estate	$600,000	$291,607	48.5
Construction contracts (including tracks)	5,720,660	3,632,841	63.5
Equipment	3,285,000	....	0
Engineering and miscellaneous	600,000	493,615	82.3
Interest	900,000	160,000	17.8
Totals	$11,105,660	$4,578,063	41.0

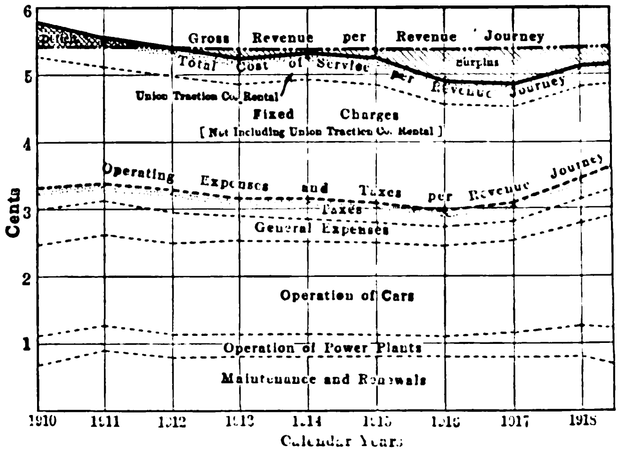
In the opinion of the Director of City Transit much of the difficulty which the railway company now finds in undertaking to carry out the rapid transit proposals of the city lies in the rentals which it has agreed to pay to its sub-companies, which even prevents the furnishing of adequate surface transportation facilities at present.

According to Mr. Twining, the company's management deserves great credit for its "skillful steering between the Scylla of increased fares and Charybdis of bankruptcy," but the limit has now been reached, and to provide the facilities urgently needed either the present fares must be increased or there must be a scaling down of the fixed charges. A diagram is then shown of the cost of transporting a passenger in Philadelphia from 1910 to 1918 inclusive and during the first six months of 1919.

COST OF TRANSPORTING A PASSENGER IN PHILADELPHIA

In commenting on this diagram the Director points out that during the first six months of 1919 the operating cost, including taxes, was 3.62 cents per revenue passenger and the fixed charges 1.5 cents, making the total cost 5.12 cents per revenue passenger. On the other hand, if the company's gross revenue for the period be divided by the number of revenue passengers it will be found to equal 5.39 cents per revenue passenger. The surplus available for dividends, support of new capital, reserve, etc., amounts to only 0.27 cent per revenue passenger, an amount declared by Mr. Twining entirely too small for the purpose. Continuing, he says:

"The mere fact that the cost of service at the present time is over 5 cents per revenue journey shows that on a free transfer basis the flat 5-cent fare would not alone meet the costs of the company. The company's 5-cent fare earnings are now supplemented by the sale of 3-cent exchange tickets, the revenue from freight, express, milk, advertising, etc., and income from other sources. . . . The diagram shows that since 1910 (except in 1916 and 1917) the average cost of carrying revenue passengers has exceeded 5 cents. The diagram also shows that the low point in operating expenses was in 1916, and that there has been a rapid increase in the item of cost per passenger since that time. The fixed charges have dropped from 1.92 cents to 1.50 cents per passenger since 1916, because very little new capital has been employed and because the "fixed charge" on earlier capital is a fixed sum, the aggregate amount of which has not been changed appreciably in recent years. As the number of passengers carried has increased nearly 30 per cent during this period, the fixed charges per passenger have naturally come down proportionately. Had the ratio of fixed passengers to operating expenses remained what it was in 1916 the cost per passenger would now be 5.54 cents and the company would be showing a deficit in place of a surplus."



THIS CHART SHOWS REVENUE AND DISTRIBUTION OF EXPENSES PER REVENUE PASSENGER, PHILADELPHIA

In conclusion Mr. Twining says that the saving made during the last few years is to be attributed primarily to the minimum investment in new facilities, a course made possible by the "complacency" of the public under "heart-breaking" conditions.

According to the report, facilities required today to render adequate service will approximate $20,000,000 to be put in service immediately, and within the next ten years at least $50,000,000 more should be supplied. About half of the $20,000,000 of facilities needed immediately is represented by the Frankford line and one-half by necessary surface line extensions.

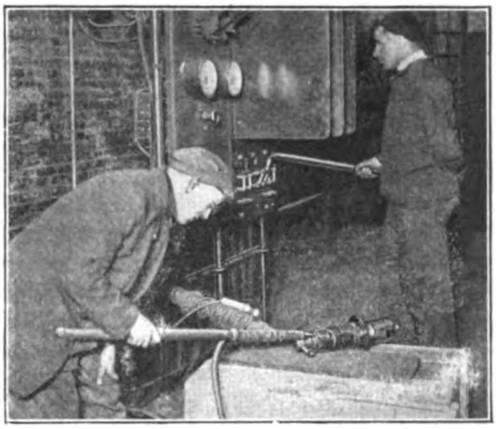
Short-Circuit Tests Prove Interesting

AS A RESULT of short-circuit tests of a 10,000-kva. turbine alternator E. S. Henningsen, of the engineering staff of the General Electric Company, draws some interesting conclusions. These are reported in the March, 1920, issue of the *General Electric Review*. Among other things he says that adding external reactance in a generator circuit equal to the internal reactance of the machine reduces to one-half the instantaneous short-circuit current. At the end of one second, however, the current is practically the same whether the external reactance is connected in or not, if the leakage reactance of the machine is small compared with the synchronous reactance.

Some Mysterious Car Ailments

Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD



Is There a Remedy for Carelessness?

ON A LARGE electric railway property operating multiple-unit trains it was the practice to reduce the length of the trains after rush hour by cutting cars off at the terminal, according to the requirements of the service. On one occasion the drill crew, after making the necessary uncoupling, was told to back the car away, so the link could be removed. The car was started, but when the motorman tried to apply his brakes, to his surprise he found that they did not respond. A glance at the air brake gage showed that he had full reservoir and train line pressure, so there was obviously something wrong with the brake apparatus. The motorman then tried to reverse his train by applying power, but this also failed. As the car was on a grade it gained momentum rapidly, so that when the motorman tried to stop the car with hand brakes, these were useless. Seeing a train approaching at the foot of the grade, he realized that disaster was inevitable, and accordingly jumped from the car, leaving it to proceed without an operator. A collision resulted which badly damaged several cars. Fortunately, there were no passengers on the train with which the car collided and the motorman was not badly injured.

The runaway car was examined to determine the cause of the failure of the brakes, and it was found that the triple valve had been cut out. A previous crew had found the car giving trouble, due to the sticking of the "triple" and had cut out the "triple," allowing the train to operate with this one car in this condition. Due to carelessness the defect was not reported and the accident resulted.

Weeding Out Weak Spots in Jumpers

THE breaking of wires in jumpers on roads which employ multiple-unit train operation is a continual source of annoyance and many roads have taken heroic measures to reduce their troubles from this source. The telephone rings in the office of the foreman of inspection and an excited voice yells: "Send an electrician to the incline on the main line and have him bring a new jumper." In such cases the electrician usually does not have to look for the trouble, as the train crew has already located an open circuit in one of the jumpers by the time he reaches the scene.

The mechanical department of one large elevated railway system has succeeded in reducing the number of failures in jumper cables by 75 per cent through a systematic testing, which eliminates all weak cables before they break down in service and an actual open circuit occurs. All jumpers are tested once a month and the back end of the head is painted a new color each time, so that any jumper which may have been missed can be readily picked out and sent in for this periodic test. In making this test a number of jumpers are connected together to form the external circuit and these are connected across the terminals of a 500-amp. storage battery. Sufficient cells are connected in the circuit to secure a current of from 80 to 110 amp. The object of the test is to put enough current through the jumpers so that if there is a wire in one of the circuits which has a few strands broken the remaining strands will be burned out, and thus any partially broken jumpers will be weeded out. Each wire in the jumpers used is equivalent to about a No. 13 wire. Through this process of frequent tests the failures of jumpers on this road have become comparatively rare.

A similar current breakdown test for jumpers in which 50 amp. at 550 volts is passed through the jumper wires in series was described in the ELECTRIC RAILWAY JOURNAL for March 15, 1915, page 487.

Blowing Circuit Breaker Gives No Indication of Location of Trouble

ONE of the cars in city service on a large railway property was reported for "blowing" its circuit breaker day after day and all shop tests failed to locate the trouble. Commutator bar tests were made as well as open-circuit tests, checks on the winding, high-potential tests and resistance tests with a millivoltmeter, but all were of no avail. The connections of the motors were carefully checked and tested, brushholders inspected and the brush tension adjusted, but still the car continued to give trouble.

The men responsible for the maintenance of the equipment began to get somewhat "peeved" and many felt sure that the motormen were to be blamed for the difficulty. In a final effort to determine the cause, it was decided to have a crew of shopmen take the car over the line and operate it in test service. The covers were removed from the motors to permit inspection during operation. The circuit breaker was given a special adjustment and the tripping mechanism was set up so that the current necessary for tripping it would be increased somewhat. The car operated perfectly for a considerable time when suddenly, while operating at high speed with the control equipment in full parallel, one of the motors flashed over. Another start was made and again this motor flashed. The part giving the trouble had been located, but still all were in the dark as to its cause. The car was returned to the shop and the motor was opened up and entirely dismantled, but there was no outward sign to indicate the cause of the trouble.

It was then decided to rewind the armature. When the windings were removed it was found that the laminations were bent and the slots forced out of line from their true position, so that the tops of the laminations were out nearly the width of a coil. At some previous time this armature had been rubbing on the pole faces and this damage was the result. The armature was then rebuilt and a new set of windings were installed. It was then put back into the motor and the car returned to service, after which it gave no further trouble.

Auxiliary Devices May Cause Failure of Main Equipment

ONE car on a system operating high speed local service between cities gave trouble by frequently "going dead" without any apparent reason for it. Motormen reported that the control equipment would be inoperative for as many as five or six times on a single trip, but after waiting a short time the equipment would again operate satisfactorily. The car was equipped with the electro-pneumatic switch-group type of control. On several occasions the motorman got out and opened up the switch group in an endeavor to determine the cause, but could find nothing out of the ordinary. The car was turned in at the shop and tested out in the usual manner, also without locating the defect, but in the course of the inspection it was found that one of the switches of the line switch was somewhat sluggish. The line switch consisted of two separate switches connected in series and the inspector decided that the sluggish operation of one of the switches might be the cause for the open circuit.

The wiring and connections were tested for improper contact, but these proved to be satisfactory. The car was then operated by the shopman, who found that after repeated operation he was able to cause the sluggish switch to stay open. The air pressure used for closing the switch was less than the main reservoir pressure, being reduced by a reducing valve. By checking up the air pressure at the time the switch refused to operate it was found that this was low due to the repeated operation. Ordinarily the pressure used for the switch group operation was 70 lb., and it was found that if the pressure dropped to 50 lb. this sluggish switch would not operate. In examining this switch it was found that the spring for opening the switch was somewhat stronger than that in the other switch and a leak in air pressure was also found at some of the valves.

This leak, together with the air used for operating the switch group, kept the pressure from increasing, so that it stayed at 50 lb. for a considerable time. The different parts of the switch were cleaned carefully and oiled and the switch was then found satisfactory and it could be operated at air pressure considerably under 50 lb. By tightening the leaky connections the danger of failure was also lessened considerably and the car operated well in service.

Why Do Commutator Leads Break?

AN INTERURBAN road operating about forty miles of track experienced a great deal of trouble due to armature leads breaking. At first it was thought that the armature cores were loose, but a careful investigation showed that these were in good condition and tight in all cases. The men responsible for the rewinding of the armatures were very careful and produced a fine looking job, so that it was thought the trouble could not lie in that direction. One of the engineers of the company, however, spent considerable time in the armature room watching the method used in rewinding armatures and he found that in order to give a neat appearance to the leads as they were brought down they were being bent quite sharply. While this gave a very neat appearing job when completed, it was evident that the wearing qualities were being sacrificed by this method. The method of bringing these leads down to the commutator was changed somewhat and further investigation showed that there was also considerable vibration of the leads between the end of the armature slots and the points where they were fastened to the commutator. No doubt this vibration was also responsible for some of the broken leads. In order to remedy the condition the space under the leads was filled in with a mixture of powdered asbestos and shellac. This hardened so that after the leads were in place they were held firmly.

Additional support was also provided for the leads where possible by taping two or more leads together. Previous to the change the leads left the coils at the corners and had no support till the commutator was reached. The change consisted of bringing the leads out farther around on the end of the coil, and then by taping them in, the distance to the commutator was shortened considerably. On armatures with leads going in opposite directions this could not be followed to any great extent, but leads going in the same direction were taped together so as to form a support for each other and make a more rigid construction.

These changes effectively did away with the trouble of breaking of the leads.

The *Electric Journal* for February, 1920, gives the following suggestions for preventing broken leads:

The windings should have a solid foundation and should be solidly built up between the top and bottom leads.

Small wire leads should be shellacked back of the neck while winding.

The complete armature should be dipped in a baking varnish and baked.

The laminations of the core should be a tight driving fit on the spider or shaft and should be held tightly together by a ring nut.

The commutator should be clamped under pressure while hot, should be held securely and should make a good press fit on the shaft or spider.

The coil supports should be of rigid construction and securely held from movement.

All armatures should be temporarily banded while hot to pull the windings down solidly. The permanent bands should be made of a good grade of hardened steel wire soldered with pure tin solder. Strips of tin should be placed under the core bands before soldering, to make a more compact band. At the front end the band should be placed out near the commutator neck to hold the windings securely in place at this point.

Excessive currents, such as are produced by too rapid acceleration or through faulty handling of cars, should be avoided.

Overspeeding, whether on the level or down grades, should be avoided.

All detail parts of the armature, as well as the completed armature, should be in balance.

Placing a steel wire band on the bottom leads before connecting the top leads has been tried, with but little success.

The armature bearing should be kept tight in the housings and renewed when worn to the allowable limit.

The bearing housings should be kept tight in the motor frame.

The axle bearings should be kept tight in their seats and removed when worn.

The axle cap bolts should be kept drawn up tightly and defective caps should be removed.

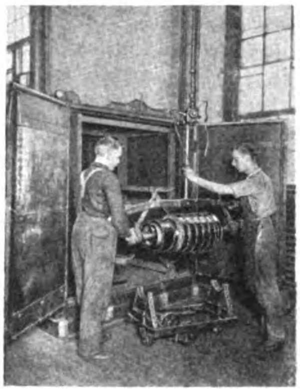
The gear case bolts should be kept tight and broken gear cases replaced.

Gears and pinions when badly worn, out of mesh or bottoming should be replaced by new ones, preferably of the helical type.

Tracks, special work and roadbed should be kept in good condition.

Shop, Track, Power and Line

These Articles and Ideas Are From Men on the Job Who Find Special Applications and New Methods an Incentive for Greater Effort — If You Have Something Good Pass It Along



Pacific Electric Opens New Shop

Thirteen Buildings, Covering More Than Nine Acres, Have Been Placed in Service for Maintenance and Building of Electric Cars

By Clifford A. Elliott

Cost Engineer, Maintenance of Way Department, Pacific Electric Railway, Los Angeles, Cal.

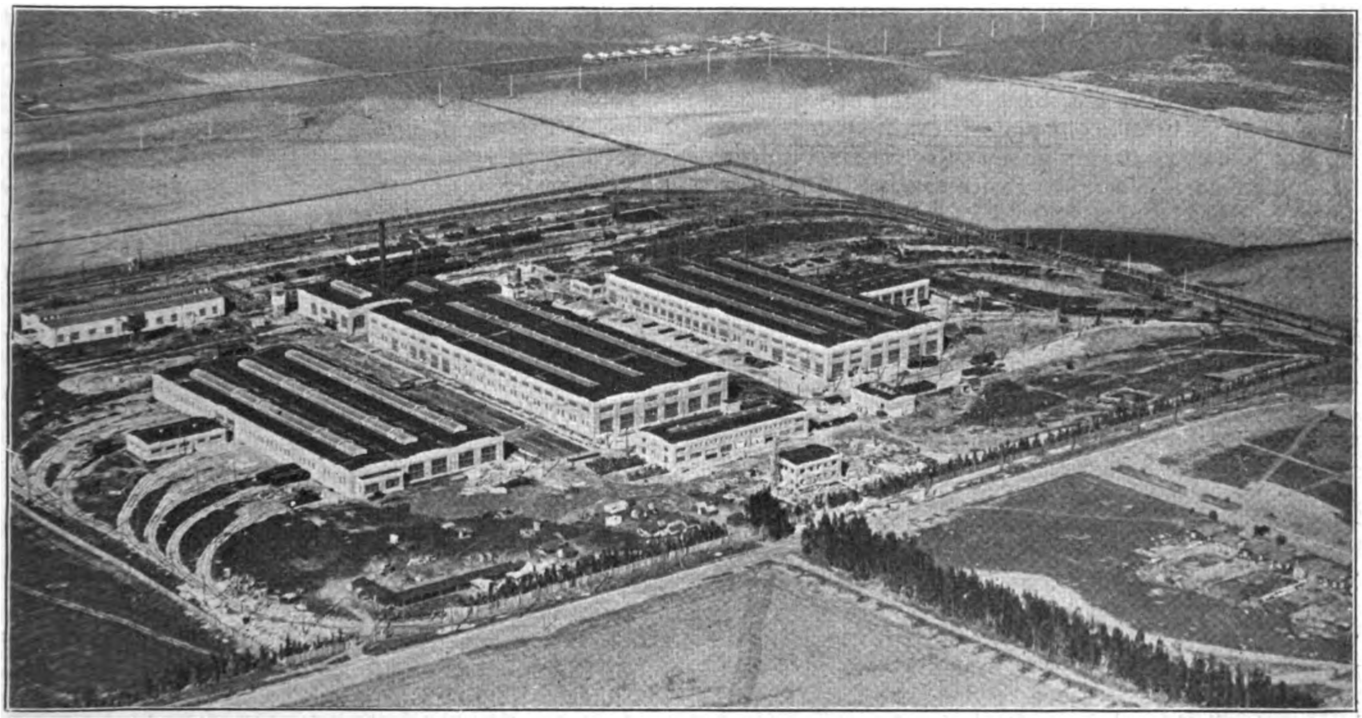
THE accompanying view of the new Torrance shop of the Pacific Electric Railway, which was taken from an aeroplane, shows in a very striking manner the large accommodations provided and the splendid construction of the buildings for their work. The plans and proposed construction of these shops were described in the issue of the Electric Railway Journal for July 21, 1917, page 95. To provide for future expansion, grounds have been acquired with an area of 125 acres.

Referring to the accompanying view, the building in the immediate foreground is the mechanical department office. Directly behind this is the store department building, and the small building to the right of this is an oil storehouse. The three large buildings which constitute the central group from left to right are the woodwork and paint shop, the electrical repair shop and the electrical winding and machine shop, respectively. The small building on the right, which in the view appears like an addition to the large shop, but which is in reality a separate building, is the blacksmith shop and forge room. The small addition to the paint shop, on the extreme left, is used for paint storage and mixing. In the rear of the central large building are the power plant, cornice works, welding rooms and other workshops. A total of thirteen new shop buildings have been erected. These are of steel-frame construction with concrete foundations, brick and concrete walls and concrete-slab roofs. Special attention has been given to the number and location of the windows so as to provide the maximum amount of evenly distributed daylight.

Some Interesting Details of Construction

In the motor shop and heavy machine shop the floors are made of 4-in. x 6-in. redwood blocks laid on sand cushion. These blocks were previously treated by boiling in asphalt. The principal machines now in use in these shops were moved from the general shops at Los Angeles, but some additional tools, together with cranes, hoists, etc., have been installed.

In the paint shop steam coils have been located in



AEROPLANE VIEW OF THE PACIFIC ELECTRIC RAILWAY'S TORRANCE SHOPS each pit for drying freshly painted equipment. It is expected that this will result in a considerable saving in the time necessary for drying the paint. The lamps in the inspection pits are installed in niches and are staggered 21 ft. center to center. Two lighting receptacles are installed in each niche; one contains the lamp and the other is used for emergency purposes so that an extension cord can be inserted and a drop line used where light at the work is needed. An Otis 5-ton self-operated electric freight elevator is installed in the wood mill and a similar type of 2-ton capacity is used in the storehouse. The top floor of the storehouse is used for motor parts and miscellaneous electrical supplies. All air brakes, switch groups and control material are located on this floor. The material cases for small parts on this floor are 6 ft. high and of an open type, so that each bulkhead can be clearly seen without the use of step ladders or boxes. The main floor is used for storing both hardware and miscellaneous supplies. In addition to these two stories the storehouse also contains a basement, where material used in the electrical department is kept.

The oil storehouse previously referred to is located adjacent to the main storehouse and has large steel oil storage tanks in the basement. These are connected with Bowser oil pumps for drawing the oil for distribution at the new shops.

One section of the power house is used for the substation equipment necessary to take care of the local car shops and freight car movement. A 1,000-ft. motor-driven air compressor and a 150-hp., 2,200-volt, three-phase alternating-current motor are installed in this section. A 750-gal. capacity motor-driven air pump for operating the fire equipment is also installed in the power house. This will be relieved by an auxiliary 500-gal. capacity Duplex steam-driven fire pump. Fuel for the power house is supplied from two 8,500-gal. concrete underground fuel oil storage tanks.

New Drill Steel Sharpener

A NEW compressed air operated drill steel sharpener machine, known as the I-R No. 50 Sharpener, has been developed by the Ingersoll-Rand Company, New York. This machine was designed primarily to rapidly and exactly sharpen and shank drill steel such as cruciform steel up to 2 in. in diameter or round, hexagon, octagon, quarter-octagon, auger or spiral steel up to 1¾ in. in diameter. When fitted with special devices it will forge bolt heads, pins, stanchions, etc., and nearly 200 different products have been made by this machine.

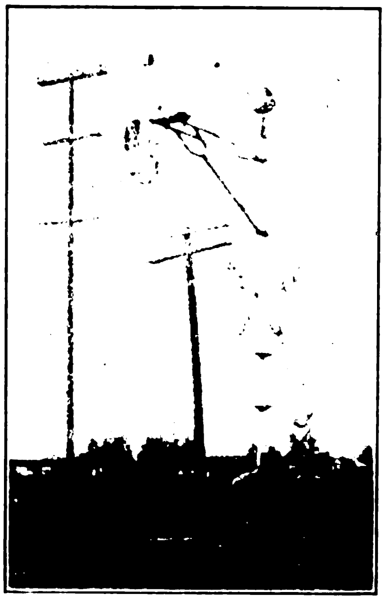
The single lever, which controls all of the operations of the machine, is fitted with a safety-locking device. This prevents accidents due to the impossibility of operating the machine unless the lock is released. The throttle valve is of the balance spool type. The hammer cylinder is an improved valveless type. This construction permits the free-moving hammer to deliver fast and powerful blows against the end of the dolly, upsetting the steel and so forming the bits and shanks rapidly, which greatly increases the capacity of the machine.

Positive lubrication is provided for the entire machine by the "Heartbeat" lubricator. This is embodied in the throttle valve chest casting and works automatically whenever the machine is in action. It is provided with adjustment for regulating the quantity of oil desired. All parts are made for hard service and all cup leathers have been eliminated from the design.

Oscillating Motor Crossing Flagman

New Design Has No Gears or Toggles and Swings Through Any Arc in Any Quadrant Without Vibration

A NEW automatic flagman or crossing signal which differs widely in many respects from any similar device formerly available has been placed on the market by the Thompson Signal Company, Los Angeles, Cal. It comprises a 26-in. disk fastened to an arm or arrow 46 in. long having a red light mounted in the end opposite from the disk, the whole oscillating, not as a pendulum but pivoting about its center of gravity. The driving mechanism is a four-pole direct current motor which for steam-road service operates on a 10-volt circuit supplied by primary cells. Where other voltages are available, as in electric railway service, the motor can be wound for the trolley voltage. The disk and arm are mounted directly on the armature shaft, thus avoiding any gearing. The motor is of the external armature type and is made up of eight field coils and twenty-two armature coils which have windings about four times heavier than necessary in order that heating and danger of burnout may be minimized. These coils are so connected in the armature that one or more could burn out without affecting the operation except proportionately to weaken the torque. During a test run of 2,500 hours' continuous operation the temperature rise in the motor was only 10 deg.


INSTALLATION OF AUTOMATIC CROSSING FLAGMAN WITH BELL AUXILIARY

The oscillating movement of the armature and signal is secured by reversing the direction of current. This change in direction of current flow is secured through two fingers mounted on the armature shaft which have a steel roller mounted at their outer ends. As the armature revolves these fingers come into mechanical contact with two switches, producing a cam action, which first closes the switch on one side of the shaft and then that on the other, these two switches alternately closing a circuit through two pairs of magnet coils, which in turn throw the main motor switch first in one direction and then in the other. The fingers of this main switch are laminated and as they are pulled into contact the laminations spread, giving a wiping contact, which tends to keep the surfaces clean.

The driving motor is made in two types, one with a commutator and one without. With the type having a commutator the two fingers which operate the control switches may be shifted relative to each other, so that the armature and signal may be made to oscillate through any arc from 10 deg. to 360 deg., or to rotate continuously in either direction, and further, so that the signal will oscillate in any quadrant.

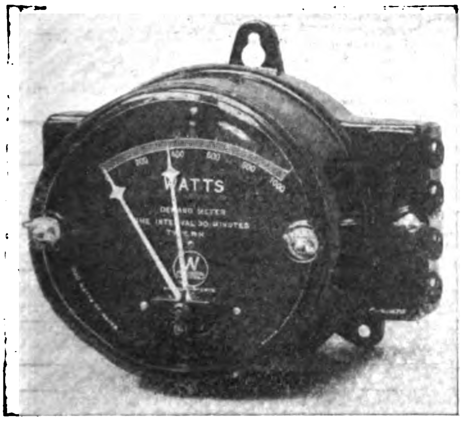
In the commutatorless type of motor connection to the armature coils is made by means of two spiral-coiled spring-brass leads, which act like the hair-spring in a watch, though not supplying any spring force, the springs merely being used to provide flexible contacts which will avoid brushes and rings and at the same time provide a practically non-breakable connection. On this motor the two fingers operating the control switches are usually permanently fastened together, so that the arc through which the disk oscillates is fixed. However, the quadrant in which the disk will oscillate can be changed if desired, to avoid an obstruction obscuring a clear view of the disk from a distance, by shifting the fingers radially on the shaft.

One of the principal claims for this new device is that there are no springs or rubber buffers employed to reverse the motion. The stopping of rotation in one direction and starting back in the other is accomplished simply by the magnetic cushion as the direction of the field is changed, thus avoiding any vibration and causing the motion of the disk to be very similar to that of a free swinging pendulum, slightly damped at each end of swing. The signal is so weighted that it is slightly out of balance in order that it will assume a normal position when it stops. This provision is made only for the sake of appearance, since the signal will begin its oscillation from any position, the torque being practically constant at all times.

The red light in the end of the signal arm which provides the night warning is connected with fixed connections in multiple with the armature circuit. With the armature type motor there are four flashes of the light during each oscillation, but with the commutatorless type motor the light is steady except for a slight flash as the polarity changes at the end of the oscillation.

New Type of Thermal Demand Meter

THE Westinghouse Electric & Manufacturing Company is now marketing a new type of demand meter employing the principle of thermal storage and indicating what has been termed the "logarithmic average demand." This line of instruments comprises indicating watt demand meters for alternating-current circuits and ampere demand meters for alternating and direct-current circuits.



THERMAL DEMAND METER

The moving element of the instrument consists of a shaft connected to two bimetallic spiral springs. These springs are attached to the shaft at their inner ends and to the cylindrical case at their outer ends and are wound in opposite directions. Thus an equal change of temperature of both springs does not produce any rotation of the shaft. However, if one spring is raised to a higher temperature than the other, it will deflect through a greater angle and the shaft will move through an angle proportional to the difference in temperature of the two springs. The cylindrical case contains a heating element which is connected in the electric circuit and is located in the case in such a way that one spiral spring is raised to a higher temperature than the other. This results in the shaft deflecting through an angle proportional to the load on the meter.

The wattmeter has two pointers, one of which, the indicating pointer, is fixed to the shaft, while the other, the maximum-demand pointer, is free to remain in the maximum position in which it is placed by the indicating pointer. By observing the indicating pointer, the logarithmic demand for the period immediately preceding the instant of observation can be determined. The maximum demand pointer can be reset at any time without removing the cover from the instrument.

The subject of thermal storage demand meters was featured in detail in the October, 1915, and February, 1918, issues of the Proceedings of the American Institute of Electrical Engineers.

Powdered Coal Plant with Compressed Air Transport

Some Details of the System That Will Be Applied in the Mount Vernon Street Plant of the P. R. T.

DURING the present spring the Philadelphia Rapid Transit Company will install in its Mount Vernon Street power plant an equipment for pulverizing and burning waste coal. Some details of the plan were given in the issue of this paper for Feb. 14, 1920, page 343. As the Quigley system, which is to be used in this plant, differs from other systems in several particulars, the accompanying illustration has been prepared to show the several parts of the system and how they are related. The drawing is merely a diagrammatic sketch, designed to show the general plan, but not in detail as it will be applied in Philadelphia. An account of the installation there will be given in due course.

The several parts of the apparatus have been lettered and the key which accompanies the illustration renders it practically self-explanatory. Briefly, the fuel is dumped from the car located on the siding, and, after passing through a crusher, where it is properly sized, it is elevated to a magnetic separator, where the tramp iron is removed. It then passes to the crushed fuel bin, from which it is automatically fed to a rotary drier and is then carried by a bucket elevator to the dry-fuel bin. From this bin it feeds automatically to the pulverizer, from which it is carried through a discharge pipe and a collector into the pulverized-fuel bin.

The pulverized fuel is fed from this bin into the blowing tank in the desired quantities, a quick-reading scale dial indicating at all times the amount of fuel in the tank. The fuel is thus automatically weighed and the amount required to fill the bins at the furnace is forced by compressed air through the transport line. Switching valves divert the flow of fuel to each bin as desired. The fuel supplied to each burner is governed by a controller, regulated by means of a hand wheel. Combustion air is controlled by a blast gate.

The transport system in this equipment differs essentially from the screw-conveyor and high-pressure blast systems in that the fuel is transported in bulk from the pulverizing plant through small wrought or steel pipe without the use of return piping. It is not carried in suspension, but its movement is analogous to the flow of a liquid. The fuel pulverizing plant may be located at the point most convenient for the fuel supply and the powdered fuel can be economically distributed to furnace hoppers at widely separated points. Delivery has been effected by this method for distances exceeding 1,500 ft. The Quigley Furnace Specialties Company has a record of 2,800 lb. of pulverized fuel having been carried 600 ft. through a 4-in. pipe in one minute under air pressure averaging 15 lb. gage.

From the furnace bins the fuel passes through a dust-tight gate into an especially designed fuel feed controller, which regulates the fuel feed into a low pressure siphon. This siphon carries it, with about one-seventh of the air necessary for combustion, into the burner, where it is mixed at very low pressure with the quantity of air necessary to effect proper combustion.

A feature of interest is the blowing-tank unit, which consists of special equipment for storing, feeding and weighing the powdered fuel and transporting it to the points of consumption.

The tank is of cylindrical steel construction, and it is connected with the pulverized-fuel bin by means of a flexible connection. A control gate located immediately below the bin is now operated from the floor by means of a hand chain.

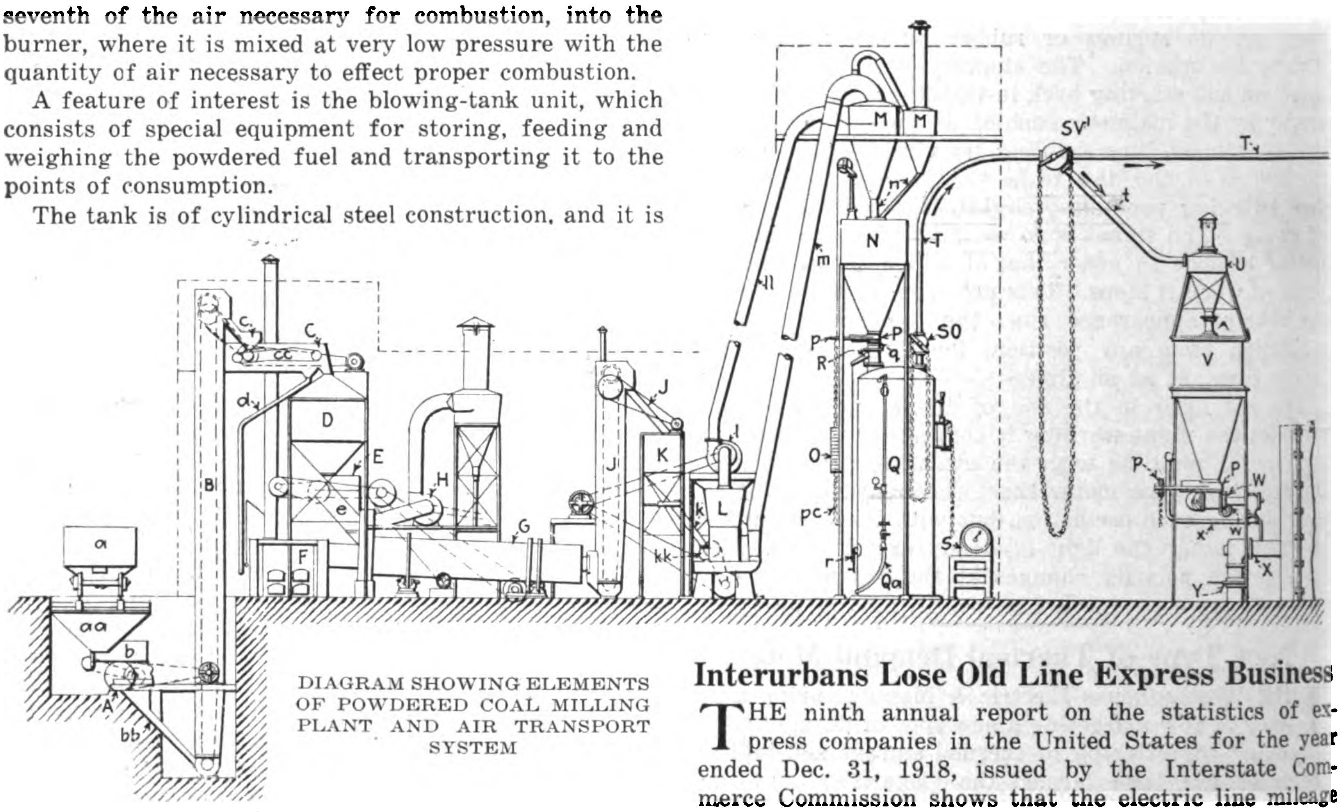


DIAGRAM SHOWING ELEMENTS OF POWDERED COAL MILLING PLANT AND AIR TRANSPORT SYSTEM

KEY TO LETTERS ON DIAGRAM

a	Coal car	m	Return air pipe
aa	Track hopper	N	Pulverized fuel bin
b	Regulating feeder	O	Fuel bin gage indicator
A	Coal crusher	P	Dust-tight gate
bb	Chute	p	Hand chain-wheel
B	Elevator	pc	Hand chain
c	Hopper	Q	Blowing tank
cc	Conveyor	Qa	Compressed air supply
C	Magnetic separator	q	Flexible connection
d	Reject pipe	R	Inlet valve
D	Crushed fuel bin	S	Scale dial
E	Regulating feeder	SO	Shut-off valve
e	Chute	SV	Switching valves
F	Drier furnace	T	Transport line
G	Drier	t	Branch fuel line
H	Exhauster	U	Collector
J	Elevator	V	Furnace bins
K	Dried coal bin	W	Fuel feed controller
kk	Rotary feeder	w	Fuel regulating wheel
L	Pulverizer	X	Burner
l	Exhauster	y	Primary air pipe to burner
ll	Discharge pipe	Y	Combustion air-blast gate
M	Collector		

A valve in the head of the tank admits the pulverized fuel in any quantity desired and is operated by a conveniently placed lever. As mentioned before, the scale upon which the tank is mounted is provided with a quick-reading dial. When the desired amount of fuel has been let into the tank, the charging valve is closed, compressed air is admitted and a shut-off valve on the transport line is opened, after which the fuel begins to flow through the line.

The controller consists primarily of a cast-iron box containing a feed screw, driven at constant speed by a gear or pulley, and adjustable shutters operated by a handwheel which give a suitable opening, under control, leading to the discharge head. The primary air supply at low pressure carries the fuel from the discharge head to the burner, where it mingles with the combustion air, also at low pressure and under separate control. The proper relative supply of each can thus be accurately controlled so that any condition of flame desired may be secured.

Interurbans Lose Old Line Express Business

THE ninth annual report on the statistics of express companies in the United States for the year ended Dec. 31, 1918, issued by the Interstate Commerce Commission shows that the electric line mileage covered by operations had decreased from 8,802 on Dec. 31, 1917, to 6,951 a year later. This is equivalent to a loss of 21 per cent. The accompanying table gives the mileage under contract by each of the operating express companies.

CLASSIFICATION OF MILEAGE COVERED BY OPERATIONS ON ELECTRIC LINES.

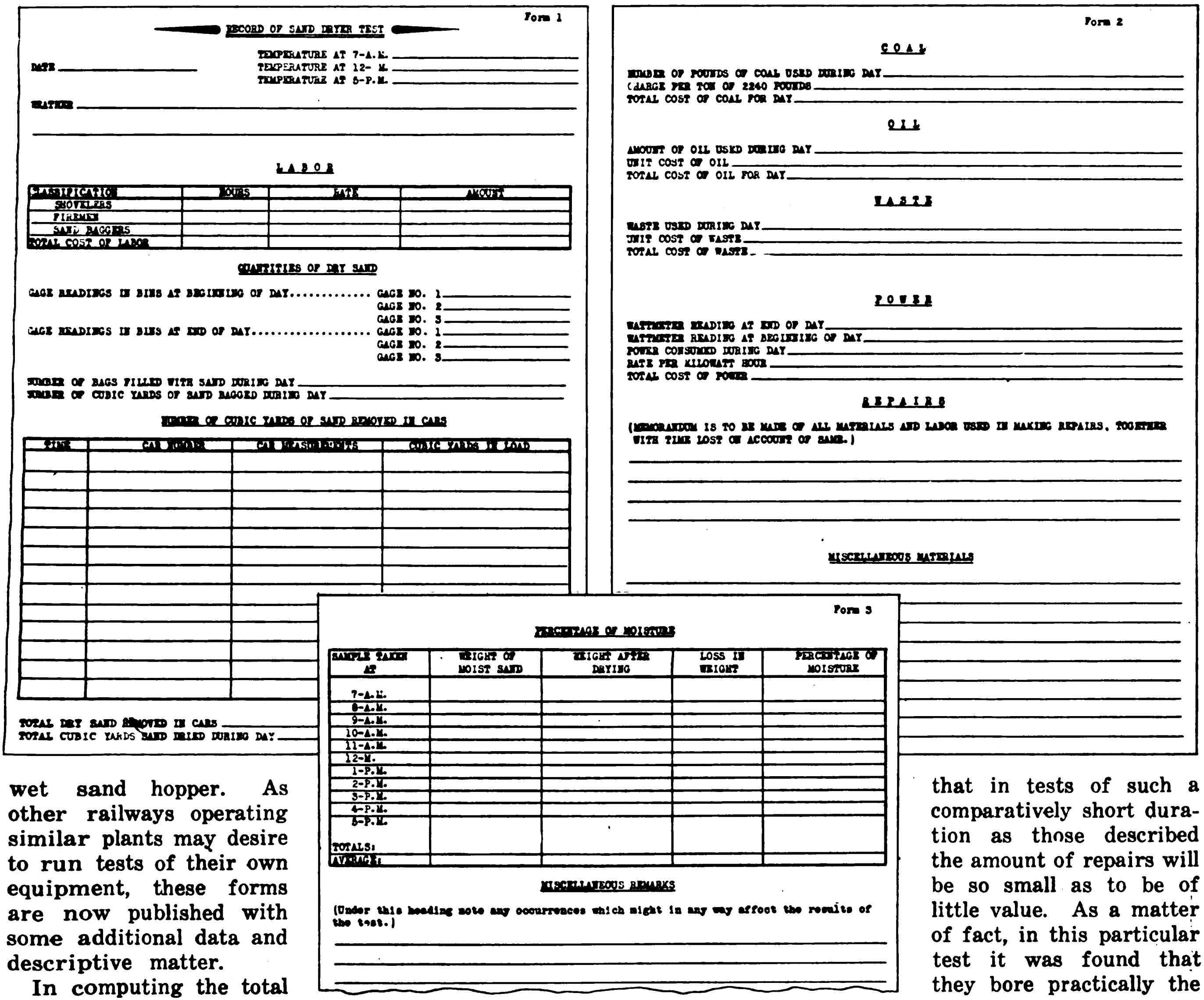
Carrier	Electric Line Mileage			Per Cent of Total Mileage of Operations		
	12/31 1918	6/30 1918	12/31 17	12/31 1918	6/30 1918	12/31 18
Total mileage of operations......	6,951	8,690	8,802	2.42	2.81	2.86
American Railway Express Company....................	6,951	....	....	2.42	....	....
Adams Express Company........	....	2,637	2,739	....	5.45	5.63
American Express Company.....	....	1,064	1,064	....	1.45	1.45
Canadian Express Company.....	....	113	113	....	0.91	0.91
Great Northern Express Company....................	....	335	335	....	3.69	3.68
Northern Express Company.....	....	14	14	....	0.17	0.17
Southern Express Company......	....	77	77	....	0.22	0.22
Wells Fargo Express Company...	....	4,422	4,431	....	3.73	3.83
Western Express Company......	....	28	28	....	0.53	0.53

The fortieth anniversary of the piercing of the Gothard tunnel between Switzerland and Italy was celebrated on Feb. 27. This important artery of travel is now doubly interesting because it is in process of electrification.

Forms Used with Sand Drier Test

For Tabulating the Data Obtained in Tests of This Nature Conveniently Arranged Forms Are Essential

THERE was published in the March 20 issue of the ELECTRIC RAILWAY JOURNAL a description by Howard H. George of the wet sand-handling machinery installed at the sand-drying plant of the Public Service Railway at Newark, N. J. In this article reference was made to forms which were used in the tabulation of the data secured from long-period efficiency tests of the plant both before and after the installation of the wet sand hopper. As other railways operating similar plants may desire to run tests of their own equipment, these forms are now published with some additional data and descriptive matter.



Form 1

RECORD OF SAND DRYER TEST

DATE ____

TEMPERATURE AT 7-A.M. ____
TEMPERATURE AT 12- M. ____
TEMPERATURE AT 5-P.M. ____

WEATHER ____

LABOR

CLASSIFICATION	HOURS	RATE	AMOUNT
SHOVELERS			
FIREMEN			
SAND BAGGERS			
TOTAL COST OF LABOR			

QUANTITIES OF DRY SAND

GAGE READINGS IN BINS AT BEGINNING OF DAY............ GAGE NO. 1 ____
GAGE NO. 2 ____
GAGE NO. 3 ____
GAGE READINGS IN BINS AT END OF DAY.................. GAGE NO. 1 ____
GAGE NO. 2 ____
GAGE NO. 3 ____

NUMBER OF BAGS FILLED WITH SAND DURING DAY ____
NUMBER OF CUBIC YARDS OF SAND BAGGED DURING DAY ____

NUMBER OF CUBIC YARDS OF SAND REMOVED IN CARS

TIME	CAR NUMBER	CAR MEASUREMENTS	CUBIC YARDS IN LOAD

TOTAL DRY SAND REMOVED IN CARS ____
TOTAL CUBIC YARDS SAND DRIED DURING DAY ____

Form 2

COAL

NUMBER OF POUNDS OF COAL USED DURING DAY ____
CHARGE PER TON OF 2240 POUNDS ____
TOTAL COST OF COAL FOR DAY ____

OIL

AMOUNT OF OIL USED DURING DAY ____
UNIT COST OF OIL ____
TOTAL COST OF OIL FOR DAY ____

WASTE

WASTE USED DURING DAY ____
UNIT COST OF WASTE ____
TOTAL COST OF WASTE ____

POWER

WATTMETER READING AT END OF DAY ____
WATTMETER READING AT BEGINNING OF DAY ____
POWER CONSUMED DURING DAY ____
RATE PER KILOWATT HOUR ____
TOTAL COST OF POWER ____

REPAIRS

(MEMORANDUM IS TO BE MADE OF ALL MATERIALS AND LABOR USED IN MAKING REPAIRS, TOGETHER WITH TIME LOST ON ACCOUNT OF SAME.)

MISCELLANEOUS MATERIALS

Form 3

PERCENTAGE OF MOISTURE

SAMPLE TAKEN AT	WEIGHT OF MOIST SAND	WEIGHT AFTER DRYING	LOSS IN WEIGHT	PERCENTAGE OF MOISTURE
7-A.M.				
8-A.M.				
9-A.M.				
10-A.M.				
11-A.M.				
12-M.				
1-P.M.				
2-P.M.				
3-P.M.				
4-P.M.				
5-P.M.				
TOTALS:				
AVERAGE:				

MISCELLANEOUS REMARKS

(Under this heading note any occurrences which might in any way affect the results of the test.)

RECORD FORMS USED IN CARRYING OUT SAND DRYING TEST

In computing the total labor cost of operating the plant the salary of the engineer running the tests was not included. In gaging the bins and for the purpose of aiding the laborers in quickly leveling the sand in the bins with a reasonable degree of accuracy the walls of the bins were carefully marked with level lines spaced at convenient intervals and three gage rods graduated to tenths of feet were installed at convenient points for interpolation. With the cross-section of the bins once determined, the calculation of the amount of sand in the bins at any time was easy.

The same procedure applies to the measuring of sand removed in bags. A large number of bags were dumped into a smaller measuring box until it was filled, and the average quantity per bag thus obtained was used in determining the total amount of dry sand distributed in bags.

The record of the temperature and weather conditions was made because of their effect on the percentage of moisture in the sand coming to the drier from the storage pile, the resulting increase or decrease in the output of the plant in a given time and the effect of this on the coal consumption.

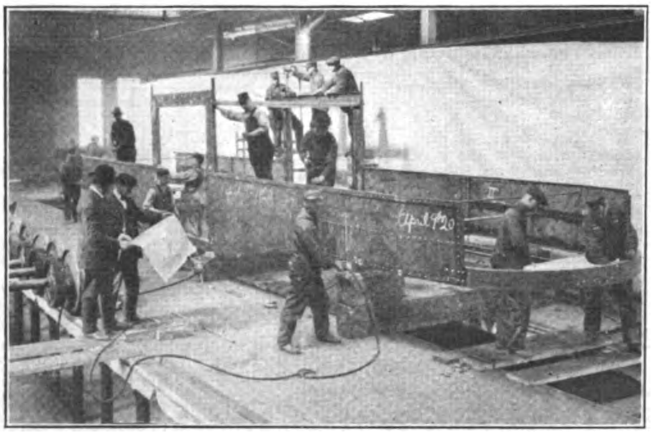
Repairs were also noted, because they are always a factor that must be taken into consideration in the total cost of production in any plant. It may be argued that in tests of such a comparatively short duration as those described the amount of repairs will be so small as to be of little value. As a matter of fact, in this particular test it was found that they bore practically the same relation to the output as was generally true for the general operation of the plant, the repairs being limited to a replacement of a conveyor belt, broken link transmission chain, worn agitator blade or something of that character.

Several months ago the Indianapolis Street Railway sent ten of its summer cars to Dayton, Ohio, to be converted to the pay-as-you-enter type. Five of these have been returned for service. In remodeling the cars special attention has been given to providing a large platform space, to prevent crowding and to reduce the time required for boarding and alighting.

Chicago's First Trail Car Under Way

One Only to Be Built Now for Trial Purposes to Determine Feasibility from Traffic and Equipment Standpoints

CHICAGO will probably go to the use of trailers as the quickest and most logical way of amplifying its rolling stock facilities. As the first step in this probable plan, a sample trailer is being built in the west side shops of the Chicago Surface Lines, and Harry H. Adams, superintendent of shops and equipment, is making a drive to build this first car within sixty days' time, two weeks of which has elapsed at the time of this writing, with the progress made pictured herewith.


A TWO WEEKS' PROGRESS PICTURE OF CHICAGO'S NEW TRAILER

The use of trailers seems particularly desirable from the standpoint of facilitating the movement of cars through the congested loop district, for it is believed that a two-car train will lose less time in the loop than two single cars. As soon as this first car is completed thorough trials will be made to determine this point as well as to find out whether the public will like the idea of trailers and whether trailer operation is adaptable to Chicago traffic conditions. Observations will also be made on the heating of the motors on the Pullman cars, which are proposed for use in hauling the trailers, both in rush-hour service only and for all-day service. The Pullman cars are equipped with four G.E.-216, 55-hp. motors, and while it is felt certain that they will haul trailers during the rush hour without serious overheating, there is some question about the all-day service. The trailer is to be a center-entrance car with an over-all length of 47 ft. 6 in., a width of 8 ft. 6 in. and an over-all height from rail to top of roof of 10 ft. 9½ in. Every effort is being made to produce a car which will weigh not more than 24,000 lb., although this may be influenced to a certain extent through the use of materials at hand that are slightly heavier than desired, for the sake of avoiding any delay in waiting for delivery of new materials.

There will be a 6 ft. 6 in. opening at the center on either side of the car, with pneumatically operated doors sliding into pockets—two doors on each side, requiring four door engines. There will be a level well 15½ in. above the rail, then a step of 10½ in. from the well to the car floor with a ramp of 5 in. in 9 ft. toward each bolster.

The body will be of arch-roof construction with a steel underframe and No. 12 gage steel side plates and a wood superstructure. The bumpers will be brought up to the average height of the motor cars and automatic air couplers installed, one on either end. Ample ventilation will be provided by the installation of eight utility exhaust ventilators in the roof and two compensating air intake and exhaust ventilators in each end of the car. At the forward end the two ventilators will act as intakes, while the two at the rear will act as exhaust ventilators.

There will be twenty cross seats of the walkover form-fit design, with rattan covering, and four short longitudinal seats at the well. These, with the circular seats at the two ends, will bring the total seating capacity up to sixty-two passengers.

The car will be equipped with Brill 67-F trucks mounted on 22-in. rolled-steel wheels, with a wheelbase of 4 ft. 4 in. These trucks have cast-steel side plates and a single coil spring over the journal box in addition to the long elliptic springs in the bolster.

For hauling the sample trailer, one of the Pullman cars will be equipped with double-folding, pneumatically operated doors on the rear platform, and probably some rearrangement of the car interior looking toward an increase in the number of seats from 40 to 48 or more will be made. The abandonment of smoking on the front platforms has made it possible to take out the bulkheads and this may be done in connection with the reconstruction for trailer service. The details of the Pullman alterations have not as yet been definitely decided upon. This would indicate that the trailer plan of operation in Chicago, if adopted, will include a reconstruction in some respects of all the Pullman cars. How many motor cars will be thus reconstructed and how many trailers will be purchased and built in the company's shops are as yet open questions.

Cattle Guard for Automobiles

SINCE the beginning of operation of the Municipal Railway through the Twin Peaks Tunnel in San Francisco there have been several instances of automobiles being driven through this tunnel, which is strictly a railway tunnel and is not paved.

In one instance the driver of the machine entered the tunnel at the west end and upon arriving at the Laguna Honda Station, about a half mile from the portal, he succeeded in turning his machine around over the car rails and went back through the tunnel, while one of the lady passengers jumped from the automobile, due to fright from an approaching street car, leaving her hat in the automobile. This lady was seen several hours later by the elevator operator in the tunnel still searching for her party and her hat. In three other instances which were reported to the superintendent of the Municipal Railway the persons in the machines went entirely through the tunnel.

To overcome this danger a concrete pit or cattle guard has been constructed under the car tracks at the entrance at each end of the tunnel. This pit is about 4 ft. wide and 2 ft. deep and will effectually prevent anybody in the future from driving an automobile through the tunnel.

Since 1911 the number of persons transported per accident by the Philadelphia Rapid Transit Company has increased from 18,640 to 50,043, equivalent to a gain in "safety efficiency" of 18.8 per cent per year.

New Alloy for Railway Use

Aluminum Castings That Are Claimed to Have the Strength of Mild Steel Offer Possibilities for Weight Reduction

A NEW alloy, known as Duralumin, having properties which will be of great interest to railway men in connection with their efforts to reduce the weight of rolling stock, has been developed by the Aluminum Company of America. Having the unique combination of the lightness of aluminum with the strength of mild steel, the significance of its application to rolling stock will at once be appreciated. The physical properties of the metal are as follows:

Tensile strength, depending on the amount of cold working and proper heat treatment	50,000 to 60,000 lb. per square inch
Elongation in 2 in.	15% to 20%
Brinell hardness, using 10-mm. diameter ball at 500-kg. pressure	85 to 100
Shore hardness magnifying hammer	30 to 45
Specific gravity	2.8 to 2.85
Weight	0.1 to 0.102 lb. per cubic inch
Melting point	650 deg. C.
Coefficient of linear expansion	0.0000226 per deg. C.
Young's modulus	4700 tons per square inch
Thermal conductivity (silver 100)	31

In addition to these very desirable physical properties Duralumin is claimed to be fully as resistant to corrosion as is pure aluminum.

The above values for tensile strength, elongation, elastic limit and modulus of elasticity are obtained through the combination of mechanical work put upon the metal and heat treatment and are, therefore, obtainable only in the wrought forms. They do not hold true for the cast metal.

The Aluminum Company has been engaged for about a year in experimental work looking toward the development of methods of manufacture of Duralumin on a commercial scale. The technique of sheet rolling has been established in an experimental mill, the capacity of which is, of course, limited. However, the company reports that the sheet-rolling capacity for this alloy probably will be large enough by the end of the current year to take care of any reasonable demand.

The problems of the commercial fabrication of bar, rod and tubing from this alloy are not yet solved, and it is probable that these shapes will not be put on the market for another six months at the very earliest. The fabrication of this alloy is slow and costly and a very special technique for handling had to be developed for every stage in the process. However, the prospects for the production and the use of this alloy are very promising and the manufacturer is developing it, having in mind its wide application to electric railway rolling stock construction.

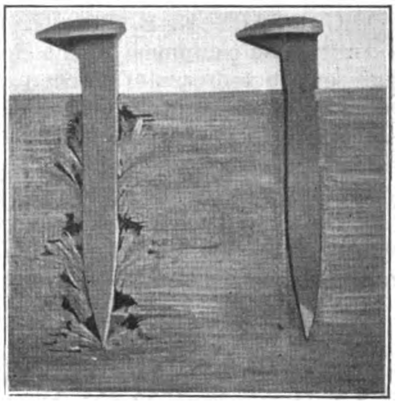
The numerous small brass castings which are used on a car, when taken together, represent considerable weight. The development of light aluminum alloys offers a chance to reduce this weight.

The Aluminum Manufactures, Inc., Cleveland, Ohio, have developed aluminum alloy castings having a tensile strength of 27,500 lb. per square inch and an elongation of 4.5 per cent, yet weighing only four-tenths as much as cast iron.

Thus far, these aluminum alloys have been used almost exclusively in the automobile industry, the manufacturers having gone so far as to make rear axle housings for 5-ton trucks of this material. In this connection it is said that while the aluminum alloy casting is not as strong, section for section, as the malleable iron or steel casting usually employed for this purpose, yet by a slight increase of the section it is possible to secure a strength equal to that of the ferrous housing and still have a weight only one-half as great.

Mutilating the Fiber of Wood Ties

The accompanying illustration shows a section of a white cedar tie split open after having a common wedge point spike and a goldie spike driven into it. The mutilation of the fiber of the wood by the common wedge point spike, which is shown at the right in the illustration, is quite pronounced.



SECTION OF TIE WITH DRIVEN SPIKES

Ratchet Jacks Improved

THE Buda Company has recently developed some new jacks which have been designed for heavy duty. Two new double-acting trip track jacks, Nos. 201-B and 206-B, are improvements over the Nos. 1-B and 6-B jacks, and the No. 219-B single-acting automatic lowering car jack is an improvement over the No. 19-B jack. These have been strengthened by ribbing the frame and base, and the additional metal has been distributed in such a manner as not to increase the weight of the jack. An improvement which will tend to make the jacks practically indestructible, it is claimed, is the use of hardened steel inserts for pawl bearings for the socket levers and the use of high carbon spring steel fulcrum pins which are machined, tempered and ground.

Chilled Wheels in Europe

THE Secretary of the International Street Interurban Railway Association has issued a bulletin saying that it had received from one of its members the following letter:

> On account of the high price of steel wheels and the difficulty of obtaining them during the war, we have tried for our cars chilled iron wheels purchased in America. We believe the results obtained by them so interesting as to communicate it to you.
>
> One of our motor cars equipped on June 15, 1919, with chilled wheels had run up to Dec. 3, 1919, 16,814 km., and the wheels showed very little signs of wear. A second motor car was equipped on Nov. 15, 1919.
>
> A number of trail cars have been equipped for a long time with these chilled wheels, and some of them have covered as much as 85,000 km. The wheels of these cars are apparently good for much additional mileage, the wear, in wheel diameter, being about 4 mm. One of these wheels having made 94,000 km. has been retired from service, because it developed a flat, probably on account of a fault in the casting. This wheel has been sent to the cupola and has given as good results as pig for recasting.
>
> Up to the present we believe that the mileage service of cast wheels is not inferior to that obtained with steel tired wheels.

In view of this communication, the association is collecting information from its members as to the service records of wheels.

Association News

Data Sheet for Life of Wearing Parts of Lubricated Motors

SECRETARY E. B. Burritt, on behalf of the committee on equipment of the Engineering Association, has sent to representative companies data sheets to be filled in with information on the life obtained from armature bearings, axle bearings, gears, pinions and carbon brushes. The list includes twenty-six questions regarding the life and service conditions for these parts, and the committee hopes to secure information which when compiled will be of valuable assistance to the various member companies and equipment manufacturers.

Fare Collection Committee Meets

ON March 29, 1920, the first conference of the joint committee on collection and registration of fares was held at association headquarters, in New York, to organize and plan the work for the year. Those in attendance were: W. J. Harvie, Auburn, N. Y., and M. W. Glover, Pittsburgh, co-chairmen; J. J. Duck, Chicago; L. D. Pellissier, Holyoke; E. C. Spring, Allentown; R. A. Stevenson, representing I. A. May, New Haven; C. W. Stocks, New York, and F. E. Webster, Haverhill, Mass.

The committee believed that inasmuch as its report of last year covered in full the matter of collecting flat fares this subject should not be opened up again this year, but that its efforts should be confined to the question of collecting zone fares on urban and suburban lines. An outline for its report along these lines was consequently developed, together with a questionnaire to be answered by all members. Companies are urged upon the receipt of this request for information to give the matter prompt attention, so that the work of the committee will not be delayed to such an extent that a full report cannot be presented to the coming conventions.

Company Membership

THE personnel of the American Association committee on company membership has been increased to permit the carrying out of the plans outlined in the issue of this paper for April 10, 1920.

The commitee now comprises the following membership: F. R. Coates, Toledo Railways & Light Company, Toledo, Ohio, chairman; E. F. Wickwire, Ohio Brass Company, Mansfield, Ohio, secretary; Benjamin Adams, St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.; J. P. Barnes, Schenectady (N.Y.) Railway; L. C. Bradley, Stone & Webster, Houston, Tex.; H. F. Dicke, Utah Light & Traction Company, Salt Lake City; C. R. Ellicott, Westinghouse Air Brake Company, New York, N. Y.; L. E. Gould, Economy Electric Devices Company, Chicago, Ill.; C. A. Hall, Eastern Pennsylvania Railways, Pottsville, Pa.; E. B. Moore, Monongahela Valley Traction Company, Fairmont, W. Va.; H. H. Norris, ELECTRIC RAILWAY JOURNAL, New York, N. Y.; R. T. Sullivan, Tacoma Railway & Power Company, Tacoma, Wash.; E. M. Walker, Terre Haute Traction & Light Company, Terre Haute, Ind., and E. P. Waller, General Electric Company, Schenectady, N. Y.

Information Bureau Reports

RECENT reports and compilations prepared by the Bureau of Information and Service of the American Electric Railway Association appear below. These reports are available to member companies upon request:

Analysis of Agreements on Working Conditions for Trainmen, dated April 1. This abstract covers a number of the larger electric railway properties and includes the following subjects: Parties to contract, arbitration, hours of labor, length and kinds of runs, overtime, extra compensation, minimum wages, methods of choosing runs, working the extra list, Sunday and holiday work, purchase of uniforms, arrangement of reliefs, special work, instructing students, securing time off, etc.

Recent Decisions on Apportionment of Costs Between Electric Railways, Railroads and Public Authorities for Joint Improvements, Changes in Grade, Elimination of Grade Crossings, etc., dated March 13.

Fatal and Total Accidents on Electric Railways, dated March 23, 1920.

Tabulation Showing the Shrinkage in Public Utility Securities During the Years 1914 to 1920, Subdivided Between Electric Railways and Other Public Utilities, and Showing Stocks and Bonds Separately, dated March 15, 1920.

A Supplement to Bulletin No. 123, on Working Conditions, dated Nov. 15, 1919, and bringing this report up to date.

Letter to the Editors

Safety Car Operation in Snowstorms

THE LEVIS COUNTY RAILWAY
LEVIS, QUE., CANADA, April 12, 1920.

To the Editors:

In reference to my article which you published in the issue of the JOURNAL for April 3, page 699, it appears from conversation with several railway men whom I have met that there is an impression that in a snowstorm we pull all our Birney safety cars into the carhouses. This impression is absolutely incorrect and I would appreciate having you take such steps as are necessary to correct it.

In any ordinary snowstorm, with a fall of from 6 to 12 in., the Birney safety cars operate even better than the double-truck cars which we have in use, and further we operate all through the storm. In a blizzard we cannot operate our double-truck four-motor cars; neither can our snow sweepers operate. We are therefore certainly not going to ask the new Birney safety cars to do so. In a blizzard or severe snowstorm, when the sweepers begin to have trouble themselves, we order both the sweepers and the cars into the carhouses, for our sweepers get snowed in just as much as the cars.

If we had the same winter conditions as Quebec, Montreal and other cities, together with good streets, the Birney safety car would operate as well as any four-motor double-truck car, and whenever any of these large cars can operate the Birney cars can.

The photographs reproduced with my article show what the Birneys can do during and immediately after a storm. H. E. WEYMAN, Manager.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION • PERSONAL MENTION

Lively Hearing at Albany

Proposed Service-at-Cost Measure Attacked and Defended—Prospects Not Promising

The hearing at Albany on April 13 on the Jenks service-at-cost street railway measures was attended by delegations from all over the State of New York. The first speech made was that of Mayor Hylan of New York. His remarks with some interpolations were almost identical with the editorial presumably written by Mr. Watson that appeared in the New York *American* on April 13. They well bore out the statement of Job E. Hedges, receiver of the New York Railways, in his opening statement: "The Mayor's remarks are always the same, and always written by the same pen. I have heard them often."

DIRE POLITICAL CONSEQUENCES PREDICTED

In general, legislators were threatened with political oblivion if they voted for any of the measures now pending. President La Guardia of the New York Board of Aldermen attacked the constitutionality of the measures. The corporation counsels of the cities and the representatives who appeared against the bills for New York City all deplored the fact that the measures had been introduced so late in the season without an ample opportunity having been afforded to the people and the corporations interested for their study. They also resented what they termed the attempt by the Legislature to interfere with the home-rule rights of the cities.

The principal persons representing the railway interests were Edward A. Maher, Jr., president of the New York Electric Railway Association; Job E. Hedges, receiver of the New York Railways; William Guthrie for the Brooklyn City Railroad; John D. Milburn for the Nassau Electric Railway, Brooklyn; Adrian H. Larkin, counsel for the Midland Road, Staten Island, and Charles E. Chalmers, receiver of the Second Avenue Railroad, New York.

MR. GUTHRIE OPENED FOR ROADS

Mr. Guthrie opened the case for the passage of the bills. He confined his remarks strictly to the constitutionality of the proposed measures, quoting decisions of the Court of Appeals of New York and the Supreme Court of the United States to show that the final power to fix franchise conditions and to raise or lower rates of fare is invested in the Legislature of the State. He brought out the point that no municipality could bind the Legislature to a contract forever. He contended that the right conferred upon a Public Service Commission or a Legislature to lower a rate likewise carried with it a responsibility to raise a rate of fare if conditions warranted so doing.

Assemblyman Cuvillier of New York City contended that under the provisions of the rapid transit act as amended in 1912 the Legislature did give to the city of New York the power to enter into contracts for the operation of subways under a partnership agreement and that the Legislature having granted such power is without constitutional authority to pass any law changing the rate of fare so agreed upon by the city of New York as a part of the contract stipulation.

Mr. Hedges argued well for an increased fare for the surface lines of which he is receiver, stating that unless relief be granted some of them will be obliged to close down. Mr. Larkin told of the attempt of the Staten Island railways to obtain relief from the city of New York and the inability of the Public Service Commission to do anything for them under the existing statute. John D. Milburn brought out the fact that under the present arrangement, if nobody wants to agree, the matter can remain unadjusted for years, while the Jenks bills, if an agreement cannot be arrived at within six months' time, the Public Service Commission may compel a change in rate to meet conditions.

It is the consensus of opinion that the bills have little chance of passage. In the first place, they were introduced too late in the session. Had they been introduced earlier in the session it is possible some real solution of the problem might have been reached. It would seem now that the best the traction interests can hope for at this session of the Legislature is the appointment of a committee to study the entire situation in the State of New York and to report to the Legislature of 1921 the result of its findings, together with any suggested legislation to remedy the situation.

Railway Will Contest Detroit Election

Company Will Continue Its Program Unabated, but Will Ask Courts to Establish Its Rights

In a statement by officials of the Detroit (Mich.) United Railway in answer to the inquiry regarding the policy it is intended to follow since the people ratified Mayor Couzens' railway ordinance, they voice their intention to continue to operate the present system as a unified railway at the present rate of fare and with the present system of transfers. It is maintained that now, as before the recent vote, the company stands ready to carry out the terms of the ordinance which it recently made public. It is intended to continue to give all the service that it is possible under the adverse conditions of a shortage in car equipment and men. The company plans to contest the election.

AT THE CLOSE of the construction season the company had under way several important railway extensions under the so-called day-to-day agreement, which it was intended to rush to completion this year. Under present developments, however, the company is not decided as to what course will be followed with this work, since tracks on these streets come within the Mayor's piecemeal plan. In view of the Mayor's statement as to the value of track construction and what he proposes to allow the company for the day-to-day lines, the company officials do not feel justified in spending money for the extensions without some certainty as to the outcome.

The company has a considerable amount of construction work outside of Detroit, not only along interurban lines but in some other cities and towns served. This work will be carried on with all possible speed, and if the labor situation permits efforts that would have otherwise been given in part to construction work in Detroit will be concentrated on the work elsewhere.

Definite action was taken by the company on the Saturday following the election by the filing of two suits in the United States District Court. It is asked that the municipal railway ordinance be declared void and invalid and that the city be enjoined from proceeding under its authority. The company as plaintiff in one suit maintains that the ordinance is invalid in that it contemplates the seizure of part of the company's property without process of law. In the second case, action is brought in behalf of the New York Trust Company, the trustee under a mortgage given by the Detroit, Fort Wayne & Belle Isle Railway. This action is placed on the ground that the taking over of the present Fort Street line as part of the Mayor's municipal program at an estimated cost of $40,000 per mile will jeopardize the value of the property pledged as security for the mortgage held by the trust company. Mayor Couzens, City Controller Steffens, the three members of the street railway commission and the nine city Councilmen are named as defendants in both cases.

COMPANY APPEALS TO COURT

In the bill filed in behalf of the Detroit United Railway it is stated that the enforcement of the railway ordinance involves the sale of part of the company's property under conditions amounting to coercion, violating the due process clause of the Fourteenth Amendment to the Constitution. The charge is based on the assertions made by the Mayor and written into his campaign literature that the Fort Street and Woodward Avenue lines together with certain day-to-day agreement lines would be taken over at a price estimated at $40,000 per mile. Reconstruction costs of these lines, less depreciation, is set at $87,000 per mile.

It is also claimed that the city has lost its right to order the company to remove its tracks and equipment from Fort Street and Woodward Avenue by allowing the continued operation of these lines by the company since the granting of the ouster decision by the Supreme Court. It is claimed that no resolution or order to remove the tracks was ever passed by the city, but that reconstruction and extension of the Fort Street line had been authorized.

The street railway ordinance is attacked on the ground, it is claimed, that the measure was drawn in such a way as to mislead the voters; that only a portion of the voters were furnished with the sample ballots; that the bond issue authorized is inadequate to carry out all of the provisions of the ordinance, and that the city is bound by the terms of the measure to construct new lines while the actual plan contemplates the purchase of certain Detroit United Railway lines.

Petition for a recount of the ballots in the election was filed by the Detroit United Railway just before the returns were certified by the board of city canvassers. The petition signed by E. J. Burdick, general manager, charges that the ballots were so printed as to permit the inspectors to glance at the votes. The company alleges that the ballots were so thin that voters' marks could be seen, which is contrary to the law providing secret ballots.

In commenting on the company's actions, Mayor Couzens stated that they were indicative of the desperation of the Detroit United Railway in the situation.

CORPORATION COUNSEL CONFIDENT

The throwing out of ballots which the company claims have been exposed will be resisted by the Corporation Counsel. In commenting on the two suits filed by the Detroit United Railway the Corporation Counsel stated that inasmuch as the people have expressed themselves by means of the ballot, he is confident that he will be able to present their side of the question to the court.

A Whole City Walks to Work

Dubuque Cars Have Not Been Operated for Six Weeks—City Seeks to Force Service

Out of the election which was held in Dubuque, Iowa, on April 5 may come a settlement of the difficulty which has made it impossible for the Dubuque Electric Company to operate cars since March 1. It is a strike story with many elements entering into it, among them personal ambition, inborn and cultivated hatred of capital, political cowardice and the failure of the press to realize that it is under any obligation other than the protection of its subscription list. The fight was forced on the company. It could have escaped, perhaps, by sacrificing the property. This it flatly refused to do.

THE PRESENT situation had its beginning in the demand made in March, 1919, by the Amalgamated Association for a wage increase from the then existing base of 34 cents an hour to 50 cents an hour. The company pleaded its inability to pay and preserve its financial integrity.

COMMITTEE INVESTIGATES MATTERS

At the suggestion of the company the City Council in May, 1919, appointed a citizens' committee to investigate the books to ascertain what could be done to meet the situation. This committee reported the inability of the company to increase wages, but further stated that if the company was permitted to charge a 7-cent cash fare with four tickets for 25 cents it could pay a wage based on 42 cents an hour. These figures were found approximately to meet the increased payroll by an equal increase in receipts from traffic. To this arrangement the company agreed, and the fare increase was established by ordinance. The Council also later ordered an audit and appraisal of the accounts and property so as to ascertain whether the employees' wages could be further increased or the new fare reduced. This work was contracted for by the City Council with the C. B. Stiver Company, Des Moines, which called in, by consent of the City Council, the Rau Appraisal Company, Milwaukee, to make the appraisal. The city was to pay the cost of the audit and a certain sum toward the cost of the appraisal. The company was to assume the balance. The work has proceeded since October, 1919. It is expected that it will be completed and submitted to the City Council in a short time.

COMPANY APPEALS AGAINST SPECIAL TICKETS

Previous to September, 1919, there had been in effect during specified hours a fare rate of 2½ cents applicable to "mechanics, working women and working girls." The company regarded this as illegal because of occupational discrimination and these rates were discontinued by the United States Court of Appeals sitting at St. Paul. The trainmen then submitted a demand for a new wage scale based on 60 cents an hour. The company stood upon its agreement to await the completion of the audit and appraisal which was to disclose what change, if any, should be made in the agreed settlement of the previous May.

On Feb. 19, 1920, the company was notified that on March 1 the men would go out if their demand was not granted. The company asked the men to tell the Mayor of their intentions. The Council then appointed a representative committee which proceeded to examine the books and accounts of the company covering a period of three years up to Jan. 31, 1920. This committee reported that the company could not pay more under existing circumstances; that a further fare increase would not secure additional receipts, and that an increase in the wage base was only practical through operating economies.

To this end the committee recommended the adoption of the safety car on several lines. Cars of this type are forbidden on the city streets by ordinance, but the committee recommended that the prohibitory ordinance be repealed. The company agreed that if this plan was followed it would pay 52½ cents an hour until Sept. 15, 1920, and then 55 cents for two-man operation and 60 cents for one-man operation. The men immediately went to a demand for 60 cents two-man and 65 cents one-man operation. In refusing the company's proposition they went on strike at midnight on March 1.

COMPANY NOTIFIED TO START CARS

Later the Council voted to visit cities where safety cars were being operated, but only four Aldermen reported when the train was to leave, the Mayor, City Attorney and three Aldermen dodging the responsibility. Gary and Terre Haute were visited by the four Aldermen and a representative of the Federation of Labor. One Alderman went only to Gary, returning because of illness. He gave to the local press unqualified approval of the safety car operation. When the others returned they declined to formulate a report until the other city authorities had made a similar inspection and could join in a recommendation. To the present time this has not been done.

On March 26, 1920, the City Council passed a resolution notifying the company to settle with the men and start the cars within twenty-four hours, and also directing the City Attorney to advise the Council what the city's rights were. As the franchise specifically states that failure to operate cars because of a strike shall not "work a forfeiture" the company has been content to await action of the City Attorney. If the city carries its case to the District Judge the court may await the report of the auditors and appraisers as a guide to his decision. There the matter rested just before the election.

Court Inquiry at Toledo to Start April 22

If Figures Submitted by Railway Are Upheld Fare at Toledo May Be 10 Cents

Federal Judge John M. Killits hopes to be able to keep the railway lines of the Toledo Railways & Light Company operating under the suspension of the "ouster" ordinance till a permanent settlement of the quarter century problem has been effected. Service was resumed in Toledo after a four-day strike when the court granted an increase in fare. The court is relying on the application of the Miller public utilities abandonment law to set aside the effect of the "ouster" after May 1, to which time it was extended by the City Council. Council in the recent negotiations, in which it refused to extend the "ouster" application or grant increased fare, has indicated that it will not grant any further privileges to the railway.

JUDGE KILLITS, at the time of granting the order restoring service, declared he would investigate the revenues and costs of the Toledo Railways & Light Company to ascertain whether or not the "7 and 2" fare was justified. His inquiry is scheduled to begin on April 22.

The order provided "that the rates of fare herein set forth shall be subject to revision upon the determination by the court, upon application by either party hereto, of the value of the street railway property and of what will constitute a reasonable rate of return thereon."

While the court will not be permitted to go very deeply into the question of valuation because of the pressure of other business, it is thought a temporary valuation can be arrived at from the recent city inventory and the books of the company.

COURT INQUIRY PLANNED

The Judge intends to look into the matter of the production and distribution of electric current by the Rail-Light and also by the Acme Power Company, owned by the same interests, but in no way related to the Toledo Railways & Light Company. It has been charged by city officials that the railway is paying "velvet" to the power company which earns revenue for the same stockholders.

If company figures submitted to the city, and approved by special accountants, are upheld by the court a 10-cent fare may become a possibility as a "reasonable return" on the investment in the railway.

The two commissions working on solutions for the problem of transportation for Toledo have about one month more in which to complete their work and submit it to the people of the city. The municipal ownership body will recommend that Council appropriate a sum sufficient to establish a modern transportation system; that it acquire by condemnation or otherwise such portions of the present street car lines as it deems necessary for a model system; that the Mayor shall name a commission to determine what lines shall be retained and what routes established, as its plan to secure public ownership of the street railway system in Toledo.

A resolution embodying these principles will be drawn up and presented to the Council within the next week.

The commissioners are in favor of building a new street railway system by using parts of the present lines. They have given up any idea of buying the entire property of the Toledo Railways & Light Company, because Henry L. Doherty has failed to quote them his absolute cash price on the property. He offered it for $11,000,000 on a part-time basis.

COMMISSIONERS WANT NEW LINES

A comprehensive system of motor buses as an auxiliary to the basic railway system is a part of the scheme of the municipal ownership commission. The commission will name in its resolution what it deems a reasonable amount to be expended by the city for a transportation system.

Henry L. Doherty declared only last week that he would not listen to any proposal which would seek to take parts of the lines and leave other parts to be sold as junk.

City Law Director James S. Martin has advised the municipal ownership commission that there is very little legal precedent for a city to condemn only portions of a public utility. The railway is operating without franchise from the city.

The cost-of-service commission has begun the task of comparing its ordinance section by section with the Doherty corrections and in the consideration of the first twelve sections has adopted most of the Doherty suggestions.

The commission will submit its final draft, embodying changes, to several Toledo attorneys before again turning it back to the federal court for submission to Council.

It is planned to have the two measures ready for submission to Council about May 1 and these will probably be ready for a referendum about June 1.

Dallas Approves Interurban Road

The voters of Dallas, Tex., passed favorably at the city election there on April 6 on the question whether the proposed Dallas-Wichita Falls interurban line shall be substituted for two of the 30-mile interurban lines that must be built by the Strickland-Hobson interests which took over the railway lines of Dallas several years ago under the service-at-cost franchise. J. F. Strickland, has indicated that his company would take over the Dallas-Wichita Falls proposition and build the line if this action will be accepted by the city as discharging its obligation to build two 30-mile lines and to guarantee which it is under bond to the city.

Mayor Frank W. Wozencraft said doubtless the City Commission had the authority to grant the substitution, but he believed the people of the city should have an opportunity to pass on the question. For this reason it was decided to submit the matter to a referendum. The Wichita Falls line will be 130 miles long and will touch Denton, Slidell, Gainesville, Decatur, Henrietta and several other smaller towns. Surveys have already been completed and estimates made.

Pittsburgh Will Discuss Service at Cost

A plan whereby the Pittsburgh (Pa.) Railways will give the city of Pittsburgh service at cost will be worked out with the reorganization of the company by representatives of the city and the company, it was announced, on April 1, following the final meeting for the present of the Mayor's traction conference. The plan, it is believed, will mean a revolutionary change in the relationship between the receivers of the Pittsburgh Railways and the city.

At the close of the conference the following statement was issued:

> Attorneys for the city and the Pittsburgh Railways, with Robert M. Feustel, consulting engineer for the city, will immediately begin negotiations with a view to attempting to establish a service-at-cost plan for the Pittsburgh district in the operation of the Pittsburgh Railways, such as has been worked out in other large cities, notably Cleveland and Cincinnati.
>
> This will be done in connection with the proposed rehabilitation and reorganization of the railways company.
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> Details of the plan, when worked out, will be reported back to the Mayor and Council at the earliest possible date. In the meantime, attorneys for the city will take any steps believed necessary to protect the city's interest in case these negotiations fail.

Worcester-Springfield Demands Rejected

Identical demands for new working agreements, to become effective on June 1, when the present contracts expire have been made by the trainmen of the Springfield (Mass.) Street Railway and the men on the Worcester Consolidated, in a communication delivered to Clark V. Wood, president.

An increase from the present maximum of $5.13 for nine hours to $6.40 for eight hours for motormen and conductors and 40 per cent advance for miscellaneous help is demanded. According to the schedule proposed, the new rates of pay for platform help would be $5.20 a day for the first three months, $5.80 for the following nine months and $6.40 after a year. The present rates are $4.23, $4.68 and $5.13.

Mr. Wood intimated that a very substantial increase in fares would be necessary to carry out such a salary program.

New York Mayors for Home Rule

A declaration for home rule for the cities of New York State in the matter of regulating fares was voiced at Rochester on April 10 at a meeting of the special committee appointed by the New York State Conference of Mayors to study the railway situation as it affects the various cities. The particular purpose of the meeting was to lay plans for the aggressive opposition which the committee intends to wage for the Mayors' Conference against the Jenks bills now before the Legislature. After a session which lasted for several hours the special committee epitomized its attitude with regard to the Jenks bills in the statement which follows:

> The committee is opposed to the bill to give to the Public Service Commission power to increase street railway fares irrespective of franchise restrictions, special statutes or agreement, because a franchise is a contract that has been made by a city with a company.
>
> The need for increasing fares in those thirty-six cities which have franchises restricting rates of fare is a matter for each of these municipalities to determine for itself. The courts have repeatedly declared that the State has authorized these cities to exact fare restrictions when granting franchises, and the Constitution provides for the protection of these contractual provisions when made.
>
> In twenty of these thirty-six cities the administrations have permitted the companies to increase these fares temporarily. In eight others the companies have not requested any increase in fares, and in the remainder, the authorities have refused to permit the companies to raise the fares because they are not satisfied with the reasonableness of the companies' claims. We believe that the action of these cities demonstrates conclusively that local authorities are able to arrange their traction affairs themselves.
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> We are opposed in its present form also to the so-called service-at-cost bill. If the measure simply gave to cities authority to enter into service-at-cost contracts with traction companies, we should approve it. Municipalities should have such power. This measure, however, provides that every city either must enter into a service-at-cost contract or must surrender its franchise rights by permitting the Public Service Commission to fix the rate of fare regardless of restrictions or agreements.
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> We are, therefore, opposed to the bill.

Akron Men Want $1 an Hour

Employees of the Northern Ohio Traction & Light Company at Akron, Canton, Massillon and other points, in addition to an increase of wages to $1 an hour, have included in their demands the requirement that 90 per cent of the runs be completed within the eight-hour period, an hour's additional pay for filling out accident reports, free transportation for the families of employees over the company's lines, discharge of any employee who violates the rules of the union, reinstatement of employees who resign if the application is made within six months, the reinstatement to be at the same wages the men received when they resigned. All new men are also to be required to become members of the union within thirty days after they begin work for the company.

Officials of the company say that to grant the demands would mean an addition of $1,560,000 annually to the payroll for the trainmen alone. Just what offer the company is prepared to make has not been stated. The contract with the union provides for arbitration of wage differences, the board to be made up of one man selected by the company, one selected by the men and the third by the Governor of the State.

Three-Cent Wage Increase in Philadelphia

Announcement was made on April 13 by the Philadelphia (Pa.) Rapid Transit Company that wages of motormen and conductors will be increased 3 cents an hour, making the maximum 61 cents an hour, effective on May 1. The wages of employees in other departments will be increased proportionately, effective the same date.

The co-operative plan provides a basis for determining the wages of the employees of the company, which shall be the average wage scale of four cities: Chicago, Cleveland, Detroit and Buffalo. Buffalo's trainmen's wages have been increased to 60 cents an hour, effective on May 1. This establishes the new maximum of 61 cents an hour for Philadelphia. The general committee of the Employees' Co-operative Welfare Association approved the new rate at a meeting held on April 13.

The gospel of thrift has been practiced by more than 70 per cent of the 9,400 employees eligible to membership in the saving fund. They have authorized the treasurer to make deductions from their pay envelopes each week. The average saving each month for each employee is $10. The aggregate savings exceed $780,000 annually.

It is expected that the men will increase their savings account, as the added weekly wage is about $1.65 to each employee. Officers of the saving fund are confident that at the annual picnic of the Co-operative Welfare Association the saving fund will exceed $1,000,000. Practical aid in saving is extended to employees through the Co-operative Welfare Association's simplified budget system for determining a household budget and keeping expense records.

Tugaloo Development to Be Pushed

The proposed Tugaloo hydro-electric development of the Georgia Railway & Power Company, Atlanta, Ga., will be located on the Tugaloo River, immediately below the junction of the Tallulah and Chattooga Rivers, where the Tugaloo is first formed.

A power house, 60 ft. by 190 ft., will be located immediately below the dam. It will have an installed capacity of approximately 75,000 hp. in water wheels. There will be four wheels of 18,750 hp. each, direct connected to 6,600-volt, three-phase, 60-cycle vertical type alternators of 12,500-kw. capacity each. The transformation from 6,600 volts to line voltage of 110,000 volts will be accomplished through two banks of power transformers of 25,000-kw. capacity each. Each bank of transformers will consist of three single-phase units. A new 110,000-volt transmission line, abcut 3 miles in length, will also be constructed for delivering the power from this plant to the present double circuit 110,000-volt steel tower line extending from the present Tallulah Falls plant to the city of Atlanta, Atlanta being the central distributing point for the transmission system of the Georgia Railway & Power Company. In addition to supplying current to Atlanta and other communities the company operates 230 miles of track.

Active construction work on this project was begun some two years ago. Contracts were then placed for the water wheels with the S. Morgan Smith Company, York, Pa., and for the generators with the General Electric Company. A part of the steel work and considerable other equipment have also been purchased. The construction was held up for the past eighteen months because of conditions resulting from the war. It will now be pushed as rapidly as possible.

All of the work on the project will be handled by day labor, under the company's own construction organization, of which Charles G. Adsit is chief engineer.

Wage Demands Rejected by Cleveland Railway

J. J. Stanley, president of the Cleveland (Ohio) Railway, on April 12 sent a communication to the officers of the local union, in which he stated that the company is compelled to refuse the demands of the men for an increase in wages to 90 cents an hour and new conditions as to time and runs. His letter contained the following proposals:

1. That all demands, whether of the company or the men, be submitted to arbitration immediately.
2. That both sides waive the privileges of the time in the present contract for naming representatives to the board of arbitration.
3. That C. Loomis Allen, vice-president and general manager of the Syracuse & Suburban Railroad, Syracuse, N. Y., be named forthwith to act for the Cleveland Railway.
4. That in case Mr. Allen and the arbitrator to be named by the men fail at their first session to agree on a third man, the Federal Judge of the District appoint the umpire.

The letter also contained counter demands, in effect as follows:

1. That restrictions as to sex of conductors and motormen on cars be removed.
2. That the clause which now provides that such employees "shall" become members of the union be changed to read only that they "may" join the union.
3. That compensation other than straight time rates (this affects split-shift runs) be abolished.
4. That there be a higher rate of pay for motormen than for conductors, if any pay changes be made at all.
5. That the present agreement remain in effect pending the results of arbitration.

Mr. Stanley said that, in fairness to the public, he feels that the increase should not be granted. The cost of living has not increased materially since last July, when the present terms were made, following the strike.

Officials of the union refused to express any opinion on Mr. Stanley's letter until they had taken time to study it thoroughly.

Wage Reduction in Denver

The Denver (Col.) Tramway has served notice on the local branch of the Amalgamated Association that effective June 1 the agreement between them will be canceled and the wage scales reduced from 58 cents an hour maximum for trainmen to the 48-cent scale established by the National War Labor Board. Jurisdiction over the case was assumed by the Colorado Industrial Commission on April 3.

Initiative petitions calling for the passage of an ordinance authorizing the collection of a 7-cent fare have been circulated by the company and will be filed with the municipal authorities. The City Council has thirty days within which to act after the petitions are certified to it and must either pass the measure or refer it to a vote of the people at the next regular municipal election, which will be held in the spring of 1921.

The company will make no campaign for the passage of the ordinance. It will limit its activities to the initiation of such measure and leave entirely to the municipal authorities the determination as to whether the rate of fare shall be 7 cents with the 58-cent wage scale or 6 cents with the 48-cent National War Labor Board wage scale.

A local board of arbitration on March 19 had granted the trainmen a 10-cent an hour increase, with corresponding increases for employees in other departments. This advance the company is unable to meet from the revenues derived from its present 6-cent fare.

Ex-Governor Compiling History of Union Crimes

Ex-Governor Joseph M. Brown of Georgia, whose protest to the President against union domination was noted in the ELECTRIC RAILWAY JOURNAL for March 13, page 535, wrote to the Atlanta *Journal* during the recent strike of the trainmen of the Georgia Railway & Power Company advising against resort by labor or its sympathizers to such tactics of frightfulness as characterized the railway strike in October, 1916. Mr. Brown is the avowed foe of force as exemplified in the labor bomb thrower. Among other things he said in the *Journal*:

> I will add that I am now making research into the course of the Amalgamated Association in "enforcing its demands" upon the public, and up to the present date have secured record of more than forty cities in which riots, with destruction of property and unlawful wounding and killing of people, were the accompaniment of strikes by this Amalgamated Association. These states include Maine, New York, New Jersey, North Carolina and Georgia on the Atlantic Ocean and Washington and California on the Pacific Ocean, with various states between the two oceans.
>
> When this record has been completed I shall lay it before Congress and before the Georgia Legislature and I shall ask Congress if, while it is holding on the statute books laws to control corporations which conduct interstate commerce, it will continue concurrently to leave non-incorporated organizations of men free to conduct at their pleasure interstate crime. And I shall ask the Legislature of Georgia some pertinent questions and make some suggestions to that body for protecting the people.

News Notes

$450,000 Carhouse Fire.—The Winnipeg (Man.) Electric Railway lost its Main Street carhouse in a fire on April 7. On account of the lateness of the receipt of this news, it is found necessary to include this item in the department Manufacturers and the Markets.

Boston Wages to Be Arbitrated.—The new wage demands of union employees of the Boston (Mass.) Elevated Railway will go to arbitration, according to a decision reached at a conference between the trustees and the men's representatives on April 9.

Dayton Road Increases Wages.—On April 6 the Dayton, Covington & Piqua Traction Company, Dayton, Ohio, increased the wages of its trainmen 3 cents an hour. This is the fourth 3-cent increase within a year. Employees in Dayton and Hamilton will now receive 50 cents an hour, while members of interurban crews will receive 51 cents an hour.

Commissioners Complain Franchises Are Violated.—Commissioners of Stark County have prepared charges against the Northern Ohio Traction & Light Company, Akron, Ohio, to the effect that the terms of the franchises are being violated in respect to rates of fare between Canton and Massillon and Massillon and Navarre. Application will be made to the Public Utilities Commission to adjust the matter.

Peoria Men Want More.—Trainmen of the Peoria (Ill.) Railway are asking for the wage scale of 80, 83 and 85 cents an hour with a basic nine-hour day. The present agreement of the men with the company expires on April 30. Arbitration is provided in the event of failure of the men and company to agree. Officials of the company state that if an increase of pay is granted to the men an advance in fare will be essential.

Conference on One-Man Car Operation.—Pending a conference between union representatives and officials of the Connecticut Company, the local employees of the company at Bridgeport on April 10 decided to assume runs on "one-man" cars on April 11, when the new service schedule of the company became effective. The men had protested the operation of "one-man" cars where zone fares are collected on the ground that it puts too much work on the motorman.

New Youngstown Scale Accepted.—Acceptance of the increase in wages offered by the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, has probably averted a strike of 800 motormen and conductors in Sharon, Youngstown, Newcastle and Warren. The employees demanded that they be paid 70, 73 and 75 cents an hour according to the length of service. The company refused the demand and a compromise rate of 60, 63 and 68 cents was accepted. The scale will date from April 1.

Sioux City Men Want More.—Demands of a 60 per cent increase in wages, a nine-hour day and a "closed shop" were made on the Sioux City (Iowa) Service Company by the trainmen's union, forecasting a fight that eventually may culminate in a movement for increased fares. When the present scale of wages was agreed on a year ago Service Company officials announced that company finances had reached the "breaking point." No further increase would be granted, it was intimated, without reciprocal action for a 6 or 7-cent fare.

Strike in Spartanburg.—Union trainmen in the employ of the South Carolina Light, Power & Railway Company at Spartanburg, S. C., went on strike on April 1. They want an increase in wages and a change in working conditions. The men charge discrimination against members of the union. An advance in pay of 5 cents an hour was made by the company recently, but the men say that the advance was negatived by other company modifications. On April 5 service had been restored in part with non-union men.

This "Ghost" Doesn't Walk Regularly.—Employees of the Norton & Taunton Street Railway, which is owned by the cities of Taunton and Attleboro, and the towns of Mansfield and Norton, in Massachusetts, were authority for the statement on April 5 that they had not "seen the ghost walk" for three weeks and that unless money was forthcoming soon they would be forced to quit the cars and get the wherewithal for daily maintenance from other sources. The men claimed that money is still due them for work done shoveling snow during the big storm. The men tell of one conductor who turned in his receipts with a note informing the company that he was $10 short simply because he needed the money.

Group Insurance for Key Route Men.—The directors of the San Francisco-Oakland Terminal Railways, Oakland, Cal., have arranged to insure the lives of all the regular employees without cost to them and without medical examination. This consideration is thus extended in recognition of service faithfully and loyally performed and to be performed. In announcing the plan the company said: "It is extended in the expectation that it will provide a means through which any dependent will be protected against immediate need and even afforded an opportunity to start anew. It is extended to the end that the employee will find satisfaction and contentment in the knowledge that whatever may befall, so long as he renders faithful and efficient service, something will be left for the protection of those dependent upon him.

Financial and Corporate

Surplus Account Up

Earnings of Holding Company Materially Increased—North American Company Has Prosperous Year

The annual report for the year 1919 of the North American Company, New York, indicates increased revenues and decreased expenses, thereby giving a material increase in the surplus account even after the payment of four quarterly dividends, each of 1.25 per cent on the $29,793,300 of outstanding capital stock.

No changes are noted in the valuations of the stocks and bonds of street railway, electric light and gas companies owned by the company. Loans and advances consist of money advanced to subsidiary companies. The only important change during the year is the reduction in notes payable from $4,177,500 to $500,000, which since has been reduced one-half. The reduction in loans of $3,677,500 and the payment of dividends aggregating $1,499,665, involving total cash disbursements of $5,167,165 during the year, were accomplished through repayment by subsidiary companies of moneys previously advanced to them, and the receipt in cash of interest and dividends from earnings of subsidiary companies. The accompanying table, gives in detail a comparison between the income and undivided profits for the past two years.

INCOME AND UNDIVIDED PROFITS ACCOUNTS OF THE NORTH AMERICAN COMPANY

Year Ended Dec. 31	1919	1918	Per Cent Change + Inc. — Dec.
Interest received or accrued	$483,331	$573,608	— 15.75
Dividends received or accrued	2,279,318	1,390,435	+ 63.90
Profits and compensations for services	33,592	33,837	— 0.72
Total revenues	$2,796,241	$1,997,880	+ 40.00
Salaries, legal expenses, net rentals and all other administration expenses and taxes	$130,422	$131,341	— 0.70
Interest paid or accrued	119,152	262,465	— 54.60
Sundry accounts written off	700	....	....
Total expenses	$250,274	$393,806	— 48.90
Net income	$2,545,967	$1,604,074	+ 58.60
Dividends paid and accrued during year	1,489,665	1,489,665	....
Balance carried to undivided profits account	$1,056,302	$114,409	+ 822.00

Shore Line Lease Abrogated

The New London division of the Shore Line Electric Railway, Norwich, Conn., has reverted to the Connecticut Company, New Haven, Conn. This division includes the New London and Norwich local lines. It extends through New London and Windham Counties to the Massachusetts State line at Wilsonville and includes the Putnam line. The division has been operated by the Shore Line Electric Railway under a ninety-nine year lease from the Connecticut Company, but the Shore Line is now able to give up this lease by permission of the Superior Court since it went into the hands of a receiver.

In a statement, Robert W. Perkins, the receiver, says in part:

> With a little margin over actual operating expenses the Connecticut Company will be able to spend a little more money on maintenance of roadway and rolling stock, give additional service and provide some more modern equipment, but it should be borne in mind that in order to provide adequate service, and a reasonable return on the investment, the gross revenue must be increased and any change in passenger fares which the Connecticut Company may find it necessary to adopt should be accepted as an inveitable consequence of the increased cost of producing the service, for, after all, the community should be more interested in service than in the price it pays for it provided that price does not give to the owners of the property a return above that common to other industries. If operations do not result in such a return, service will have to terminate.

The Connecticut Company has also issued a statement in which it says in part:

> The direction of affairs will be under the local supervision of Samuel Anderson, who filled the position of manager of the same properties during the period of operation by the Connecticut Company.
>
> It is the intention to install safety cars for local service in both New London and Norwich as soon as such cars, now on order, can be delivered and operation of all lines will be continued for the present and until we have had an opportunity to determine what changes must be made to meet the patronage accorded the service.
>
> The prevailing rates of fare will be continued for a time in order to allow a complete study to be made of conditions and revenues in various localities. Ample notice will be given in advance of any changes which may be required.
>
> We hope that we may be able to provide a character of service that will invite the patronage of a sufficiently large number of passengers at such rates of fare as will provide us with funds required to keep the service going, and as the communities depend largely upon the means of transportation we appeal to the public for co-operation in our effort to solve the problem of your street railway.

City Must Pay Appeal Cost

The United States Supreme Court has denied the request of Kansas City that the Kansas City Railways be compelled to pay for printing part of the record in the recent unsuccessful legal attempt of the city to set aside the order of the State Public Utilities Commission in allowing higher fares.

Pittsburgh Valuation Protested

City Considers Recent Commission Decision Misleading—Thirteen Objections Specified

The Pennsylvania State Public Service Commission's decision valuing the properties of the Pittsburgh Railways at $62,500,000 is branded as "misleading and prejudicial to the rights" of the city. The commission is asked to "set forth" definitely and clearly that its decision was solely for reorganization purposes and is not to be accepted as a basis for fares in Pittsburgh in a petition for a rehearing in the matter filed on April 8 in behalf of the city of Pittsburgh.

The city filed the petition as a "safeguard" against any attempt that might be made to advance the present fare to a 10-cent flat rate, in view of the demands of the motormen and conductors for an increase in wages to a maximum of 91 cents an hour.

A number of other municipalities and the committee on better service of the allied boards of trade also are filing petitions for a rehearing on the commission's valuation decision, which Special City Counsel Robinson has declared means, if it stands, a straight 10-cent fare in Pittsburgh.

CITY'S OBJECTIONS SUMMARIZED

In thirteen specific instances, the city in its petition for a rehearing charges, the commission erred in its valuation decision, and these "thirteen counts," as the city sets them forth, summarized, are as follows:

1. The commission erred in finding the value of the properties for reorganizing and refinancing upon a complaint alleging unreasonable rate of fare.

2. The commission was without jurisdiction in acting as though the evidence had been taken upon an application for a certificate of valuation.

3. The commission erred in attempting to set a valuation without having evidence of the market value of the stocks and bonds of the companies.

4. Interest on debenture bonds amounting to $600,000 and interest and principal on car trusts, amounting to $312,471 for 1920, are not chargeable to fixed expense, as was done in the commission's report, and should be deducted from the annual fixed charges of $4,200,000.

ERROR IN AVERAGING PRICES

5. The commission erred in taking as the basis for reproduction cost range of prices from 1914 to 1918, when prices were abnormally high.

6. The commission erred in not deducting cost of financing from the capital account.

7. Depreciation was not deducted from reproduction cost.

8. Superseded property and depreciation was not deducted from historic cost, to the extent that past earnings were in excess of 7 per cent.

9. Excessive sums were allowed for consolidation costs and consolidation values.

10. Properties not used or useful for street railway purposes were included in the valuation.

11. The commission should have ascertained actual gross income of the company during recent months, which naturally exceeded returns of September and October.

12. Its action in placing a valuation upon the property when it was not asked for by the petitioners is misleading and prejudicial to the rights of the complainant and not a proper basis for rate making purposes.

13. The commission erred in approving fare increase when such session set aside ordinances fixing the rate of fare.

$5,154,332 Duluth Value

Local Railway Appraised in Connection with Fare Vote Which Is to Be Held on June 21

The Duluth (Minn.) Street Railway has been appraised by Hagenah & Erickson, Chicago, Ill., in connection with the fare matter referred to elsewhere in this issue. Three sets of figures are presented, varying considerably with the level of prices used. The appraisal based on the average of labor and material prices which prevailed during the five-year period ended Dec. 31, 1919, follows:

	Reproduction Cost New	Reproduction Cost Less Depreciation
Physical property...	$4,930,539	$4,362,332
Working capital.....	192,000	192,000
Going concern value	600,000	600,000
Total............	$5,722,539	$5,154,322

The appraisal based on the level of labor and material prices indicated by the trend of prices as reflected by the continuation from 1914 to 1919 of the normal price movement which was established during the period from 1896 to the beginning of the European war, follows:

	Reproduction Cost New	Reproduction Cost Less Depreciation
Physical property....	$4,383,069	$3,886,023
Working capital.....	192,000	192,000
Going concern value	600,000	600,000
Total............	$5,175,069	$4,678,023

The appraisal based on the level of labor and material prices which prevailed during 1918 and 1919 and which reflects the level of prices which will probably continue for a number of years in the future, follows:

	Reproduction Cost New	Reproduction Cost Less Depreciation
Physical property....	$5,638,093	$4,977,894
Working capital.....	192,000	192,000
Going concern value	600,000	600,000
Total............	$6,430,093	$5,769,894

The figures are as of Dec. 31, 1919.

Under the conditions which have prevailed for several years and which will undoubtedly exist for a number of years in the future the appraisers reported that the results based on the normal trend of prices were indicative of a lower value than can be justly considered, and against that they submitted the appraisal results based on the present level of prices, which reflect that level to which all business and private industries are now seeking to adjust themselves. They said:

> Between the two extremes we believe that the appraisal results based on the average of the labor and material prices which have prevailed during the last five years more nearly represent a just basis for rate-making purposes, and from a consideration of all of the facts it is our conclusion that the fair value of the property represented by the Duluth division of your company is not less than $5,154,322, and that such amount should be considered as the minimum valuation on which your company is entitled to receive that measure of return contemplated by law.

Mayor C. R. Magney objected to one item in the valuation figures. The company claimed $600,000 as its "going concern value." The Mayor contended that if the company claims that it is on the verge of bankruptcy, it is ridiculous to suppose that it has an "intangible going concern value of more than $500,000" on which to expect a return in the shape of dividends.

In arriving at this item the company's appraisers said they were guided by facts obtained from the history of the company and by a consideration of the actual investment in property and the earnings and operating expenses over a period of thirty years. They also determined what would be the normal cost to reproduce the present business of the company and further considered the provisions which have been made by the courts and public service commissions covering this item of property in the appraisals of public utility companies.

EXTENT OF PROPERTY REVIEWED

The Duluth Street Railway serves a population of approximately 100,000. It owns and operates a total of 76.83 miles of track, measured as single track. The company owns no power plant, but purchases electric power from the Great Northern Power Company, measured to the Duluth Street Railway on the direct current side of the station, the power company thus bearing the loss in transmission. As a part of its property in Duluth the company owns and operates an inclined railway for carrying passengers from the main business thoroughfare to the heights and bluffs. This inclined railway consists of 2,971.3 ft. of track, of which amount 2,749.9 ft. are located on steel trestles while 221.4 ft. are on masonary foundation. The equipment devoted to the operation of this inclined railway embraces two cars operated from control apparatus located at the top of the incline, the cars being operated so as to serve seven waiting rooms and large upper and lower loading and unloading platforms.

In addition, the company owns a substantial modern brick office building. This adjoins its principal carhouse and repair shops. The company owns two substations in Duluth. The rolling stock consists of 160 revenue passenger cars.

Texas Road Reports Increase

Gross earnings of the Northern Texas Traction Company, operating in Fort Worth, Tex., and between Fort Worth and Dallas, for the calendar year of 1919 amounted to $3,264,565. The operating expenses during this period were $2,631,093. During the year extensions costing $276,224 were made. The maintenance cost was $233,935. Miscellaneous expense is listed at $217,329, labor $931,840 and fixed charges and interest, $380,433. Fares in Fort Worth are 5 cents for adults, or twenty-two tickets for $1, with a 2½-cent fare for children and students or forty tickets for $1. Interurban tickets sell for 2 cents a mile. Of the total income reported, $2,977,851 was derived from fares and tickets.

Abandonment Protested

It was stated at the hearing before Chairman Hill of the Public Service Commission for the Second District of New York, on April 3, that the Port Jervis (N. Y.) Traction Company had taken steps for abandonment of its franchises in Port Jervis. This statement was by John B. Knox, New York, representing the company, on the hearing of an order to show cause why the railway abandoned operations in Port Jervis.

Mr. Knox admitted all the city's claims about non-operation, but denied that the company had violated the law. The company was operating at a deficit, he said; it had paid no interest on bonds for six years; it had borrowed money to pay taxes, and it was absolutely impossible for the company to run. The company, he said, is insolvent.

Corporation Counsel William A. Parshall objected to the company's abrogating terms of its franchise. He expressed surprise at the company's declared intention to abandon its road. This position, he maintained, was untenable. The company's ceasing operations was indefensible and Port Jervis, he told Chairman Hill, went further than any other city to help the company, even waiving all fare restriction and consenting to the commission's determination of a reasonable rate. Mr. Parshall asked that the commission direct the company to resume operations, saying the Port Jervis authorities were not "corporation baiters." He contended the company could not abandon operations.

Mr. Knox said the company had taken steps for dissolution. He said: "We are getting ready to go out of business."

Mayor George E. Hornbook, William M. Tuscan and P. E. Rutan represented the Chamber of Commerce.

Chairman Hill said an early decision will be rendered.

New Plan for Service in Hyde Park District

At a meeting of the trustees of the Boston (Mass.) Elevated Railway and the Eastern Massachusetts Street Railway a new plan for the service in the Hyde Park District was adopted. The plan provides for the operation of the cars on the Hyde Park division as far as the boundary lines of Hyde Park as they existed before being incorporated in the city of Boston by the Eastern Massachusetts Street Railway. Within this line, included in the city of Boston, the Boston Elevated Railway will operate.

The Hyde Park district will be relieved of the obligation of contributing to the cost of operation of the Boston Elevated Railway or sharing in the assessments necessary to meet any deficit. On the other hand, this district will be called upon to pay over to the Eastern Massachusetts Street Railway an equivalent amount toward any deficit this company may incur.

Fare Increase Beneficial

Traffic Losses in Lexington Not Sufficient to Show a Decrease in Gross

The annual report of the Kentucky Securities Corporation for the year ended June 30, 1919, gives the following information concerning the Kentucky Traction & Terminal Company, one of its subsidiaries:

PROSPEROUS CONDITION SHOWN

The railway gross earnings reflect the generally prosperous business conditions that prevail and receipts show an increase of $37,172. This increase is largely due to the fare increase on the interurban lines, for in April, 1918, the cash fares were increased from 2.5 to 3 cents per mile and through fares from Lexington to Frankfort, Georgetown, Paris and Nicholsville were increased 5 cents on each one-way ticket. In September, 1918, the unit rate of fare on all city lines was increased from 5 to 6 cents.

The total number of passengers carried, both cash and transfers, however, decreased 8.12 per cent, this being due in many respects to the increase in fare and to the restricted riding during the influenza epidemic in the fall of 1918, as well as the discontinuance during the war of the several annual county fairs. The largest traffic loss was 14.7 on the Lexington city lines.

In the city of Lexington one-man operation of cars was inaugurated during the year on all local city lines.

The accompanying table gives information as to the extent of the system, the rolling stock and the traffic handled:

TRACK MILEAGE

Interurban system:		
Main line	65.87	
Sidings and spurs.......	1.80	67.67
City lines:		
In Lexington	16.02	
In Frankfort	7.64	
In Georgetown	1.26	
In Winchester	1.20	26.12
Total track mileage....	....	93.79
Rolling stock:		Total
Passenger city cars................		*47
Passenger interurban cars.........		15
Freight cars		4
Service cars		6
Total cars owned...............		72

*Includes 14 cross-bend open cars.

Year ended June 30

	1919	1918	Per Cent Change +Inc. —Dec.
Passenger traffic—cash and transfers—	1,415,989	1,660,133	—14.70
Lexington city lines.....................	388,065	426,624	— 9.04
Other city lines.........................	3,751,883	3,959,734	— 5.25
Interurban lines			
Total passengers	5,555,937	6,046,491	— 8.12

$1,447,363 Refused on Principle

The city authorities of Chicago on April 10 refused to accept $1,447,363 from the Chicago Surface Lines. This was the total of two checks, one from the Chicago Railways for $1,004,372 and the other from the Chicago City Railway for $442,991—each representing 55 per cent of the net receipts of the companies for the fiscal year ended Jan. 31, 1920.

Tender of the checks was made by M. B. Orde, treasurer of the Surface Lines, under the terms of the 1907 ordinances which require that payment be made by April 10 of each year. The city law department has contended that when the surface companies abandoned the ordinance rate of fare and began collecting 6 cents under authority of the State Utilities Commission they forfeited all rights under the city franchise. Therefore, when the checks were offered to the city comptroller he called upon Special Counsel Cleveland for an opinion, and the latter said the money should not be accepted unless the companies would enter a stipulation that this would not be construed as an admission by the city that the 6-cent fare was legal. This the companies refused to do.

Paving Charges Withdrawn

The City Council of Wausau, Wis., has adopted an ordinance permitting the construction of extensions to the existing system operated by the Wisconsin Valley Electric Company, in Wausau, which provided for the replacement of track torn up by the company in its construction work, but relieving the company of the obligations to repave or to maintain the pavement. In the ordinance appears this section:

> Whereas, the statutes for the regulation of rates, service and operation of street railways that have been enacted since the granting of the existing franchises of the said street railway company by said ordinances placing street railway companies under the control and supervision of the Railroad Commission make ample provision for the protection of the interests of the public and cause the burdens as to street paving imposed by said franchises upon the said street railway company to result in increased cost to that portion of the public who use said street railways.

The adoption of the ordinance followed the report of a committee of the Council appointed to investigate the matter. In its report to the Council, the committee said, among other things:

> The original street railroad franchises were adopted prior to the enactment of the present public utility laws, which place the control of the rates and of the service of all street railroads in this state under the exclusive control of the railroad commission of Wisconsin. This condition did not exist at the time that these franchises were granted.
>
> Under this law a reduction of operating expenses tends to result in improved service and reduced fares or both, whereas increased operating expenses of the company tend to increase the fares, or curtail the service rendered, or both. And whereas the street railroad is being patronized by working men and women who cannot afford automobiles, it seems proper that no unnecessary expenses be now imposed upon street car lines so that adequate service and reasonable rates of fare can be put into effect and so maintained.

The committee further recommended the passage of an ordinance shifting the cost of paving maintenance, hitherto borne by the company, from the abutting property owners to the city.

Financial News Notes

Abandonment Announced. — The Southern Railway & Light Company announced the abandonment of service on its railway lines in Natchez, Miss., on April 5. The tracks will be torn up and the equipment sold.

Subway's Transfer to State Approved.—The sale and conveyance to the State of Massachusetts of the Cambridge subway for $7,868,000 was formally approval at the annual meeting of stockholders of the Boston Elevated Railway on April 5.

Contribution to the Cost of Operation.—The town of Deerfield, Mass., has been authorized by the Massachusetts Department of Public Utilities to contribute $200 to the Connecticut Valley Street Railway to aid in the cost of operation of the road for the year 1920.

Interest Passed on Income Bonds.—The directors of the Chicago (Ill.) Railways have decided that the year's interest on the company's $2,500,000 of adjustment income bonds was not earned. Consequently no payment will be made May 1. Interest on these bonds was not paid for the previous year.

Receiver for Ohio Interurban.—Common Pleas Judge Dan B. Cull at Cleveland, Ohio, on April 4 named Attorney Milton C. Portmann receiver for the Cleveland, Alliance & Mahoning Valley Railroad, Ravenna, Ohio. The company operates 46.5 miles of road. It is said to have defaulted in the payment of $25,000 of interest due on April 1.

Offer to Rehabilitate Abilene Line.—A. Hardgrave, Dallas, Tex., vice-president and general manager of the American Public Service Company, has submitted an offer to the city of Abilene, Tex., whereby the American Public Service Company would take over, rehabilitate and operate the railway system of Abilene. The company proposes to spend $50,000 on improvements if the deal goes through.

Earnings Are Insufficient.—It is expected that the Tri-City Railway will petition the Public Utilities Commission of Illinois for an increase in fare on the Illinois side of the Mississippi. Officials of the company state that it is no longer possible for the company to operate at a 7-cent fare. According to the ruling of the commission, the company is entitled to earnings in Illinois amounting to 7 per cent on $2,900,000. The earnings at present are only 4 per cent on this amount. If the petition is approved by the commission and higher fares are put in effect on the Illinois side the company will probably ask the City Council of Davenport, Iowa, to consider a similar increase in fares in that city.

Traffic and Transportation

Louisville Committee Back

City Considers Recent Commission Decision Misleading—Thirteen Objections Specified

Mayor Smith of Louisville, Ky., and Louisville Railway officials returned to that city recently, after studying electric railway conditions in Cincinnati, Cleveland, Philadelphia, New York and Newark. Mayor Smith stated that no city in the country has as much trackage as Louisville in proportion to the population. Another fact noted was that the rolling stock in Louisville appears to be in better physical condition than that in most other cities. In Cleveland it was noted that through an ordinance prohibiting the use of tracks by traffic other than street cars better time is made by 2 m.p.h. than in Louisville.

SUGGESTIONS OPPOSED

Mayor Smith stated on his return that he favored (a) the elimination of automobile parking on Fourth Street from Main to Broadway; (b) installation of modified zone system of fares, with a 5-cent fare as a basis, and a limited transfer system; (c) freeing car tracks of all other traffic; (d) prevention of looping of cars in the business district.

Already the Retail Merchants' Association, the Automobile Club and other organizations have attacked the suggestion of no parking on Fourth Street. They are also opposed to routing cars one way on Fourth Street. The auto club is especially opposed to suggested non-allowance of tracks for vehicles. The Market Street Merchants' Association is endeavoring to increase looping in the downtown district to bring more business to Market Street, and is consequently opposed to the no-looping plan.

Labor organizations and general consumers are opposed to the zone system, modifications of transfers or anything that would increase expenses for the rider. The City Council has fought every effort made to raise prices. The City Council, however, cannot control transfers to any extent or the elimination of paralleled lines or zoning outside of the city limits on some lines, so that the Mayor may have his way.

MAYOR FAVORS NICKEL FARE

Mayor Smith apparently is in favor of the retention of the 5-cent fare, with charges for transfers, modification of routes and improved city co-operation in keeping tracks clear for rapid transit.

The Mayor, upon his return, gave out an interview in which the following impressions were stated relative to traction conditions in the cities visited:

> I discovered that the burdens on most of the traction companies in Cincinnati, Cleveland, Philadelphia and New Jersey cities were much greater than those of the Louisville Railway. In nearly all of these cities the cost of labor, coal and everything that goes to make the running of a railway is more than it is here.
>
> Nearly every one of these cities compels its railway to pay a certain amount for the repair and the use of the streets. All of these cities, which are much larger than Louisville, have a separate branch of the city government which costs considerable to look after street car traffic.
>
> In every city the tendency is toward doing things that will improve traffic conditions. This was particularly noted in Cleveland, where all traffic is barred from the street car tracks. This is done in order that the cars can make more miles in a day, thus necessitating fewer cars and a faster mode of travel. The system of the Philadelphia Rapid Transit Company impressed me as more progressive than any of the others.
>
> Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., explained the zone system. He thinks it will work out finally, but when he first applied it it lowered property values and had to be abandoned for the time being. Mr. McCarter thinks it will solve the problem to a great extent when the public takes more kindly to it. While I am not committed to this plan, I still maintain it would be a step in the right direction.

Members of the party who went on the trip besides Mayor Smith were: Board of Public Safety Chairman Burlingame, Councilman Isrigg, Alderman Wills and the Louisville Railway's executive committee, W. S. Speed, John W. Barr, Jr., and W. H. Kaye.

Mr. Kirwan, president of the Board of Aldermen, who acted as Mayor during the period that Mayor Smith was in the East, is hostile to any effort to advance fares over a 5-cent basis. His attitude toward higher carfares is shown in the following statement:

> What the company probably needs is more short hauls. I believe that the present General Council is opposed to a raise in fares, at least it was a little while back. Of course, that body will listen to the recommendations of the Mayor and other city officials, but it probably will be stubborn in the matter of increased fares.

Philadelphia Committee Named

A committee representing business and civic organizations of Philadelphia, Pa., has been appointed by Mayor J. Hampton Moore to investigate the transit situation in that city. The committee, named at the suggestion of the Philadelphia Chamber of Commerce, is asked to inquire into the nature of the service furnished by the Philadelphia Rapid Transit Company and to suggest improvements. It will also report on the rights of the city to require the company to operate the Frankford elevated and the Byberry lines, now nearing completion. The membership includes Alba Johnson, president of the Chamber of Commerce; William P. Barba, Dr. Thomas Conway, and others.

Thomas E. Mitten, president of the Philadelphia Rapid Transit Company, has notified Mayor Moore that the company will operate the Frankford line only if the city will furnish all equipment, including trains.

Conciliation Board Ruling

Continuance of Higher Fare in Kenosha Made Contingent Upon Improved Service

The Railroad Commission of Wisconsin has handed down a decision confirming the award of the State Board of Conciliation in the matter of wages of railway employees of the Wisconsin Gas & Electric Company, Kenosha. In addition it has granted the company an increase in the rate of fare to provide for the increase in wages. The new rate of fare is 6 cents cash or nine tickets for 50 cents. Whether or not this rate will be continued after the temporary order expires on July 31 depends upon the service rendered by the company.

In its decision the commission commented upon the rapid growth of Kenosha and the inadequacy of the present street railway system for taking care of the present transportation needs of the city. It pointed out that some double tracking and considerable further line extensions were absolutely necessary, as are also additional cars. The commission did not order any definite amount of improvement or extensions to be made, but stated that the people of the city were as vitally interested in the adequacy of the service as they were in the rate of fare, and that while the company is entitled to a reasonable return upon its investment, it is also under a primary obligation to provide facilities to meet the reasonable public transportation demands.

If the company makes these needed improvements, there will result a considerable increase in the investment and a possibly longer average length of haul. These two considerations make it impossible for the commission to determine what the reasonable rate of fare would then be. When the question of the rate of fare again comes before the commission it states that it will give full consideration to the adequacy of the service and the efforts made to improve it.

The Board of Conciliation granted an increase of 9 cents an hour in the wage scale, making the maximum for the fifth year's service and thereafter 55 cents an hour. This increase will cost the company $18,000 a year. The company operates about 7 miles of railway in Kenosha. It suffered severely from jitney competition until recently, when the jitneys were eliminated by a City Council ordinance.

May Abolish Transfer Charge

The city manager of Norfolk, Va., has started negotiations with officials of the Virginia Railway & Power Company, Richmond, looking to the discontinuance of the 2-cent transfer charge now in effect on the company's lines in Norfolk. The charge for transfers became effective at the time when the fare was raised from 5 cents to 6 cents several months ago.

Duluth to Vote on Fares

Some Measures of Relief Contained in 6-Cent Fare Ordinance—Company Wanted More

Citizens of Duluth, Minn., will on June 21 next vote on an ordinance providing that the Duluth Street Railway may increase its fare from 5 cents to 6 cents. This is the result of the City Council on April 8 having agreed to submit the proposition to the voters by referendum at the June primary election.

The railway asked the Council for a referendum ordinance providing for a fare of 7 cents or four rides for 25 cents, but the City Council turned down the proposition. Later the 6-cent rate ordinance was proposed by the company and accepted by the Council.

A. M. Robertson, Minneapolis, president of the company, declared that with a 6-cent rate the company would be unable to do as much as it would like to do in the way of extensions, but that it would be in a position to meet all reasonable demands. He said:

> We believe that a cash fare of 7 cents and four rides for 25 cents is the lowest fare which will yield the revenue vitally necessary to enable the company to finance extensions, buy new cars, rebuild present cars to the "pay as you enter" type and make other needed improvements, and in accepting the 6-cent rate at this time the company wishes it clearly understood that it is relieved only in part from the difficulties it must overcome in supplying service. We will do the best under the conditions to furnish the people with good service, and with complete co-operation of the city officials and the people we hope to succeed.

Now that the matter of a 6-cent rate is to go before the voters at the June election, the company is in a position, Mr. Robertson said, to place orders for material which will be needed this summer. In the event that the increase is defeated the orders can be canceled without the company losing its priority rights.

Before the ordinance was accepted by the Council there was a series of conferences between the city officials and the company officers at which the necessity was discussed for raising the fare now charged. The company recently had its property appraised by Hagenah & Erickson, Chicago, and according to their figures the fair value of the property in Duluth was not less than $5,154,322. It was contended this was the minimum amount that should be considered on which the company is entitled to receive the measure of return contemplated by law.

Seven Cents in Buffalo

The 7-cent fare authorized by the Public Service Commission will be put into effect on the Buffalo, N. Y., lines of the International Railway at 6 a.m. on April 18. Four tickets will be sold for 25 cents. All outstanding 5-cent tickets will be redeemed by the company at their face value. A show cause order to stay the proposed fare increase was granted on April 14 by Supreme Court Justice Cole. A writ of certiorari was also obtained by counsel representing the city.

George Clinton, Jr., special counsel retained by the municipal authorities to fight the fare increase, made application for the order, which directs the Public Service Commission to show cause in Albany on April 17 why the order for a higher rate of fare should not be stayed pending the determination of the proceedings begun by the city to review the commission's action in granting the 7-cent fare.

The writ of certiorari provides for a review of all proceedings resulting in the commission's 7-cent fare order, papers and other material having to do with the case to be produced within twenty days. If the city is unsuccessful in having the 7-cent fare put off until a later day, the city will ask that the International Railway be required to give 2-cent rebate slips to all passengers.

Zone System Likely

This Plan Appears Best Suited to Meet Needs of Local Company at Houston—Master's Report Approved

The report of Judge Otis Hamblin, special master in chancery, who heard the case of the city of Houston, Tex., versus the Houston Electric Company, wherein the company is seeking authority to charge higher fares in Houston than now permitted, has been approved by Judge J. C. Hutcheson of the United States District Court for the Southern District of Texas.

Immediately upon approval of the report of Judge Hamblin, which fixed the valuation of the company's properties at $6,000,000 and held that the present fares of 5 cents for adults and 2½ cents for children were confiscatory, Judge Hutcheson issued an injunction restraining the city from interfering with the company in levying higher fares than those now charged. The order of the court provides, however, that the city shall have the right to apply to the court for a further decree whenever it shall appear that the railway is earning a sufficient compensation in granting the 7-cent fare. The 7-cent fare order was issued by the commission several months ago.

Luke C. Bradley, district representative of Stone & Webster, owners of the railway, and city officials have entered into negotiations looking toward an agreement fixing fares. It seems certain that a zone system of fares will be put into effect, whereby 5 cents and 2½ cents will be charged within the business district, with 6 cents and 3 cents within the first zone outside the business district and 7 cents and 3½ cents for the most remote places. The report of Judge Hamblin fixed 8 per cent as a just rate of return on the fixed valuation, and it is believed that the zone system with the graduated fares will yield this return.

Negotiations looking to an agreement between the city and the railway regarding the increased fare to be charged are continuing with satisfactory results.

Portland Relief Plan Declared Illegal

Portland, Ore., is legally unable to carry out recommendations made by the Oregon Public Service Commission for the solution of its transit problems. City Attorney La Roche has filed an opinion to the effect that the city is prohibited by the State constitution from acquiring the trackage or any other part of the physical properties of the Portland Railway, Light & Power Company, with the intent of allowing the corporation to use such properties after the purchase by the city.

Under this opinion the Public Service Commission's suggestion that the city purchase the trackage of the company for the purpose of leasing such tracks to the company at a nominal rental fee becomes impossible unless the State constitution is amended. The opinion is based on Section 9 of Article XI, which reads as follows:

> No county, city, town or other municipal corporation by vote of its citizens or otherwise shall become a stockholder in any joint company, corporation or association whatever, or raise money for, or loan its credit to or in aid of any such company, corporation or association.

The City Attorney's opinion was submitted to a special committee, composed of Commissioners Mann, Barbur and Bigelow, and was supplemented by a later statement reviewing Supreme Court cases in Oregon dealing with similar subjects.

Mayor Baker is in sympathy with efforts to afford relief to the company. He maintains that some plan whereby the company can increase its revenue is essential if the city's transportation system is to remain intact. In a recent statement he pointed out that the city must choose one of three courses: A straight increase in fare, an operating agreement with the company, or municipal ownership. In his statement Mayor Baker said:

> Failure to adopt one of these three measures would send the street railway into the hands of receivers. It is a problem that cannot be evaded and should be the concern of every resident of Portland. Under the opinion given by the City Attorney, it would seem that the main proposal offered by the Public Service Commission cannot be carried out. It now devolves upon the Public Service Commission and the City Council to study the problem further and attempt to work out the proper solution.
>
> I am opposed to municipal ownership of street railways. The experience of Seattle is a lesson. But if increased fares will not give the required relief, and if the city is prohibited from entering into an operation agreement with the company which would bring relief, then acquisition of the entire street railway system in Portland by the city is inevitable.

Eight-Cent Fare Denied

Public Service Commissioner Lewis Nixon of the First District has denied a *pro forma* application by counsel for the receiver of three of the surface lines of the Brooklyn (N. Y.) Rapid Transit Company for permission to charge an 8-cent fare. Counsel for the company stated that the application was made for the purpose of providing grounds for an appeal to the higher courts, where the issue of an increased fare could be fairly tried out.

Transportation News Notes

Zone Fares Increased.—The Northern Massachusetts Street Railway, Athol, Mass., has raised its fare from 6 cents to 10 cents for a ride in two zones. The increase was authorized by the Massachusetts Department of Public Utilities.

Modifies Fare Request.—The Shreveport (La.) Railways has asked the Shreveport City Commission to grant it a 6-cent fare instead of one of 7 cents. The company some time ago petitioned for a 7-cent fare. The present rate is 5 cents.

Seven Cents Asked in Pensacola.—An application has been filed with the Florida Railroad Commission by the Pensacola Electric Company for a 7-cent fare in Pensacola. The State Supreme Court some time ago ruled that the commission had authority to grant fare increases.

Recommends 7-Cent Fare.—At a joint meeting on April 7, committees representing the City Councils of Hampton, Newport News and Phoebus, Va., recommended that the Newport News & Hampton Railway, Gas & Electric Company be permitted to raise its fare. The committees favored the adoption of a 7-cent fare with 3½-cent labor tickets.

Ten Cents in Nashua.—Cash fares of 10 cents became effective in Nashua, N. H., on April 1. The Nashua Street Railway had previously petitioned the State Public Utilities Commission for an increase from the 8-cent cash fare then being charged so as to stimulate the use of tokens. Tokens are sold as formerly at the rate of five for 35 cents.

Wants More in Elmira.—Application has been made to the Public Service Commission for the Second District by the Elmira Water, Light & Railroad Company, Elmira, N. Y., for permission to raise its fare from 5 cents to 6 cents. The Elmira city authorities oppose the granting of the company's petition on the ground that its franchise limits the fare to 5 cents.

Agree on Asheville Fare.—As the result of hearings before Judge Webb of the Superior Court of North Carolina, the Asheville Power & Light Company on April 1 began selling six tickets for 35 cents. Several months ago the State Corporation Commission authorized the company to raise its fare from 5 cents to 6 cents. The city appealed the case to the Superior Court. Judge Webb directed the company to reduce the fare by the sale of six tickets for 35 cents.

Eight Cents Asked in Morgantown.—A hearing has been set by the Public Service Commission of West Virginia for May 11 in the application of the West Virginia Traction & Electric Company, Morgantown, to increase its rates in Morgantown, effective May 15. The company asks the following rates: 8 cents to any point on the Loop division; 8 cents to any point on the Sabraton division. Passengers paying the 8-cent fare may purchase transfers to any point for 3 cents. The fares were last increased on Feb. 14, 1919.

New Transfer in Seattle.—The Seattle (Wash.) Municipal Railway has recently issued a new transfer, designed by Thomas F. Murphine, former superintendent of municipal railways, which it is believed will add considerable revenue to the system. The transfer consists of a ticket 1½ in. wide by 3 in. high with detachable coupon 1½ in. wide by 1½ in. high. The conductor on the car that receives the transfer from the passenger detaches the coupon. Any effort by the holder to use the transfer on another line would come to grief. The transfer is punched for time and direction.

Asks 7 Cents Pending Decision.—The East St. Louis & Suburban Railway, East St. Louis, Ill., has filed a petition with the Illinois Public Utilities Commission for a temporary fare of 7 cents on its city lines pending final ruling of an application for an 8-cent fare. The application states that three tickets would be sold for 20 cents. The commission recently suspended the 8-cent fare until Aug. 23 while the petition was being considered. The company has been contending for more than a 6-cent fare since Sept. 1, 1918, and made application for an 8-cent fare on Sept. 1, 1919.

New York Inquiry Continues.—Despite the withdrawal of the representatives of the railway lines several weeks ago, the New York City Board of Estimate and Apportionment is going ahead with its investigation of the traction situation in the metropolis. The companies' representatives withdrew from participation in the inquiry at the direction of Federal Judge Mayer. At the board's session on April 8 Cornelius M. Sheehan, deputy water commissioner, presented arguments against allowing the Brooklyn Rapid Transit Company and the New York Railways to raise their fares.

Change Unlikely in Montreal Fares.—It is understood that the present tariff of fares in effect on the Montreal (Que.) Tramways, while put into force several months after the beginning of the fiscal year of the company, justifies a belief that it will not be necessary to raise rates on June 30, 1920, the end of the company year, unless abnormal circumstances should arise. The company started its present fiscal year with a deficit, but business is gradually improving, and even if at the end of the present fiscal year there should still be a deficit, it is not expected that it will be so large that it cannot be overcome in the following year without having resort to fare increases.

Eight Cents in Northport.—The Northport (N. Y.) Traction Company has been authorized by the Public Service Commission, Second District, to increase its rate of fare from 5 to 8 cents, the order to be effective until April 1, 1921, and thereafter until further order of the commission. The company, under authority of the commission, put a 6-cent fare in operation in November, 1917, but after the decision of the Court of Appeals in the Rochester case the company returned to the 5-cent rate. Franchise restrictions by Northport and the town of Huntington were waived. About 200,000 passengers are carried annually and a 3-cent fare increase will result in increased revenue of about $6,000.

Rochester Report Expected Soon.—The railway situation in Rochester, including the amount of the fare, is covered in a report prepared by Public Service Commissioner John A. Barhite, which was filed on April 6 with the Public Service Commission. That body is expected to take action on Judge Barhite's recommendations and suggestions this week. Judge Barhite said that he was not at liberty to divulge the contents of the report. The decision will be announced by the entire commission. Judge Barhite's report covers thirty-six typewritten pages. There is a supplementary report by Electrical Expert Charles R. Barnes, and this report is said to be in full accord with Judge Barhite's recommendations.

Wants More in Macon.—A petition asking an increase in fare from 6 cents to 7 cents has been presented to the City Council of Macon, Ga., by the Macon Railway & Light Company. The company states that unless relief is granted it will be forced into bankruptcy. It declares that the 1-cent fare increase allowed by the Council produced during the year 1919 $81,551 but that the increase in operating expenses consumed the entire additional revenue and $2,591 additional. In the year 1919 the earnings were $491,110 and the operating expenses $398,197, leaving the net income at $92,913. While the gross earnings of the company for the year increased $72,698 the expenses of the transportation department alone increased $84,143.

One Killed in "L" Wreck.—Running by a signal which had been set against it, a local train on the Ninth Avenue "L" line of the Interborough Rapid Transit Company, New York, on April 12 crashed into the rear of a seven-car express, derailing the latter. One of the wooden coaches of the express, catapulted over the side of the "L" structure, was shattered against the brick wall of an office building, its passengers being dumped into the street below. One man in the wrecked coach was so badly injured that he died shortly after the accident. Few of the other passengers were seriously hurt. Traffic on the portion of the Ninth Avenue line below Christopher Street was suspended for more than two hours as a result of the accident.

Personal Mention

Mr. Bleecker Resigns from New Orleans Company

John S. Bleecker, general manager for the receiver, New Orleans Railway & Light Company, New Orleans, La., has resigned to become general manager of the Myles Salt Company, owners and operators of the largest salt mine in the world, which is located near New Orleans. Mr. Bleecker went to New Orleans a little over a year ago from Columbus, Ga., where he was general manager for Stone & Webster of the Columbus Electric Company and Columbus Railroad Company. He undertook a task made difficult by the complications of a receivership, but has made an enviable record during his year with the New Orleans company. In speaking of Mr. Bleecker's resignation, J. D. O'Keefe, receiver, said:

> Mr. Bleecker has severed his connection with the property voluntarily and to my very great regret, as I believe the property is losing an able, conscientious and progressive operating official. Mr. Bleecker came to the property at a critical period in its history and he has done much, during his short tenure, to improve its physical condition and the service generally.

A portrait and a biography of Mr. Bleecker were published in the Electric Railway Journal at the time he took up his duties in New Orleans.

George I. Plummer has been appointed to the newly created position of superintendent of traffic of the Dallas (Tex.) Railway.

Benjamin B. Foss, for the past twelve years superintendent of the Lynn (Mass.) division of the Eastern Massachusetts Street Railway, has resigned.

Edward H. Sharpe has been appointed general passenger agent of the Pacific Electric Railway, Los Angeles, Cal. Mr. Sharpe succeeds Richard Kelly, who has been made general passenger agent of the Southern Pacific Company.

W. H. McAloney, superintendent of rolling stock of the Winnipeg (Man.) Electric Railway, has resigned. Mr. McAloney, who has been connected with the company for the past two years, will return to Denver, Col. Thirty department heads of the Winnipeg Electric Railway tendered him a farewell dinner on March 31. On that occasion Mr. McAloney was presented with a handsome wrist watch as a token of remembrance from his many friends in Winnipeg.

Samuel Anderson, who filled the position of manager of the electric railways at Norwich and New London, Conn., during the period of their operation by the Connecticut Company, has again taken up the direction of the affairs of the lines. For some time past the lines have been under lease from the Connecticut Company by the Shore Line Electric Railway, but they have reverted to the Connecticut Company from the Shore Line under court order.

F. H. Behrens has resigned from the business department of the Electric Railway Journal to join the staff of the Simmons-Boardman Publishing Company, New York, as eastern representative of the *Railway Electrical Engineer*. Mr. Behrens has been connected with the Electric Railway Journal since October, 1911. He entered the business department, and after spending about four years there was transferred to the editorial department, where he worked on the department "Manufactures and Markets," broadening his knowledge of the business as a whole and extending his acquaintanceship among the manufacturers of and dealers in electric railway equipment. After a year in this work he returned to the business department, where he has been since that time.

Promotions in Chicago Elevated

Reorganization of Personnel Announced—B. J. Fallon, Assistant General Manager—Others Step Up

Five members of the operating personnel of the Chicago (Ill.) Elevated Railways have been advanced to positions of greater responsibility in that organization. Under the new plan, as noted briefly in the Electric Railway Journal for April 10, Bernard J. Fallon becomes assistant general manager, filling the vacancy caused by the resignation of G. T. Seely several months ago, while Edward J. Blair is made assistant to the president. H. A. Johnson takes Mr. Blair's place as organization engineer. R. N. Wade succeeds Mr. Fallon as engineer maintenance of way, while Adolph H. Daus is appointed superintendent of shops and equipment, succeeding Mr. Johnson.

BERNARD J. FALLON, the new assistant general manager, held, until his recent promotion, the position of engineer maintenance of way. Mr. Fallon has been connected with the elevated railroads in Chicago for nearly thirteen years. He was appointed engineer maintenance of way of the old Metropolitan West Side Elevated Railroad in June, 1907. After two years in this capacity he was made assistant general manager of the same road under Britton I. Budd, then general manager. In 1911, when the several elevated railways of Chicago were consolidated and Mr. Budd became president of the combined system, Mr. Fallon was made engineer maintenance of way with jurisdiction over all roads. His jurisdiction was later extended to include the Chicago, North Shore & Milwaukee Railroad, the operation of which had been taken over by Mr. Budd for the Insull interests.

Mr. Fallon was born on Aug. 10, 1880, at Rutland, Ill. His schooling for his work with the elevated system was gained largely in the steam railroad field. After receiving a B. S. degree from La Salle Institute, Chicago, in 1898, he became a rodman with the Burlington Railroad. During the following eight years he held the positions of assistant engineer, division engineer, and finally engineer of track elevation in Chicago. Since his connection with the elevated system he has served on the American Electric Railway Engineering Association way committee. He is a member and a director of the Chicago Engineers' Club and a member of the Western Society of Engineers.

In his new position Mr. Fallon will have a large share of the responsibility of operating the elevated railways, the fast interurban service between Chicago and Milwaukee and the small street railway properties in Waukegan and Milwaukee.

Edward J. Blair, who becomes assistant to the president, was born in Chicago on Feb. 19, 1883. After completing a course of study at Lewis Institute, Chicago, he went to Cornell, receiving an M. E. degree from that university in 1905. In that year he began work in the Throop Street shops of the Metropolitan Railroad as a night helper. Two months later he was given a day job as pipe fitter foreman, and four months thereafter he went into the engineering department as a draftsman and inspector on track elevation work. In the fall of 1906 he was made a carpenter foreman in the maintenance of way department.

After eight months spent at this work, he was made a storage battery operator in the old Throop Street power house of the Metropolitan. In 1908 he was promoted to the position of engineer of substations and transmission lines, with jurisdiction over the entire distribution system of the company. He was again promoted in 1910, becoming electrical engineer of the Metropolitan lines. Upon the consolidation of the several elevated railroads he was made electrical engineer of the Chicago Elevated Railways.

Commissioned a captain of engineers in 1917, Mr. Blair was stationed at Camp Grant for nearly a year, at the end of which he was sent overseas with the rank of major. He was subsequently promoted to lieutenant-colonel. Upon his return to the Chicago Elevated Railways in August, 1919, he was given the title of organization engineer and the duty of studying operating conditions with a view to recommending improvements in methods. Mr. Blair is well known to members of the American Electric Railway Engineering Association through his connection with several of its committees. He is also a member of the committee on electrolysis of the American Electric Railway Association.

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E. J. BLAIR

Harry A. Johnson, appointed organization engineer, was formerly superintendent of shops and equipment. Mr. Johnson was born at Ottumwa, Iowa, on Dec. 8, 1884. In 1905, shortly after his graduation from Purdue University with the degree of mechanical engineer, he went to work for the Metropolitan West Side Elevated Railroad, and for several months thereafter was engaged as a night helper in the Throop Street shop, as a field engineer on the Douglas Park extension, and on various other special jobs. He was then assigned to design work on equipment. Through 1906 and part of 1907, in addition to his work in this capacity, he served as an inspector of car construction and later worked for a time in the transportation department on traffic surveys.

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R. N. WADE

In June, 1907, he was made engineer of car equipment, and in the following year master mechanic of the system. In 1911, his jurisdiction was extended to include the three other elevated railroads of the city. When the Chicago, North Shore & Milwaukee Railroad was taken over, he became consulting mechanical engineer for this road in addition to his duties on the elevated lines. Early in 1917 his title was changed to superintendent of shops and equipment, with jurisdiction over the four elevated roads and the Chicago-Milwaukee interurban line. Mr. Johnson has been a member of the equipment committee of the American Electric Railway Engineering Association since 1915. He is also a member of the executive committee. He is a member of the American Institute of Electrical Engineers and the Western Society of Engineers.

Rex N. Wade, who succeeds Mr. Fallon as engineer maintenance of way and structures, formerly held the position of track engineer. Mr. Wade was born on April 30, 1882, in Brussels, Ont. In 1902 he entered the University of Illinois, but left college in the winter of 1903. He then joined the Burlington Railroad as a back flagman with a construction force. He continued with the Burlington for several years in location, construction and maintenance work, becoming assistant division engineer in 1906 and later signal supervisor.

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B. J. FALLON

In 1908 he became connected with the Metropolitan West Side Elevated Railroad as assistant engineer maintenance of way. Two years later he became engineer maintenance of way of this road, continuing in this position until the consolidation of the elevated railways in 1911, when he was made track engineer of the combined system. He resigned in November, 1912, to become connected with the Pacific Great Eastern Railroad, which was then engaged in the construction of a line from Vancouver to Fort George, B. C. In 1915, however, he returned to the Chicago Elevated Railways, resuming his position as track engineer.

Adolph H. Daus, appointed superintendent of shops and equipment, has been connected with the shops department for some time as assistant superintendent. Mr. Daus entered the service of the Metropolitan West Side Elevated Railroad in 1898 as an armature winder in the Throop Street shop. In 1902 he was made foreman of the winding department, and in 1906 general foreman of electrical repair at the Throop Street shop. In 1912 he was advanced to general foreman of the shop and in 1913, after the operating consolidation of the city's four elevated systems, he was transferred to the downtown office as assistant to the master mechanic.

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H. A. JOHNSON

Mr. Daus' rise to the responsible position which he now holds is a mark of achievement which is all the more remarkable by reason of the fact that his entire knowledge of electrical equipment has been gained through self-education, his only schooling having been that secured in the grammar schools of Chicago and three years of night school. He is the inventor of the high-tension and the heavy-current, low-voltage, low-frequency methods of testing motors for opens, shorts and weak insulation. He is also a joint inventor with H. A. Johnson and E. T. Munger of a safety interlocking device which has been installed on 125 elevated cars in Chicago.

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A. H. DAUS

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Varnish and Enamel Prices Advance

Turpentine Advances to $3 a Gallon in New York Market Owing to Scarcity

Prices of varnishes and enamels have been increased on an average of from 5 to 10 per cent by several manufacturers. Paint, however, has not advanced.

Stocks of varnishes and enamels are badly broken and it is becoming more and more difficult to make deliveries. Demand in the railway field has been heavier than for many months past and is steadily increasing.

It has not been possible to make satisfactory shipments for a month and unless the transportation difficulties are removed immediately paint and varnish manufacturers will sustain heavy losses.

Turpentine is not to be had in New York owing to the coastwise shipping tie-up. Although quoted at $2.50 per gallon on April 10, turpentine is now $3 to $3.50 per gallon. One large manufacturer who has considerable business in the railway field, on Wednesday purchased a considerable amount at Philadelphia, the price being $3 per gallon f.o.b. at that point. No relief is expected until the shipping strike has been settled, after which the price will immediately drop, probably to $2 per gallon. According to reports, a considerable quantity of turpentine is held in the port of New York but cannot be unloaded. In several instances ships have cleared for Southern ports carrying large cargoes of turpentine which they were unable to discharge here.

Manufacturers Hold Good Stocks of Supplies

Many Able to Continue Production for Two Weeks Without Additional Supplies

Manufacturers of electric railway equipment and supplies for the most part have been plentifully supplied with raw materials. Stocks of finished apparatus, however, are piling up rapidly at the factories, and will cause much inconvenience unless some outgoing transportation can be secured.

At the offices of the General Electric Company it was stated that certain raw material stocks are already low and will give out in spots in ten days to two weeks. In general, however, it was stated, the factory can run along for several weeks. Good storage space is still available. The Westinghouse Electric & Manufacturing Company has plenty of raw materials for some weeks to come, it was stated in New York on Thursday. Finished material is piling up at East Pittsburgh, but it will be several weeks before warehouse space will be filled up to capacity. The company is working on its heavy bookings. Other manufacturers have reported fair amounts of raw materials but are unable to transact much business or even to send needed supplies by express. The combination of the railroad strike and the effective tie-up of express by the express company employees has put a premium on every means of transportation. The rush to the parcel post has so clogged the mails that even first-class mail is being seriously delayed in consequence. Up to this time, numerous railways have been receiving rail bonds and shipments of other supplies in 50-lb. packages.

G. E. Sales for 1919 Show Increase

Sales Billed During 1919 Largest in History of the Company—New Plants Acquired

During the past year the volume of business of the General Electric Company, Schenectady, N. Y., exceeded that of any previous year with the exception of 1917, when a considerable portion of the company's business consisted of orders for ship propulsion and other apparatus placed by the Government.

The value of orders received during 1919 was $237,623,932, compared with $234,134,037 for 1918. Sales billed, however, were $229,979,983, the largest in the history of the company, amounting to $13,164,705 more than in 1918 and $33,053,665 more than in 1917. Total figures for orders received and sales billed for the past three years are as follows:

	Orders Received	Sales Billed
1919	$237,623,932	$229,979,983
1918	234,134,037	216,815,277
1917	246,778,491	196,926,318

During the year $14,462,285 was expended for additional land, buildings, machinery and other equipment. The sum of $7,688,893 was charged against income and general plant reserve, making the net increase in book value for the year of plant and equipment $6,773,392.

GENERAL ELECTRIC INCOME STATEMENT FOR 1919

Net sales billed		$229,979,983
Cost of sales billed, including operating, maintenance and depreciation charges		196,855,683
		$33,124,299
Int. and discount	$1,938,391	
Income from securities	2,887,144	
Sundry revenue	405,384	5,230,920
Net income		$38,355,220
Interest on debentures	$571,685	
Int. and discount on notes payable	1,705,564	2,277,249
		$36,077,970
Federal income and excess profits taxes (estimated)		11,000,000
Profit available for dividends		$25,077,970
8 per cent cash dividends		9,545,469
Net surplus for the year		$15,532,501
Surplus January 1, 1919		53,250,661
		$68,783,163
4 per cent dividends payable in stock		4,772,918
Total surplus		$64,010,245

Profits were $25,077,970, equal to 20.8 per cent on $120,557,200 capital stock. In addition to the regular 8 per cent cash dividend which is paid quarterly, a semi-annual dividend of 2 per cent, or a total of 4 per cent, payable in stock at par, was declared on Dec. 1, 1919, by the board of directors. Federal income and excess profits taxes for the year are estimated at $11,000,000. For the sake of convenience, the assets and liabilities of the International General Electric Company are included with the above because of failure to complete all of the transfers, etc., by Dec. 31, 1919.

Owing to the increase in orders, the company has added substantially to its manufacturing capacity, partly by enlarging present plants and in part by purchasing or leasing, with option to purchase, factories already constructed which offer immediate available facilities. The total factory floor space has been increased to 20,681,000 sq.ft., as compared with 19,581,000 sq.ft. in 1918.

Lack of Coal May Force Shut-Downs

Railways Affected by "Outlaw" Strike Must Stop Operating Unless Coal Is Obtained

Lack of coal may force a number of railways to suspend service before the week is out. The Eastern seaboard, generally, is in fair shape, but where railways have had to depend on rail for coal shipments, shortages have appeared. The Mayor of Toledo, Ohio, on Monday ordered the confiscation of coal on the Pennsylvania Railroad tracks and its diversion to the Toledo Railways & Light Company in order to keep the railway in operation. The Columbus (Ohio) Railway, Power & Light Company reported on Tuesday only enough coal to last until this Saturday. Boston Elevated Railway has ten days' coal supply and ten more on the water. Interborough Rapid Transit Company, New York, N. Y., in a statement given out the first of the week at that time had a normal supply. The Brooklyn (N. Y.) Rapid Transit Company on Thursday reported a six days' supply.

Companies in and about New York City are purchasers of tidewater coal, the supply of which is dependent on rail shipments. On April 15 these companies had on hand coal reserves sufficient for their full requirements for a period of from six days to two weeks. Should the condition continue beyond this time it will be necessary for these companies to establish a priority list of power users and apportion the amount of power available for each class of business.

Reports from different parts of the country indicate that conditions gradually are improving and that the strike is rapidly breaking up. Whether or not movements of freight within the next week will be sufficient to prevent shutdowns, is problemetical at this time, but as has happened previous to this time, embargoes against everything except foodstuffs and coal may be declared in order that coal may be had to keep railways, utilities and manufactures from closing down.

$450,000 Carhouse Fire

Fire which broke out on the night of April 7 in one of the cars of the Winnipeg (Man.) Electric Railway destroyed the Main Street carhouse of the company. The machine shop and the store rooms operated in connection with the carhouse were saved by the fire being confined to the carhouse proper by fire doors between the carhouse proper and the shops and by a fire wall between the carhouse and store rooms. The following cars were entirely destroyed: nineteen passenger cars, four single-truck sweepers, one single-truck line department construction car, and one Electric Railway Improvement bonding machine. In addition to the carhouse and the rolling stock that were destroyed, approximately $50,000 worth of tools, etc., was lost, the principal item being thirty-six General Electric 258 motors which the company had on hand for cars it was rehabilitating. The fire loss is estimated at approximately $450,000. The plant and contents were covered by insurance. The company proposes to rebuild the carhouse and replace the rolling stock immediately. The fire spread so rapidly it was possible only to get one car partly out of the carhouse before the overhead work fell. This car was only partly destroyed.

Gear Association to Meet at Detroit

Standardization in the manufacture of gears is one of the important subjects to be discussed at the fourth annual meeting of the American Gear Manufacturers' Association, which will be held in the Hotel Statler, Detroit, Mich., April 29, 30 and May 1. An entire day of the convention will be devoted to the various angles of this subject, and reports will be given by committees which have had it under consideration for months.

An interesting program has been arranged which will include papers on such subjects as "Gears from a Purchaser's Standpoint" by D. G. Stanbrough; "Routing of Gears and Machine Parts Through the Factory" by J. A. Urquhart, of the Brown & Sharpe Manufacturing Company; "The Science of Manufacturing" by Henry M. Leland; "Problems of the Gear User," "Mill Gearing from the User's Standpoint," and other phases of gear manufacturing. A visit to the plant of the Ford Motor Company will be an interesting event of the convention. The annual banquet will be held on Friday evening, April 30, at which F. W. Sinram, president of the association, will act as toastmaster.

Rolling Stock

Hudson & Manhattan Railroad, New York, N. Y., noted in the Feb. 7 issue of the ELECTRIC RAILWAY JOURNAL as inquiring for subway cars, has placed an order with the American Car & Foundry Company for twenty-five cars similar to the ones now in operation in the Hudson tubes.

Franchises

Pacific Electric Railway, Los Angeles, Cal.—An ordinance has been passed by the Los Angeles City Council granting the Pacific Electric Railway a franchise to build a spur track on Santa Monica Boulevard.

Track and Roadway

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company will build twelve blocks of track in the business section of Bessemer, Ala. The company will abandon its loop in First St. and will install a new double-track loop.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway has applied for permission to extend its line in Stafford Road, Fall River, Mass.

Southern Public Utilities Company, Charlotte, N. C.—The Southern Public Utilities Company contemplates an extension of its line in Anderson, S. C.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—This company has started work on an extension of its Trenton Junction line. The work will cost $15,000.

Toronto (Ont.) Civic Railway.—It is planned to build a municipal railway line over the Prince Edward Viaduct, Toronto, at a cost of $168,378.

Montreal (Que.) Tramways. — The Montreal Tramways proposes to build a line on Mt. Royal, Montreal.

Dallas (Tex.) Railway.—The Dallas Railway has begun construction of its Lake Ave. extension out Fairmount St. The extension will cost approximately $22,000.

Dallas (Tex.) Railway.—The Dallas Railway has received permission to expend $10,200 in removing the single track from Colonial Ave. between Lenox and Pear Sts., replacing it with double tracks. The company will also remove the double tracks on State St., near Washington Ave.

Dallas (Tex.) Railway.—The Dallas Railway will shortly begin work on the Seventh St.-King's Highway extension. The line will extend from Seventh and Tyler out Seventh to Edgefield, thence on Edgefield to King's Highway, a distance of a little more than one mile, and will cost approximately $100,000.

Wichita Falls (Tex.) Traction Company.—The Wichita Falls Traction Company will shortly begin the construction of a 5-mile double track line to the Wichita Fair Grounds.

Power Houses, Shops and Buildings

Sacramento Northern Railroad, Sacramento, Cal.—The Sacramento Northern Railroad will build an addition to its warehouse at Durham, Cal., to cost $11,000.

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway has received a permit for the construction of a station at San Pedro, Cal. The building will cost approximately $50,000.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—Plans are being worked out by the Terre Haute, Indianapolis & Eastern Traction Company, the Union Traction Company of Indiana and other interurban roads entering Indianapolis for the erection of a union freight terminal on Kentucky Ave., Indianapolis. The carrying out of the project would involve an expenditure of $1,000,000.

Winnipeg (Man.) Electric Railway.—Fire destroyed the main carhouse of the Winnipeg Electric Railway on Main St. South, Winnipeg, on April 7. The total loss is placed at $450,000 and is covered by insurance. Nineteen cars, four sweepers and one work car were destroyed.

Northern Ohio Traction & Light Company, Akron, Ohio.—Work on two new carhouses for the Northern Ohio Traction & Light Company was scheduled to begin on April 12. One of them will be located on Fulmer Ave., Akron, and the other on the Canton line, near Massillon. The Akron building will be 70 ft. x 130 ft. and will contain eight tracks of the open pit type. The first floor will be used for washing, inspection and workshop for minor repairs. About 100 cars can be stored, but plans call for an extension next year that will make the capacity 175 cars. The second floor will be used as clubrooms for the men, including a modern recreation room, gymnasium and shower baths. The Massillon house will be 52 ft. x 120 ft., with open pit tracks and storage room for twenty-six cars. It will contain clubrooms, lockers and baths.

Trade Notes

National Carbon Company, San Francisco, Cal., has awarded a contract for an addition to its plant, 175 ft. x 275 ft., to cost about $60,000.

Mitchell Rand Manufacturing Company, New York, N. Y., has elected Joseph H. Lecour treasurer of the company, succeeding in this capacity W. E. G. Mitchell, whose duties as vice-president require all of his attention.

Independent Pneumatic Tool Company, Chicago, Ill., has appointed Fred J. Passino to be assistant manager of the Eastern division with headquarters at 1463 Broadway, New York City. Mr. Passino for many years has covered the Southwest territory for the company.

Electric Storage Battery Company, New York, N. Y., through its manager, F. L. Kellogg, announces that on April 24, 1920, the New York office, which has been located for twenty-two years at 100 Broadway, will be removed to the National Association Building, 23-31 West 43d Street.

Kentucky Switch & Signal Company, Louisville, Ky., has been incorporated by R. V. and L. Cheatham of St. Matthews, W. S. Scoggan of Sanford, Fla., and R. R. Scoggan of Jeffersonville. The company is capitalized at $16,000 and proposes to manufacture appliances for electric and steam railroads.

Wellman-Seaver Morgan Company, Cleveland, Ohio, announces that its manufacturing sales department, which handles the company's sales of rubber equipment and machinery, and which is in charge of L. N. Ridenour, moved on March 31 from the company's Akron office to its general offices at 7000 Central Avenue, Cleveland, Ohio.

Chicago Pneumatic Tool Company recently held a general conference of executives, plant and branch managers and salesmen at its Detroit plant, Second Avenue and Amsterdam Street, on the occasion of the formal opening of a large five-story addition. It was reported that much of the proposed increase in production was already absorbed by orders for future deliveries.

W. H. Smaw, purchasing agent for the Georgia Railway & Power Company, Atlanta, resigned March 1 to become southern sales representative of the Electric Service Supplies Company, Philadelphia, manufacturer and jobber of electrical supplies and street railway specialties. Mr. Smaw joined the Georgia company in 1903 as assistant purchasing agent and in 1910 became purchasing agent.

Electric Storage Battery Company, Philadelphia, Pa., has appointed Godfrey H. Atkin as manager of its Western district, covering the sales offices, warehouses, service stations and all departments in Chicago, St. Louis, Kansas City, Minneapolis and Denver, with headquarters in the Marquette Building, Chicago. Taliaferro Milton is in charge of the Chicago office, succeeding Mr. Atkin. Both appointments were effective March 1.

Strauss Bascule Bridge Company, Chicago, Ill., has been appointed engineers to design the bascule span of a joint railway and highway bridge over Inner Harbor at Johnson Street by the city of Victoria, B. C. The cost of the bridge will be borne jointly by the city of Victoria, the provincial government of British Columbia and the Canadian Pacific Railroad Company. Preparation of plans and specifications will begin just as soon as all details regarding the requirements as to length of span, etc., are determined.

Roller-Smith Company, New York, N. Y., has appointed Hammond D. Baker as manager of its Detroit, Mich., office at 1202 Majestic Building. Mr. Baker, a graduate electrical engineer of Alabama Polytechnic Institute, after his discharge from the aviation service of the army, became connected with the United Motors Corporation as technical traveling representative. Later he joined the sales department of the Hoskins Manufacturing Company, Detroit, Mich., from which he resigned to accept the appointment with the Roller-Smith Company.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has appointed George Bailey, manager of the supply division of the Cincinnati district office of the company, to be assistant to manager J. J. Gibson of the supply department at the East Pittsburgh works. T. J. Pace, formerly industrial assistant to manager of supply department, has recently been appointed assistant manager of the supply department of the company. Mr. Pace has been actively identified with the electrical industry along supply lines with Westinghouse and allied interests for about twenty years.

National Conduit & Cable Company, Inc., Hastings-on-Hudson, N. Y., has recently opened two new branch offices. Frank T. Payne represents that company and its subsidiary, National Brass and Copper Tube Company, Inc., in the states of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, with headquarters in the Commercial Bank Building, New Orleans, La. Wallace M. Cutler, whose territory covers Ohio, a portion of Michigan and the states of Kentucky and Tennessee, has opened an office in the Hippodrome Building, Cleveland, Ohio.

J. H. Williams & Co., Brooklyn, N. Y., and **Whitman & Barnes Manufacturing Company, Akron, Ohio,** have called a meeting for the merging of the Chicago, Ill., and St. Catherines, Ontario, plants of the latter company with the J. H. Williams Company. This plan will contemplate the operation by J. H. Williams & Co. of drop forging and drop forged tool plants at Brooklyn, N. Y.; Buffalo, N. Y., and West Pullman, Ill., in the United States and at St. Catherines, Ontario, in Canada, which is located close to Buffalo, and the business will be operated by the individuals now connected with these plants. The Whitman & Barnes Manufacturing Company's Chicago plant includes the new forge shop, 100 x 500 ft., and power house, which has just been built by Stone & Webster at a cost, including complete equipment, of $1,250,000. The company will continue the manufacture of twist drills, reamers, etc., at Akron, Ohio.

New Advertising Literature

Monitor Controller Company, Baltimore, Md.: Bulletin 100, on the Monitor system of machine tool control.

E. B. Badger & Sons Company, Boston, Mass.: Bulletins Nos. 100 and 102, describing methods of cooling water and air by the spray system.

Standard Underground Cable Company, Pittsburgh, Pa.: Bulletin No. 100-1, describing its products, copper, brass tubes, rods and wires. Additional data is included.

Lapp Insulator Company, Le Roy, N. Y.: Bulletin No. 62, comparing designs of American and European high-voltage pin-type porcelain insulators. Curves are included.

Smooth-On Manufacturing Company, Jersey City, N. J.: A new thirty-one page booklet, entitled "Smooth-On Home Repairs," describing methods for the repair of boilers, radiators and furnaces.

International Steel Tie Company, Cleveland, Ohio. A booklet, "Maintenance of Way for Street Railways," in which the organization and methods employed on the work necessary for maintaining the tracks of the Connecticut Company are described.

Utilities Engineering and Accounting Company, Harrisburg, Pa., has opened an office in Harrisburg, Pa., 10 South Second Street, which is in charge of W. C. Rounnel, formerly rate expert for the Public Service Commission of Pennsylvania.

Bridgeport Brass Company, Bridgeport, Conn.: An eighty-page publication, "Seven Centuries of Brass Making," a brief history of the ancient art of brass making and its early and even recent method of production as contrasted with the twentieth century electric furnace process as made by this company. Sixty pages are devoted to modern methods in brass making, illustrating furnaces, showing crucibles and their preparation and also the pouring of molds. Difficulties in brass making, possibilities of the electric furnace, electric brass furnaces, casting shops, phono electric wire, brass and copper tubes, sheet brass, rods and wires are thoroughly covered under separate headings and illustrated with numbers of engravings. Additional chapters on the company's laboratory and research department, on the characteristics of brass and on additions and impurities are illustrated and described.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 55 New York, Saturday, April 24, 1920 Number 17

The Next Convention of the American Electric Railway Association will be held at Atlantic City, N.J., on Oct. 11-15, 1920.

The American Electric Railway Association announced this week the time and place of its next convention, as given above. Atlantic City has become the logical place for national conventions, especially for those with exhibits, and the selection will give general satisfaction.

Edward Hungerford Will Talk About Electric Railways in This Paper

WE COMMENCE this week the publication of a series of articles by Edward Hungerford on the electric railway situation of today in several cities. This paper has had in the past many accounts on the properties in these cities and on the industry in general from what might be called the "electric railway side." We have thought that it would be interesting, therefore, to our readers for us to publish the viewpoint of some one not closely allied with the industry, and we have selected a well-known magazine writer, who, not being so near to the problem, could see it in a perspective not possible to one daily engaged in electric railway work.

Our understanding with Mr. Hungerford was that in these articles he would have entire freedom to express his opinions on conditions as he saw them. With this understanding he was glad to accept the commission. Obviously, for the reason just given, Mr. Hungerford is responsible for the opinions expressed in the articles and not the editors.

In conclusion, we need only add that each article is based on a special visit and personal study of the transportation system in question by Mr. Hungerford. These visits were made during the past three months for the purpose of collecting material for this series of articles.

Fareless Passengers vs. Wageless Trainmen

ACCORDING to the latest news from Soviet Russia 'most everybody is an employee of the government, and as government employees don't have to pay fare the operation of the street railways has been reduced to the simplest terms. Life for the conductor is now one round of joy, for while his work has been reduced enormously his nominal wages at least have also been increased enormously.

How different is this picture from that presented to us by conditions on the Norton & Taunton Street Railway Company, which, in spite of its name, is now jointly owned by the cities of Taunton, Attleboro, Mansfield and Norton. On this line the proletariat, the salariat and the bourgeoisie must pay fare as of yore. But what about the trainmen? They, poor fellows, are reported in an April 5 despatch to the Boston *Herald* as being prepared to quit after failing to see the pay-day ghost walk in three successive weeks. It is true that one conductor is said to have organized a little Soviet of his own by borrowing $10 from his traffic receipts as a draft on his pay, but most of the men have advised the management that they can't extend credit much longer; that while they are in a most entertaining kind of social welfare work, which brings them into contact with all sorts of the best people, they are not immune to the demands of Nature.

It looks to us as if the Russian comrades have a more desirable form of government ownership than their American brethren. No fare collection and more pay certainly sounds better than more fare collection and no pay.

How to Write an Ad for Platform Men

AN ADVERTISEMENT, like a word, often conveys to the reader a meaning or an impression very different from what the writer intended. This thought was thrust upon us as we read a recent car poster which asks that men whose "records can stand investigation" apply for platform jobs. Probably the writer of this card did not intend to hurt any one's feelings, but isn't it rather tactless to assume gratuitously that some of the men who might apply would have records that will not bear investigation? Why bring up this aspect at all, inasmuch as the very first thing an applicant is asked to do is to furnish satisfactory references? Every job seeker knows that. Now, how much better it would be if the writer of this advertisement had seized upon the man shortage of his company as a means of bettering relations with riders and employees. Assume that the wording was something like this:

"We have the cars but not enough men to give you the service to which you are entitled. If you know any high-grade men to whom platform work might appeal, or if you are desirous of entering such service yourself, please get into touch with us."

The foregoing need not be the exact words, but it is believed that they would have the twofold effect of making the public more patient with shortcomings and of making the present employees have a higher respect for their calling. Splendid examples of "help wanted" advertisements that do have such influence are offered by those of the Bell telephone companies. Also, in the very same town where our railway is located is a laundry which carries right on the wagons a statement of its exceptionally attractive labor conditions: "Girls, why not work under the pleasant conditions of the ——— Laundry? The hours are so and so, minimum wage so and so, etc." If this does not get ideal help, it surely does accomplish something toward mollifying the bachelor who finds that he is expected to wear a brassiere instead of a boiled shirt for that dinner of the Grape Juice Improvement Association. Verily, there are indirect as well as direct ways of selling through creating a better atmosphere for the product.

What Is a Safe Light Rail for Safety Cars?

THE increasing use of the safety car continually calls attention to the question of rails of lesser weight which may possibly be used under such cars. There is considerable talk, but little data, to the effect that lightweight safety cars cause less rail wear and lessen track maintenance costs. Logically these desirable features may be present where these cars are in use but the cars have not been in service long enough to warrant any assumption as to what the savings may amount to. Furthermore, the cars are usually sandwiched in between heavier cars on most systems which have adopted them and the lessening in track wear is difficult to determine. It is also a well-known fact that our accounting methods seldom have permitted us to determine with any reasonable degree of accuracy what track maintenance costs are upon particular lines or sections thereof. Until some road has operated a line solely with these cars for a period of several years and has kept some comparative track maintenance data covering the "before and after using," as the patent medicine "ads" have it, we are unlikely to know much about the maintenance cost and wear-and-tear phase.

Meanwhile it is reasonable to assume that some tracks may need rebuilding soon where safety cars are operated. The selection of the new rails for the tracks then becomes a problem worth consideration. Some calculations show that an 8.5-ton safety car with a 60-passenger load would have a static wheel load of 6,500 lb. and a dynamic augment (addition of 0.70 of the static load) of 4,500 lb., giving a total dynamic wheel load of 11,050 lb., and that it would require a rail weighing about 50 lb. per yd. under the Baldwin Locomotive Works rule for safe weights of rails. But a 50-lb. rail is altogether too small for use in pavements and would be out of the question for use under almost any other cars which are still in service. The matters of adaptability of the rail to varying pavement conditions, adequacy of rail joints and need for allowance against corrosion with provision for reasonable wear before renewal also enter into the conditions to be met in the rail selection.

These items all tend toward the selection of a rail weighing not less than 70 lb. per yd. with a height of not less than 6 in. We have the 6-in. 72-lb., the 7-in. 70-lb. and the 7-in. 80-lb. rails in the plain girders from which to make a choice. The 5-in. 80-lb. A. S. C. E. rail is probably the lightest weight and least depth of rail which should be used with the few modern pavements which can be adapted to it. Our choice then would range, as determined by paving conditions, other car traffic and ordinances, between rails weighing from 72 to 80 lb. per yard. In view of the good service which ancient 7-in. 70- and 80-lb. rails have given in the past, it appears that we shall hardly need to go above 80 lb., but with an increase in safety cars to practical exclusion of other and heavier types we might safely go to the lower limit of about 70 lb.

The available groove girder rails do not offer such advantages in rails of appropriate weight. The groove necessarily adds weight in any case. While there are four groove girders weighing from 90 to 100 lb. and five weighing 103 to 105 lb., most of them have certain poor features of design. Those under 100 lb. all seem to have the gage line too close to the center line of the web. If the selection of these rails for safety car tracks becomes insistent, some attention should be given toward a betterment and standardization of design. Past experience cautions against the use of rails of too light a weight and it must not be forgotten that weight adds salvage value at the end of service life. A reasonably high weight over bare necessity is always a form of insurance against the future.

Another feature of the track construction with reference to suitability for safety cars is that of ballast. We believe that most track engineers are agreed that a ballasted track construction is the best for average soil conditions prevailing over the country. The lessening of car weight should not be used as an argument in favor of lessening the depth of ballast to be used under a safety-car track. The depth under the ties should certainly not be decreased below the quite generally used 6 in., because this is 25 per cent less than the 8-in. depth recommended by the committee on way matters in its report on ballast.

British Experience Shows More Riding Follows More Leisure

A BRITISH electric railway manager who is still among the select few operating on pre-war rates of fare calls attention to one of the interesting reasons for this happy condition, namely, the radical shortening of the workday in his country. Before the effort to "make Britain fit for heroes to live in" the manual worker had to be on the job at 6 a.m. or earlier, leaving a hiatus of one hour or more between the manual and clerical loads. There was a certain amount of "breakfast riding" in some cities, but generally speaking the morning peaks came at two widely separated periods. With the arrival of the eight or nine-hour day many British managers feared that their peaks would assume the highly concentrated form characteristic of America, inasmuch as all classes of workers would be going and returning within the same hours. It may well be that such will prove the case in some cities. In others, however, this undesirable shift has not occurred for two reasons at least.

In the first place, the introduction of the eight-hour day in shipbuilding and other mechanic arts has led to the two-platoon and three-platoon system, especially because of the great need for technical equipment. This change naturally has improved the load factor by giving quite as good rush-hour traffic in one direction as in the other. In the second place, the shortening of the workday has given the laborer an opportunity for leisure, whereas a twelve-hour day left him too fagged out for anything but to eat and sleep. As the result of this leisure, he and his family go a-visiting or to amusement resorts on a much more liberal scale than before. One point which our British friend did not mention, because it is doubtless so matter of course with him, is that this leisure riding is really neighborhood riding, and that this neighborhood riding is the logical result of years of development of the principle of a short ride for a short fare. The fact that nearly all of this extra riding is within an average of less than 1 mile per passenger shows how the flexibility of a zone fare aids in taking advantage of conditions that would mean little or no change on a flat-fare system.

"Here a Little, There a Little" in Steam Road Electrification

THERE will be no avalanche of steam railroad electrification until finances become stabilized and credit is restored. But the process will go on gradually with increasing satisfaction to all concerned. Every few days there is an announcement of some new order or project, such as that regarding the Paulista Railway in this issue of the JOURNAL, another regarding the Hershey Cuban Railway two weeks ago, etc. Such straws as these show the direction of the wind. At the coming Pasadena meeting of the National Electric Light Association there will be a special symposium on railway electrification, indicating that electric power producers sense the importance of this coming field for their output. Herbert Hoover, president of the American Institute of Mining and Metallurgical Engineers, this week gave out a report, made after a conference with representatives of the American Railroad Association, in which electrification of railroads is urged and the "super-power" plan of power generation and distribution is indorsed.

The proponents of conservation and transportation improvement by electrification have every reason to be encouraged by the present prospects. The change to electric motive power is bound to come in a substantial part of the heavy traction field. In the programs for needed rehabilitation to be carried out during the next few years it must have a conspicuous place.

The Wonders of Modern Urban Transportation

THE rapid transit trains of the Interborough Rapid Transit Company of New York City recently carried a very effective issue of the *Elevated Express* and *Subway Sun* showing graphically the distances to which New Yorkers can be carried on the subway lines for a nickel and also the comparative fares for steam railroad suburban service in the same territory. The *Express* and *Sun* are familiar to the readers of this paper through the copies which have been reproduced in its columns from time to time. One of the particular issues referred to was reproduced in the April 3 ELECTRIC RAILWAY JOURNAL, page 694.

If the impression made by this poster upon other patrons of the "L" and subway lines was as vivid as it was in the case of the writer, the general sense of appreciation of the quantity of service which one gets in New York for a nickel was considerably intensified. The one-way fare per mile on the steam roads was shown to be from ten to thirteen times that on the subway lines. In justice to the steam roads it must be allowed that they do much better for regular commuters, who pay from a fourth to a third of the single-fare rates if they utilize their privileges fully. It is the regular rider on the subway, also, who utilizes most fully his long-distance-travel privilege. But even with this allowance there is still a marvelous difference between the fares in the two cases, a difference which is much larger than that in the investment necessary to permit the service to be given.

The discrepancy between these two classes of fare is due to a number of factors. Of course, to begin with, the nickel is too low a fare for even the average ride in the subway, to say nothing of the maximum ride. But even if a reasonable fare were permitted to be charged, it would be low compared with the steam road fares, because a well-operated electric road can furnish transportation more efficiently than the steam road, at least under conditions such as obtain in New York. And the occasional rider is especially well treated by the electric road. He gets the same rate as the regular patron, whereas he is heavily penalized by the steam road. But whatever the causes which enable the Interborough to give the service it does at the fare it charges, a comparison with steam road suburban service and charges ought to be fruitful in fostering a reasonable attitude on the part of the public toward the need of the utility for a reasonable fare.

Detroit Embarks on Tempestuous Seas

THE political tumult and shouting have died in Detroit. The city now faces the stern realities of what it means to enter upon the program for municipal ownership approved at the recent election. An initial fund of $100,000 out of the total authorization of $15,000,000 was quickly made available with which to begin work on the municipal railway. The first move was the "starting" of construction on April 6, when the Mayor, spade in hand, began digging at Connors Road and Charlevoix Street. The election was held on April 5. This was quick work and good politics. That one spade of earth, however, appears to have uncovered a lot of trouble for the city.

With the abstract question of municipal ownership and operation we are not here concerned. The fact is that Detroit has decided upon the piecemeal construction policy, with an implied if not actual threat to order the Detroit United Railway off certain streets upon which it is now operating under its expired franchise rights.

Detroit must first prepare for the actual construction of its new lines. Then it must build the lines, and finally set up the machinery for their operation. The program which has been laid down is fairly comprehensive. It remains to be seen how far the $15,000,000 approved at the election will carry the city toward the consummation of that program. But before the city even starts on its program it is faced with very grave difficulties. The Detroit United Railway appears to have a strong case in its favor against some of the proposals of the city. In addition to this, the east side of the city is organizing against the plan of the Mayor because it feels it has been left out in the cold. Detroit's troubles, great as they may have seemed to some in the past, really are only starting if the city sticks to its program, announced or implied, and the company seeks redress from imposition in the courts.

At the election a year ago the city rejected the purchase of the local lines. More recently the city decided against the service-at-cost proposal. During the recent municipal ownership campaign the city failed to respond to the direct offer of a program of extensions and improvements made by the Detroit United Railway. This last proposal, it seems to us, was most advantageous to the city. It would have put all the incubus on the company. Detroit, however, has made its choice. It now remains to be seen how well the city will fare in carrying out a program deliberately adopted in the face of experience elsewhere which should have served as a warning. The examples in San Francisco and Seattle meant nothing to Detroit. Of these two it chose to follow the least desirable.

This Is Number One of a Series of Articles on Salient Phases of the Electric Railway Situation

The Trolley Car and the City Man

By Edward Hungerford

Said Doherty to Coates:
"Will you do it?"
Said Coates to Doherty:
"I will."

Coates did it. That was the evening of Nov. 8 last. The two men had been in conference in an upper room of the Secor Hotel, Toledo, for long hours that afternoon. The dinner hour had hardly passed before the trolley cars of Toledo began moving silently toward the state line—some twenty miles away. By a little after midnight they were all gone from the deserted town—300 of them; everything on wheels of the Toledo Railways & Light Company except twenty hopeless cripples, which were in the company's repair shops and totally incapable of being moved. The 300 trolley cars—placed tightly end to end they would stretch for more than 5 miles—were interned on convenient sidings of the interurban lines in the adjacent sections of Michigan, and for twenty-seven days thereafter there remained, while that large portion of the population of Toledo which was not able to own its automobiles either paid outrageous toll to jitneys or walked.

No one could accuse Coates, the president of the road, or Doherty, its chief owner, of a lack of courage. Theirs was a genuine *coup d'état*—a stroke so swift and so sure that one is instantly reminded of D'Annunzio conquering Fiume, while great powers slept.

And not alone a swift and sure stroke but one that succeeded—absolutely succeeded. For Toledo, which had quarreled at and with its traction company, suddenly had a bitter taste of the value of a utility to it that until the ninth day of November, 1919, had seemed as much a part of its ordinary work-a-day life as its electric light or its gas, or its police or fire protection, or its food or its water, or even almost the air it breathed.

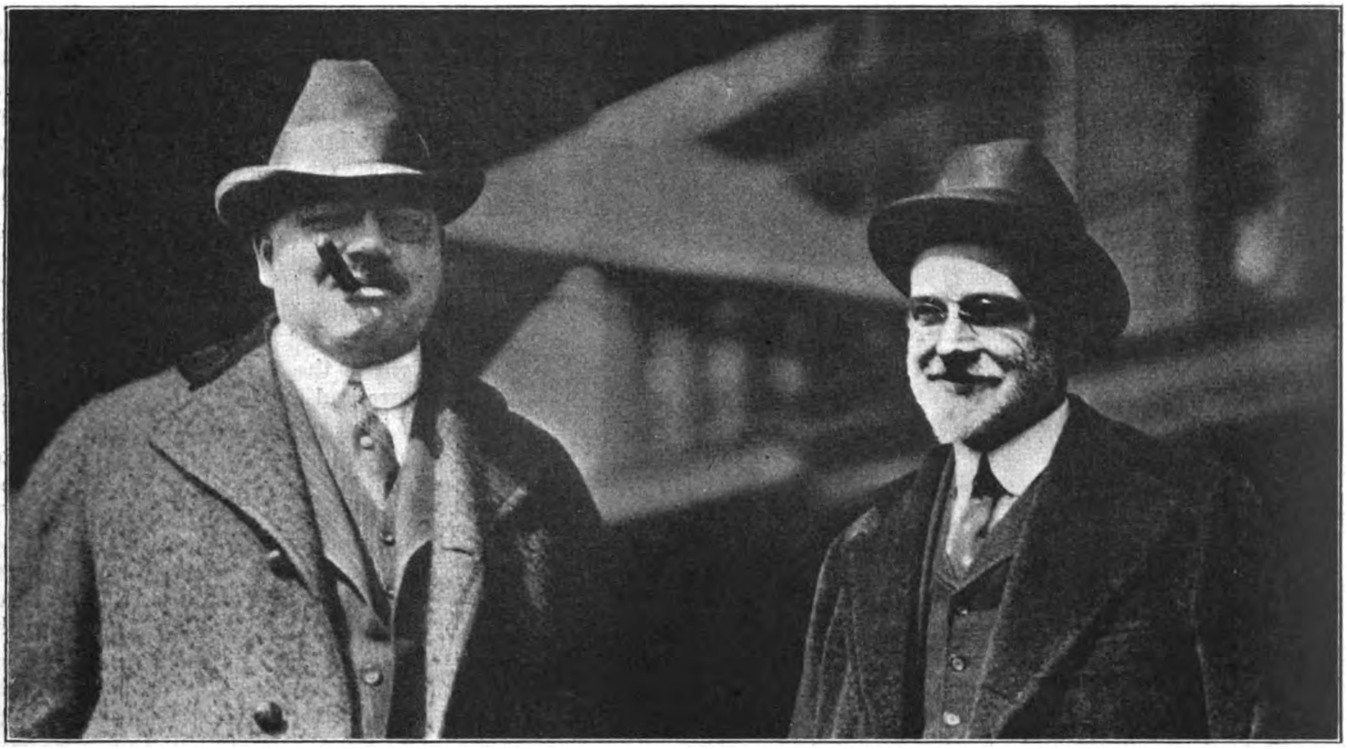
EDWARD HUNGERFORD is writing a series of articles on the traction situation for the *Electric Railway Journal*. They are based on intimate, first-hand and recent information obtained on visits to cities in different parts of the country. His keen powers of observation are well recognized, and the editors of this paper are confident that the series will not only prove notable as to interest and readability, but will be of reference value both inside and outside the industry. Mr. Hungerford is well qualified to prepare this series because of his extended newspaper experience as well as because of his acquaintance with electric railway matters from the operator's point of view. After a service of some eighteen years on the editorial staffs of daily papers in Rochester and New York City, Mr. Hungerford joined the Brooklyn Rapid Transit Company in 1904 as its press representative, and this connection continued seven years. Since resuming his work as a writer he has been a free lance in the newspaper field. His contributions have appeared in a number of the popular magazines and many of them have been on railway subjects. In this, the first article in his series for the *Electric Railway Journal* on salient phases of the industry, Mr. Hungerford draws some lessons from recent events in Toledo, New York and other cities. Later articles will take up situations elsewhere. The next article will be on Kansas City.

Suddenly it saw city transport in a new light—saw it as a real fundamental of life itself in a closely builded urban community—realized the hopeless dependence of a city of 275,000 or more upon the trolley cars which morning, noon and night for more than a quarter of a century had been almost part and parcel of its important streets. A few weeks later the important suburban district of Staten Island, in the city of New York, was to come with an equally bitter experience to the same understanding; a few weeks after that practically that entire metropolitan community, foundering and paralyzed under a sudden and unexpected heavy snowfall, was to undergo the same experience, while somewhere between these episodes certain important industrial cities in the eastern portions of Massachusetts were to have totally different but equally enlightening instances as to the genuine value of the humble trolley car to them.

Of these other experiences, more in an instant. For the moment come back to Toledo; consider in some little detail its interregnum of transport. For the proper background—scenic investiture, as the French would say—understand the almost continuous struggle for many years past between various Ohio communities, as well as some of neighboring Michigan, and their trolley companies. The spirits of the late Tom L. Johnson and the late Allen W. Pingree still live, and from time to time mix things up a good bit. Yet some of these communities have made a distinct progress in this situation along permanent and economic lines. Cleveland has one of the very best service-at-cost plans, which has stood successfully the hard test of ten years of operation. Youngstown recently took the Cleveland plan and bettered it, as a permanent solution of its own difficult traction problem. Detroit seemingly is both obdurate and obstinate. And so was Toledo—until recently and the coming of the *coup d'état*. Now it seems as if the very air had been cleared for her; as if she was on the way to a genuine solution of her own traction problem.

"The trouble with Toledo is that she is a cheap town," said a man in a rival Ohio community who had made a considerable study of this whole traction question in the Great Lakes district, "and therefore seeks to solve a pretty big problem in a small, cheap way. There are two different pathways for her. One is to give her trolley company a decent and an equitable rate of fare and the other is for the city to buy its property and run it as an out-and-out municipal enterprise; running into deficit.

certainly, but assuming that deficit for the public weal, as she would the cost of the operation of her schools or her police or her fire department."



Behind the smiles of Frank R. Coates and Henry L. Doherty is a serious desire to give Toledo fine railway service.

Discounting for the moment the Ohio gentleman's description of Toledo as "cheap"—I am inclined to think, after cursory glances at two of her wonderful new high schools, her wonderful city club and her surprising art museums, that she is anything rather than "cheap"—I do believe that he has hit the nail on the head as regards the two paths open to the men who are trying to guide her destinies. I further believe that the second of these would appeal to most of them. But, fortunately or unfortunately, Toledo, like a good many other American communities, is dangerously near bankruptcy. And the purchase of an extensive electric railway company, which while nominally a return bringer in actuality would probably be a deficit accumulator, is at this moment, beyond all doubt, completely out of the question. The most of our American cities today are having hard work maintaining a credit sufficient for them to operate their most imminent necessities. When I was in Ohio a number of its municipalities were besieging the Legislature down at Columbus with demands for city income taxes. Which leaves the average man with the interesting possibility of contemplating not only federal taxes of this sort, and one or more state income taxes heaped above the first comer, but also city income taxes, also varying in number according to the number of cities in which he might be living or doing business.

So it would seem that Toledo's only way out was in the readjustment of its trolley fares. In fact it is this very step toward solution that has embroiled the City Hall with the trolley company's headquarters for nearly nine or ten years past.

For a good many years the Toledo Railway stuck by the 5-cent fare with universal free transfers just like most of the other city tractions all the way across the land. In addition it sold six tickets for a quarter and, for a short time only, workingmen's tickets at 3 cents each. These last were good for only two hours in the morning and two in the evening, and the practical operating difficulties in holding their use to the four specified hours was a large factor in their discontinuance.

But the 3-cent idea had been bred in the minds of the city politicians. They began more and more to insist that this be made the standard figure throughout the city, at all hours and with the universal free transfers continued as part of the system. This despite the fact that the figures of their own experts showed that the actual operating expenses of the road, to say nothing of the necessities of its stockholders, even then precluded even the faint possibilities of 3-cent fares.

But what are statistics to a City Hall crowd, anyway? Figures lie—when Aldermen rule that they shall lie. And so it was that as far back as March, 1914, the Toledo City Council suddenly passed an ordinance fixing the local fares at 3 cents and advised Toledoans to pay no more. In fact the Council went so far as to promise police protection to folk who were threatened with ejection from the cars after tendering the 3 cents which it had blandly declared legal fare.

Now what did the company do in this situation? Did it try to fill its rear platforms with thugs or threaten then to suspend its service entirely? It might have done either, and still have been entirely human. But it did neither. It merely put the case squarely up to its patrons in a series of posters and newspaper advertisements that if they did not wish to pay 5 cents they could tender 3 cents—and then ride free.

And what did the patrons do? Let me haste to record the answer, lest you gain the impression that the Ohio man who called Toledo a "cheap town" was right:

Eighty per cent of the company's patrons paid their 5-cent fares and rode—in company with the satisfaction of their consciences. The other twenty per cent tendered 3 cents, which was promptly refused, and rode free—also in company with their consciences. Which, I think, of itself is something of a commentary on American individualism in actual day-by-day practice, and a fair to middling test as well of the real recognition by the individual man of the value of the trolley car to him. The politicians do not always accurately interpret his real state of mind.

The Federal Courts Step In

For some weeks this anomalous situation, where conscience was the fare register, continued. Then the United States courts upheld the trolley company, which had applied to them for relief, and 5 cents became a matter of regulation and not of individual decision. But the clamor of the City Hall was by no means appeased or silenced. No matter what decisions the federal courts might bring forth, it held a trump card in the fact that the term franchises originally granted to the Toledo Railway expired very early in that same year of 1914. Since that time it has operated the streets of its community purely on the basis of public necessity and without franchise rights of any sort whatsoever —a day-to-day agreement it is called —but the so-called agreement is hardly worth the paper upon which it is written.

A reminiscence of Toledo's eventful carless days when the railway rolling stock reposed peacefully in Michigan.

Last June ex-President Taft's War Labor Board expired after making numerous and sweeping raises in the pay of street railway men across the land. Toledo shared in these increases; the platform men of its street railway, in particular, receiving large, and for the most part justified, increases in their pay envelopes. But the large increases in the pay envelopes of employees made a sizable deficit in the company's daily operating balances. And it quickly moved to a readjustment of its fare schedules to keep pace, in part at least, with the large readjustments of its payrolls. It raised its local fares to 6 cents, with an additional charge of 2 cents for each transfer.

Close upon the heels of this step the Toledo City Hall moved. It passed an ordinance to remove the Toledo Railways & Light Company from its streets—to end abruptly the informal day-by-day agreement—and having passed the measure in its council chamber sent it to the electorate at the November election, in accordance with the workings of the initiative and referendum law of Ohio.

The local politicians had no intention of actually removing the trolley company from the streets. Oh, no, they were far too shrewd for that. They anticipated just what a storm such a radical step would bring, those politically wise old boys of the city by the broad Maumee. They would get the ordinance approved on the referendum—that would be easy—and with that approval sealed and certified they would have some little big stick to hold over the trolley folks. If they were not good, down would come the stick. But the trolley folks would be good. The Councilmen knew that. Councilmen almost always have the wisdom of super-Solomons.

The intelligent electorate of Toledo on Tuesday, Nov. 4 last, approved the "ouster" ordinance by a decisive vote—I might easily add, "of course." Why did they do it? Search me. Why did the intelligent electorate of metropolitan New York turn down John Purroy Mitchel and elect John F. Hylan their Mayor? Or Milwaukee reindorse Berger? Or——

But this is not a treatise on municipal politics. This is merely a statement of some rather vital dramatic facts in regard to the traction situation across the land. And as such a related fact comes the decisive vote of the citizens of Toledo on Tuesday, the fourth day of November, 1919. And Henry L. Doherty, the oil and traction man of New York, who numbers this railroad among many other properties, closed his desk in a small but very busy street in downtown Manhattan and hurried out to Toledo. There he sat with his Man Friday—Coates, the big framed and big minded president of the company—for three days more and awaited the formal receipt of the election return.

It came—with pomp and gusto from the City Hall, which forwarded it at once to the trolley company's headquarters. Coates hurried it to Doherty, in the hotel across the way. Doherty read it slowly; read it twice. Then the corners of a naturally humorous mouth began to rise.

"Will you do it?" he asked.

And the lieutenant replied with the remark quoted in the first part of this article.

Toledo, with all her great growth, has not yet progressed so far toward metropolitanism that Saturday night downtown has ceased to be a locally beloved institution. And a Saturday evening early in November, with the weather still holding a little of the mildness of autumn, sees the busy length of Jefferson street and other important downtown thoroughfares well crowded with shoppers, theater patrons and the like. The second Saturday of November last was no exception to the rule. The trolley cars—Cherry and Long Belt and Short Belt and all the rest of them—were working their way homeward well laden with tired folk. And there must have been another of those falltime dances down at the Yacht Club. The folk who lived down on the road to Toledo Beach saw a pretty steady bound procession passing them toward that popular resort.

As the evening crept on there were

fewer of the cars. The runs became further and further apart. Gone into the barns for the night, you surmise. On any ordinary night—yes. But this was an extraordinary night in Toledo's history. The crews whose runs ended in the early evening and who reported with their cars at the barns to turn them in and get their time found that the day's work was not yet over. There were special runs on that night—at least so it seemed. Orders were curt and unexplanatory.

"Take no passengers and report to inspector at Cherry Corners," read half of them. The other half were equally unsatisfactory save that they sent the empty cars to the inspector at the corner of Cherry and West Central. Both of these men were veteran employees of the company—accurate and close mouthed. They had verbal orders as to what to do with the cars which began reporting at intervals of five or ten or fifteen minutes.

An empty trolley car marked "Special" in the streets of any large city is not a particularly noticeable thing. But a long string of them begins to be. And late that evening the telephone began ringing in the offices of the Toledo morning papers. The curiosity of the folk down on the road to the beach had been aroused. What sort of an affair was that going on down at the Yacht Club, anyway? Judging from the number of the cars that had gone down there to bring the crowd home, it could hardly be anything smaller than a state political convention. The city editors consulted their little news calendars, confirmed their suspicions by their telephones. There was nothing on that evening at the Yacht Club. The place had been closed for the season more than a fortnight.

The city editors swore great editorial oaths and speeded their nimblest reporters over to the trolley company's offices. The big street doors of the building were closed, and when a sleepy watchman answered to their pounding he said that they could come at eight o'clock on Monday morning and pay their light bills. More oaths. Desperation. Then reportorial ingenuity. Then reportorial eyes fell upon an ancient hotel the windows of whose upper floors looked into the lighted windows of a single floor of the darkened trolley building, windows which the news getters knew gave to the offices of the president and the general manager of its energies. Up to the fourth floor of the old hotel—rent those rooms, for a night, for a week if necessary, shrieked reportorial ingenuity. One of the Toledo scribes had taken his wife to a show earlier that evening and made the lucky find of opera glasses in his overcoat pocket, which came into quick use.

It needed no opera glasses, however, to show Coates in his office—big of body and brawn, shirt sleeved, an unlighted cigar in his teeth—at his desk and telephone, tremendously busy about—something. And taking no notice whatsoever of the wild gesticulations of his newspaper friends in the hotel window across the way. After a time Coates did seem to see them. He came to his window and beckoned to the street door of his building. There he met them. It was just a very few minutes past midnight.

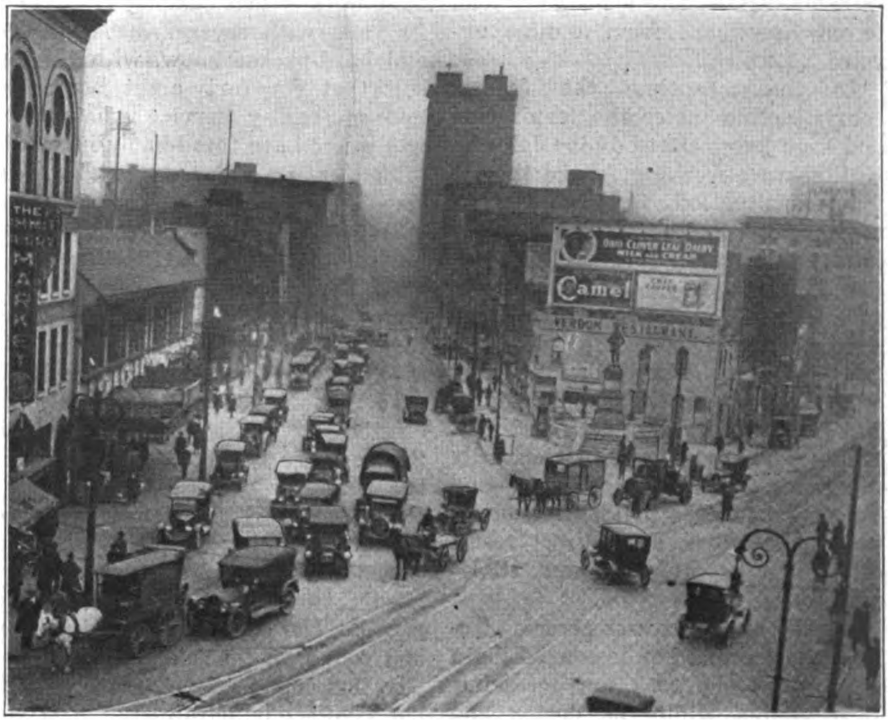
"I think that we will call it a day's work," said Coates.

"What as a day's work?" asked one of the scribes.

"We have taken the people of Toledo at their word," was the reply. "There is not an able-bodied trolley car left in this city."

Then he fell to telling them of the evening's work, of the careful plans that had made so daring a *coup d'état* possible, without a single soul becoming aware of it; how the cars that had been sent to Cherry Corners had been ordered on by the inspector there to Toledo Beach; those to Cherry and West Central on to the Toledo & Western tracks. Orders had been veiled and most secret. Few chances were taken as to the thing leaking. And the cars, having hit these two interurban tracks leading out from the town, were already safe in Michigan—and would stay there until the people of Toledo who had ordered them out asked them back again.

As a matter of recorded fact it was just 1:40 o'clock that Sunday morning when the final bunch of cars pulled into the Toledo Beach terminals, had the trolley poles carefully removed and hidden—Coates proposed to take no chances with a mob movement of the citizenry of Toledo going out there and bringing the cars back by main force—with the drawbridge that crossed a small creek between them and the town opened and spiked open. The crews had to be brought back on work trains. And it was 6 o'clock on the Sabbath morning—dawn in trolleyless Toledo—before it was really a day's work ended for Coates and the big president of the trolley company went home to a well-earned rest.



When Toledo's cars went "on vacation" every other type of vehicle was pressed into service.

Jitneys Try to Do the Service

Toledo had little rest out of the situation. The city authorities who had put it into such a mess made strenuous efforts to replace the trolley service with jitneys of every sort and description, but with pitiful results. They appointed a traffic manager for jitneys and abolished the charge for licenses for these, practically all traffic regulations as well. In response to these appeals, some 1,500 cars, of every style, vintage and description, appeared. They advertised routes—and then did not stick by them. On the contrary, they showed no disposition whatsoever to leave the "good streets," where traffic awaited in large and profitable volume, for "lean" ones, which needed transportation service and in the days of the trolleys had it. They ran in routes and hours such as pleased their drivers, and for this vastly inferior service Toledoans were glad to pay anywhere from a dime upward.

In the meantime the federal courts, acting under the inspiration and keen judgment of Judge John M. Killits, were working to end the intolerable situation. The cry of "overcapitalization" was raised by the local newspapers. The trolley company suggested a valuation of its property. But the City Hall whined a protest that it lacked the money to take this step. The trolley company offered to put up the $25,000 for it. But still the City Hall declined. Yet Killits persisted—the situation daily grew worse rather than better—and Toledoans faced a holiday season of vast trade losses, as a direct result of their own stupidity and shortsightedness.

Finally the truce was struck. Toledo had learned her lesson. Like a good sport she took her medicine. With Judge Killits as doctor and nurse she gave the trolley company its increased fare—6 cents, with a charge of 2 cents for transfers—and today is preparing a permanent agreement based on that which has worked so successfully in Cleveland and some other Ohio cities, and realizes, as perhaps some less-favored communities fail to realize, the value of the trolley car to her householders. If she really does that, perhaps the lesson has been well worth all that it has cost.

Condition Is Serious in New York Also

If I have treated a really dramatic incident in our American municipal history with the journalistic touch, please do not think that I am for a moment overlooking its tremendously serious aspects. There was not a day in the following twenty-seven that the average thinking Toledoan did not come to realize just what the trolley car meant to his health, his happiness, his comfort—and his pocketbook. I think that here is a thing that a good many of us Americans completely overlook. In the long years that I owned a house in an outlying district of Brooklyn it used to be a simple enough matter to step over to Flatbush Avenue for the morning trolley car into town and to curse out our own trolley system on those unfortunate winter days when the cars came all too rarely, in bunches, or, for hours, not at all. Then came a winter's day when they came not at all—all day long. A severe and unanticipated storm had caught the Brooklyn Rapid Transit napping and had completely covered its rails with several inches of ice and hard-packed snow, with the result that for forty-eight hours we had no trolley service whatsoever, and would have fared badly indeed if it had not been for the neighboring elevated railroad, which picked up a huge burden of overload traffic, ordinarily carried by the trolley cars.

On a day early in February I went from New York to a small city on the west bank of the Hudson River. It is reached by the West Shore Railroad, but in winter is not easily accessible by the New York Central. So therefore I had a small trunk and the necessity of reaching the West Forty-second Street ferry from the Hotel McAlpin, at Thirty-fourth Street and Broadway. The trip, hardly two miles, took nearly two hours. The severe storm of Feb. 5 had found an inefficient city administration sound asleep and so had all but completely paralyzed the street traffic of the largest city of the Americas. When one traveled one rode in taxicabs if one was lucky to find them, and paid fearfully high prices for bumping over ice-clad streets. The street railways? Alas, they were not available even for folk without trunks. They had made little headway against the storm—although in other years I had seen them conquer even greater ones—and after a few feeble attempts to battle against it gave up completely and suffered their rails to be covered and their trolley slots to be filled and clogged with ice which could not be removed, save by hard hand labor.

In those other years, however, the surface railways of Manhattan were still "going organizations." They had pride and pep in their service; the sort of thing that in the days of the war we learned to call morale. Three years of bickering and conflict with a city administration without any constructive policy of its own, but merely a desire to make political capital at every turn by the simple, and not original, processes of swinging big clubs and emitting great shriekings, had robbed our surface roads in New York of their last vestige of morale. They had lost heart and hope. They no longer cared. It was easier to quit than to struggle. And quit they did. While a great metropolitan city could thank each and every one of its lucky stars that it possessed a fairly complete subway and elevated railroad system. Without these it would have had to shut up shop completely.

As it was it has had to pay a great price for its own neglect and stupidity—according to the amateur statisticians some five million dollars a day—and is not yet done paying the bitter price. I rode from the McAlpin to the West Forty-second Street ferry, which boasts no subway or elevated railroad connections, in a taxicab and paid $5 for the ride. The taxi driver earned every cent of his fare. We swerved through ruts and sank into deep holes. Second speed was the best that we could do. Once, in order to get around a truck blockade that had lasted for almost three hours, we rode for a space upon the sidewalk, and reached the ferryhouse in time to miss the train. It had taken us more than an hour and a half to traverse less than two miles of city streets.

Yet my loss, time and disposition and taxi fare, was as nothing compared with those of the business houses of New York. The repair bills alone to trucks of every sort in New York during February, 1920, must have come to astounding totals. Every garage in the community ran its shops night and day continuously and then found itself far behind the work offered to it. There was a shortage of spare parts, of tires, of gasoline. I do not believe the five million dollar guess the least bit of an exaggeration—not when one comes to consider the aggregate of loss in time to a whole cityfull of folk.

Yet, as I have just said, Manhattan Island had the benefit of a complete subway and elevated railroad system which never ceased to function for a moment, either during the storm or after it. Staten Island is not equally fortunate in her rapid transit facilities, and when, a few weeks before, the Midland Railway Company, which renders almost the sole transport service to a large and well-populated section in the center of that small borough, found its appeals for fare relief utterly ignored by the city authorities and so was forced to suspend its service completely the commuters who had builded their homes along its lines in the hope and promise of at least adequate transportation facilities were left stranded. Apparently that hope and promise have meant little or nothing to the New York City Hall. Mayor Hylan sent a few of his trolley-breaking motor buses down to Staten Island, but the attempts at service that these rendered were so pathetic as to have been laughable were they not so tragic. The jitney drivers not only commanded such prices as the traffic would bear but, in the face of one of New York's heavy winters, ran when or where it pleased them, while the Staten Islanders begged for a return of their trolley cars—at a 10-cent fare if need be. The company had only asked for 7 cents.

What Massachusetts Has Done

One other group of instances of what the trolley car means to the city man—and I shall try to draw one or two definite conclusions: Down in New England, where for a long time past living and wage conditions have been exceptionally high, the lines of the Eastern Massachusetts system—formerly the Bay State Street Railway—have had hard sledding indeed. In fact if it had not been for the action of the commonwealth in stepping in and practically guaranteeing the operating costs of the road, in a fashion similar to that of the city lines of Boston, I doubt if this system would have been able to keep its cars moving at all on a good part of its lines. It matters little that a good many of these were badly planned and placed; should never have been built at all. The kernel of the nut is that they have been built and operated continuously for a goodly term of years. And upon the predication of the continuation of such service men and women have gone out upon these lines and there built their homes. The question of fares is a secondary matter with most of these. The Eastern Massachusetts lines are today charging 10-cent fares, which seems to be regarded as a sort of maximum possibility for street railways, even in these extravagant days. And there has been comparatively little protest from folk who have had any real understanding of the situation.

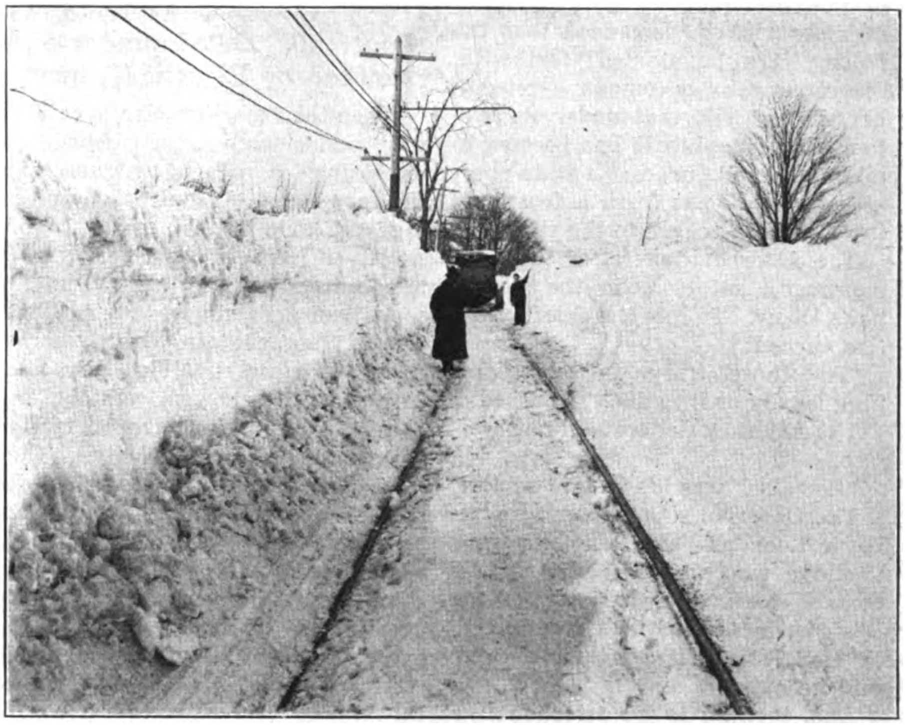
The vital factor with these home owners is the continuance of the service; they feel that with efficient state regulation the fares will be held to a basis of decency at least. Jitneys will not do. Not only are there the service uncertainties of an unorganized business but the New England winters are ill suited for the operation of automobiles, particularly through the roads of the open country.

Yet upon jitneys the Mayors of at least four important industrial cities of eastern Massachusetts began to pin their faiths. Not that they had any particular love for this form of transportation, but, like the ouster ordinance of Toledo, it formed an admirable big stick to hang on the wall and, school-teacher fashion, to be pointed at from time to time. So it was in Salem, in Lawrence, in Lynn and in Brockton—some other nearby towns as well—the jitneys, winked at by the politicians and taking a keen commercial advantage of the raised trolley fares, began multiplying in great numbers.

The trolley folk watched this situation with an ill-disguised impatience, and in the case of Lawrence took a decisive step on the day before Thanksgiving, 1919. Whether there was any significance in choosing such a holiday time I do not really know, but the fact remains that for that day and Thanksgiving Day itself the many lines of the Eastern Massachusetts in and through Lawrence suspended service entirely. And like the motorless Toledoans the motorless Laurentians either rode in a miserably inadequate jitney service—or walked. In either case they suffered almost equally great inconvenience. For during both days it rained steadily and heavily. And within forty-eight hours the City Council was brought to the passage of a stiff ordinance regulating jitneys; classifying and limiting them to streets or routes not used by existing trolley lines. Upon the assurance of the passage of this ordinance the trolleys resumed operations and Lawrence breathed more easily.

Salem was a more refractory subject. On December 18, a fearfully cold day, with the average temperature at a bare 4 deg. above zero, she, too, in company with the adjoining communities of Peabody and Beverly, either walked or shivered in her beloved, and unheated, jitneys. The trolleys were completely withdrawn from the streets of all three towns, while their retail merchants, fearful of the almost total ruination of their Christmas shopping trade, besieged the Salem City Hall, with the definite result that before night the municipal authorities promised the enactment of a fair but restrictive jitney ordinance, and at once began the revoking of existing jitney licenses, which, in turn, meant the resumption of trolley service upon the morrow.

But Salem did not keep her promise. She juggled with it, politically. She toyed with a referendum election, stood politically first upon one foot and then upon the other.



Transportation under some difficulty on a Massachusetts electric railway last winter

The City Hall powers seemed to look with kindly eye upon the jitney drivers, until the exasperated trolley folk again were forced to suspend their service—this time in Salem alone, but for three bitter, stormy January days, the fifteenth, the sixteenth and the seventeenth. Heaven seemed to be in league with the Eastern Massachusetts in its fight for the square deal in each of its *coups d'état*. On the last of these three grinding days the Mayor of Salem took a train and went into Boston—went straight to the State House and into the office of the Governor. With a fine show of enterprise he demanded that the trolley cars be started—forthwith. The street railway company—remember, if you will, that under its system of trusteeship it has become to all intents and purposes a state-operated concern—put forth a few facts in rebuttal in regard to the jitneys.

The Attorney-General of the commonwealth sat close to the Governor's elbow. To him the chief executive turned:

"Are those jitneys in Salem running legally or illegally?" he asked.

The Attorney-General did not hesitate.

"Illegally," was his instant reply.

The Governor's jaw snapped shut. He is Coolidge—the same Governor Coolidge who occupied a fairly important role in the settlement of the Boston police strike last autumn.

"If Salem can't stop them, I can," said he quietly.

And, turning to his telephone, he ordered the chief of the state police into Salem on the next day. The troopers moved in there promptly. They found the trolleys all in normal operation again—in accordance with a request of the Governor—and the jitneys up to their old practices, running along the street car routes and underbidding them in fares. But only for a short time. Without fuss or feathers or any commotion whatsoever the state troopers moved. They cleared the Salem streets of these buses. They have not since returned.

Service has not been suspended either in Lynn or in Brockton. In the latter city a mere posted notice saying that continued refusal of the city authorities to co-operate would bring about a total cessation of service on a certain designated day was quite sufficient of itself. The Brockton City Hall co-operated—at once—as finally the Salem and the Lawrence City Halls had come to the same sage decision. But one shudders to think what might have happened if the Eastern Massachusetts had been just a plain old grubbing private traction system, instead of a state guaranteed—and protected—service institution. I think, myself, that each of these towns would have had Toledo all over once again, with the probabilities that the combination of sullenness, misunderstanding and the hardest winter that New England has known in thirty-six years would have brought a suspension of trolley service for nearer forty-seven days than twenty-seven and with all the consequences that would certainly come with such a complete breakdown.

Montreal's Development Promoted by Electric Transit

When the Canadian Northern Railway audaciously accomplished the impossible—a railroad entrance into the very heart of Montreal, by piercing a 2-mile tunnel under Mount Royal—it anticipated some future possibilities of its step by buying some thousands of acres on the north side of the mountain, directly across from the closely builded city side. These acres showed, mutely but unmistakably, what transportation means to the modern city. They were open acres indeed—fine fat truck farms and orchards, with here and there a 200-year-old cottage of a habitant showing itself—yet within 2 miles of the very heart of the greatest city of imperial Canada. In every other direction Montreal stretched herself, 4, 5, 6 and 7 miles. In that one the mountain stood, a seemingly impassable barrier to further development.

The Canadian Northern Railway folk, deciding to undertake the herculean task of tunneling Mount Royal because they needed downtown freight and passenger terminals in Montreal for their through traffic, foresaw the inevitable results of transportation through the mountain upon those self-same truck farm acres. Overnight they would rise in value, might double and redouble and redouble again. While the railroad itself would merely have the cost burden of the tunnel on its hand, to be distributed as best it might be upon its long-distance traffic. With that foresight as a guide it reached out and bought those truck farms and orchards, and decided that the benefits that would accrue to them, by reason of direct high-speed transportation, should be translated into dollars that would repay the greater part if not the entire cost of the tunnel and the terminals.

I wonder, myself, why there have not been more instances in this country of a more direct connection between city transportation development and the certain development of real estate values that follows in its train. There have been isolated instances where this has been done—in a more or less indirect way. But on the other hand all too many instances where the trolley road or its big brother, the steam railroad, has starved while the real estate operators and the land-owning public generally have grown fat and rich at its expense. These are matters of record. They are indisputable. And it is just as indisputable that it is the expert real estate operator who realizes the most keenly the real value of the trolley car to the city man, who generally is the most active in trying to bring about co-operation with it, as well as a constant extension of its facilities. It is he who most quickly translates trolley service into assessed, or real, valuations.

Transit Is a Necessity to the City Dweller

I bear no briefs or cudgels for the trolley companies across the land. I know where some of them have sinned, and have sinned grievously, but I feel today that there are more of them that are sinned against than sinning. From wine and cakes they have come to stale water and to husks. They have lived to repent most seriously of earlier sins, of omission as well as of commission. While the opprobrium which they have brought upon their right-minded and right-actioned fellows of the traction world is not to be counted as the least of their shortcomings.

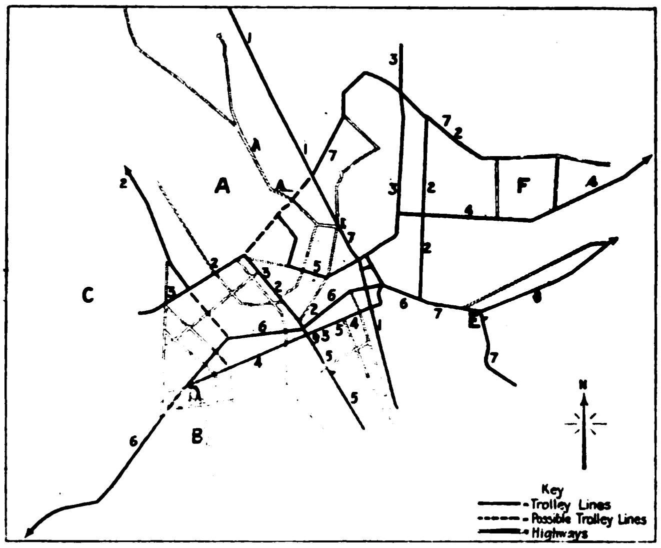
But this is not the hour for recriminations. The point that I am trying to make is that the soul or the conscience of a street railway has nothing to do whatsoever with the dependence of the householder upon its service. It may be the blackest of organisms. But to the man who lives upon its line it is a daily necessity—almost as his light or his water or his food or air itself. His health, his comfort, his happiness—the daily ordering of his life as well as the mere commercial value of his house and home—are vitally dependent upon it. Here is the rub. Here, it seems to me, is the pre-eminent and vital guiding principle that the City Halls of Toledo or New York or Salem or Lawrence or any other widespread and well-built American community can hardly fail to ignore.

The Place of the Bus—III

American Conditions, Under Which the Bus Is Preferable to the Car Despite Higher Cost of Operation and Consequently Higher Rate of Fare

By WALTER JACKSON
Consulting Engineer

In opening this study attention was directed to the extensive development of motor bus services by British tramways in co-ordination with their transportation on rails. No such extensive development exists as yet in this country, although the pioneer installation of buses by electric railways for the feeding of interurban lines was made as early as 1915 by Stone & Webster interests in the State of Washington, and even before that by certain city railways which wanted to obtain a first-hand idea of the cost of jitney bus operation. At first thought one would suppose that the thousands of individually operated jitney automobiles and jitney buses, which became so unpleasantly prominent about 1914, would have demonstrated where the superiority of the trackless vehicle does lie. However, as has already been shown, it is a lot easier for jitney drivers to travel in the old railway rut and to steal traffic than it is to break a new path and to create traffic. It is the exception to find a jitney operator habitually taking a short cut or driving around instead of through a congested district. Far be it from him to keep away from the thoroughfares where traffic is heaviest and to persuade the public to walk one or two blocks to patronize him.



THIS IS A MAP OF THE CITY CITED AS CASE 3 AND SHOWS EXISTING CAR LINES AND ROUTES PROPOSED FOR BUS AND RAILWAY EXTENSIONS

Yet there is more than abundant proof that the one way to use the motor bus in the manner most beneficial to the public is to operate it in conjunction with the car service, but with as little duplication and overlapping of routes as possible. Necessarily, this implies operation under one management if not one ownership.

WASHINGTON BUSES AVOIDED NEEDLESS INTERURBAN FEEDER TRACK

The experiment of Stone & Webster and the results thereof may be summarized as follows:

Edmonds—Seattle Heights route, 3 miles long over unpaved highway and steep grades. Population of Edmonds, 1,600. Object: To connect with Pacific Northwestern Traction Company. This line had to compete with a private bus service giving direct service between Seattle and Edmonds, and with the Great Northern, giving through service between Edmonds and Everett, also on the Pacific Northwestern. Service was discontinued after sixteen months. During the operating period of June, 1915, to September, 1916, there were operated 33,657 bus-miles with gross earnings of $1,272.43, which gave the hopelessly low intake of 3.78 cents per bus-mile.

Auburn—Enumclaw route, 21 miles over a route unpaved at first and which included steep grades. Population of Enumclaw and intermediate town of Buckley, 3,000. Object: To connect with electric trains at Auburn, such connections not being provided by the independent operators. Service discontinued after seventeen months. Monthly earnings of $661 to $1,177 failed to meet the cost of service.

Puyallup—Orting route, 10 miles long over paved highway with moderate grades. The company operated with buses withdrawn from the Auburn-Enumclaw route. Object: To connect Orting with the interurban railway at Puyallup, but in competition with through bus service to Tacoma, the destination of many riders from Orting. Competition and the small amount of traffic made profitable operation impossible. During the eight months of service there were operated 59,879 bus-miles whose takings averaged only 6.24 cents per bus-mile.

The lesson to be drawn from these unsuccessful efforts to tie bus and interurban together obviously is that no such form of transportation can be successful if there are not enough customers to go around, if competition is unrestricted and if the direct bus service is preferable (whether from a time, money or comfort standpoint) to the use of two kinds of transportation. The amount of traffic carried did not justify the service, even after the bus is credited with bringing some patrons to the interurban. At the same time, if the bus did not make any money for the railway it had the important, though negative, virtue of preventing it from losing far more on the construction of a track and line for the distance under consideration.

It is also clear from these experiments that so long as irresponsible, free-for-all competition is permitted the public will not enjoy that reliability of service and liability for accidents which are possible only through an established transportation undertaking.

The fourth, and surviving, route served by Stone & Webster interests is of entirely different character, its purpose being to afford a through bus service between Seattle and Bothell, a distance of 16 miles over well-paved highways. This line was opened in November, 1915. Up to June 26, 1916, it had to compete with a five-car company, but by Oct. 10, 1916, the last jitney operator had disappeared. The Seattle-Bothell route is an example of a clean-cut bus line from a large city to rather distant outlying communities which have no electric railway service.

A significant fact is that few users of this route took advantage of the 5-cent fare and free transfer privilege which would have enabled them to save money on the 5 miles (Cowen Park and city depot at Fifth and Pine Streets) within Seattle. Consequently, the inter-line arrangement with the Seattle electric railway, then under Stone & Webster management, was canceled Aug. 1, 1917.

This is in accord with much British experience. Most of such passengers from outlying communities desire to reach the heart of the city as quickly and as conveniently as possible rather than go through the bother of transferring from one vehicle to another at the terminus of the trolley line. Where a higher rate of fare is charged on the bus than on the car—a procedure necessary in any case—the bus will not be slowed down too much within the city through use by short-ride passengers, while the facilities remain available for the out-of-town riders for whom the buses were specifically installed.

CALIFORNIA BUSES IN BOTH CITY AND INTERURBAN WORK

In 1917 the question arose whether the San Francisco Municipal Railway should build certain track extensions into sparsely settled territory or go to less expense by developing these districts through bus extensions. It was decided to install buses, of which six White nineteen-seaters were purchased for the following services:

Route No. 1, two buses, for transfer to and from "A" line, twelve-minute headway across Golden Gate Park for which a trackway was quite inconceivable in any case. Maximum ride possible for 5 cents 6.88 miles, made up of 4.8 miles on trolley and 2.08 miles on bus. Passengers carried April, 1918, were 632,664 on car and 34,654 on bus, a ratio of 1:0.054; bus riders during 1918, 367,751.

Route No. 2, one bus, for transfer to and from "B" line along Great Highway (ocean shore), fifteen-minute headway. Maximum ride possible for 5 cents 8.18 miles, made up of 7.06 miles on car and 1.12 miles on bus. Passengers carried April, 1918, 754,245 on car and 14,346 on bus, a ratio of 1:0.019; bus riders during 1918, 159,511.

Routes Nos. 3 and 4, three buses connecting with "K" line on Ingleside and Parkside routes (which had been combined to reduce losses), ten-minute headway. Maximum possible ride for 5 cents 7.74 miles, made up of 6.04 miles on car and 1.70 miles on bus. Passengers carried April, 1918, were 165,741 on car and 50,089 on bus, a ratio of 1:0.31; bus riders all of 1918, 496,036. (Discontinued April 12, 1919. Later figures will be given in the article on costs.)

The comparative speeds of cars and buses were: For nineteen-seat buses operating in sparsely settled territory 12.5 m.p.h.; for cars of more than twice the seating capacity, operating through the congested district in part, 9.4 m.p.h., including layovers. The writer figured at the time that each bus rider was subsidized to the extent of 2.1 cents per month, a loss which naturally has risen since. However, it is perfectly plain that the loss would have been greater if this thin traffic had been handled by means of a trackway. A bus service like this can be made self-supporting only by a transfer charge or modified zone fare.

Late in 1916 the Pacific Gas & Electric Company installed some twelve-seat buses on 1 and 2-mile extensions in Sacramento purely as an accommodation, as there was no profit in serving the sparsely settled districts that had asked for transportation.

The Pacific Electric Railway, operating in a state which has had a tremendous development in long-distance busing, has given thought to the motor bus as an auxiliary for both its city and interurban railways. Thus in 1916 it built at its Los Angeles shops two thirteen-seat one-man pay-leave buses with 30-hp. automobile engines to serve Arlington Heights, a Fresno suburb of 3,000 population. In this instance, also, passengers are carried in buses only from the terminus of the railway routes. In 1917 it was announced that the company was building thirty-seat buses for the same service. Permits were also received to operate buses in San Bernardino County. In a recent statement the president of the company declared that its bus operation had not proved financially successful. Detail figures bearing out this statement will appear in a later article.

BRIDGE CONNECTION AT DUBUQUE AND CROSSTOWN LINK AT FT. WAYNE

Coming eastward, we find that on Sept. 4, 1914, the Union Electric Company, Dubuque, Iowa, installed a bus service over a 2200-ft. bridge to East Dubuque, Ill. (then "wet" territory), a community of 1,500 population. The round trip is about 3.5 miles. The fare is now 7 cents, or four tickets for 25 cents, and the service is entirely independent of the local street railway system as regards transfer privileges and the like. The fare includes a bridge toll of 1 cent per passenger. Two fifteen-seat gasoline buses are now used on a fifteen-mile headway, with one as spare, for since prohibition came July 1, 1919, traffic has dropped from 85,000 to 38,000 a month!

The crosstown link bus service installed by the Ft. Wayne & Northern Traction Company at Ft. Wayne early in 1917 was the result of a request from residents in the Bloomingdale district for connections to electric lines which were only 1 mile apart. This bus route was established, therefore, partly to please the patrons of the company and partly to determine the best route for an eventual crosstown trackway. The route connects the two railway lines at points about 1.5 miles from their repsective suburban terminals. Four sixteen-passenger buses were purchased, but only two were used regularly, the others being kept as reserve. Operation was conducted for eighteen hours a day. The fare was the same as on the cars, namely, at that time, six tickets for 25 cents, including the transfer privilege. Ft. Wayne's present rate of fare is 6 cents. During the last ten months of 1917 the buses ran 93,012 miles at a cost per bus-mile of 12.084 cents.

A somewhat similar bus service was inaugurated in 1918 by the Winnipeg Street Railway for 1.2 miles on Westminster Avenue, between the terminal of one line and a feeder connection of another. (See ELECTRIC RAILWAY JOURNAL, May 1, 1918.)

BALTIMORE'S BUS SERVICE INDICATES POSSIBILITIES OF CONGESTION RELIEF

The University Parkway-Charles Street (2.63 miles) bus service of the United Railways & Electric Company of Baltimore has been discussed so extensively and competently by L. H. Palmer, assistant to the president of that company, in his paper before the 1919 convention of the American Electric Railway Association (ELECTRIC RAILWAY JOURNAL, Oct. 11, 1919) and in the ELECTRIC RAILWAY JOURNAL for Jan. 3, 1920, that it is necessary only to remind the reader that because this service is run by the railway itself (through the Baltimore Transit Company) overlapping can be reduced to a minimum. Furthermore, with the assurance that jitneys would not follow the car tracks this and future bus service could be routed from the viewpoint of affording alternative routes to and shorter routes than the street railway. At present both the cars and buses are operated at a 7-cent fare. Experience abroad, and here as well, indicates, however, that people will pay a higher fare on the buses if the latter can offer noteworthy advantages in speed because of long non-stop runs. This is not yet the case in Baltimore, but doubtless will be when the company can treat its problem as a whole without worry as to jitney interlopers.

Within the limits of this article it is not practicable or desirable to list all the cases where electric railways have instituted bus services either directly or in co-operation with realty development companies, manufacturers and other parties, but one may say confidently that to-day both roads and vehicles have improved to the point where requests for service to thinly peopled districts can be best and most cheaply satisfied by the installation of the motor bus. From an account of what electric railways have done it is now logical to pass to a review of some of the things that they have not done but ought to do in this field. As examples, the writer will discuss three different situations with which he has been personally connected:

FORCING THE PUBLIC TO IMPROVISED MOTOR-TRUCK BUSES

In City No. 1 the electric railway had asked for an increased fare. The prevailing rate of fare was actually below 5 cents and one would have been inclined to recommend an increase out of hand. Unfortunately, the company could not show that it had been trying very hard to reduce its operating expenses or to pick up a lot of traffic that was literally begging to be carried. With a population of less than 100,000 it could not show a single safety car, and its general attitude on that subject might be summed up by the phrase, "Give us the increased fare now, and then we'll see if there's anything in this kind of operation."

The city had been growing beyond the terminals of the city railway for distances varying from ¾ to 2 miles, largely through the establishment of big factories. The company could not raise the money to build extensions to serve these districts, as its operating figures showed a loss on the average length of ride already being given. Nevertheless, the employees of these new plants had to have some form of transportation. To meet this need, several of the factories started an auxiliary service for employees, using motor trucks fitted with benches, which were removed when the trucks were used for their other job of carrying material. Because of the inadequacy of this service the workers have little temptation to settle in cottages on the cheap land near the factories. They naturally prefer to live in town in order to be near the stores and center of amusement life.

As one result, the community had reached the point where it was quite ready to install a bus system indiscriminately and to let the railway die with all its imperfections and antiquated cars. The writer's investigation disclosed that an all-bus system would be far too expensive. What this community did need primarily was safety car operation for almost all the mileage, except that some of the big cars could be retained for rush-hour service after automatization with pneumatic door and step control, and, secondarily, it needed a few modest bus routes until the building up of the factory suburbs would justify track extensions. For this particular situation through bus routes into the city at a special fare were not desirable because the extensions were so short that the greater part of the run would be in direct competition with an underloaded street railway. Also when the bus services were confined to the comparatively short extensions fewer buses would be required; nor would it be necessary to use an elaborately equipped vehicle for ten-minute rides.

The proper plan appeared to be to charge an increment of say 2 or 3 cents for the ride between the street railway and bus terminals. This increment might be paid by manufacturers because of their being relieved of the costly and unsatisfactory use of motor trucks for passenger service. Similar arrangements covering car rides are actually in practice at Racine, Wis., and also on the Connecticut Company's line, since the coming of the zone fare. At Racine a factory on the outskirts pays directly to the railway 1 cent extra for every employee passenger entering or leaving via the turnstile station at the plant. In Connecticut a number of employers are making up for six months anyway the difference between the old 6-cent fare and the new 8-cent, 10-cent, etc., zone fares.

City No. 2 represents one of the growing number of cases where the congestion of certain car routes offers a tempting morsel to the bus promoter. In this instance, while the bus promoter was rather grieved that he was not permitted to run on the busiest street of the city he had the faith that there were enough good sports in the community to pay a double fare for the sake of enjoying a seat and more ozone. Here was an example of failure on the part of the electric railway to institute a bus service itself for the sake of relieving some lines and rerouting others. There must be necessarily a great difference between the policy of an independent and of a co-ordinating bus system. The independent company naturally wants to lap the cream of the railway traffic without regard to how such lapping will affect the finances or traffic currents of the railway, whereas operation of the buses by the railway can be helpful to the railway from the twofold standpoint of putting off the construction of costly extensions and of shunting away from overcrowded trolleys enough riders to make practicable an increase in the schedule speed, and therefore a decrease in the operating cost, of the electric railway routes.

WHERE SAFETY CARS, TRAINS AND BUSES WOULD MAKE AN IDEAL SYSTEM

City No. 3 offered the most interesting case of all. Here was a community of high industrial character and so compactly developed that jitney bus service on the heavy routes can be conducted for 5 cents at a fair profit against 6, 8 and even 10-cent fares on the electric railway. As a consequence, about half the traffic is carried by the jitneymen in buses averaging no more than sixteen seats. Aside from the lower fare, the jitneys appeal to the public because of immensely better headway and somewhat better speed between terminals.

In analyzing this situation with the view of determining whether the 5-cent fare could be restored to the greater portion of the city, the writer was struck by the fact that outlying factories and isolated localities were getting practically none of the service which the motor bus can handle so well. Several attempts to secure direct jitney service had been made by isolated plants, but a guaranteed return plus a premium for punctuality was not sufficient to tempt the jitney operators for any length of time. They were likely to disappear any time that bigger profits were to be had in the heart of the city with its short rides and sardine packing. Of the tens of thousands of workers, only a few hundred were found to be enjoying direct bus service for which they paid some 30 to 50 per cent more than for street car fare—and gladly.

So far as the isolated home area communities were concerned the jitney bus paid no attention to them at all. It is true that police regulations compel them to follow the car tracks, but this rule was made merely to prevent cut-backs and would not apply to a created route over trackless or partially trackless thoroughfares. The remarkable point about the chief isolated area is that it begins within a mile of the center of the city. It is on high ground of most desirable character for residential development. In fact, the trolley lines which flank this area are banked by the best houses in the city. However, because of the hilly country between, each trolley line represents a shoestring development hardly two or three blocks wide. The fare on one of them from city center to a terminus in another township is 8 cents for say 3 miles, while equally good city territory much closer in is almost untouched. The fact that nearly all the highways in this area are well paved in Warrenite asphalt seems to be no inducement to the jitney operator to create a traffic which could not be injured by any car route for years to come!

The solution proposed for City No. 3 contemplates a co-ordinated service that will give ample scope to both car and bus operation. By means of safety car operation it will be possible to cut present headways in half with little increase in operating expenses. This more frequent service will certainly wipe out the jitney operator's margin of profit. It will not pay him to come out only during the rush hours (when he is welcome) because of the heavy overhead which he must now meet in bonding liability, licenses, etc. Deprived of this skimmer of its non-paying rush traffic the railway will have to go to peak-hour train operation, which, of course, will also give higher platform economy. The combination of short-headway safety cars for most of the time and of train operation for part of the time will not only put the jitney out of business automatically, but will also make possible a greater length of ride for 5 cents than is now given for 6 cents. The return to a 5-cent instead of a 6-cent basis would also help to raise the schedule speed and please the public.

However, it is clear from the accompanying map that conditions in City No. 3 do call for a certain amount of bus service. Such service would not pay in itself and therefore would not attract independent operators. On the other hand, if operated by the electric railway in conjunction with the car routes two interesting and valuable results would ensue: First, the isolated areas would be opened up as feeders for the trolleys at an investment which grows only as the amount of business to be handled grows; second, direct routes between factory and home could be installed to shunt via shorter by-paths a lot of people who must now use roundabout trolley routes. These conditions may be referred to more specifically as follows:

Locality "A" is the area close to the business and social center of the city whose growth is hindered by lack of transportation. It is bifurcated by a road which lies between the two trolley lines "1" and "2" and farther on this road branches out most conveniently. In developing a bus service for this section it would not be necessary to run the buses all the way out at once, but simply to keep on extending and extending as the territory was built up. Then in the fullness of time the density of traffic would reach the point where the cost of rail operation would be cheaper. In this particular case conditions favor running the buses directly into the center of the city, especially as the greater part of the run would be by bus.

Localities "B" and "C" may be considered together for a rather unusual reason. Locality "B" is an isolated peninsula which eventually will be all factory, but which is now part factory and part foreign settlement. The overflow from this settlement has, in large part, settled at "C," just outside the city limits. Many of the workers of locality "C" work either in "B" or in locality "D," which is shown on the way from "B" to "C." Unfortunately, the means of travel between all three districts are very poor. People living in "C" who want to find a way to patronize the car line have to walk a mile or so to the terminus of trolley route "3," on which the headways are not particularly good. At that cars of route "3" do not bring them anywhere near "B" or "C." They have to ride downtown to transfer to trolley route "4" and then return in the general direction from which they came. It goes without saying that most of the people prefer to walk in the comparatively straight lines offered by the highways than to take the roundabout rides by trolley. For this public a bus line is needed between "B," "D" and "C," including a connection to trolley route "3" at its terminus.

The purpose of showing three of the streets in peninsula "B" is to disclose the possibility of running the buses on each street in turn until experience has determined which routing will serve the greatest number. The choice of route is not obvious because most of the plants are off on the eastern side. In recommending a bus route to tie "B," "C" and "D" together the writer considered the saying, "Birds of a feather flock together." In other words, areas of like nationality have in common many social and business interests that will produce riding other than that between factory and home. Also in these times when so much is said about Americanization (it should be "humanization") it is a real service in patriotism to draw foreign communities out of their status of isolation. Transportation in this case means more mingling with the rest of the community, better attendance at night schools, theaters, and so forth.

The question of special bus services for factories assumes importance in this city owing to the radial character of the trolley system. North and south crosstown travel is out of the question unless one rides to the most congested part of the city first. Thousands of people who work in locality "D" are obliged to ride into town along one rib before they can ride out of town along another. The irony of this situation is that these riders do not patronize the transfer-less jitneys, but take longer rides on the cars than any one else. If handled by buses many of them would have a ride of but 1 to 2 miles instead of 3 to 4 miles, they would be home within fifteen to twenty minutes instead of thirty to forty-five, and they would have to pay only a very slight additional fare.

In like manner people working in locality "E" but living at "A" would be the gainers by a bus service that would either save them from transferring or would eliminate long walks.

The operator will naturally ask how a special-hour service can be made to pay even if a fare 50 to 100 per cent in excess of 5 cents were to be charged, according to distance. That this service should pay in itself, however, is hardly to be expected, but it can and should be made to pay from the standpoint of traffic relief as a whole. For example, if this diversion of traffic can speed up the rush-hour car schedules by 1 m.p.h., the company would save daily a substantial sum which should be credited to the account of the bus.

It so happens that the hours of going to work and return from work in this city are spread sufficiently to permit two and possibly three to four loads morning and evening. In addition, the home-luncheon habit encouraged, let us admit, by the short-headway jitney will assure at least two loads in the middle of the day. Another favorable factor is that on several routes there is as much rush-hour traffic in one direction as in the other, owing to the commingling of factories and homes in almost all but the northern or "A" district and vicinity.

Now, to take a leaf from the trick-book of the jitneur, it will be unnecessary to have the buses lie idle when they are not in home-factory service. Many of them can be diverted to the sections serving the isolated communities, aside from specialized livery operation. For example, part of the buses running between "A" and "D" can be shifted during the morning shopping and afternoon hours to the right-hand branch of bus-route "A," which leads into the business and social center. This would merely be doing in a large way what a two or three-route jitneyman does in a small way. As a matter of fact, no concern does this sort of thing better than the great London General Omnibus Company.

The dotted lines on the map on page 849 represent possible trolley links for special rush-hour routes to be built only after the bus has developed a sufficient density of traffic to insure profitable operation.

The foregoing examples by no means exhaust the ways of co-ordinating car and bus operation, but they are adequate to prove that there are possibilities under almost any conditions. In the next article to appear on this subject a discussion of some competitive and some *de luxe* bus services will be presented.

A Massachusetts Company Starts Buses

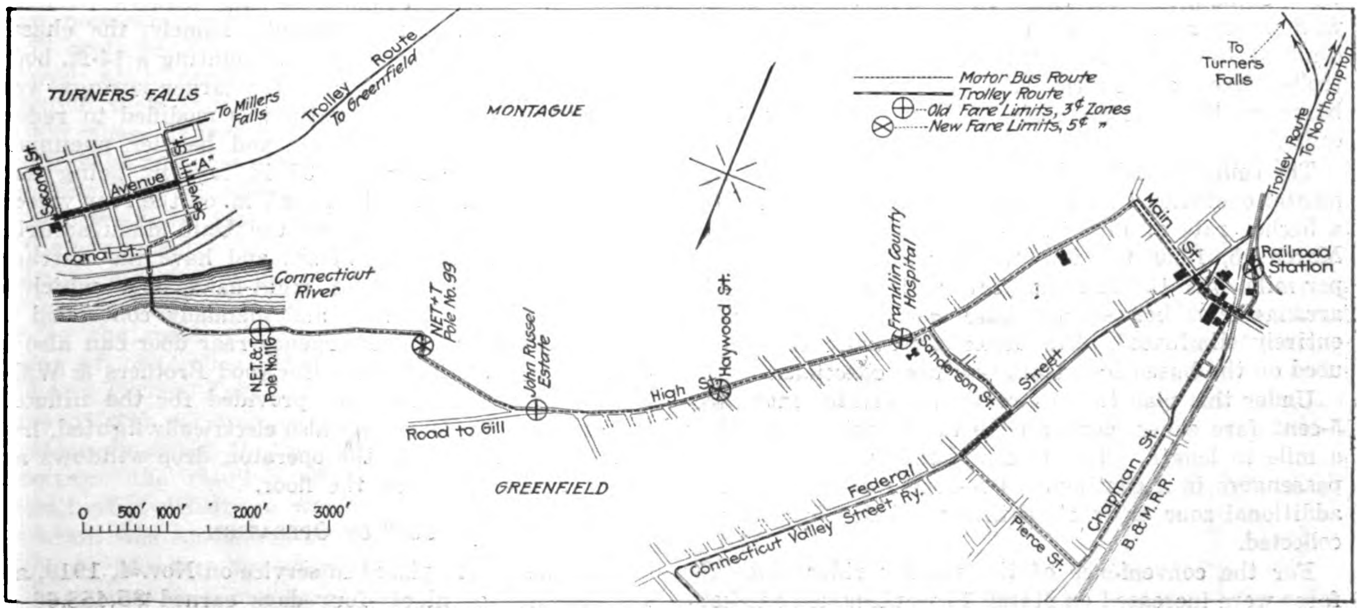
Takes Over Operation of Jitney Route and Substitutes Up-to-Date Buses—Experimental Period Proved Service Justified Higher Fare Than on Trolley

THAT an electric railway company can render high-class motor bus service at a reasonable fare has been demonstrated since Nov. 4, 1919, by the Connecticut Valley Street Railway Company. The public feels assured of the company's good will, for sufficient liability insurance is carried to protect both the passengers and the public.

For the last five years many Massachusetts electric railway companies have had more or less jitney competition, with the result in most cases that what had heretofore been paid out in dividends went into the jitney drivers' pockets. In 1915 independent jitneys began operating between Greenfield and Turners Falls in competition with the Connecticut Valley Street Railway Company. While the two routes did not cover the same intermediate territory, the revenues of the buses were derived very largely at the expense of the railway company, as not enough new traffic was created to offset the railway losses. After the buses had been in operation about two years their revenue was estimated at not less than $25,000 per annum, equivalent to about one-third of the trolley company's gross revenue received prior to competition.

The railway company naturally took various steps to regain the lost traffic, one of which was to cut the running time between Greenfield and Turners Falls from thirty to twenty minutes and to operate cars on a forty-minute headway. This change in schedule, while it slightly increased the revenue, failed to curb the jitney, which seemed to flourish, through lack of any regulations, until seventeen buses of various types were in operation between the two cities.

In 1916 the first of the present regulations under which buses are permitted to operate was enacted. The


TURNERS FALLS
To Millers Falls
Trolley Route To Greenfield
MONTAGUE
Second St.
Avenue "A"
Seventh St.
Canal St.
Connecticut River
N.E.T.&T. Pole No. 116
NET&T Pole No. 99
John Russel Estate
Road to Gill
High St.
Haywood St.
Franklin County Hospital
Sanderson St.
Street
Federal
Connecticut Valley Street Ry.
Pierce St.
Chapman St.
B.&M.R.R.
Main St.
Railroad Station
To Turners Falls
Trolley Route To Northampton
GREENFIELD
Motor Bus Route
Trolley Route
Old Fare Limits, 3¢ Zones
New Fare Limits, 5¢ "
0 500' 1000' 2000' 3000'

PLAN SHOWING MOTOR BUS ROUTE OF CONNECTICUT VALLEY STREET RAILWAY BETWEEN GREENFIELD AND TURNERS FALLS WITH FARE LIMITS UNDER EACH ZONE SYSTEM

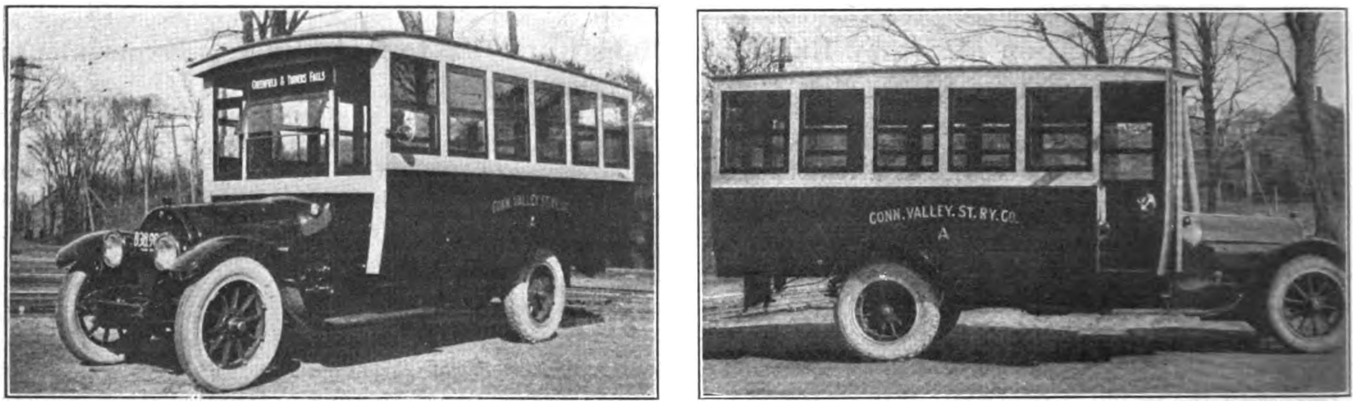
State Legislature that year granted all cities and towns of Massachusetts the right to regulate local motor bus service, but required that all buses be operated on a fixed schedule and under a liability bond to protect the patrons. In 1918 additional legislation was enacted, allowing electric street railway companies to own and operate buses, and in the following year all motor bus regulation and operation was made subject to review after April 1, 1920, by the State Department of Public Utilities.

The Connecticut Valley Street Railway had long realized that its round-about trolley route of 4.8 miles could not compete with the shorter 3.14 miles motor bus route and retain the greater bulk of the traffic, nor could the single trolley line properly serve the intermediate territory along the bus route. Rights were therefore obtained under the recent legislation to operate buses over the 3.14 mile route heretofore utilized by the jitneys, as shown on the accompanying map. Service was inaugurated on Nov. 4, 1919, with half-hourly headways between Greenfield railroad station and Turners Falls. The bus route was divided into four zones, each approximately 0.8 miles in length, and the fare was fixed on the mileage basis at 3 cents per zone, with the through rate fixed at 12 cents and the minimum fare at 6 cents for two zones or less. Free transfers were exchanged with the trolleys and vice versa and were accepted either on the buses or trolleys to the limit of the first zone. The fare on the round-about trolley line between the same two points is likewise based on the mileage basis. The through fare is 15 cents.

The company believed from its three months' experimental operation that the superior bus service justified a higher rate of fare than on the trolley cars and on March 15, 1920, the fare was increased to 4.75 cents per mile, with the minimum fare at 10 cents. Transfer arrangements between the buses and the trolleys were entirely eliminated. The Rooke automatic register is used on the buses for making all fare collections.

Under this plan the bus route was divided into three 5-cent fare zones, each zone being slightly more than a mile in length. The 10-cent minimum fare entitled passengers to a continuous two-zone ride and for each additional zone or fraction thereof ridden 5 cents was collected.

For the convenience of the regular rider since the fares were increased on March 15 workingmen's tickets, so called, are sold in lots of twenty-five for $3. These tickets are good during the hours of 5 and 8 in both morning and evening and each ticket entitles the holder to ride from one terminal to the other.



TYPE OF NINETEEN-SEAT CADILLAC MOTOR BUS USED. AT LEFT, SHOWING HOW BUSES ARE SIGNED. AT RIGHT, SHOWING ONE-MAN ENTRANCE AND EXIT

SCHEDULES AND EQUIPMENT

The first bus leaves Greenfield railroad station at 6:15 a.m. and thereafter on a half-hourly headway until 10:15 p.m.) In Greenfield, as will be noticed on the diagram, there are two alternate bus routes. The buses leaving the railroad station at fifteen minutes after each hour follow one route on both inbound and outbound trips, while the buses that are scheduled to leave at forty-five minutes past the hour follow the alternate route, thus giving hourly service in either direction over each route.

(The running time between the termini on the bus is less than fifteen minutes as against twenty minutes on the trolleys. Two buses only are required to maintain this schedule, the third being held in reserve for inspection, repairs or emergency. The passenger-carrying capacity of the buses is limited strictly to their seating capacity. The bus operators receive the maximum rate of wages paid the motormen and conductors on the trolley cars.)

The automotive equipment to furnish the motor bus service consists of the 1919 model 57-B Cadillac chassis, embodying several changes by the makers to cover the heavier service requirements, namely, the chassis was lengthened 10 in. to permit mounting a 14-ft. body, having an outside width of 7 ft.; larger springs were substituted and the gear ratio was modified to reduce the maximum speed. Larger and heavier pneumatic tires are used throughout, 35 in. x 5 in. being used on the front wheels and 37 in. x 7 in. on the rear wheels. All bus bodies were built by the Unit Manufacturing Company of Amesbury, Mass., and have the entrance and exit through a front right-hand door which is interlocked with the step and manually controlled by the bus operator. An emergency rear door can also be operated in a similar way. Heywood Brothers & Wakefield cross rattan seats are provided for the nineteen passengers. The buses are also electrically lighted, have push button signals to the operator, drop windows and heavy rubber mats on the floor.

COST OF OPERATION

(Two buses were placed in service on Nov. 4, 1919, and for a period of ninety-four days earned $5,458.66, or an average of $29.01 per day per bus. The mileage

INCOME STATEMENT

	Total	Per Bus-Mile (Cents)
Operating revenues	$5,458.66	21.56
Operating expenses:		
Wages of bus operators and repairmen	2,162.00	8.53
Gasoline—3,625 gal. at 26 cents	942.50	3.72
Oil—188 qts. at 20 cents	37.60	0.16
Tire allowance	761.40	3.00
Insurance	282.00	1.13
Depreciation	2,030.40	8.00
Total operating expenses	$6,215.90	24.54
Deficit from operation	$757.24	2.98
Taxes	100.00	0.40
Interest	225.00	0.89
Net loss from bus operation	$1,082.24	4.27
Saving on trolley car operation, 140 miles per day at $35 per day	3,290.00	*25.00
Net revenue from operating buses	2,207.76	8.72
Bus-miles operated	25,385	.....
Average miles per gallon of gasoline	7.0	.....
Miles per quart of oil	135.0	.....

* Per car-mile (trolley).

operated was 25,385, equivalent to 135 miles per bus per day. The earnings per bus-mile thus average 21.56 cents.

The cost of operation of the service rendered for the same period, which covers not only the wages of repairmen and operators, gas, oil, etc., but overhead expenses, including really a larger depreciation reserve than necessary, indicates that the buses were run at 25.73 cents per bus-mile. In these costs depreciation is figured at 8 cents per bus-mile, which would extinguish their initial cost of $4,800 at approximately 60,000 miles. It is fair to say that this rate of depreciation is high and does not consider the scrap value of the bus, nor does it take into account the fact that the automotive power plant depreciates faster than the rest of the equipment.

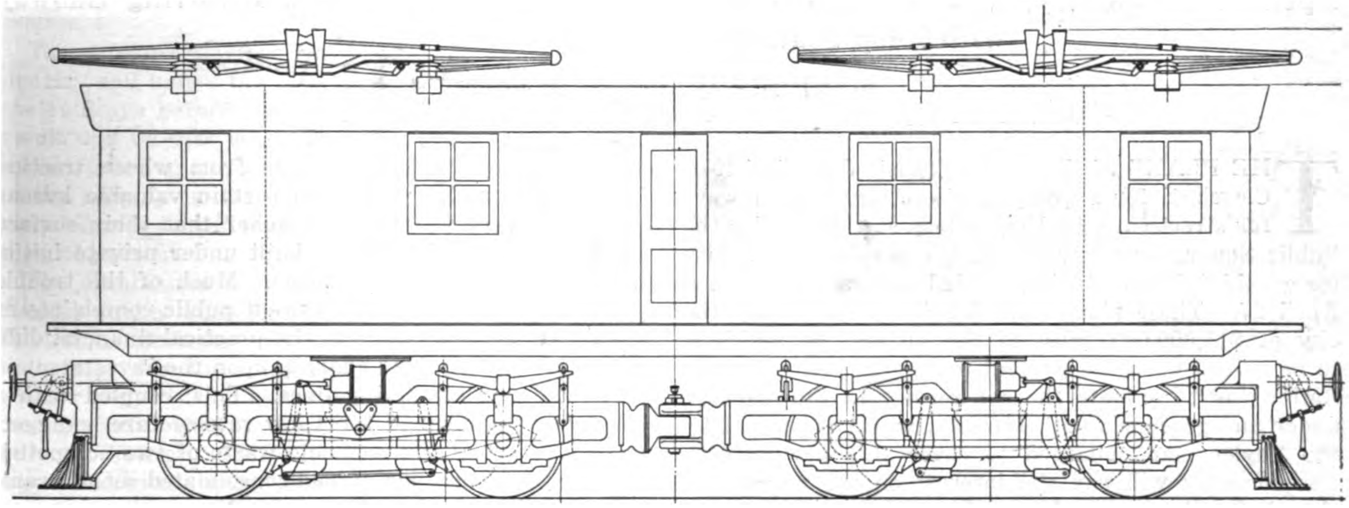
Another factor to be considered by the company is the net cost of operation of the property as a whole, for as the result of the bus operation there was a saving of 140 trolley car-miles per day between Greenfield and Turners Falls. If only the actual cash expenditures of $35 per day to provide this car mileage is considered, added to the net income from the bus operation, the result would be then a fair surplus instead of a deficit, as would be the case if the bus operation was considered as standing alone. Then too, the daily bus earnings show an upward tendency, and it must also be remembered that for a part of the period of operation heavy snows materially increased operating costs. The accompanying income statement shows the results in total and per bus-mile operated for ninety-four days' operation commencing Nov. 4, 1919.

Paulista Railway Electrification

Line in Brazil Having 28 Route Miles Will Be Equipped for Operation at 3,000 Volts, Direct Current

THE double-track line of the Paulista (Brazil) Railway, between Jundiahy and Campinas, will be electrified at once, on the 3000-volt, direct-current system. The route mileage is 28, the total length of single track involved being 76 miles. A later 100-mile extension from Jundiahy to San Carlos is contemplated.

The locomotives will be of the geared type and these and the overhead construction will be designed after the models furnished by the Butte, Anaconda & Pacific and Chicago, Milwaukee & St. Paul Railways. The locomotives will be similar to those used on the former, as will be seen from the accompanying illustration, but they will be furnished with regenerative braking control. There will be eight freight locomotives weighing 100-tons each, with all weight on the drivers, and four 120-ton passenger machines with two guiding axles at each end.



SIDE ELEVATION OF 100-TON ELECTRIC FREIGHT LOCOMOTIVE FOR BRAZIL

The locomotives, overhead contact and transmission line material and substation equipment will be furnished by the General Electric Company. Power for operation will be furnished at 88,000 volts, 60 cycles by the Sao Paulo Light & Power Company.

Accident Fatalities in Cleveland

IN commending the work of the local Safety Council, Dr. H. L. Lockwood, Health Commissioner of Cleveland, Ohio, has given to the council the following data (see *National Safety News*, March 22):

ACCIDENTAL FATALITIES OCCURRING IN CLEVELAND DURING 1918 AND 1919

	Jan. 1 to June 30, 1918	Jan. 1 to June 30, 1919	July 1 to Dec. 31, 1918	July 1 to Dec. 31, 1919
Railroads	30	22	29	27
Street cars	16	9	22	23
Automobiles	46	63	143	73
Other vehicles	7	4	8	10
Other causes	18	11	27	12
Total	117	109	229	145

CLEVELAND'S PUBLIC SQUARE, UNDER WHICH COMMISSION PROPOSES THE LOCATION OF LOOP SUBWAY STATIONS

Rapid Transit for Cleveland

April 27 People Will Vote on Plan for Relieving Street Congestion, Involving Subway with Loop Stations Under the Public Square

By HENRY M. BRINCKERHOFF
Of Parsons, Klapp, Brinckerhoff & Douglas, Consulting Engineers, New York City

THE PLANS of the Rapid Transit Commission of Cleveland for a group of short terminal subways for street cars, leading to loop stations under the Public Square, are now before the people of that city for consideration and will be voted upon at the election April 27. These plans* call for a bond issue by the city of $15,000,000, most of the interest on which is to be spread upon the general tax levy. The Cleveland Railway is to operate the car service in the subways under an agreement with the city, which is essentially the Tayler plan, enlarged to cover this new service. The company will pay the interest on the tracks and electrical and other equipment in the subway, while the city will own the structures themselves, pay the interest thereon and control the train and car service under the Tayler plan of regulation.

An interesting question arises in this connection as to the principle underlying the construction of short sections of subways in the center of the city as a "first step toward rapid transit," as is stated in the commission's announcements. In the following the writer presents a brief statement of the basis of the plan and the warrant for the phrase just quoted:

Duplication of Transit Facilities Is Costly

Cleveland has just reached the point where its metropolitan district houses 1,000,000 people. Cities which have passed this mark, such as Philadelphia, Chicago, Boston and Brooklyn, commenced the development of rapid transit systems when they were at or near 1,000,000 in population. The general public demand for a rapid transit service is therefore normal as viewed from the standpoint of experience and the development of cities which in population and area have grown to perhaps twice the size of Cleveland today.

In studying the larger cities from whose traction history and present condition certain valuable lessons can be learned, we must remember that their surface and rapid transit lines were built under private initiative and on a competitive basis. Much of the trouble lying at the bottom of the present public complaints of inadequate service is due to the practical financial difficulties of earning fixed charges upon the investment in duplicated and competing lines. This, coupled with a natural public demand for a low rate of fare, exaggerates the effect of the economic waste of two competing systems as against one unified consolidated set of transportation lines.

From the viewpoint of the car riders the ideal system in a large city would be one giving the freest possible use of all lines, surface and rapid transit, by universal transfer of passengers and the arrangement and co-ordination of each class of service completely to cover and serve the constantly broadening city area.

An effort to produce such a co-ordinated system in the larger cities today develops at once the fact that there is a considerable duplication both of physical structures and investment, as the tracks and equipment are in places in duplicate and often parallel, due to their competitive origin. If these tracks and systems could be completely wiped out and a carefully planned, unified system substituted the rapid transit trunk lines could be used for the congested and long-haul business and the surface cars run as feeders to these trunks to accommodate the strictly short-haul traffic. Thus, much better accommodations could be afforded the public at less original cost and at a lower operating expense.

Given a city like Cleveland, therefore, without any rapid transit development, and looking to a future city of perhaps twice its present size, it is reasonable to propose so to plan the initial steps of the rapid transit lines as to avoid the obvious shortcomings seen in the dual competitive systems found in our larger cities. The fact that Cleveland has controlled its street car service for the past ten years under the direction of a city commissioner makes easy the task of dealing with the practical operating questions of such a combined service.

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*See issue of ELECTRIC RAILWAY JOURNAL for July 12, 1919, page 71.

With the present high cost of materials and labor in all construction and with the proposal to expend public money upon permanent structures without thought of profit the obligation lies heavily upon the engineer to plan the system so as to make each dollar build the maximum of facilities and the design provide for the greatest economy in running costs.

SOME DETAILS OF THE COMMISSION'S PLANS

The plan proposed by the Cleveland commission attacks the problem by first bringing the surface car lines to their maximum capacity and usefulness.

The principal difficulty with the existing Cleveland surface car lines lies in the congested condition of all traffic in the central business district. Forty-five per cent of the passengers riding on the street car lines entering this district ride to or through the Public Square or its immediate vicinity. The greatest volume of long-haul traffic in the city is east and west, parallel with the lake shore, and passes through the Public Square.

The principal surface car lines entering this central district will under the proposed plan be run down into the subways before reaching the congested area. The result will be that with the wide streets comparatively unobstructed in the outlying sections and with the cars in the subway in the congested districts a very much more regular and higher speed service will be rendered than at present.

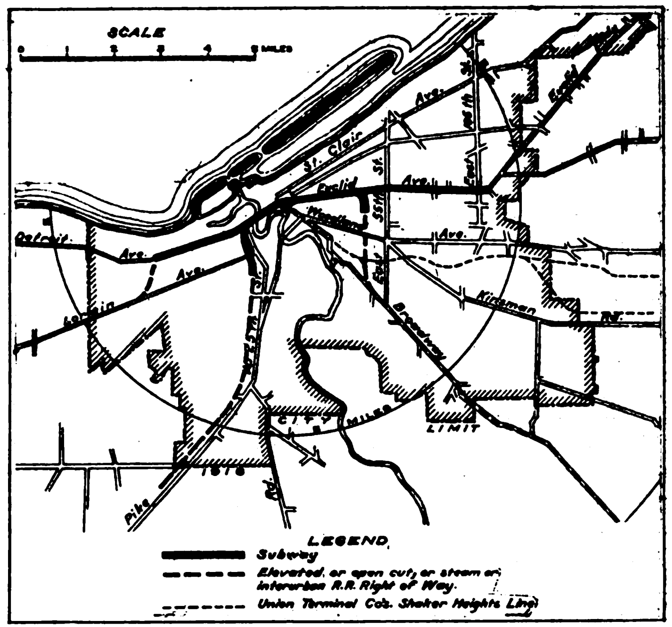
The elimination of congestion in the Public Square district during rush hours will not only save a certain amount of time for the rider, but make it possible to load fully for the outlying tracks, which now have greater capacity for car movement than can be passed through and loaded in the Public Square and congested delivery district. This will therefore result in making it possible to run many additional cars, with consequent greater comfort to the public and greater earning capacity for the system.

The arrangement of the subway tracks in the Public Square is such that the radiating street car lines can be operated independently from this point in various directions or can be connected up and run through across the city. The loading platforms, switches, loops, etc., are so designed in this central subway transfer station as to permit through routing of a part of any of the surface lines and the turning back of the unbalanced portion. In this way the usual practical objection of through routing is avoided, as no idle car mileage need be run, but the through cars can be proportioned to the actual demand for through service and the heavier end of the line fully supplied with cars without running useless mileage on the lighter side of the city. It will be admitted that this should produce a street car system operating under the most favorable conditions for the rendering of regular, uninterrupted and high-speed service to the traveling public.

The question of rapid transit is answered by designing the sections of the subway, the loading platforms, curves, loops and all clearances so that trains of standard rapid transit cars can be run through these subways. The development of separate rapid transit train service on any one of these lines can then be accomplished by extending any one of the five radiating subway sections far enough to warrant such service.

It is contemplated that it may be possible to connect the present short subway sections to elevated lines or to lines on private rights of way or even to use some of the steam railway lines to reach the outlying districts. The present subway construction is therefore literally a *first step in rapid transit.*

If one of the present short sections is extended, as for instance the Euclid Avenue section, for several miles train service can be placed in this subway and a limited number of street cars continued to be operated upon the street car tracks directly above. As this plan contemplates a unified system, operated by the same company and under city control, transfers can be given from the rapid transit line to the street cars by vertical transfer at station points. The subway trains will then perform the function of express service and the street cars on the surface tracks above will operate as local service, making frequent street corner stops. The subway trains will stop only at stations spaced at about one-third-mile intervals. In the building of further street car lines or in the rerouting of the existing lines further development of this idea can be obtained by running cars directly to certain stations on the extended subways where transfers can be given to the trunk or rapid transit subway trains.



OUTLINE MAP SHOWING PROPOSED RAPID TRANSIT DEVELOPMENT FOR CLEVELAND

Thus it is planned to develop a system which will produce a thoroughly co-ordinated development of surface and rapid transit lines.

COMMISSION ESTIMATES A RAPID TRANSIT INVESTMENT COST OF BUT $75 PER CAPITA

It is interesting to note in this connection that cities such as Chicago, Boston, Brooklyn and Philadelphia have from $95 to $110 per capita invested in their combined surface and rapid transit lines. A study of a plan for a city such as Greater Cleveland when it shall have grown to a population of 2,000,000 indicates the possibility of developing a satisfactory trunk line rapid transit system giving transfers to a surface system with radiating or crosstown street car lines at from $70 to $75 per capita.

The economic value of locating and building the rapid transit lines so as to utilize effectively the street car lines to their maximum capacity as feeders and for local hauls is obvious. This will avoid the evil of competing lines and effect a great saving in investment, while at the same time keeping the whole system under one management and city control.

The objection made by those familiar with the transportation system of Boston that a similar plan in that city resulted in high rates of fare and excessive investment per capita misses the very essence of the proposed Cleveland rapid transit plan. The Boston system started with street car subways in the downtown district, but the subsequent development has been allowed to run into the excessive building of expensive rapid transit subways and tunnels. The high cost is partly due to the separation of the various parts of metropolitan Boston by waterways requiring long subaqueous tunnels. Narrow and crooked streets have made difficult the full development of surface car lines. In Boston also the interest charges are all carried by the car riders.

In Cleveland, with its wide streets and with only its single river and valley separating its principal metropolitan area, no excuse arises for such great expenditures in subway and tunnel construction. The commission's plans also provide for relieving the car rider by spreading the fixed charges largely on the tax roll.

"THE FIRST STEP IN RAPID TRANSIT" FOR CLEVELAND

The Rapid Transit Commission's plan in Cleveland will in this first step create a hub with radiating spokes, any one of which can be developed by extension into the outlying districts of the city. The extension of any one line must depend upon the traffic development in the district such as to warrant the extended building of the permanent rapid transit structures and the operation of trains.

"The First Step in Rapid Transit" is therefore a justified expression as the development of this system is planned. It is proposed to attack first the most vital difficulty confronting the city, namely, that of congestion and delays to the existing service. Outlying rapid transit lines not traversing this downtown district and leaving the street car lines choked and throttled by vehicle traffic would not be a justifiable first step. More of Cleveland's own citizens will be benefited by the present proposed first step than by the expenditure of an equal amount of money in a single competing rapid transit line in any one of the various radiating directions followed by its main thoroughfares.

A. L. A. to Help Industries

The American Library Association, which during the war supplied the men here and overseas with more than 7,000,000 books, is undertaking an enlarged program through which it hopes to create a far wider reading interest throughout the nation. Through librarians, library trustees and friends of libraries it is now creating a fund of $2,000,000 to aid in a general campaign for Americanization. In this direction the association will encourage the establishment of technical libraries in plants and factories, will further the county library system, etc.

Rezoning Effective on May 9

Connecticut Company to Appeal from Commission's Decision on Reduced Rates for Zone and Commutation Tickets

PRESIDENT LUCIUS S. STORRS of the Connecticut Company on April 21 issued a statement that the company would appeal to the Superior Court of Hartford County from the recent decision on the zone system of the Connecticut Public Utilities Commission, in so far as that decision affects its "fundamental rights," the specific complaint being that in allowing commutation tickets the commission virtually confiscates the property of the company. The appeal, however, will have no effect on the new rates ordered in effect for May 9 by the commission. The company is hard at work rezoning its system on the mile-zone basis.

The statement sets forth that it is the belief of the company that the commission exceeded its powers in suggesting the installation of reduced rate tickets. It also contains a warning that it may be necessary to increase fares further or eliminate service on some lines altogether in case the proposed rates do not produce sufficient revenue. Reduction of revenue can be prevented only by a greater use of the service.

Mr. Storrs' statement follows:

COMPANY WILL APPEAL

The directors of the Connecticut Company have made a careful study of the finding and order of the Public Utilities Commission regarding the system of fare collection and rates installed by this company in November 1919.

In adopting this system our primary object was to preserve to the communities served the extensive fabric of street railway facilities which had been developed during a period of many years and upon which the social, business and industrial life of so large a portion of the state depends.

We regret that the commission did not see its way clear to permit a longer trial of the system which we had adopted after such careful consideration and comprehensive survey of the riding characteristics on all lines, but it is our intention to place the new schedules in effect as proposed, using our best endeavors to make the plan a thorough success.

It is gratifying that the commission so fully approves the method of collecting fares based upon the distance traveled and we appreciate that the commission has been most desirous of affording a just and proper solution of the many difficulties inherent in the situation. Both the commission and the company are endeavoring to obtain the same results, but, as is pointed out in the finding, full co-operation of the public is necessary to enable the company to maintain adequate service. It is, of course, essential that our revenues are not reduced and this can only be accomplished by a greater use of the service under the proposed rates of fare. We think that the theory upon which all street railway fares should be based—that of giving the maximum of safe and convenient service at a minimum charge—does not justify the making of any reduction from established cash rates for any class of riders.

It is to be hoped that such use will be made of the service under the proposed rates as will produce sufficient revenue in order that it may not be necessary further to increase the rates or materially reduce the service which on some lines would result in the entire elimination of the street cars.

There is a legal question involved and we are advised by our counsel that it is probable the commission has exceeded its powers in suggesting the sale of tickets at reduced rates and the installation of commutation tickets. In view of this fact the company has felt constrained to file an appeal with the Superior Court, but with the definite desire of not contesting any further than is necessary to preserve our fundamental rights at this time.

Until the rezoning, which is now in progress, is completed no estimates can be made as to the effect of the proposed rates upon any particular fares.

An interview with the commission prior to the time the company decided to appeal the case brought out that it was its intention to increase the income as a whole and to establish lower rates for the regular rider. It believed that the casual patrons, including those that rode only when other forms of competitive transportation were not available, should pay a higher rate and for that reason made the cash rate per zone 3 cents. With the new zone rates established and good merchandising methods on the part of the company, the commission said that it hoped that a larger income would be derived from the passenger business without discriminating wholly against the suburban rider. The increase in revenue under the plan should keep pace with the increased cost of rendering service. To reduce expenses and taxes, the commission urges that the company be relieved of paving charges, bridge assessments and other forms of indirect taxation that it is now required to pay at the expense of the car rider.

In pushing out the minimum fare limit a half mile from the traffic centers the commission also hoped to decrease the travel on jitneys, providing the company rendered adequate short-line service out to this fare limit.

The commission believes in up-to-date merchandising methods in the way of advertising in the cars, to bring to the attention of the car rider the unnecessary burdens that are now imposed upon him because he rides upon the cars, and what these burdens mean not only to the local company but to the street railway industry as a whole.

Commutation and zone tickets were established because the evidence at the hearings showed that the existing zone fares were discriminatory against the suburban rider. The commission also held that the use of such tickets would speed up the fare collection on the cars as it would eliminate a large percentage of the change making at the unloading points. The principle of pay-leave as the best system of fare collection under a distance tariff was indorsed.

The commission retains jurisdiction over the zone system established, not only as to the location of the zone limits but as to the rates themselves, and should it prove after a fair trial that the system does not earn sufficient revenue to pay a reasonable return, the ticket rates will be increased gradually until they reach the cash fare rate of 3 cents per zone.

WHAT SOME NEWSPAPER MEN THINK

When the finding was discussed with several daily newspaper men, one stated that he believed that the decision would simply reduce the trolley income without lessening expenses and that the cost of operation would very likely be increased because the trainmen might ask for additional wages due to claims of extra work. While it is true that the commission urges a reduction in taxes, both direct and indirect, and the elimination of unfair competition, this cannot be accomplished until the next legislative session, which does not meet until 1921.

The commuter, he said, is the only one who can rejoice over the finding, for he is favored with a lower rate. For a little more than half the amount of fare the casual must pay, the commuter can make his daily journeys. The city rider who buys the new zone tickets will ride for two-thirds of what the casual rider will pay. The unearned increment of the suburban land owner is safeguarded, and the rural dweller's property values are increased at the expense of the trolley company, which is made a public benefactor without a chance of getting any reward.

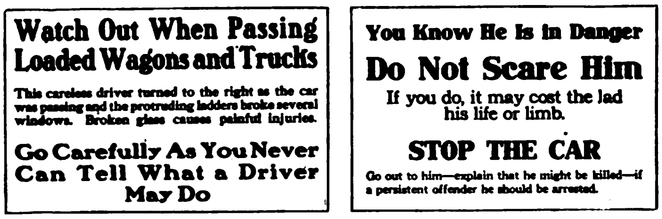
Having established new rates, the commission assumes responsibility for the financial future of the company. If they result in further deficits the fault will rest with the commission, for the company under its own plan has been receiving a material increase over that earned with the 6-cent fare. Any criticism of the Legislature for failure to grant the relief suggested will under these circumstances avail nothing. The commission should consider conditions, not possibilities, and if the conditions it is creating are to make the trolley situation worse than it now is, instead of better, its obvious desire to placate complainants must bring a reaction.

Bridgeport is particularly displeased with the result, for an element there sought to have the lines in that city segregated and operated under a nickel fare with safety cars. While the commission has properly denied the segregation claim, nevertheless the city is greatly agitated over the high cash fare and the discrimination in favor of the rural dweller. One editor says, "the more one studies the zone fare order the more ridiculous, impractical and harmful it appears. It is full of high-sounding phrases such as 'inequalities of fares,' which it promises to adjust, yet the actual effect of its adjustment is to make them more unequal than ever."

At the hearings several cities and towns indorsed the company's plan and believed that it entirely safeguarded the public welfare, but now Waterbury and New Haven show no great pleasure over the finding.

Careless Drivers and Reckless Boys

THE accompanying illustrations are reproductions from current bulletins issued by the National Safety Council. The one at the left is accompanied by an appropriate illustration of the accident described, a hazard to passengers and rolling stock that is growing more serious each day. A circular letter accompanying the bulletin directs attention to the fact that while the motorman cannot always foresee possible accidents, such a bulletin as this will serve as a reminder to him to be constantly on the lookout for this specific hazard. In such accidents the burden of responsibility is placed first on the motorman, notwithstanding the fact that investigations usually show that the driver of the wagon or truck was at fault.



Watch Out When Passing Loaded Wagons and Trucks

This careless driver turned to the right as the car was passing and the protruding ladders broke several windows. Broken glass causes painful injuries.

Go Carefully As You Never Can Tell What a Driver May Do

You Know He Is in Danger

Do Not Scare Him

If you do, it may cost the lad his life or limb.

STOP THE CAR

Go out to him—explain that he might be killed—if a persistent offender he should be arrested.

THE TEXT OF TWO RECENT BULLETINS ISSUED BY THE NATIONAL SAFETY COUNCIL

The bulletin at the right is accompanied by an illustration showing a small boy "flipping" a car. An accompanying letter states that conductors should be instructed to handle the boy problem tactfully and especially to avoid frightening boys, for it is while frightened that they are most likely to be injured or killed. It may be advisable to station supervisors at certain points where boys are especially troublesome.

American Association News

THE ANNUAL CONVENTION OF THE A. E. R. A. WILL BE HELD IN ATLANTIC CITY, OCTOBER 11 TO 15. WAY COMMITTEE HOLDS TWO-DAY SESSION. MERCHANDISING TRANSPORTATION DISCUSSED AT COMMITTEE MEETING IN NEW YORK

Convention at Atlantic City, Oct. 11 to 15

THE thirty-ninth annual convention of the American and affiliated associations will be held at Atlantic City, N. J., from Oct. 11 to 15, inclusive. Announcement of this decision has just been made, following a meeting of the committee on location held at Atlantic City on March 24 and after the committee had considered a number of other locations.

A committee on exhibits and other convention committees will soon be appointed to begin active preparations for what is expected to be the largest and most successful annual convention ever held by the association.

Work on the program of the American Association meeting is already under way and the programs for the affiliated associations have been practically completed. From the interest already shown by the manufacturer members this year's exhibit of apparatus and devices promises to surpass anything held in previous years.

Contracts have been entered into with the management of Young's Million-Dollar Pier, where the convention and exhibit will be held; with the Atlantic City Hotel Men's Association, with C. M. Koury & Company, for furniture, rugs and furnishing; with J. J. Habermehl's Sons, for floral decorations, and with the Eldredge Express Company, for hauling exhibitors' materials.

The members of the committee on location are George Keegan, chairman; Martin Schreiber, John M. High, W. R. Hulbert, Thomas Casey and E. B. Burritt, secretary.

Two-Day Session of Way Committee

THE committee on way matters met at association headquarters in New York on April 15 and 16. Those members in attendance were: R. C. Cram, Brooklyn, chairman; A. E. Harvey, Kansas City, Mo.; H. A. Abell, Rochester, N. Y.; C. A. Alden, Steelton, Pa.; Victor Angerer, Easton, Pa.; E. B. Entwisle, Johnstown, Pa.; E. M. T. Ryder, New York City, and H. Fort Flowers, New York City.

On the subject of standard specifications for track spirals, a system of spirals as prepared by the subcommittee was recommended for adoption as "recommended practice" and plans were made for an early subcommittee meeting to work out suggestions of application of the system of spirals suggested. It was stated that for use in consideration of the subject of standard sections for curved rail heads a questionnaire was sent out to the member companies, but up to the time of the meeting only five replies had been received. Three of these indicated no use for the rail in question, while the two others indicated satisfaction with this design. One of the latter submitted blueprints of standard rails in use and worn wheels and rails. Those showing rail wear indicated close agreement with the general outline of the curved-head rail shown in the Lorain Steel Company drawing No. 122-491. It was decided that the committee should recommend a change in the association's recommended design for 7-in. and 9-in. grooved girder rails to eliminate the flat or plane head and substitute a curved head to agree with the Lorain Steel Company's drawing mentioned above. The equipment committee, represented at the discussion of this subject by F. W. Sargent, concurred in this recommendation. It was also decided not to recommend a change in the designs now recommended for girder guard rail. This latter subject is held open for final decision.

In the discussion of the assigned subject of progress in rail joints the committee raised the question as to whether the arc-welded joint is good practice and what happens when it is applied. It was decided to consult the Bureau of Standards to determine what arrangements can be made for a thorough investigation of joints, including all types of welded joints. The subject of revised specifications for plain bolted special trackwork was discussed, and it was decided that Section Ws 8a of the Manual needs complete revision. It was suggested that there should be incorporated in this section a paragraph on plain bolted crossings and something additional on insert work.

The subject of specifications for wood-block paving was discussed at some length. One member of the committee expressed the opinion that a granite flangeway should be retained inside the rail whenever wood block is used as a pavement. It was agreed that the use of wood block should be limited to new construction and to absolutely first-class track. It was brought out that in answer to a questionnaire sent out by another association 51 per cent of the electric railways answering said that with modern, properly constructed track wood block can be used with satisfaction, 23 per cent said they had no use for it and 26 per cent failed to answer the question. The committee will review this subject as reported by the American Wood Preservers' Association.

In the discussion of the subject of revision of the Manual, it was decided that some form of concrete slab construction substantially like type C, formerly suggested, should be recommended for use under special conditions. This is a revision of section Wf 1a. Some plans for new designs of track construction are to be formulated and the use of steel ties is to be reviewed and some recommendations suggested. In section Wm 1a it was decided to change the phrase "special work" to read "special trackwork," using trackwork as one word. It was also decided to change the definition of special work to read "switches, mates, frogs, crossings, guarded curves and parts of track other than plain straight track and plain unguarded curves."

On section Wm 3a there was considerable discussion in regard to the elimination of the word "T-rail" from the specification for splice bars for girder and high T-rails. The change recommended is for reasons of policy and not on account of engineering considerations.

and is due to the aversion of city engineers to the use of T-rail. The recommendation adopted was that the recommended specifications should read "Specifications for splice bars for girder rails of plain, grooved and guard types." In a discussion of section Wm 7a it was brought out that from tests made by the American Railway Engineering Association it had been determined that six-hole drilling of rail joints was not necessary and did not add any strength to the joint. It was decided to eliminate the drawing showing the six-hole drilling and to show instead the four-hole drilling.

It was recommended that the recommended design for plain girder rails for use in paved streets shown in section Wr 1b be brought to the attention of the ensuing committee with the suggestion that these designs be changed to conform to general usage. The suggestion is based on the belief that the 80-lb. rail has never been used, that the 90-lb. rail has never been rolled and that the 100-lb. rail has had practically no use by either steam or electric railways. A report will be made on this subject at the next meeting of the committee.

At a discussion of the recommended specifications for the manufacture of open-hearth girder and high T-rails, section Wr 2c, it was recommended that the title be revised to read "Specification for the manufacture of open-hearth steel girder rails of plain, grooved and guard rail types for use in paved streets." Under this section the matter of the modified Brinell or impression test was thoroughly discussed. The consensus of opinion seemed to be not to abolish the drop test until more was known of the Brinell test, in spite of the fact that the American Society for Testing Materials has specifically adopted the latter tentatively until 1921. The matter was referred to a sub-committee for a report on the merits of the proposition and recommendations as to what it is believed the committee should recommend in its report.

On the subject of safe limit of wear on rails, it was stated that some data have been obtained and that additional data will be prepared on this subject. On the subject of safe limit of wear on special trackwork, it was suggested that the safe limit and the economic limit coincide for all practical purposes and that the economic limit of wear depends on many conditions such as the effect on rolling stock, on surrounding pavement, on the nerves of trainmen, passengers and surrounding inhabitants, etc. It was decided to send out a questionnaire to assist in the compilation of data on this subject.

It is expected that another meeting of the committee will be held some time during June.

City Engineer Praises Connecticut Company

THE thirty-fourth monthly meeting of the Connecticut Company, section No. 7, was held at the Hotel Garde, New Haven, on April 8. Sixty members and guests attended a seven o'clock dinner preceding the addresses.

President W. R. Dunham, Jr., first presented Robert A. Cairns, city engineer of Waterbury, Conn., who referred to the pleasant business relations between his office and the Connecticut Company. He made special reference to the service which the Connecticut Company performed during the storm period of February and March, not only in providing service but in clearing the streets for other vehicles. On account of his using an automobile for his own transportation, he had judged service only by hearsay until a memorable trip from New Haven to Waterbury showed him a sort of service satisfactory in every way, which indicated that some one must have planned the operation with a view to making it satisfactory. He commenced to believe that railway officials are really working efficiently on the job, and not loafing.

The other speaker of the evening was A. R. Williams of Providence, R. I., attorney for the Rhode Island Company. Mr. Williams took as his text "Leninetrotzkyitis, the bug; where it came from and where it is going," and analyzed from the historical viewpoint the present social unrest. His talk was full of sound encouragement for sane American thought and action in the present crisis.

Merchandising Transportation

ON APRIL 12 a preliminary meeting of the committee on merchandising transportation was held at the association headquarters in New York. Due to the railroad strike, the only members of the committee who could attend were F. G. Buffe, Kansas City, Mo., chairman, and W. H. Boyce, New Brighton, Pa. It was thought best, in order to get the work started, to attempt an analysis of the subject and to assign to members of the committee different divisions of the subject upon which to prepare a report for a meeting to be held some time during the latter part of May.

The subject of merchandising transportation was subdivided as follows:

1. Scope of the subject; report to be confined strictly to merchandising methods and not to enter the field of public relations or to include much general matter.

2. Bibliography of the subject and brief synopsis of work along similar lines by previous committees.

3. Direct methods of merchandising transportation: (a) Advertising—Billboards, "movies," newspapers, letters, publications. (b) Service—Extent to which proper service adds to the salability of transportation. This will include headways, proper schedule regulations, use of loading platforms, rearrangement of congested district stops, etc. (c) Employees—Means of educating employees along the line of salesmanship. Necessity of securing co-operation of transportation service employees and means to arouse their interest. (d) Ticket fares—Method of selling, agencies, selling by mail, etc. (e) Merchandising of transportation, with particular reference to meeting jitney competition. (f) Merchandising of transportation, with particular reference to the operation of safety cars.

4. Indirect methods of merchandising transportation: (a) Co-operation of public bodies—This subject will deal with the opportunities of awakening Chambers of Commerce, Public Service Commissions, etc., to the necessity of helping to increase the business.

5. Recommendations.

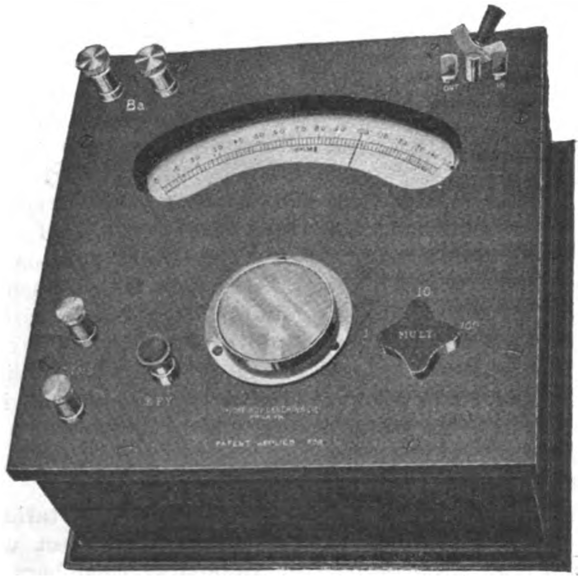
The thought expressed by the committee was that urban transportation today, due to jitneys and the rapidly increasing use of private automobiles for business purposes, is more than ever a competitive business. It is subject to the law of supply and demand and will respond to advertising. It is dependent upon salesmanship methods, and within certain limits will react to the stimulus of merchandising methods. The subject is to be considered only from this point. While merchandising is dependent upon public relations, which in the last analysis constitute "good will," the report of the committee will not attempt to go into this side of the question, but will confine itself to the means and methods whereby the service to be sold can be made more attractive; to the education of employees so that they may represent their company more in the capacity of salesmen than heretofore; to the mediums of advertising, and the appeal that will most quickly attract business; to the help that it is possible to obtain from public and civic bodies, and to the advantages offered by the widespread use of tickets.

Electric Railway Address at Chamber of Commerce Meeting

THE program for the general session on Wednesday morning of the United States Chamber of Commerce convention next week has been changed to admit of an address on electric railways. The speaker will be John H. Pardee, president American Electric Railway Association, and the subject will be electric railways in relation to increased production. The session on Wednesday morning will be devoted entirely to the subject of transportation in relation to increased production, and the address on electric railways will be preceded by others on steam railroads and followed by others on highways and the merchant marine.

New Type of Indicating Ohmmeter

THE Thompson-Levering Company, Philadelphia, is marketing a new type of indicating instrument called the Vawter Ohmmeter. This is an aperiodic or dead-beat instrument and does not require any preliminary adjustment calibration. Some eight different types of the instrument are being manufactured in order to meet every requirement of resistance measurements from microhms up to megohms and for any degree of accuracy to one involving an error as small as 0.1 of 1 per cent. One application of this instrument is to measure the resistance of a section of electric rail containing a bond in terms of 1 ft. of the solid rail that is bonded. Another low-resistance type of this instrument, used in conjunction with ordinary current-carrying shunts, indicates the resistance of transformer, armature or field coils of low resistance.



INDICATING OHMMETER

Insull Speaks at W. S. E. Luncheon

Points to Duty of Engineers to Know the Facts and Pass Knowledge Along to Public

AS THE speaker of the day before the first regular monthly luncheon of the Western Society of Engineers, Chicago, Samuel Insull talked about the influence of engineers in connection with the public utility industries. He said that they should be the leaders of thought in utility problems; that they should make it their duty to post themselves on the facts and apply their powers of reasoning and exact statement to the work of enlightening the public in utility matters, and in public questions in general involving engineering thought. He criticised the engineers as a group for their tendency to react against new, broad utility developments and to point to the difficulties rather than to post themselves and advocate the great possibilities.

Speaking of the incessant talk about "home rule" of public utilities, Mr. Insull remarked that the whole tendency of public utility control is irresistibly more than an urban problem and that it could only be settled on a state or interstate basis. This was one example of where the engineer might exert his influence advantageously. Another situation in which the engineers could help toward sound progress was in connection with the broad assertions which are made about the water-power resources of the country. He stated that if all the water powers of the United States could be used the total energy thus made available would not be sufficient to take care of more than half of the present demand for electrical energy. He said also that the possibilities for using oil or gas for fuel in any extensive way was out of the question. This pointed to the fact that the future wealth and well being of the country depend on the coal supply, thus emphasizing the imperative need for securing the utmost economy in coal consumption through interconnection of power systems, electrification of railroads, etc. He declared that the known supply of coal in the United States was great enough, if proper economy were exercised, to support an infinitely greater population than the present one into the very distant future. As indicating the possibilities for economy through efficient engineering sales work, proper construction and design of equipment, Mr. Insull pointed to the results which have been obtained by the Commonwealth Edison Company, which supplies all the energy requirements of all the local transportation companies in Chicago, as well as all lighting and power requirements. Chicago has between 2½ and 3 per cent of the total population of the country, while the energy generated there is more than 5 per cent of the total electrical energy produced in the United States. The generation results in 6 per cent of the gross income from the sale of electrical energy in the country and it is done on an investment which is only 3 per cent of the capitalization in the central station industry in the country.

Mr. Insull referred to the starving process to which many of the utility companies have been subjected and asserted that this could not go on with the expectation that the utilities could continue properly to function. The effect of such a policy was far greater upon a community than upon the company which is being crucified. Under such conditions great industrial efficiency is impossible.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Toledo Commission Active

Rushing Work on the Cost-of-Service Measure So Early Vote May Be Had

Members of the cost-of-service commission at Toledo, Ohio, have been busy adjusting their draft on an ordinance for the settlement of the Toledo railway difficulties to meet the objections pointed out recently by Henry L. Doherty on behalf of the Toledo Railways & Light Company, owning the lines.

MR. DOHERTY'S SUGGESTIONS ACCEPTED

The commission has determined that whatever is submitted to the people for ratification must satisfy the Doherty interests first or be useless if adopted by the people. They are rushing the work so that an early vote on the terms of settlement may be had. In many sections of the ordinance the objections of Mr. Doherty have been found to be well taken and changes have been incorporated in the ordinance.

By the provisions of the latest turn in the Toledo situation, in which Judge Killits of the District Court granted a fare increase to the company so that a wage advance to the men might be allowed in order to restore railway service after a strike had been called, the company and city were granted the privilege of making application for investigation by the court to determine whether the fare now being charged is excessive or enough for a proper return on the investment.

The court set April 22 as the day for making such a request for investigation. Neither the company nor the city has shown any inclination to make a move in that direction. Whichever party asked for the hearing would have to furnish the bulk of proof.

JUST SUSTAINING LIFE

It appears that the company, while not claiming to make a fair return on its investment, is obtaining revenues which maintain it in a living condition. The recent fare increase provided for the wage advances in a large measure and as long as these terms continue it is doubtful whether the company would aggravate the situation by asking for higher fares.

The city, on the other hand, while its Mayor and law director have been contending that the company is making excessive charges for power and other items, so that operation is not economical, has not seen fit to take unto itself the burden of proving these claims.

The court promised a thorough investigation which would be based on a valuation of the physical properties and investment of the company. The city officials fear that such an investigation of the court might set a basis for a valuation in the future which would be detrimental to the efforts of the city providing condemnation proceedings were brought in an attempt to buy the lines for municipal control.

The municipal ownership commission, which has been investigating a proposition to submit to the people at the same time a cost-of-service plan is put before them, is now considering the feasibility of a bond issue of about $2,000,000 for a motor bus system. Some members of the commission fear that the unsettled condition resulting from the ouster ordinance of last fall will be carried through the coming winter and that Toledo may again suffer a tie-up of transportation without any adequate relief. The bus system could, of course, be used as an auxiliary to the railway.

The commission has not yet submitted a report to the federal court.

130-Mile Interurban Project Approved

The Dallas (Tex.) Railway will build an interurban line from Dallas to Wichita Falls, a distance of 130 miles, in lieu of two lines, each at least 30 miles long, which the company contracted to build under terms of the franchise granted this company in 1917. The proposition was voted upon favorably in the municipal election in Dallas on April 6.

The Dallas-Wichita Falls line has been promoted by committees of Dallas and Wichita Falls business men, who have had surveys made by the Fred A. Jones Company, Dallas, and estimates covering cost of construction prepared. These committees have agreed to carry through the financing details of the proposition, which are already well advanced, and then turn over to the railway the uncompleted project, which the traction company agrees to have in operation by July, 1922. It is estimated that the completed line and its equipment will cost $9,500,000.

The line will run northwest from Dallas, touching Denton, Krum, Bowie, Henryetta, Wichita Falls and numerous smaller towns. The line would penetrate a zone of 2,400 square miles, with a population of 150,000 people now practically without railroad facilities. It would also connect with several trans-continental railway lines not now easily accessible to Dallas.

Subway Campaign Opened

Considerable Opposition Seems to Have Developed to Putting Through the Cleveland Plan Now

The subway bond campaign has been opened at Cleveland, Ohio, and members of the Rapid Transit Commission are addressing various organizations and bodies of business men on the subject. For some time the Cleveland *Plain Dealer* has been running a series of articles, detailing both the arguments in favor of the project and those against it. Up to this time they have dealt mostly with those favoring it.

WILL INCREASE TAXES

The greatest objections yet advanced are the increase in taxes that will be required to take care of bond interest and the excessive cost of materials and labor at this time. Current loaning rates are 7 per cent and only recently it was found impossible to sell 5 per cent city bonds. This is the rate the subway bonds were expected to bear.

No action has been taken by the Cleveland Chamber of Commerce upon the adverse report made to it by the special subway committee. Because of a division of opinion among the members, it is said that the report may not be put before the body for its decision.

An adverse report was made to the Rapid Transit Commission by the Cleveland Association of Building Owners and Managers on April 14. The reason assigned for this step is that it is an inopportune time for the construction of such an improvement.

The Cleveland Building Trades Council has approved the construction of the subway as mapped out by the engineers. Business Agent Charles Smith said that the subway is needed for the development of home building outside of the high-rent district and to insure the employment to those people who are attracted to the city by the home building program.

RAILWAY COMMISSIONER EXPLAINS

Fielder Sanders, Street Railway Commissioner, has taken issue with a statement published recently to the effect that only twenty-five cars have been purchased by the Cleveland Railway during his administration. He shows that a total of 181 cars has been added during the years 1916, 1917 and 1918. No cars were purchased in 1919, because of the existence of war conditions. During the period mentioned 145 cars were scrapped, leaving a net gain of thirty-six. All the new cars and trailers, however, are of the largest size and contain the latest improvements.

Electrification Urged

Canadian Government Asked to Electrify Main Lines as Offset to Proposed Radial Systems

Electrification of the Ontario lines of the Grand Trunk and the Canadian Northern Railway systems now owned by the Dominion government was advocated in the Canadian Senate at Ottawa recently by Senator E. D. Smith, who declared such action to be necessary to avoid "frightful losses" which would otherwise result from duplication of existing railways by a system of Hydro-Electric Power Commission radials.

A $200,000,000 Project

Forty-seven municipalities have now voted in favor of the construction of 1,600 miles of hydro radials, the estimated cost of which is $200,000,000. One line to be constructed is between Toronto and Bowmanville, a 40-mile stretch already served by six railways, several of which are owned by the Dominion government. The cost of that section is estimated at $200,000 a mile.

Senator Smith argued that the people of Ontario are determined to have electric railway service, because of the advantages of speed and frequency, and unless the government is prepared to accept heavy losses on the federal system, he declared existing steam roads should be forthwith electrified.

Sir Adam Beck, chairman of the Hydro-Electric Power Commission of Ontario, at whose behest the people have declared in favor of the radial scheme, at a recent conference with the Minister of Railways at Ottawa proposed a plan for co-operation between hydro radials and the Canadian National Railways system. He asked that Hydro be permitted to purchase the Niagara, St. Catherines & Toronto Railway, the Toronto & Eastern Railway, which runs to Bowmanville, and the Toronto & Suburban line to Guelph, thus to avoid construction authorized by the people, which would entail duplication.

Sir Adam Satisfied

Sir Adam also proposed the electrification of certain branch lines of the old Grand Trunk and the Canadian Northern Railway systems and the electrification of city terminals and their operation by the Hydro system. He urged that the hydro radials and electrified branch lines would serve as feeders to the main lines of the government system. Sir Adam Beck afterward announced that the results of the conference were "wholly satisfactory."

Substation Destroyed by Fire

Service on two railway lines at Toledo, Ohio, was held up for six hours on March 10 by the destruction of the Casino substation north of the city by fire of unknown origin. The loss to the Toledo Railways & Light Company is estimated by officials to be $50,000, about 90 per cent covered by insurance. The substation was located in a building that was once a hotel. Help from the city fire department arrived too late to save anything.

F. J. Derge, assistant general manager of the company, declared that the station would be rebuilt immediately and probably at a new location. The present site of the destroyed station may be again used for hotel purposes. The substation supplies all the power for the Toledo, Ottawa Beach & Northern lines and also the Point Place and Summit Street lines. It also served lighting customers in the northern section of the city and beyond the city limits.

Wages Increased in Appleton

Voluntary Wage Advance Provokes Favorable Comment by Daily Press on Railway Management

The Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., on March 8 voluntarily increased the wages of motormen and conductors on both the city and interurban lines and other employees directly connected with the operation of the cars 5 cents an hour. The increase dates from March 1. This makes the present scale 48 cents to 50 cents an hour. The action of the company came as a surprise to the men, inasmuch as they had received a substantial increase less than six months ago.

The issue of the Appleton *Post* for the day prior to that on which the increase in wages was announced contained an editorial which bespeaks the public attitude which good service begets. It reads in part as follows:

> Not the least of Appleton's assets is the Wisconsin Traction Light, Heat & Power Company. In making this favorable comment we refer in this instance particularly to the interurban line which it operates between Kaukauna and Neenah. We do not believe there will be found anywhere in the State of Wisconsin an electric railway operated with greater efficiency and with greater fidelity to the service of the public than this property. When other interurban lines throw up their hands in the face of storms and cold this company works ceaselessly to keep its road open, and actually does keep it open . . . The record of the Wisconsin Traction, Light, Heat & Power Company is one to be proud of. The city and communities served by it are fortunate. It gives service in the best sense of the word—service that is dependable and accommodating.

New York Bills Defeated

The Jenks service-at-cost bills referred to previously in the ELECTRIC RAILWAY JOURNAL were defeated in the Assembly on April 22. The most important of the measures lacked ten votes of the required majority of seventy-six. The bills can, however, be brought up again for reconsideration on motion of their sponsor, Assemblyman Jenks. The vote on the first Jenks bill stood sixty-six for and seventy-seven against passage. On the second Jenks bill and the third, of relatively slight importance, the vote stood sixty-five for and seventy-eight against. The opinion seems to prevail at Albany that the defeat the bills sustained on April 22 is final.

Preparing Houston Grant

Service-at-Cost Measure, Growing Out of Fare Case, Being Drafted for Submission to Voters

The new franchise for the Houston (Tex.) Electric Company is expected to be ready for submission to the people for ratification in a few weeks. This franchise will be granted in line with the findings of Special Master Otis K. Hamblen and Judge Hutcheson of the United States District Court, holding that the present fares permitted the company are confiscatory and that the company should be permitted to earn a return of 8 per cent on its valuation of $6,000,000 as fixed by the special master. The company is charging a 7-cent fare for adults with 3½ cents for children and students. This fare went into effect on April 4 and will continue until the new franchise takes effect.

Dallas Being Copied

The new franchise is being patterned somewhat after the Dallas grant of 1917. Co-operation of the company and city officials will be one of the chief features of the new franchise. A commission of four, two city officials and two company officials, is proposed to audit the books and control the sliding scale of fare charges and earnings and supervise expenditures.

The fares charged are to be on a sliding scale and bear a definite and fixed relation to earnings. The company will be permitted to earn 8 per cent net on the $6,000,000 investment, to which will be added the cost of all improvements and betterments ordered by the board of control. There will be a stabilizing and reserve fund of $200,000 to which is to be added all earnings above the authorized 8 per cent on the property valuation and the 4½ per cent allowance for depreciation and upkeep, until this fund reaches $300,000. Any time earnings exceed these allowances fares are to be revised downward and any time the earnings fail to provide these allowances fares are to be increased. The fare adjustments are to be made quarterly by the board of control.

Paving Requirements Modified

The company is not to be compelled to pave the space between its tracks in the residential sections of the city, but is to fill such space with gravel or similar material that will enable vehicles to turn or cross thereon, but which will not invite drivers to drive thereon.

Municipal Ownership Bill Advanced

The bill of the city of Toronto, Ont., for the acquisition of the Toronto Railway and the operation of the road by a commission was approved by the private bills committee of the Legislature on April 8 with only one important change. The change gives the City Council power to pay the members of the commission a salary if it sees fit.

New Welfare Association at Louisville

Objects Are Collective Bargaining and Co-operative Welfare with Adequate Service to the Public

To attain the threefold object of adequate service to the public, welfare of the company and welfare of the employees, the Louisville Railway and the Louisville & Interurban Railroad and the employees of both companies will, on April 1, enter into a co-operative agreement. The organization is to be known as the Co-operative Welfare Association. Its purposes, as defined by the constitution, are collective bargaining and co-operative welfare. A clause under this heading provides that for the purpose of collective bargaining the companies will deal with no organization of its employees other than the Co-operative Welfare Association.

MEMBERSHIP in the organization is not to be compulsory and it is specifically stated that any member of the organization may join any union or other organization. Two classes of membership are provided, limited and active. The limited membership extends only to the participation in co-operative benefits, while active membership extends to all of the activities of the organization. Eligibility to membership requires that an employee shall have been with the company four months. It also provides that to be an active member, a man may not be an officer of the company, which is defined as follows:

1. In the transportation department: the chief despatcher, trainmaster, regular inspector, regular assistant carhouse foreman, carhouse foreman, or above.
2. In the maintenance of equipment department: the chief motor inspector, foreman of the interurban repair shop, foreman of the machine, carpenter, or paint shop, or above.
3. In the motive-power department: watch engineer, line foreman, or above.
4. In the maintenance of way and structures department: assistant foreman, foreman, or above.
5. In the clerical department: cashier, auditor, paymaster, superintendent of change and transfer room, chief adjuster of claims, or above.

Scheme of Organization

The organization may take cognizance of wages, hours of service, conditions of service, through a series of committees, but all other activities of the transportation enterprise are outside the scope of the organization. All committees are to be composed of equal numbers of active members of the welfare association and persons appointed by the company, who need not be members. There will be local committees, departmental committees, and a general committee. Any matter on which a local committee cannot reach a decision will be referred to the proper departmental committee, and from this to the general committee.

If the general committee cannot reach a decision the matter must be submitted to arbitration. Any decision of a local or departmental committee is to be final except that the general committee by a majority vote of either side may call up for review any decision of a local or departmental committee. To reach a decision, a majority of company committeemen must concur with a majority of those representing the men, a majority meaning more than half of those present and absent. A quorum of any committee to do business is to be a majority present on each side.

The local committees will be composed of two active members from the welfare organization and two persons appointed by the company. Local committees will be organized as follows:

Transportation department: one at each carhouse.

Motive-power department: one at each power house, one representing substations of which one committeeman shall be a city operator and the other interurban, and one representing linemen.

Maintenance of equipment department: one for each of the following: paint shop, carpenter shop, machine shop, motor inspection, interurban repair shop.

Maintenance of way and structures department: one representing city trackmen and one representing interurban.

Clerical department: one from all of the various city offices and one from interurban clerks and agents.

At the first election all active members will be eligible for the office of local committeeman. Thereafter only those who shall have been continuously in the employ of the company twelve months and, in the transportation department, who, in addition, are assigned as trainmen to a regular run. The employees' representatives on the departmental committee are to be made up of the committeemen from each local committee who is elected by the highest number of votes, and an equal number of company appointees. The general committee is to be composed of delegates elected by the departmental committees from their own number, and an equal number of company appointees.

Meetings of the general committee are to be held at least monthly, for the consideration of adjustments, complaints and grievances, general welfare of the men and of the company, expenditure of the funds of the organization and all other business within the scope of the organization.

The constitution provides that in the event the general committee cannot reach a decision, the matter must be arbitrated. In this case the company will appoint one arbitrator, the Welfare Association members of the general committee another, and these two are to elect a referee, the decision of the majority of the three being final.

Funds for conducting the organization are to be provided by contributions from the company and dues of the members. The amount of dues is to be determined by the Welfare Association members of the general committee and the amount of the company contributions is to be determined through negotiation of the general committee with the board of directors of the company.

The idea behind the movement in Louisville is to create an industrial democracy in the electric railway industry of the city. With this in mind, the concluding provisions of the constitution are interesting:

> This constitution proposes an industrial experiment. We, its framers, believe in the success of our undertaking. But we realize that we are not infallible, and we are conscious of a lack of experience in dealing with industrial democracy.
>
> The only way that we can suggest to obtain a workable form of industrial democratic government is to try something: if it works, well and good—if it doesn't work, try something else. Therefore, it is provided:
>
> 1. If, at any time within three years, either side is dissatisfied with this constitution, it may withdraw therefrom by giving six months' notice of such withdrawal to the other side: after three years, by giving twelve months' notice.
> 2. In considering withdrawal, the company acts by a majority of all its directors, the men act by a majority of all their committeemen, held at a joint meeting of general, departmental and local committees.

Detroit United Stands Its Ground

The Street Railway Commission of Detroit, Mich., has addressed a letter to the Detroit United Railway asking its intentions relative to the St. Jean Avenue extension. Although the Mayor's opinion was that the Detroit United Railway would not be interfered with until the city lines were well under way, the letter to the company at this time is expected to bring a statement as to the company's attitude relative to the city's acquiring the lines built or being built on the day-to-day plan.

The proposed St. Jean extension was approved by the Council in May, 1919, but has not been completed. It is one of the much needed east side lines. The resolution of the Council giving the company the right to construct the line states that the Council or the people of Detroit may revoke the permit thereby granted and that the company must forthwith remove from the streets the property placed therein.

According to the agreement, the company is required to sell the lines to the city at cost of construction less depreciation, upon request by the city. It is the belief of the commission that the company will sell rather than remove its tracks from the streets where the work is already completed. In case the price to be paid by the city cannot be agreed upon with the company, the agreement provides for a board of arbitrators composed of three members, one chosen by the company, one by the city and one by the first two.

The Detroit United Railway maintains that it is the bounden duty of its management to direct its efforts in behalf of the continuation of uninterrupted service and that service to be the best possible at the lowest possible price. A purchase of the properties as a unified city system with the proper continuation of the interurban service represents an honest course which the company officials have always been willing to have carried out, but they state that "blackjacking first one line and then another, that the investors may in the end be robbed of their property, shall never receive their consent."

Strike Threatened in Pittsburgh

A strike of trainmen in Pittsburgh, Pa., seems almost inevitable. The receivers for the Pittsburgh Railways declare that they cannot possibly grant the demands for a 75 per cent wage increase, and the trainmen declare they will quit work on May 1.

The present agreement between the men and the receivers expires on April 30. Under this agreement the trainmen are receiving 49, 52 and 54 cents an hour, according to length of service. The new demands, which the men want made effective on May 1, include wages of 86, 89 and 91 cents an hour, with an eight-hour day. The company granted an increase of 10 per cent voluntarily, effective on April 1. This was made possible by the approval of the 7½-cent fare by the Public Service Commission of Pennsylvania. To meet the new rate of pay demanded by the trainmen an increased fare amounting to 12½ or 15 cents will be necessary, according to the receivers. They are reluctant to raise the fare.

The question whether the demands of the trainmen should be granted was put up to the public on April 17 by the receivers in a letter to Mayor E. V. Babcock and the City Council. The letter states that under the present fare charged on the lines of the Pittsburgh Railways it would be impossible to grant the demands of the trainmen, and that the receivers are prepared to receive and consider the suggestions of the public as to the wisdom and advisability of acceding to demands that would entail an increase of from 75 per cent to 100 per cent in fare.

In reply to this, the trainmen accused the receivers of "passing the buck" to the public.

Mayor Babcock replied to the receivers on April 20 that he had nothing to do with the controversy between the receivers and the men; that the matter rested with them, the United States District Court and the employees who operate the cars. He voiced opposition to an increased fare, and said a strike would be calamitous. Mayor Babcock decided to take this attitude after a conference with the Council.

Thirty-five Cents Advance Asked in Chicago

Two thousand trainmen of the Chicago Surface Lines attended a meeting of their union on April 19 and approved the report of their committee asking an increase of 35 cents an hour in the wage scale and no changes in working conditions or hours. This means that their demand will call for the payment of 95 cents an hour for men three months in service, 98 cents for the next nine months, and $1 for those in service over one year. Night car men, who now receive 67 cents, would be entitled to $1.02 on this new scale.

The agreement now in force was effected after a strike last August. Members of the Public Utilities Commission acted as arbitrators and established a wage scale of 60, 63 and 65 cents an hour. Sixty per cent of the runs were put on a straight eight-hour basis, the balance to be completed within fourteen consecutive hours and no run to pay less than eight hours' time. Payment for overtime is at the rate of time and a half.

The present contract expires June 1 and the union was required to notify the company of any proposed change before May 1. Following the establishment of the 65-cent maximum wage last year, the Public Utilities Commission allowed the companies to charge a 7-cent fare, which was subsequently reduced to 6 cents. Hearings on the valuation which is to be the basis for a permanent rate of fare are still in progress. All the companies' figures have been on the basis of cost to reproduce new, while the city's lawyers have been seeking to prove a depreciated value.

International Railway Rejects Men's Demands

After a series of conferences with representatives of its employees, the International Railway, Buffalo, N. Y., has rejected the demands of the union employees for a wage advance of approximately 100 per cent. Other demands of the union were also turned down. The company offered the men an increase of 12 cents an hour. This would increase the payroll about $1,000,000 a year.

The railway refused the demand for a closed shop and refused to grant an eight-hour workday and other concessions asked by representatives of the employees who are members of the Amalgamated Association. Negotiations, however, will be continued by the company and its employees. The present agreement expires on May 1.

In a statement announcing the company's attitude and the offer to increase the wages 12 cents an hour, Herbert G. Tulley, president of the railway, says that the company's employees must always retain their freedom of action and "themselves elect whether or not they become members of your association. Your request for a closed shop is, therefore, denied."

Continuing, the statement of President Tulley says:

> The eight-hour day with time and a half for overtime, payment for time not worked and the other suggested changes which increase costs cannot at this time be considered. Wage increases requested and other requested allowances would increase the company's payroll more than $4,000,000 per annum. Wages so increased would then alone consume the entire gross earnings of the company. The wage increase of 12 cents an hour allowed by the company will approximate $1,000,000 a year. This is the amount of increased revenue expected from the 7-cent fare, and consequently represents the maximum increase possible of payment.
>
> The rates of pay for motormen and conductors shall be as follows from May 1, 1920, until May 1, 1921: First three months, 83 cents an hour; for the next nine months, 86 cents, and after one year, 88 cents an hour.
>
> Rates of pay for engineers, conductors and brakemen in freight service; motormen and conductors in flat car service, and motormen and conductors in package express service shall be as follows: Engineers and motormen, first three months, 88 cents an hour; next nine months, 91 cents, and after one year, 93 cents. Conductors, first three months, 88 cents; next nine months, 91 cents; after one year, 93 cents. Brakemen, first three months, 84 cents; next nine months, 87 cents; after one year, 90 cents.

The complete schedule of wages asked by International employees follows:

> Rates of pay for shopmen, carhouse men, power house men, bridge and building department men, curve cleaners, baggagemen, watchmen, ticket agents, agents of the Buffalo, Lockport & Olcott division, freight handlers, emergency men and all others covered by this agreement, and others who are members of the association in the employment of the company, shall be increased at the rate of 40 cents an hour, effective May 1, 1920, and to last until May 1, 1921.

New York-New Jersey Tube Service Resumed

During the general transportation strike in New York there was considerable talk about the possibility of the employees of the city railways in the metropolitan district joining the strikers. None of these men, however, went out. Among the heavy traction roads affected by the strike was the Hudson & Manhattan Railroad, operating under the Hudson River between New York and New Jersey and to Newark. Operation of the tubes, however, was resumed on April 19 almost simultaneously with an announcement from the officials that they had put into effect the increased fares authorized by the Interstate Commerce Commission.

Oren Root, president of the company, in announcing service resumption, said:

> Up to this time we have not had sufficient men properly qualified to operate our trains and we have, therefore, been unable to re-establish our service. As previously stated, we did not think it safe to operate our service with inexperienced men.
>
> We have already been granted an increase of fares by the Interstate Commerce Commission, and I do not see how that question can be brought into the present situation. We have no intention of making application for any additional increases.

President Root estimated that 500 trainmen had walked out, and asserted that approximately seventy-five of the strikers had returned to their jobs. The motormen had not joined the strikers, consequently the company, with the new men, the seventy-five who have returned and those who remained at their posts, had been able to resume a partial operation of trains.

The new fares are 6 cents from points in New Jersey to the Hudson terminal in downtown New York and 10 cents to stations above the Hudson Terminal.

Change in Magazine Name

The *Em-an-Ess Electric News* will hereafter be known as the *Penn-Ohio Electric News*. The paper is published by the Pennsylvania-Ohio Electric Company, formerly the Mahoning & Shenango Railway & Light Company, and the change in name of the paper was considered desirable on account of the change in name of the company itself. A first prize of $10 was offered for the best suggestion. The award was made to Donald S. Jones, night ticket agent at the Boardman Street office.

Arbitrators Chosen in Boston

Both Eastern Massachusetts and Boston Elevated Wage Disputes Are Being Prepared for Arbitration

Hugh Ogden has been selected as the third arbitrator and chairman of the board to which has been referred the wage increase demands of the employees of the Eastern Massachusetts Street Railway, Boston, Mass. The other arbitrators are James H. Vahey, counsel for the union, representing the employees, and Philip G. Carleton, counsel for the company, and its representative on the board. Mr. Ogden is a well-known Boston attorney.

The arbitrators will devote their entire attention practically to the question of wages, the trustees of the company being opposed to granting the full demands of the employees for an increase from the present maximum of 51 cents an hour to 75 cents an hour. Both sides have agreed to abide by the board's decision.

All of the other matters included in the employees' demands, such as wage schedules, etc., will be denied, it is expected, by conferences between the joint board of the men's unions and R. B. Stearns, vice-president and general manager, and other officials of the company, which are now being held daily. Such items as cannot be decided by them will be referred to the arbitrators.

COUNSEL BARNUM TO REPRESENT "L"

The board of trustees of the Boston (Mass.) Elevated Railway has appointed H. W. Barnum, counsel for the company, as arbitrator for the conference to be held this month called for the purpose of establishing a new wage schedule.

James H. Vahey, counsel for the carmen's union, will act for the men.

The board of trustees has decided to settle as far as possible by means of direct negotiations all questions coming up for discussion. Several conferences have been held to date, with W. D. Mahon, president of the Amalgamated, presenting the case for the men. Each item will be taken up and discussed and settled if possible. If an agreement cannot be reached, the case will be submitted to the arbitration board.

The two members selected will meet shortly to choose a third member, who will act as chairman of the board.

Little Progress in Cleveland Dispute

A conference between representatives of the platform men and officers of the Cleveland (Ohio) Railway took place on April 16. It was called at the request of the men, who desire to arrive at an understanding with the company on the demands made by both sides. The men want to reopen the contract, which is subject to change after May 1. In his reply to the demands submitted recently, J. J. Stanley, president of the company, questioned the wisdom of reopening the contract at this time and said that the demands made by the men are unfair to the public.

After the meeting, officials of the local branch of the union stated that they still had hopes of arriving at some conclusion that would make arbitration unnecessary. It is probable that another conference will take place this week.

C. Loomis Allen has been selected to represent the Cleveland Railway in the arbitration of the wage question.

Mr. Mahon Appeals for Loyalty

In an open letter to the officers and members of the local divisions of the association, International President Mahon, of the Amalgamated Association of Street Electric Railway Employees of America, has appealed for the exercise of good judgment and sound reason and the fulfillment of their promises during these times of "outlaw" strikes and general unrest. President Mahon's letter is as follows:

> I take this means of appealing to you to ask that you be not misled by the present agitation for a general or sympathetic strike.
>
> This is the hour when good, sound judgment and good reason must prevail. You have contracts that have been established after years of hard and patient labor by the officers of your association, and these conditions must not be foolishly cast aside or lost by following false promises from irresponsible persons who know nothing of your conditions.
>
> I therefore appeal to you to remain loyal to your contracts, uphold the laws of your association and be in a position to march forward in the future as you have been in the past, securing better positions and upholding the true standard of American labor.

News Notes

Carhouse Destroyed in Ohio.—The carhouse and eleven cars of the Dayton & Troy Electric Railway, Tippecanoe City, Ohio, were destroyed by fire on April 14. The loss was placed unofficially at $150,000.

Non-Union Employees Insured.—The British Columbia Electric Railway, Ltd., Victoria, B. C., has insured all its male office employees who have been a year in the service and who are eighteen years of age or more. The amount of the benefit is $1,000. The insurance does not cover any one who is a member of a railway, light and power or gas union.

Coinage of 8 and 7-Cent Pieces.—A bill has been introduced in the United States Senate by Senator Frelinghuysen of New Jersey, directing the coinage of 7-cent pieces and 8-cent pieces. One of the arguments which has been used in favor of the production of such coin is that they will simplify the payment of railway fares in these denominations.

Jim Crow Law Upheld.—The Supreme Court of the United States on April 19 sustained the Kentucky separate coach act requiring the separation of white and negro passengers and holding that it applies to the South Covington & Cincinnati Street Railway and the Cincinnati, Covington & Erlanger Railway while operating between points in Kentucky.

Wage Demands Made in New Hampshire.—The Manchester (N. H.) Traction Company employees and the trainmen in the employ of the Concord Electric Railway are asking for an increase of 10 cents an hour and a 25 per cent increase for shopmen and trackmen. The trainmen at Concord were increased last September from a scale of 36 cents and 43 cents to a scale ranging from 45 cents to 55 cents.

Demands of Interurban Men Rejected.—J. F. Collins, general manager of the Michigan Railway, is reported to have stated that it is impossible for the company to meet demands made upon it by the men engaged on the interurban lines operating out of Grand Rapids. Among these demands are a closed shop, 85 cents an hour for the first six months for motormen and conductors after June 1 and 90 cents an hour after the first six months.

No Intention to Electrify.—C. E. Ingersoll, president of the Midland Valley Railroad, which extends from Wichita, Kan., to Ft. Smith, Ark., denies that there is any intention on the part of the management to electrify the road. He explained that the Midland Valley is primarily a coal road. In addition to serving a rich coal region in eastern Oklahoma and western Arkansas, the railroad owns some of the very best coal producing properties in the district which it serves.

New Wage Scale Presented at Wheeling.—The electric railway employees of the Ohio Valley submitted their new wage scale to the companies at Wheeling, W. Va., on March 30, the new scale to go into effect on May 1. It is understood that the new scale calls for an approximate increase in wages of 25 per cent, with changes in working conditions. The new scale affects the motormen and conductors, the electric linemen, trackmen, barnmen and others. It is understood that a counter proposition is to be submitted by the companies.

Toledo Lines Kept Running.—Judge Killits again kept the cars of the Toledo Railways & Light Company, Toledo, Ohio, running when a shortage of coal due to the "vacation" of switchmen and yard employees, tying up all of Toledo's twenty-three railroad lines, nearly closed the powerhouse. The court issued an order allowing the company to confiscate up to forty cars daily of coal, in yards at Toledo, destined to northern points. The Toledo Railways & Light Company provided its own engine for switching the coal.

Publicity Campaign at Little Rock.—The Little Rock Railway & Electric Company, Little Rock, Ark., through the daily press is running a publicity campaign on the merits of electric traction. "Daring Not Always an Admirable Quality" is the caption of one of the discourses on travel. The distinction is made between daring for a good cause and purpose and the reckless pest who menaces his own and others' safety.

"Jack" Dempsey Acquitted in Wreck Trial.—John J. Dempsey, formerly vice-president of the Brooklyn (N. Y.) Rapid Transit Company, was acquitted by a jury in the Supreme Court at Mineola, Long Island, on April 14 on an indictment charging him with manslaughter in connection with the death of Thomas Gilfeather in the Malbone Street, Brooklyn, tunnel wreck on the night of Nov. 1, 1918. The jury in the first trial failed to agree on a verdict. The accident followed a strike on the road. More than ninety persons were killed in the wreck.

Preparing for M. O. Charter Amendment.—In accordance with the declared intention of Mayor Rolph of San Francisco, Cal., in his election platform to submit the purchase of the United Railroads to the people City Attorney George Lull has begun the consideration of a charter amendment to this end. Unless a charter amendment is submitted at the coming election in November the whole matter will have to go over for two years. The Mayor is desirous, if possible, of disposing of the acquisition of the United Railroads during his present term of office.

Commissioners Will Contest Removal.—The members of the Board of Public Utility Commissioners of New Jersey have decided to go into the courts to prevent, if possible, an investigation of the board by Governor Edwards. Notice to this effect was served upon the Governor by Utility Commissioner Andrew Gaul, Jr., who applied to the Supreme Court for a writ to review the record and proceedings in the complaint of Jersey City against the commission. The city asks that the commission be removed from office for alleged misconduct and neglect of duty.

Ottawa Wages Being Negotiated.—Negotiations are under way between the Ottawa (Ont.) Railway and its employees, in connection with a request by the latter for an increased schedule of wages to come into effect on May 1. While the executives of the union have given out no official information, it is learned that the company is being asked to grant a maximum wage of 65 cents an hour. The present maximum, granted following the trouble and consequent disastrous strike last summer, is 45 cents an hour. It is said that both sides believe a satisfactory arrangement will shortly be reached.

No Demands by Montreal Men.—The present working agreement between the Montreal (Que.) Tramway and its employees does not expire until June 30. So far there has been no application on the part of the men to the company for higher wages. Applications would go to the company in the first instance, but a study of the contract between the company and the city of Montreal, as approved by the Legislature and creating the Tramways Commission, shows that in the end it would be the commission which would have the say, for it is this body which makes the allowances to the company as to the various amounts to be expended for each account.

Arbitration Decided Upon in Washington.—There will be no strike of the union employees of the Washington Railway & Electric Company and Potomac Power Company, Washington, D. C., at this time. The differences between the men and the companies will be submitted to arbitration. This decision was made on April 17 at a meeting of the Amalgamated Association. The vote followed presentation of a letter from William F. Ham, president of the companies, to Secretary of Labor Wilson offering to arbitrate. The next step is a conference between President Ham and a committee from the association. It is probable that a board of arbitration will be selected by May 1.

Wage Agreement at San Antonio.—An agreement has been reached between officials of the Public Service Corporation, San Antonio, Tex., and its trainmen, whereby the wage scale for conductors and motormen who have been in the service of the company for one year or longer will be 51 cents an hour and the pay of men in the service less than a year will be 49 cents an hour. This is an increase of a little more than 20 per cent. Employees in the sheds, carhouses and elsewhere receive substantially the same percentage of increase. Nine hours, under the agreement, will constitute a day's work. Time and a half will be paid for overtime.

Electrification of Jamaica Railways.—The Westinghouse Electric International Company has submitted to the Government of Jamaica an estimate of the proposed electrification of the railways on the island and the proposal to provide electrical power for industrial purposes. It is estimated that power plants would cost $849,000, substations $333,000, overhead construction $1,850,000 and electric locomotives and other motor equipment $357,000, a total of $3,489,000. The cost of operating the railway would be about $260,000 yearly, or about 7.7 per cent of cost of electrification. The sale of current to outside consumers could probably be conducted at a profit which would increase the return on the investment to about 10 per cent.

Change in New Arlington Station Plans.—The board of trustees of the Boston (Mass.) Elevated Railway has approved the change in plans providing for a second entrance to the new Arlington Street station. The new plans call for an entrance at Berkeley Street, which will require the construction of a passage about 350 ft. long. The advantage gained by this addition is to provide a more convenient entrance for the district now fast developing in the neighborhood of Stuart and James Streets. The contract for the construction of the station has been awarded to the Hugh Nawn Construction Company, Boston. It is not expected that the change in plans will delay the opening of the new station, which is scheduled to take place at the beginning of next year.

Will Remain True to His Trust.—Sydney L. Wright, Philadelphia, president of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., was summoned to Trenton recently to confer with J. H. Twitchell of New York and representatives of the union in an attempt to adjust the wage question. President Wright said: "We are under obligation to the public to maintain our franchise. We carry the United States mails and about 10,000 quarts of milk daily for Trenton families. We are not going to betray our trust to the public and we are not going to increase wages. If we paid the increase we would have to increase the fares to 10 cents and this we are unwilling to do." The men are asking for a 25 per cent increase.

$1 an Hour Asked at Detroit.—New demands by the trainmen of the Detroit (Mich.) United Railway will be presented to the company on or before May 1 according to action taken by the men at their meeting on April 17. The employees instructed a committee to present a request to the company for an eight-hour day with time and a half for overtime and all Sunday and holiday work. The following wage scale will be demanded: 95 cents an hour for the first three months; 98 cents an hour for the next nine months and $1 an hour thereafter. No statement was made regarding the company's attitude in the matter as it was maintained that no opinion could be expressed until the demands of the men had been officially presented to the company.

Cost of Pasadena-Los Angeles Line Reduced.—The proposed municipal electric railway between Pasadena and Los Angeles, Cal., can be built for $1,000,000 less than the estimate recently made by R. V. Orbison, former city engineer. This is the finding of the board of engineers appointed by the City Commission to pass on Mr. Orbison's estimate. The report of the engineering experts was filed with the City Commission by Commissioner John J. Hamilton. Instead of costing $3,919,689, as estimated by Mr. Orbison, the board of engineers report that the line can be built and constructed exclusive of the right-of-way for $3,465,867, or a saving of $453,822. The principal saving in construction in this proposed line is made by changing the right-of-way so as to avoid two costly tunnels. The report as filed by Commissioner John J. Hamilton was referred to the committee of the whole without any comment.

Financial and Corporate

Holds Normal Gain in Net

Hawaiian Company Still Meeting Cost of Service Without Increase in Rate of Fare

That the Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, had a fairly prosperous year is reflected in the very complete annual report recently issued covering operations for 1919. The revenue from passenger transportation was 95.2 per cent of the gross earnings. It showed a 6.53 per cent increase for the year, although the months of January and February were lean owing to the "flu" epidemic.

INCOME STATEMENT OF HONOLULU COMPANY

Year Ended Dec. 31	1919	1918	Per Cent Change, + Inc., — Dec.
Passenger revenue....	$742,275	$697,278	+ 6.45
Special car revenue..	1,655	966	+ 7.14
Mail car revenue....	225	220	+ 2.27
Freight revenue.....	10,465	8,212	+26.75
Total railway operating revenue.	$754,620	$706,676	+ 6.71
Way and structures..	$54,291	$67,802	—19.80
Equipment..........	48,933	38,639	+26.60
Depreciation.........	67,437	67,285	+ 0.23
Power..............	77,605	59,172	+31.30
Conducting transportation..........	212,269	193,777	+ 9.54
Traffic..............	7,048	10,361	+ 3.19
General and miscellaneous.........	55,549	52,833	+ 5.14
Total operating expenses.........	$523,132	$489,869	+ 6.80
Net operating revenue............	$231,488	$216,807	+ 6.76
Taxes and car licenses	64,152	61,818	+ 3.76
Operating income.	$167,336	$154,989	+ 7.96
Non-operating income..........	26,326	28,475	— 7.57
Gross income.....	$193,662	$183,464	+ 5.56
Interest — bills payable...........	8,400	6,695	+25.48
Net corporate revenue............	$185,262	$176,769	+ 4.81
Dividends..........	$160,000	$160,000	......
Sinking fund reserve.	107,314	93,426	+14.86
Loss and gain.......	....	2,929	......
Deficit for year....	$82,052	$79,586	— 3.86

The number of passengers carried increased 6.43 per cent, or slightly more than 900,000. The average number of passengers carried daily approximated 42,000, of which 24 per cent used transfers. The increase in revenue on the various routes ranged from 4.57 to 12.63 per cent.

Freight tonnage increased 27.2 per cent for the year but the revenue failed to hold the increase. This would indicate that the average rate for the increased business was below the average heretofore handled, this causing a decrease of 0.305 per cent in the average rate per ton.

The operating ratio did not increase materially, but the cost of power and conducting transportation increased sufficiently to offset the saving made in maintaining way and structures.

STATISTICAL INFORMATION

	1919	1918	Per Cent Change + Inc. — Dec.
Average total miles operated........	30	30	......
Car-miles...........	2,115,575	2,082,133	+ 1.605
Car-hours..........	222,369	218,920	+ 1.572
Rev. passengers (*a*)	15,225,168	14,304,489	+ 6.43
Transfer passengers..	3,703,350	3,407,229	+ 8.68
Free fares...........	158,268	177,219	—10.68
Total traffic......	19,086,786	17,888,937	+ 5.67
Gross passenger revenue............	$743,931	$698,244	+6.54
Average fare:			
Per revenue passenger (cents)...	4.88	4.88	......
Per total passenger (cents).......	3.905	3.91	......
Operating ratio (per cent).........	69.39	69.35	......
Car-mile statistics:			
Operating revenue (cents).........	35.67	33.94	+ 5.1
Operating expenses (cents).........	24.75	23.50	+ 5.3
Net income (cents)	8.75	8.46	+ 3.43
Passenger traffic....	9.015	8.57	+ 5.24
Car-hour statistics:			
Operating revenue.	$3.510	$3.358	+ 4.53
Operating expenses	$2.355	$2.235	+ 5.37
Net income.......	$0.833	$0.806	+ 3.34
Passenger traffic...	$ 85.7	$ 81.6	+ 5.03
Ratio car-miles to car-hours (m.p.h.)	9.52	9.52	......
Taxes—per cent of gross revenue....	8.22	8.41	—2.26
Freight traffic:			
Tonnage handled..	33,331	26,213	+27.20
Revenue.........	$10,689	$8,432	+26.75
Revenue per ton (cents).........	32.069	32.167	— 0.305
Wages paid conductors and motormen.............	$197,677	$180,776	+ 9.37
Per car-mile (cents)	9.34	8.65	+ 7.98
Per car-hour (cents)	89.00	82.40	+ 8.02

(*a*) Full fares, half fares and chartered cars.

Increased power cost was due principally to the higher contract price for fuel oil, which advanced from $1.60 to $2 per barrel. The following table shows the cost of producing power the last two years:

	1919	1918
Wages.....................	$13,492	$11,817
Fuel.......................	61,585	43,754
Lubricants and waste..........	747	949
Miscellaneous repairs........	1,781	2,653
Total....................	$77,605	$59,172
Kilowatt-hours produced.....	5,122,527	4,910,921
Average cost per kw.-hr. (cents)	1.515	1.205
Barrels of fuel oil consumed...	30,351	28,105
Kilowatt-hours per barrel of oil consumed..............	168.78	174.73

Details of the cost of track and paving maintenance together with similar figures for the distribution system follow:

OVERHEAD DISTRIBUTION SYSTEM

Maintenance and rehabilitation:	1919	1918
Labor....................	$4,730	$4,375
Material..................	2,379	3,432
Poles—Maintenance:		
Labor....................	1,355	818
Material..................	2,864	1,982
Total maintenance distribution system..................	$11,328	$10,607
Feet of trolley wire replaced....	6,747	5,000

WAY AND STRUCTURE COSTS

Track maintenance and rehabilitation:	1919	1918
Labor....................	$12,833	$14,952
Material..................	5,991	14,301
Paving maintenance and rehabilitation:		
Labor....................	5,907	5,629
Material..................	6,439	8,129
Superintendence of way and structures.................	5,358	6,239
Cleaning and sanding track...	4,495	4,131
Storm work.................	64	1,110
Total—Track and paving maintenance............	$41,087	$54,490

Conference on Ways and Means of Financing

The Public Utilities Commission of Illinois realizes that unless the utilities of the State are able to raise money promptly to finance indispensable extensions and enlargements to plant and equipment, the public will be put to serious loss and inconvenience. In order to find out what remedies the utilities and others have to suggest, the commission has issued an order for hearings in Chicago on April 29 and in Springfield on May 3, at which the question is to be discussed. These hearings were requested by utilities which have been unable to finance extensions ordered by the commission and also at the request of other utilities which have been unable to raise the money to finance additions and improvements which they consider necessary in order to keep up with the needs of the communities served.

In discussing this situation with a representative of the ELECTRIC RAILWAY JOURNAL, James H. Wilkerson, chairman of the commission, said:

> The financial problems of the utilities of the State are independent of questions of their financial stability or of the rates charged for service. The companies say they are unable to get money by the sale of securities on any reasonable terms and the commission must consider how far the utilities are to be required to make extensions under such financial conditions. The difficulties of the companies as presented to the commission are twofold. One is due to the general financial condition of the entire country. The other is local and has to do with the credit of this State where the misuse of public utility questions for political purposes has made people with capital afraid to invest in the securities of the utilities.
>
> In other words, the utilities which serve the public of this State are drifting into the conditions of the railroads when they were unable to meet the demands of the public for adequate service. Very little new construction was undertaken by utility companies during the war, and additional equipment is needed to meet the greatly increased demands for all kinds of public utility service. Unless something is done promptly, the public will suffer severely, as the companies cannot respond to the public demand without money. Notices of the two hearings have been sent to all interested utilities, civic associations and municipalities so that every one concerned will have an opportunity to present complaints, submit evidence and make suggestions to the commission.

$91,076 Profit in Boston for March

The statement of the board of trustees of the Boston (Mass.) Elevated Railway for the month of March shows a net profit of $91,076. Applying this amount to the accumulated deficit, there remained on March 31 an accumulated deficit of $661,266. This, it is expected, will be wiped out by the beginning of the fall period.

The total cost of operation for the month of March was $2,142,208. Of this amount, $1,399,766 represents wages, $118,115 was required for the removal of snow, $294,697 was required for the maintenance of track and line equipment, $277,405 for power and the remainder for general expenses incurred in operation.

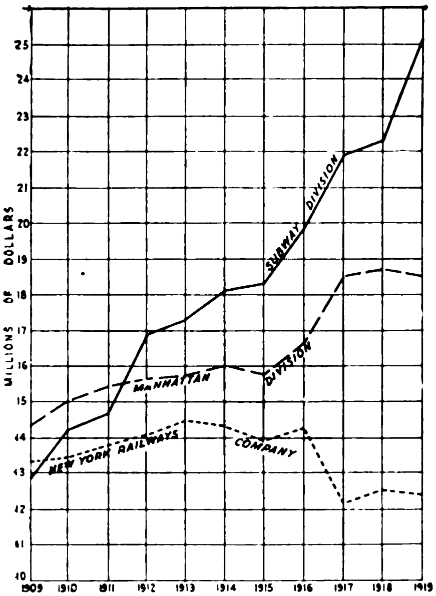
The total receipts were $2,927,022, and the total cost of service $2,835,946. The cost per passenger was 9.723 cents, of which 4.799 cents was for labor.

One-Man Cars Proposed for New York City

Stone & Webster Report on New York Railways Suggests One-Man Cars for Entire Base Load of Company—Flat Fare with Free Transfers Recommended—Interborough Upheld

Stone & Webster have submitted a report, under date of Jan. 1, 1920, to Job E. Hedges, receiver, New York Railways, which analyzes the present condition, operating methods and financial situation of the New York Railways and makes recommendations looking toward financial relief and increased operating efficiency. The outstanding features are an increase of fare to be made with the retention of the flat fare and with free transfers, a service-at-cost franchise basis, and the adoption of one-man cars to carry the base load of the system. The report is made in compliance with a request from Mr. Hedges, under date of May 31, 1919, since which time there have been numerous changes in the situation of the New York Railways arising out of the partial disintegration of the system, and it has been impracticable to amend the report in all respects in accordance with these changes. Consequently, the report is based upon conditions as of June 30, 1919, and none of the changes that has occurred since that time has been taken into account except the general 25 per cent increase in wages effective on Aug. 17, 1919, and the 2-cent charge for transfers.

THE report is introduced by a summary of the findings and principal recommendations and contains extended arguments and discussions, with supporting data, on the various points which the report includes and upon which recommendations are made. A large number of charts, maps and diagrams are included in the report to complete the analysis.



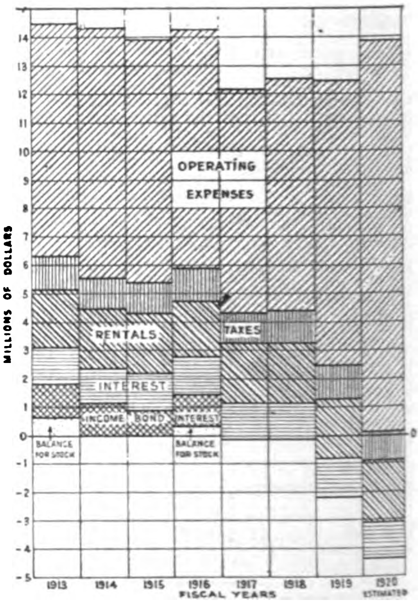
GROSS REVENUES—1909-1919

A detailed examination of the physical property of the company and its subsidiaries shows the entire property in fair operating condition except the 96th Street power station, which, however, has not been operated for four years. It appears inadvisable to expend $500,000 to put this plant in operating condition, particularly as it could not even then produce power as cheaply as it can be purchased. The engineers do find, however, that the condition of the track is such as to demand large amounts for renewal jobs for which the company has not heretofore been able to accrue any cash reserves whatever. In other words, there is a deferred maintenance on track of approximately $13,000,000, which should be expended by 1926. The maintenance standard of the system as carried out up to four years ago is expressed as good, but the maintenance standard has apparently dropped off due to the necessity of retrenchment until it can now be expressed as only fair. One of the reasons given for the present condition of track over subway is that after subway construction, the track has never been left in fairly satisfactory condition.

Since 1916, the gross earnings have gone down steadily until within a few months, due to rapid transit competition, wartime, labor troubles, and the like, the car-miles have been cut so as to increase steadily the gross revenue per car-mile. The Third Avenue system has made a more drastic cut, but it is not evident that the New York Railways could have cut any further than it did. The gross passenger revenue per car-mile increased from 1916 to 1919 from 38.94 cents to 45.58 cents, while the increase for the corresponding period on the Third Avenue system was from 38.6 cents to 53.9 cents. The average cost per revenue passenger has risen from 5.88 cents to 7.58 cents in the same period, while the average gross earnings per revenue passenger have changed only from 4.87 cents to 4.88 cents.

As a means of increasing gross revenue until it exceeds gross operating expense, the engineers suggest several steps, the principal one of which is the adoption of the one-man safety car to carry the twenty-four-hour base load of the system. An immediate purchase of 110 of these cars is suggested, with an ultimate purchase of at least 550. There is an estimated annual saving of more than $400,000 in operating expenses which should result from the use of these one-man cars. Sufficient additional two-man cars would, of course, have to be provided during rush hours to compensate for the amount by which the aggregate and maximum capacity of the safety cars is less than that of the two-man cars which they would replace.

There is an extended argument in support of the recommendation for the adoption of the one-man car, data being given to show the saving in power cost, the saving in platform expense, the saving in car maintenance, and an argument indicating that there would be an increase in gross. Double-end one-man cars are recommended. Assuming the favorable financial showing, the cars must be "proved in," so to speak, to New York traffic conditions. Extended traffic studies were made and typical busy corners in New York were compared with typical busy corners in other cities in which one-man cars are already operating, notably Seattle, Wash.; Kansas City, Kan., and Bridgeport, Conn. At the intersection of Main and Fairfield Streets in Bridgeport, for example, a total of 1,261 vehicles, including street cars, pass in one hour. The intersection at this point is only 38 x 33 ft. Safety cars operate over this intersection satisfactorily and are handled more easily than the double-truck cars that operate over the same tracks. At Broadway and Forty-second Street in New York only 1,173 vehicles, including street cars, pass during the busy hour of the day, the intersection at this point being 55 x 50 ft. This and other data seem to indicate that the one-man cars can navigate in traffic as congested as found in New York.



DISTRIBUTION OF GROSS INCOME.
1913-1920

That the one-man car is adaptable to the underground trolley system is attested by J. S. Doyle, superintendent of car equipment of the New York Railways. That the public will like the car is indicated by testimony from other companies, the questionnaire results of the American Electric Railway Transportation and Traffic Association showing 96 per cent of the communities in favor of it being quoted. As to the attitude of trainmen, results of the canvass under the same questionnaire show 89.2 per cent favorable. The fact that one-man cars climb successfully the steep hills in Seattle and in Bangor, Me., indicates no difficulty on such grades as are found in New York.

As to other operating economies, the report finds that the company is already doing what it can in power saving by coasting recorders, by using the turnback, and by accident prevention. It finds the skip-stop inapplicable to New York conditions and suggests that a part of the special taxes should be remitted by the city. Information is quoted showing that the New York Railways pays in taxes 4.92 cents per car-mile as compared with 2.19 cents for the Philadelphia Rapid Transit Company and 1.86 cents for the United Railroads of San Francisco.

NEW CAPITAL NEEDED FOR CARS

There is no apparent immediate necessity for new capital, except for the purchase of one-man cars. These, it is suggested, should be financed through equipment trust certificates and paid for out of earnings from the savings in operation. It is pointed out, however, that the present rate of fare is insufficient to furnish funds required for track rehabilitation work of large magnitude during the coming five or seven years.

The analysis of the traffic business of the company shows an average haul of 1¾ miles, thus confining the field of the surface railway to the short-haul business. From 1914 to 1919 the annual gross earnings of the company fell from $14,295,000 to $12,418,000, while the Interborough gross earnings, subway and elevated, during the same period increased from $34,128,000 to $43,814,000. While, since July 1, 1919, there has been a partial return of the surface line earnings, any further marked increase in surface line earnings is too problematical to count on with confidence. Headways are now close enough to get all the business available in the inner part of the system, and it is doubtful if any further business might be obtained in outlying sections from more frequent headways using safety cars.

The only relief possible to increase gross earnings, therefore, seems to be in an increase in fares. An analysis of the fare situation and the traffic on the road leads the engineers to the conclusion that the answer cannot be found in a 5-cent fare with a 1, 2, 3, or even 5-cent transfer charge, but that the most simple and effective way is to inaugurate a flat increase in rate with free transfers. The same analysis of the traffic leads the engineers to the conclusion that the surface lines are of no particular importance as feeders to the rapid transit system, but that the surface lines' usefulness will continue to be confined to the crosstown and short-haul business.

SERVICE AT COST RECOMMENDED

The report calls the arrangement between the New York Railways and the Interborough Rapid Transit Company advantageous for the former. The surface lines, at a cost of one-fifth the total general management cost of the entire system, Interborough and surface combined, get the benefit of the service and judgment of an organization of great ability and experience. This applies as well to purchasing, maintenance of equipment, and power, and the cumulative effect of these factors is of undoubted advantage to the New York Railways. A detailed analysis of power rates and the relation from a power standpoint between the New York Railways and the Interborough Rapid Transit Company is given in the discussion of the report. It is of interest to note that for the year 1919 the power costs of the New York Railways were 3.38 cents per car-mile as compared with 5.40 cents per car-mile for the Philadelphia Rapid Transit Company.

Under the discussion of the franchise situation in New York, the engineers recommend that the New York Railways and the city work out a plan providing for a service-at-cost franchise. A short analysis of what is meant by this term is given and reference is made to other cities in which such a plan is in successful operation.

Financial News Notes

Valuation Commission Created.—The bill creating a commission to value the public utility properties in New Jersey and especially the Public Service Railway has been passed by the New Jersey Legislature. The commission, under whose direction the work will be carried out, consists of the Governor, State Comptroller and State Treasurer.

Receiver Discharged.—J. D. Whittemore was discharged as receiver for the West Virginia Traction & Electric Company, Wheeling, W. Va., on April 14. As announced in the ELECTRIC RAILWAY JOURNAL for April 10, page 772, the line will be transferred to the Wheeling Public Service Company, details of the capitalization of which were given at that time.

Will Seek Permission to Abandon Lines.—The Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, notified the Mayors of East Liverpool, Wellsville and Steubenville on April 16 that it would apply on or about May 1 to the State Public Utilities Commission for permission to abandon three lines in East Liverpool, two in Steubenville and make changes in its service at Wellsville because of a loss of $167,513 last year. The company appeals for additional revenue. The present city fare is 5 cents.

Receiver for Road at Olean.—William A. Dusenbury, Olean, N. Y., has been appointed receiver for the Western New York & Pennsylvania Traction Company, Olean, by Justice Cole in the Supreme Court in Buffalo. The appointment was made on behalf of a judgment creditor. The action was not opposed by the company. Wilson R. Page resigned recently from the presidency of the company and the management and operation of the line were taken over by Day & Zimmerman, Philadelphia, Pa. Mr. Dusenbury will continue as receiver under bond of $100,000.

Three-Year Notes Sold by Milwaukee Company.—Spencer Trask & Company, New York, N. Y., are offering for subscription $2,000,000 of three-year 7 per cent secured gold notes of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., due on May 1, 1923. The offering price is 97⅜ and interest to yield full 8 per cent. Interest is payable on May 1 and Nov. 1. The notes, in addition to being a direct obligation of the company, will be secured by the pledge of $3,000,000 of general and refunding mortgage 5 per cent bonds, due in 1951. This is presumably a refunding operation as the company has $2,000,000 of two-year 7 per cent notes coming due on May 1.

Preferred Stock Dividend Passed.—The dividend on the preferred stock of the Nashville Railway & Light Company, Nashville, Tenn., payable ordinarily on April 1, 1920, was passed because of an action of the Public Utilities Commission of the State of Tennessee in connection with the application of the company for an increase in fare. This increase was granted on certain conditions, one of which was that "until such time as the commission shall establish rates on the permanent basis of the amount invested in the property of the company, and upon which it is entitled to a proper return," the company not pay dividends. The $274,000 of Nashville & Edgefield bonds due on Jan. 1 were paid at maturity. Refunding and extension bonds of a like amount were issued by the Nashville Railway & Light Company.

Call for Deposits.—A committee has asked the holders of the first mortgage 5 per cent bonds of the Ft. Wayne, Van Wert & Lima Traction Company, Springfield, Ohio, on which interest was defaulted on Jan. 1, 1920, to deposit their bonds, with all unpaid coupons, including that of Jan. 1, 1920, attached, with either the Fidelity Trust Company, Philadelphia, Pa., or the People's Savings & Trust Company, Pittsburgh, depositaries. The committee is composed of J. C. Neff, chairman, Fidelity Trust Company, Philadelphia; George K. Johnson, Penn Mutual Life Insurance Company, Philadelphia; George deB. Greene, and Thomas J. Walsh, E. H. Rollins & Sons, New York; A. C. Robinson, People's Savings & Trust Company, Pittsburgh, with T. H. Atherton, secretary, 325 Chestnut Street, Philadelphia, Pa. The company is included in the system of the Ohio Electric Railway, the operating management of which has passed to Day & Zimmerman, Philadelphia, under conditions outlined recently in the ELECTRIC RAILWAY JOURNAL.

Traffic and Transportation

St. Louis Fare Reduced

Commission Orders 7-Cent Flat Rate—Finds Return Under 8-Cent Fare Excessive

Declaring revenues resulting from an 8-cent cash fare to be excessive, the Missouri Public Service Commission on April 2 ordered the United Railways of St. Louis to reduce its rate to 7 cents straight. The company was directed to lower the rate for children from 4 cents to 3 cents. Improvements in the service were also specified. The commission's order became effective on April 10. The new rates are to continue operative until Jan. 1, 1921.

In reaching an estimate of the value of the company's property, the commission accepted two valuations, one of $50,000,000, and the other of $60,000,000, for the entire physical properties in St. Louis city and county. This was done in the absence of the true valuation of the property, which the commission announced will be completed by its engineers and accountants within a short time.

$950,000 REDUCTION

Basing its conclusions on figures submitted for the period from November to February, the commission decided that, under the existing fares, the United Railways would show an approximate return of 7.45 per cent for the entire year if the valuation were placed at $60,000,000, and 8.95 per cent if the $50,000,000 valuation were to be accepted.

This rate of return, the report states, would be excessive, and a reduction in fares was therefore authorized. The saving to the public by the reduction is estimated at $950,000 a year, according to J. L. Harrop, chief engineer for the commission.

The decision was made following an application of the receiver for an extension of the present fares for the ensuing year. Attorneys for the city, who opposed the extension, declared that the annual revenue of the company was more than 50 per cent greater than under the 5-cent fare, and that the revenue was increasing each month. Since Nov. 1, 1919, the fare has been 7 cents for tokens in quantities of fifty or more, 7½ cents when purchased in pairs from conductors, seven fares for 50 cents, and 8 cents for single fares. Children's fares have been two for 7 cents, or 4 cents for single fares.

MORE TRAILERS ORDERED

The decision was reached by the unanimous vote of the entire commission, sitting in Jefferson City. The order directed the receiver for the company to place in operation fifty additional trailers. The company is permitted to furnish the extra cars at the rate of two a week.

According to the findings of the commission, the company is expected to transport 284,000,000 passengers in 1920. The number of passengers in November was 21,931,788; in December it rose to 22,984,394. The revenues for the two months were $1,606,585 and $1,683,258, respectively. For the same months in 1917, when the flat 5-cent fare was operative, the revenues were $1,063,446 for November and $1,088,440 for December.

TRAFFIC INCREASE SHOWN

Increases in revenue and the number of passengers carried during January and February, 1920, corresponding to those shown in November and December, were shown. The commission based its estimate of the increasing number of passengers on the fact that more persons ride in the summer.

The new rates are effective from April 10 to Jan. 1, 1921, with the commission retaining jurisdiction to again fix the rates upon the definite appraisal of the company property.

The city has applied to the commission for a rehearing of its order, asking that the rate be further reduced to 6¼ cents. In its motion for rehearing the city alleges that the commission's allowance of 6 per cent of the company's gross revenue for injury and damage reserve is excessive. The motion also objects to the setting aside annually of $1,500,000 for the depreciation reserve and claims that $900,000 would be adequate for this purpose.

Atlanta Company Wants 8-Cent Fare

A petition for increase in rates which the Georgia Railway & Power Company, Atlanta, Ga., has announced it will file with the Railroad Commission contemplates an advance of 33⅓ per cent in all classes of service, including gas, electric and railway service. In the case of gas the rate would be increased from $1.25 per 1,000 cubic feet to $1.66 per 1,000 cubic feet, the maximum rates subject to 10 per cent discount.

The maximum rate for electric service is now 8 cents per kilowatt hour. The new rate would be 10.6 per kilowatt hour. The increase proposed in railway fares would raise the fare from 6 cents to 8 cents.

The request for rate increases will be based on the increased cost of operation of the company, included in which is the recent award of a 15 per cent increase to motormen and conductors of the company. This increase was granted through arbitration.

Auto Deadline Does It

Anti-Parking Rules Reduce Congestion and Speed Up Railway Traffic in Los Angeles

Restrictions on the parking of vehicles within the congested district of Los Angeles, Cal., are having a marked effect in improving electric railway service in that city. Although the "no-parking" regulations have been in force for only two weeks, they have already accomplished results which, according to H. Z. Osborne, Jr., chief engineer of the city's public utilities department, fully justify their existence. The operation of cars has been speeded up by the cutting down of headway, and, for the first time in years, schedules are being maintained.

The so-called "no-parking" ordinance went into effect on April 10. Under it the city's business district is divided into three sections, a "congested" zone, a semi-restricted section, and an unrestricted area. Within the first of these, the parking of vehicles is prohibited between the hours of 11 a.m. and 6:15 p.m. Outside of this "congested" area, but still within the business district proper, is a zone within which automobiles may be parked for a period of two hours without police interference. Beyond the boundaries of this area, unrestricted parking is permitted. The use of the "left-hand turn" is also prohibited within the no-parking hours.

DRASTIC MEASURES NEEDED

The ordinance was passed by the City Council some time ago as a means of relieving a condition of congestion declared by competent observers to have few parallels in the United States. Drastic regulations to control the movement of vehicular traffic were recommended by the State Railroad Commission as offering the best hope of remedying the situation. The no-parking plan was described in detail in the ELECTRIC RAILWAY JOURNAL for March 20, page 623.

The speeding up of rush-hour traffic has been the most striking result of the enforcement of the new rules. Electric railway cars, both local and interurban, are moving through the city streets without delay. Schedules are being maintained without the interruptions which have been frequent in the past.

Car riders are arriving home in the evening from ten to fifteen minutes earlier than formerly. In the past it has been a common occurrence for cars to be delayed from forty minutes to one hour or more. These delays, which resulted from congestion in the business district, have been reduced to a minimum.

Pedestrian traffic, also, has been speeded up and has been placed on a basis of greater safety. At the busiest corner of the central district a check of persons crossing the street between the hours of 5 and 6 p.m. shows an increase in foot-travel of 30 per cent.

Washington Increase Granted

Commission Allows Eight-Cent Cash Fare on All Lines of District—Tax Readjustment Urged

Cash fares on all the electric railway lines of Washington, D. C., will advance from 7 cents to 8 cents on May 1 under the terms of an order issued on April 15 by the Public Utilities Commission of the District of Columbia. The increase affects the lines of the Washington Railway & Electric Company, the Capital Traction Company, the Washington-Virginia Railway, the East Washington Heights Traction Railroad and their subsidiaries. Four tickets will be sold for 30 cents. The 2-cent charge for inter-company transfers will continue, there being no charge for transfers between the lines of the same company. The new rates will remain in effect until Jan. 1, 1921.

THE commission based its order upon the application of the Washington Railway & Electric Company for relief beyond that afforded by the 7-cent cash fare with four tickets for 25 cents, which was put into effect Nov. 1, 1919. Early last January the company requested the commission to sanction a further increase in fare, stating that it could not long continue to operate at the 7-cent rate. At subsequent hearings William F. Ham, president of the road, testified that during the preceding twenty months the company had operated at a loss of more than $1,100,000.

$625,000 ESTIMATED INCREASE

The new rate will, it is estimated by the commission, increase the company's revenue by $625,000 annually. This is less than the amount declared by the company to be necessary to assure a return of 6 per cent upon the investment. Under the new rates the return on the railway investment of the District taken as a whole will, it is believed, be slightly in excess of 7 per cent.

The Capital Traction Company had not applied for an increase, but the commission deemed it advisable to order a uniform rate for both roads. The two systems are highly competitive in the central section of the city, and the commission feared the demoralizing effect of a disparity in rates. Further adjustment of revenue to give both systems approximately the 6 per cent return declared by the commission to be just should, in that body's opinion, come from Congress in the shape of regulation of the tax rate. On this point the commission said:

> The commission is of the opinion that only a part of the relief asked for should be secured by an increase in rates of fare and that in fixing a rate the commission should assume that Congress will also grant relief through a modified form of taxation. . . .
>
> The commission is faced, therefore, with the necessity of granting an increase to both systems, but it believes that the Congress should readjust the method of taxation so that the Washington Railway & Electric Company will be relieved of a portion of its present tax burden. The revenues of the district thus diminished would be recouped by increasing the tax on the other system, and this increased tax would in turn offset the fare increase granted to that company solely to protect the public from the evil consequences of different rates of fare for the several companies.
>
> The proposed increased fare will under existing law unduly increase the revenues of the Capital Traction Company, but if the street railway lines of the District of Columbia be considered as a whole the new rate will yield a return only slightly in excess of 7 per cent on the combined fair value of all the street railway property used and useful for street railway purposes in the District of Columbia as heretofore determined by this commission.

A proposal to establish a zone-fare system was considered by the commission, but was rejected as impracticable under existing conditions. The order referred to the proposal as follows:

> At the request of the commission, the Washington Railway & Electric Company presented information through its expert, Prof. Albert S. Richey, of the application of a zone system to its lines. Decided opposition was manifested by individual citizens and by representatives of various civic bodies to the adoption of any form of measured service, and while the commission believes that it is right and just in principle that the users of a public service should pay for that service as far as possible in proportion to the cost of furnishing it to them, it is of the opinion that under present conditions it is inadvisable to adopt a zone system of street car fares or any other form of measured street railway service.

Wants Jitney Menace Removed

As a means of reducing the deficit in the operation of the Seattle (Wash.) Municipal Railway, Mayor Hugh M. Caldwell, in a communication to the City Council, asks for more stringent regulation of the jitneys. D. W. Henderson, general superintendent of railways, estimates that curtailment of the jitney competition would result in an additional revenue of approximately $200,000 annually for the railway. Mayor Caldwell wants the jitneys to operate on schedule and the equipment to be subject to city inspection. The operation of jitneys in Seattle began in 1915, when 1,500 buses entered the service. At present about 215 jitneys are operating in the city.

Mayor Caldwell urges that the Council consider first of all the fact that the municipal railway should be so operated as to pay expenses. He points out the injustice of permitting the jitneys to scoop up the cream of the business, leaving the railway to maintain its schedule throughout the day, regardless of whether or not it is profitable to do so. Mr. Caldwell concurs in the recommendation of the superintendent of railways that legislation should be passed by the city requiring the operators of jitney buses to:

> (a) Secure a license to operate a motor bus (and this should include inspection with the right of suspension or revocation).
>
> (b) To operate according to schedule between the terminals of route applied for and at fixed rates of fare.
>
> (c) All vehicles used in motor bus service to be subject to inspection as to equipment.

Mayor Caldwell also submitted a report of E. A. Mitchell, transportation inspector, declaring that city lines can take care of 40 per cent more business than is now being carried. Mr. Mitchell, in his report, calls attention to the unfair methods used by jitney drivers to secure business.

A report submitted by the weights and measures division indicates that the personnel of the jitney organization is far from satisfactory and is not subject to proper supervision.

The utilities committee of the Council has asked W. F. Meier, Corporation Counsel, to prepare an ordinance providing for the regulation, of the jitneys.

Local Regulation Proposed

People of St. Paul Will Vote on May 4 on Putting Fare Control in Hands of Council

At the general city election on May 4, the people of St. Paul, Minn., will vote upon a proposed amendment to the charter of the St. Paul City Railway authorizing the City Council to regulate the fares to be charged by the company, providing, however, a maximum of 7 cents with free transfer. The ordinance has been passed by the City Council and accepted by the company. It now awaits action by the people. The original ordinance was approved on Sept. 20, 1889. It has nineteen years to run.

It is prescribed in the amendment that in no event shall the company be entitled to more than the present 5-cent fare until it shall have built and put in service sufficient cars, or is furnishing car service as prescribed by the city ordinance. The company is specifically relieved from any 5 per cent gross earnings tax because such a tax tends to increase the fares. The company does not now pay any such gross earnings tax.

While some doubt exists in the minds of city officials as to whether this ordinance will be approved at the election there is still pending in the Federal Court a suit brought by the company to restrain the city from enforcing the service feature of the ordinance now in force. The injunction is in the form of a temporary restraining order. The hearing as to whether this shall be made permanent may be called at any time.

The ordinance will in effect do four things if approved:

> It will grant to the City Council the power to regulate and fix fares.
>
> It will prohibit the Council from ever fixing the rate higher than 7 cents, but will not establish a minimum.
>
> It will prohibit the company from ever receiving any increase unless and until it provides cars sufficient to furnish the service prescribed by the city ordinances.
>
> It will place the company under all restrictions and regulations contained in the city charter relating to public utilities, excepting only that it will specifically exempt the company from paying the gross earnings tax.

The controversy over service by the railway originated two years ago. The company pleaded that it was operating at a loss and asked relief from the Council in the way of larger fares than those prescribed in the ordinance. The Council had this under consideration for a long time and in 1918 made an audit of the company's books through a certified accountant. The result indicated that the company was operating at a loss, the finding based on the understanding that the figures it furnished the city were correct. In August, 1919, F. L. Powers succeeded Commissioner Oscar Keller in charge of public utilities and he took an immediate interest in the question.

Mr. Powers had another examination made, by the chief accountant of the department, and, excepting an amount set aside by the company for depreciation, a matter upon which authorities might disagree, it was found that the company was operated at a loss in 1919. After the cost-of-service franchise failed of approval at a special election last fall in Minneapolis the plan was proposed to the St. Paul company that the city regulate the fares, the advance and decline to be left to the judgment of the Council. This amendment to the ordinance was prepared by Commissioner Powers and submitted to the company. In due time the company filed its acceptance of the ordinance. The matter will now go before the people.

City's Appeal Denied

New York Commission Rules Rochester Lines Are Fulfilling Requirements Under Present Conditions

The application made by the city of Rochester to the Public Service Commission for the Second District of New York for an order directing the New York State Railways to increase the railway service in Rochester was denied on April 16. In the opinion the commission said:

> It appearing from the evidence that orders heretofore made by this commission with regard to equipment and service in the city of Rochester have not been disobeyed by said railway company, except for a short period during a time of emergency; and that the revenues of the company are not sufficient to enable said company to furnish adequate, sufficient and proper service within the city of Rochester; and the commission being of the opinion that under the facts disclosed in the record, the making of an order requiring the large additions to service which are found to be necessary would be an arbitrary and unreasonable exercise of the power possessed by it under subdivision 2 of section 49 of the Public Service Commission's law.

In consequence the commission ruled that the order to show cause in the case be discharged and the case closed on the books of the commission.

Commissioner Barhite wrote the prevailing opinion. He is sustained by Chairman Hill and Commissioner Irvin. Commissioner Kellogg dissented. Commissioner Van Namee, recently appointed, was excused from voting. In dissenting, Commissioner Kellogg favored the issuing of an order directing the respondent to furnish service "which shall be adequate as required by sections 26 and 49, subdivision 2, of the Public Service Commission law."

Commissioner Barhite found that the railway obeyed the commission's order to reroute the Monroe Avenue line and also to increase its service in non-rush hours up to Jan. 16 last, which sickness of employees and severe weather prevented. Commissioner Barhite also recited that the company set up the claim that the commission had no authority in law to confiscate its property. This is what the company alleged would be brought about by an order to increase service with an increase in fare.

The law of New York State provides that where the Public Service Commission fixes rates it shall have due regard among other things to a reasonable average return upon the value of the property actually used in the public service and to the necessity of making reservations out of income for surplus and contingencies. Mr. Barhite said:

> If it be contended that if a rate when fixed is fair and reasonable, that such rate is fair for all the time does not follow. While it is true that these cases deal with rates of fare as fixed by statute, as distinguished from the Rochester contract, it cannot be said that the distinction takes away from the company the protection of the Constitution, which is the supreme authority in the land. Even if it be urged that the State Constitution, Article III, section 18, takes away the protection guaranteed by the United States Constitution, then the only result would be that that particular section of the State Constitution, to which reference is made, is itself unconstitutional.

Mr. Barhite finds that in view of the legal right which the New York State Railways has to demand a proper compensation for its services, the commission might make some "other" order with regard to service if it appears that its present rate of fare will not furnish such service.

The commissioner refers to the record showing the deficit for operation in 1919 in the 5-cent zone in Rochester, which was $643,171, and on the suburban lines $80,443, and that no estimated deficit for a future twelve-month period with an increased proper service in the 5-cent zone would amount to $835,974. He asks, therefore, whether the present fare in Rochester is just and reasonable for the company. In this connection the commissioner said:

> It is evident from the authorities to which attention has been called, that the New York State Railways has an absolute right to an income which will pay not alone its necessary expenses of operation, and its proper fixed charges, but will produce a fund sufficient to provide a surplus for contingencies and a proper and reasonable return upon the value of the property used in its business. It is further apparent that if the present rate fixed by the contract is not sufficient to furnish the amount of money necessary to provide for the purposes to which attention has been called, the State cannot, and if it can, should not attempt to force the company to perform services beyond its power.

City Has Power Over Rates

Four of the five judges of the Appellate Division of the Supreme Court of Ontario have ruled in a suit respecting the London Street Railway that the city of London has power to alter a contract covering fares incorporated in a franchise agreement, without a vote of the citizens or the consent of the provincial Legislature or the Hydro Electric Power Commission of Ontario. The City Council to end a strike last July passed a municipal by-law permitting an increase in fares from seven and nine tickets for a quarter to six and eight tickets. A judge of the Supreme Court quashed the by-law and restored the old rates. The corporation counsel had given his opinion that the Council of an Ontario municipality was debarred from altering a franchise agreement by provincial legislation.

The street railway company's legal advisers obtained the Council's permission to appeal in the name of the city of London and established the City Council's rights and the by-law's validity, only one of the five Appellate Division judges dissenting.

The platform men of the London Street Railway at present receive a maximum rate of 44 cents an hour. They now want 65 cents an hour. This demand the company has announced it is unable to satisfy and another strike is threatened for May 1.

Orders City to Cease Bus Operation

Operation of buses under the direction of Grover A. Whalen as Commissioner of Plant and Structures of New York City is in violation of the law, according to a ruling made recently by Justice Cropsey of the Supreme Court. The Justice ordered a suspension of the bus service. Justice Cropsey held that there had been no emergency which justified the operation of the buses. He said that the operation of the buses was a flagrant violation of the law and held that the city had no more right to violate the law than any citizen. The suit was brought by the Brooklyn City Railroad against Mr. Whalen individually and as commissioner. On application of counsel for the city, the Appellate Division of the Supreme Court has granted a temporary stay of Justice Cropsey's order until April 29.

Justice Edward J. Gavegan of the New York Supreme Court on April 9 signed an order directing the city to show cause why a temporary injunction should not be issued suspending operation of all bus routes competing with the surface lines of the New York Railways. Job E. Hedges, receiver for the traction company, had previously obtained from Federal Judge Julius M. Mayer an order directing him to bring suit to have the operation of the buses halted.

The State Senate on April 20 passed a bill which, if it becomes law, will give the city of New York power to operate bus lines. The measure, the passage of which was urged by Commissioner Whalen, would legalize the purchase and maintenance of motor buses by the city. As originally introduced by Senator Lynch, it authorized the establishment of bus routes in competition with electric railway lines. The bill was later amended to prohibit said competition, and in amended form was passed by the Senate. It is now under consideration by the Assembly, which is expected to take favorable action on the measure.

Transportation News Notes

Fares Up on Municipal Line.—The board of directors of the municipally owned Norton, Taunton & Attleboro Street Railway, Attleboro, Mass., has voted to increase the single fare from 7 cents to 10 cents, the increase to become effective at once. A ticket good for fourteen rides will be sold for $1.

Wants More in Knoxville.—The Knoxville Railway & Light Company, Knoxville, Tenn., has applied to the State Railroad & Public Utilities Commission for permission to charge a 7-cent fare with 2 cents for each transfer. In its petition, the company states that it operated at a loss of $25,000 in 1919.

Seven Cents in Attleboro.—Fares on the lines of the Interstate Consolidated Street Railway, Attleboro, Mass., were raised from 6 cents to 7 cents on April 18 under a temporary order of the Massachusetts Department of Public Utilities. The department will hold a hearing on May 5 for the purpose of fixing a permanent rate.

Zone Changes in Worcester.—The Worcester (Mass.) Consolidated Street Railway has made several changes in the zone limits on its lines in Worcester at the direction of the Massachusetts Department of Public Utilities. The latter, which has had the company's case under consideration, has intimated that it will order the retention of the two-zone system with a 7-cent fare in each zone, as at present.

Side and Terminal Service Discontinued.—The transportation of mails by the Kansas City (Mo.) Railways between the Kansas City postal sub-stations and the Union Station has been discontinued. The mail cars have been replaced by forty-three motor trucks. The increase in mail, especially in parcel post matter, owing to many new mail order houses being opened in Kansas City, made the change imperative.

Raises Commutation Rates. — Commutation rates on the lines of the Washington-Virginia Railway, Washington, D. C., were raised on April 16 under authority granted by Interstate Commerce Commission. The price of twenty-trip tickets, good for a period of two weeks, was increased from $2.70 to $4, an advance of $1.30 on each ticket. Last December the price of monthly commutation tickets was raised from $4.05 to $4.45.

Municipal Line Increases Fares.—The St. Thomas (Ont.) Municipal Railway has increased fares from eight for a quarter to six for a quarter to cover the extra cost of wage advances. The old wage rate of 40 to 45 cents an hour has been increased 5 cents. Fares of 5 cents, 6 cents, 7 cents and 10 cents on different lines of the Peterboro (Ont.) Street Railway (Hydro Electric Power Commission) will be adopted at an early date to cover increased operating costs and the costs of extensions.

Upholds Michigan Rate Law.—The constitutionality of the State law granting to roads earning less than $8,000 a mile the right to charge fares of 2½ cents a mile on their interurban lines was upheld in an opinion recently handed down by the Michigan Supreme Court. The court reaffirmed its finding in another case that the State, through its Legislature, has the right to set aside franchise agreements between public service corporations and municipalities.

Ten Cents on Hudson Tubes.—The Hudson & Manhattan Railroad, New York, N. Y., raised its rates on April 19, when it resumed operations after the strike of its trainmen. The company, which operates the Hudson River tubes, now charges a 6-cent fare from New Jersey to the Hudson Terminal, Manhattan, and a 10-cent fare to uptown New York. The rates were formerly 5 and 7 cents, respectively. The Interstate Commerce Commission has refused to suspend the new rates.

Would Retain 6-Cent Fare.—The Winnipeg (Man.) Electric Railway has applied to the Public Utilities Commission of Manitoba for a permanent increase in fare to 6 cents. The commission several months ago allowed the company to install a 6-cent fare temporarily. At a recent hearing on the company's application witnesses testified that the average cost per passenger in order to cover all operating costs and provide a return of 6 per cent on the investment was 6.14 cents.

One-Man Cars Approved.—Speeding up of service and reduction in costs through one-man car operation on its lines in Elgin are advocated as a partial solution of the financial difficulties of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., by Joseph K. Choate, receiver of the company. Mr. Choate has submitted to the State Public Utilities Commission a report in which he recommends the use of safety cars and other changes in the road's equipment. Twenty-one "safeties" would be required to give adequate service in Elgin.

Will Reopen Staten Island Lines.—Federal Judge Chatfield has authorized the city of New York to enter into an agreement with Jacob Brenner, receiver for the Staten Island Midland Railway, Richmond Borough, for the operation of the company's lines. The company suspended service on Jan. 16 last, after futile efforts to secure financial relief from the city. All attempts on the part of the city to force the road to resume operation have failed. Judge Chatfield on April 9 authorized the city and the receiver to unite in working out a plan for the resumption of service. Cars will be leased by the city from the company.

Reject Higher-Fare Proposal. — A proposition to allow the Michigan Railway, Kalamazoo, Mich., to charge a 7-cent fare on its lines in Kalamazoo was defeated by the voters of that city at a special election on April 5. The City Council had previously agreed to waive the 5-cent fare provision of the company's franchise provided such a course were approved by the voters. Although the proposition received a majority of 78 votes at the polls, City Attorney Shaberg ruled that the city charter and the State Constitution required a two-thirds vote to carry the proposal. The company will appeal the case to the courts.

Tokens for Toledo.—The Toledo Railways & Light Company, Toledo, Ohio, will use metal tokens on its lines beginning about May 1. The present scale of fares, set by the Federal Court at 7 cents, with three tickets for 20 cents, made necessary the issuance of paper tickets, the first used in more than three years. Fare boxes installed this year necessitate the use of tokens. The court ruled that passengers may ride for 6 cents cash if the conductor cannot furnish tickets. Bus fare in Toledo, set at 10 cents with 25-cent owl service during the transportation tie-up, dropped to 5 cents on most lines as soon as cars began operating at the 7-cent fare.

Penalty for Non-Payment.—The New Jersey Legislature has passed a law which places electric railways on the same basis as steam roads in the matter of protection in the collection of fares. The measure provides that "Any person who shall travel on any street railway car without having paid his fare, and with intent to avoid payment thereof, or any person who, having paid his fare, and having traveled on such car to a point where, under the rule of the company operating such car, as announced by the conductor of said car, an additional fare is due, shall on demand refuse or fail to pay such additional fare or leave such car, shall be deemed and adjudged to be a disorderly person." The act has already gone into effect.

Seven-Cent Fare in Mobile.—A 7-cent fare became effective April 14 on the lines of the Mobile Light & Railroad Company, Mobile, Ala. The City Commission on April 6 voted unanimously to allow the company to raise the rate from 5 cents to 7 cents for a period of two years. The company was directed to sell four tickets for 25 cents and five for 30 cents. The skip-stop is to be abandoned within sixty days. An audit of the company's books showed that the company earned approximately $87,000 between October, 1918, and October, 1919. Later a second audit was made covering the years between 1912 and 1918 which showed that the company had made a net annual earning during this period of more than $100,000, or a total of $670,000 in the six-year period. This amounted to a return of 4.97 per cent on the investment.

Personal Mention

A. L. Kempster Goes South

Appointed General Manager of New Orleans Railway Company, Succeeding John S. Bleecker

A. L. Kempster, manager of the Seattle division of the Puget Sound Traction, Light & Power Company until the railway property in that city was acquired by the city of Seattle a year ago, has been appointed general manager of the New Orleans Railway & Light Company, New Orleans, La. Mr. Kempster succeeds John S. Bleecker, whose resignation as general manager of the New Orleans system was announced in last week's issue.

A. L. KEMPSTER

By virtue of his present appointment Mr. Kempster becomes the operating head of one of the most important public utilities of the South. The New Orleans Railway & Light Company, a subsidiary of the American Cities Company, operates 218 miles of track. The property is now in the hands of J. D. O'Keefe, receiver, for whom Mr. Kempster will direct the system.

Since leaving Seattle Mr. Kempster has been engaged in the conduct of investigations into public utilities for Stone & Webster. The survey of the lines of the Brooklyn Rapid Transit Company and the New York Railways, recently completed, was made largely under his direction. For several months he assisted Frederick P. Royce, then general manager for the receiver of the Brooklyn Rapid Transit Company, and later took part in the appraisal of the Manhattan surface lines.

Mr. Kempster was born in Canfield, Ill., in 1872. Entering the employ of the Seattle Consolidated Railway as a clerk at the age of nineteen, he was subsequently made bookkeeper and auditor.

When the Seattle Consolidated Railwav was reorganized as the Seattle Traction Company, he became secretary and auditor, continuing in these capacities until the merger of the city's utilities under the name of the Seattle Electric Company. Entering the operating department at that time, he was made trainmaster of the system.

In 1902 he was advanced to the position of superintendent of transportation, retaining this title for eight years. He was then appointed superintendent of the railway department. Still later he was again promoted, becoming general manager of the Seattle properties. He served in this capacity until early in 1919, when the system was taken over by the city.

Alexander Shapiro, formerly statistician for the American Electric Railway Association, has become connected with the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., as a member of its statistical staff.

Alfred D. Blake, superintendent of the Derby division of the Connecticut Company, New Haven, Conn., has been appointed superintendent of transportation of the lines formerly included within the system of the Shore Line Electric Railway, Norwich, Conn. These lines recently reverted to the Connecticut Company under a court order.

H. B. Flowers, general manager of the United Railways & Electric Company, Baltimore, Md., was elected second vice-president of the company at the annual meeting on April 14. Mr. Flowers will continue to discharge the functions of general manager. He assumed that office several months ago. A biography of Mr. Flowers was published in the ELECTRIC RAILWAY JOURNAL at that time.

Arthur H. Mann, resident engineer of the Empresas Electricas Asociadas, operating the city and suburban railways at Lima, Peru, South America, expects to sail for Lima from New York on April 28. For several years Mr. Mann was electrical engineer for the city railway in Evansville, Ind., and the Evansville & Princeton Traction Company. Later he was division manager of the city and suburban lines of the Michigan United Railways at Lansing, Mich. Before going to South America five years ago he was general superintendent of the Jersey Central Traction Company and the Middlesex & Monmouth Electric, Heat & Power Company at Keyport, N. J. During the world war the company was unable to get cars and other equipment from the United States or any other foreign country and Mr. Mann made several cars in Lima that are all American in style.

Mr. McCauley at St. John

Manager of Municipal System Appointed to Important Post with Private Enterprise

Thomas H. McCauley, formerly superintendent of the Calgary (Alta.) Municipal Railway, has assumed the duties of general manager of the New Brunswick Power Company, St. John, N B. The system of which he is now in charge includes railway, power and light properties serving a community of more than 40,000 persons.

Mr. McCauley's management of the Calgary Municipal Railway was attended by marked success both from an operating and an engineering standpoint. This is indicated by the fact that, when the city contained between 65,000 and 70,000 persons, the railway carried in the neighborhood of 45,000 riders daily. These results were accomplished largely through a liberal ticket policy. In 1918 it was estimated that the proportion of riders carried on tickets was at least 80 per cent.

T. H. McCAULEY

Realization of the possibilities contained in the one-man car was largely responsible for Mr. McCauley's success at Calgary. He early conceived the idea of rebuilding two-man cars of the older types to require the services of only one operator. As a result, the wages per car-mile to motormen and conductors decreased from 7.641 cents in 1913 to 5.688 cents in 1918, and in the interim wages had been largely increased.

Mr. McCauley has had a varied career as a utility operator. He was born in Peel County, Ont., in 1872. Entering the employ of the Bell Telephone Company at Port Arthur in 1889, he served as a lineman until 1891, when he was made local manager for Port Arthur and Fort William. Three years later he was made superintendent of the Port Arthur Street Railway & Electric Light Company. In 1909 he was appointed general superintendent of construction of the Calgary Municipal Railway. Upon the completion of the line he became superintendent, continuing in that capacity until his appointment at St. John.

New Manager for Doherty Interurban

J. Franklin Johnson has been appointed general manager of the Toledo & Western Railroad. With the appointment came the announcement that the general offices of the company would be moved from Toledo to Sylvania, Ohio, where the operating offices are located. The road operates between Toledo and Pioneer, Ohio, with a branch to Adrian, Mich.

A. P. Nicolet has been appointed secretary-treasurer, auditor and purchasing agent of the company, with offices at Sylvania.

Frank Coates, president of the Toledo Railways & Light Company, has been acting as general manager of the railroad for several years. Albert Swartz, also of the staff of the Toledo Railways & Light Company, resigns as vice-president of the Toledo & Western.

Mr. Johnson, the new manager, is a product of the Doherty training system. He joined the "cadet school" at Toledo, in February, 1916, after graduating from the University of Wisconsin as an electrical engineer. From Toledo he went to Durham, N. C., and later was transferred to Bartlesville, Okla. He comes to the Toledo & Western directly from the railroad department of Henry L. Doherty & Company, at New York.

The Toledo & Western has been in a difficult financial position for the last few years due to the increasing costs of operation and the decrease of revenues largely caused by good roads and automobile competition. The Adrian branch passenger business has been paying, but all other portions of the lines have been operated at a loss during the last year.

President Frank Coates and members of his staff have been attempting to put the road on a paying basis by acquainting the several communities served by it with the actual financial difficulties of present-day operation. They have held meetings at Morenci, Fayette and some other points on the railroad and have been promised co-operation by the people along the route.

It is expected that the establishment of the offices at Sylvania will bring the administration more directly in contact with the problems of the system.

A. B. Cole, general passanger and freight agent of the Monongahela Valley Traction Company, Fairmont, W. Va., has tendered his resignation. Mr. Cole has not yet announced his plans for the future.

J. O. Weigel has resigned as general superintendent of the International Railway, Buffalo, N. Y. Mr. Weigel succeeded Nelson H. Brown at Buffalo three years ago. He has not announced his plans for the future.

W. M. Casey, former superintendent of transportation of the Denver (Col.) Tramway, has been appointed general superintendent of the International Railway, Buffalo, N. Y., to succeed J. O. Weigel, resigned.

Thomas W. Connette, superintendent of transportation of the International Railway, Buffalo, N. Y., has resigned. He is the son of Edward G. Connette, former president of the company. Thomas W. Connette has gone into business for himself, organizing the Railway & Industrial Service Corporation.

Reuben B. Ladd has been made chief inspector of lines of the Connecticut Company, New Haven, Conn., formerly included within the system of the Shore Line Electric Railway. These lines have reverted to the Connecticut Company as the result of the abrogation of the lease under which they were operated by the Shore Line.

W. H. Smaw has resigned as purchasing agent of the Georgia Railway & Power Company, Atlanta, Ga., to accept the position as southern sales representative of the Electric Service Supplies Company, Philadelphia, Pa. Mr. Smaw had a very wide knowledge of the needs of the industry of which he was a part and established an enviable reputation in the work which he did for the company at Atlanta. He was born in Atlanta on Aug. 11, 1873, and was educated in the public schcools of that city. He entered business with a large wholesale house and served successively as shipping clerk, assistant cashier, and traffic manager. He resigned this position in January, 1903, to become connected with the purchasing department of the Georgia Railway & Power Company. For two years prior to 1910 he acted intermittently as purchasing agent owing to the ill health of G. B. Graves, who then occupied that position. He succeeded Mr. Graves in December, 1910. Mr. Smaw has contributed occasionally to the ELECTRIC RAILWAY JOURNAL. Actively interested himself in the affairs of the American Electric Railway Association, Mr. Smaw has long urged more active participation in the work of the association by the purchasing agents of the industry as a group.

Obituary

Colonel John N. Partridge, formerly Police Commissioner of New York City, died at South Norwalk, Conn., on April 8. He was 83 years of age. Colonel Partridge was born in Massachusetts. He enlisted in the army in 1861 and fought through the Civil War. After the war he moved to Brooklyn, where he joined the old Twenty-Third Regiment, National Guard. In 1880 he became colonel of the regiment. From 1886 to 1897 Colonel Partridge was president of the Brooklyn City & Newtown Railway, afterward included in the system of the Coney Island & Brooklyn Railroad, which is now a part of the Brooklyn Rapid Transit System.

New Publications

Inventions, Their Development, Purchase and Sale.

By William W. Baff, patent attorney. 230 pages. D. Van Nostrand Company. New York City.

This is a practical manual for the inventor, prepared with the aim of assisting in the commercialization of inventions. A few of the twenty-four chapter headings will give an idea of the scope and contents of the book, as follows: Value and price of patents, types of inventions from the commercial side, developing inventions, patents as property, methods of making sales, elementary contract law, mistakes of inventors, etc.

Armature Winding and Motor Repair

By Daniel H. Braymer, A.B., E.E. 514 pages. McGraw-Hill Company, Inc., New York. Price $3.

This book discusses the subject of armature winding, repair shop methods and testing of armatures from a practical standpoint and no attempt has been made to include theoretical calculations. It is a compilation of practical methods that are used by repairmen and armature winders and includes details of those methods which have been found by actual experience to represent the best practice in a repair shop of average size. A handbook of useful information is thus provided which can be readily understood by practical men engaged in shop work.

Effective House Organs

By Robert E. Ramsay. D. Appleton & Company, New York, N. Y. 361 pages. 5 x 7½ in. Price, $3.50.

Mr. Ramsay has written a very readable book. It should appeal to all the men in the public utility field and in manufacturing who have to do with the conduct of house organs and should also be of considerable interest to the executives in public utility work who are charged with the responsibility of fostering better public relations. Mr. Ramsay's book is all inclusive, so that only a small part of it treats of public utility publications. House organ costs are given in detail. There are also valuable hints on typographical display. There are some public utility publications which are very attractively dressed typographically, but others could be considerably improved. Editors can find valuable hints along these lines in what Mr. Ramsay has written. The first part of the book sets forth the principles and practical methods for successfully conducting house organs. The second part presents the "how and why" of such publications. Of particular interest to all public utility publicity men is the chapter "How Public Service Companies Have Used House Organs Successfully."

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

N. O. T. Orders 111 New Cars

Three Types of Cars Costing a Total of Almost $1,500,000 Placed with J. G. Brill Company

Northern Ohio Traction & Light Company, Akron, Ohio, has placed an order with the J. G. Brill Company, Philadelphia, Pa., for 111 cars. The order is reported to include twenty interurban cars at $22,000 each, fifty-six Peter Witt cars at $13,500 each, twenty-five safety cars at $6,500 each and ten trailers at $7,000 each, making a total of $1,428,500.

Twenty-five of the large cars and ten trailers are expected to be placed in the Akron city service. Service on the Akron-Kent-Ravenna, the Canton-Massillon and the Springfield Lake divisions also will be improved, according to reports. The safety cars will be similar to those now being operated in Canton. The interurbans are said to seat fifty-eight persons, the Peter Witt cars fifty-four, the safety cars thirty-five and the trailers fifty-eight.

It is believed that a considerable number of the cars will be built in the G. C. Kuhlman Car Company's plant at Cleveland, Ohio. This is one of the four Brill plants.

Delivery on all of the equipment is expected to be made in the fall.

Window-Glass Scarce

Some Leading Interests Have Withdrawn from Market—Longer Production Schedules Planned

Car window glass stocks are low and car builders are having great difficulty in obtaining enough stock for present needs. The present railroad tie-up has interfered with shipments principally of raw materials billed to the glass factories and has caused a material curtailment in production.

Several leading interests have withdrawn from the market entirely and some had to close their books more than two months ago. One company expects to be in a position to open its books for orders in about three weeks to a month.

It is impossible to obtain polished plate glass in sizes that are used for car windows and railways must be content with heavier glass in from 32 to 39-ounce sizes.

Window glass manufacturers are operating in two periods on account of difficulty in securing skilled labor. About half the manufacturers who were supplied with coal and other materials have been running since about Dec. 10, 1919, and will continue until early in June. The factories operating at a later period will commence in August and will probably operate up to Dec. 1, unless by special agreement with the men they can be influenced to continue working beyond that date provided the need for glass is pressing at that time.

Electrification in South America

$2,000,000 Contract Placed with International G. E. for Locomotives, Line Material and Substation

Electrification of the Paulista Railway between Jundiahy and Campinas, Brazil, has been assured by the placing of a contract amounting to almost $2,000,000 with the International General Electric Company.

Equipment to be supplied consists of twelve locomotives, eight freight and four passenger engines and material for the transmission line, substation and 3,000-volt overhead. The locomotives will be built at the Erie Works of the General Electric Company.

The project anticipates further extentions amounting to 100 additional miles of route, which may eventually bring the total electrification up to 128 miles extending between Jundiahy and San Carlos. The new line is expected to be in operation by July, 1921. It is one of the largest railway contracts awarded since the Chicago, Milwaukee & St. Paul electrification. An elevation drawing of the freight, low motive and friction technical details of its construction will be found on page 855 of this issue.

Railway Signal Business Outlook Better

Deliveries Range from Several Days to Three Weeks—Prices $550 to $600 per Block—Sales Show Improvement for First Quarter

Although nothing like a boom in electric railway signal orders characterizes today's business, inquiries among representative manufacturers show that the outlook is improving for larger sales. One concern reports 15 per cent larger sales in equipment during the first quarter of 1920, as compared with the corresponding period last year, and another active competitor declares that while his sales are not much above those of 1919, a healthier tone can be noted in the market. Inquiries are coming in at a faster rate and maintenance orders are helping to keep this branch of the industry occupied. The total volume of business is still far below the productive capacity of the various plants engaged in manufacturing and the prospects of getting upon a "mass production" basis are remote at present. The type of signal apparatus used in standard makes is favorable to large scale production, the most important obstacle to this being the slowness of many operating companies to realize the value of the insurance afforded by the latest designs of equipment.

It is true that the cost of signal apparatus has increased since 1914 about 60 to 70 per cent and that the factory price of higher grade equipment is today of the order of $550 to $600 per block. The cost of accidents, however, expressed merely in money, is relatively greater than before the war, and the demands of the public for service are capitalizable as probably never before. It is a fair statement that the cost of signal installations will be met by the traveling public if the issue is made clear by the operating companies.

In one factory shipment of complete blocks can be made within two or three days, assuming an order for ten or a dozen sets. Another manufacturer would probably require three to four weeks on account of a local shortage of materials. Stocks of glass, wire and brass are reported in good shape, but steel parts and malleable iron castings are very hard to obtain. Labor conditions in the foundries are very unsatisfactory, wages being so high that many employees work only part time each week. The labor turn-over is also heavy. It is doubtful if malleable iron castings ordered in eastern New England today, for example, would be delivered before August 1, and the lack of such supplies, accentuated by the recent railroad strike and embargoes, is holding back some shipments of completed signal apparatus. At 35 cents per pound, some malleable castings exceed the cost of copper.

Price tendencies have been upward in view of recent labor advances, 10 per cent in a representative case a few weeks ago. One maker advanced his prices about 10 per cent in March, and another is uncertain as to his ability to maintain present quotations. No immediate advance appears in contemplation, and if the volume of business should increase it might be possible to go no higher than present figures this summer. Equipment is becoming well standardized as a result of development work now practically completed. Some manufacturing interests are making a modest profit after several lean years, and as a whole the outlook is for gradually improving conditions predicated upon the recognition by the public that the cost of safe service must be met out of revenue.

Shipments Lengthen on Copper Products

Lack of Raw Materials and Coal Causing Hardships—Stocks Are Piling Up

In the face of a heavier buying movement than heretofore on the part of the railways which have commenced rehabilitation of rolling stock and equipment, and which have recently made large purchases of new equipment, the copper and brass mills are having their own troubles filling their orders. Several mills in the New England and New York territories are in whole or in part shut down because of labor troubles and shortage of raw materials and coal, while many mills which are running have only enough operatives to run one shift, with sufficient work on hand to run night shifts, too. One mill in particular is working four nights a week at full capacity until 9 o'clock and has not enough labor available to run a regular night shift. Productive capacity is in general booked up to a heavy excess.

MOTOR TRUCKS TO RELIEVE TRANSPORTATION DIFFICULTIES

Shipments are long. If transportation were available now, the mills, of course, could begin moving much of the material that is piling up in their warehouses. Motor trucks are moving quantities of it, but this method is merely taking the edge off the stocks piling up and is taking care of only rather local traffic. The mills that are running are quoting from six to twelve weeks for shipments, while at least one of those shut down is not quoting any shipping date. Copper sheets and brass shapes are in a condition somewhat analogous to that of the steel industry. Hot copper sheets are in heavy demand and are carrying a six weeks' shipping date. Cold-rolled copper sheets can be turned out in about double the time.

There does not seem to be any immediate prospect of relief for the situation outside of a resumption of rail traffic. This, of course, will release pent-up finished stocks, but it will in no wise increase the supply of labor which is necessary if more business is to be handled. Except in finished products, it is reported that little or no brass is being exported, the New England mills supplying domestic trade only. The electrical industry is taking more and more copper and brass tube, rod, wire and sheet, and it is expected that mill conditions and shipments will become increasingly more unsatisfactory as the summer advances. In connection with the export trade there is reported a heavy demand from India for sheet copper and brass.

LITTLE FLUCTUATION IN COPPER PRICES

Prices of finished and semi-finished materials have held quite steady for several weeks. Copper itself has been holding within a cent of 19 cents all this year and so has had little effect in changing prices of its products. The price of copper is not likely to advance materially unless a heavy foreign buying movement sets in. It would not be surprising, however, to see a slight advance in the raw metal when domestic buying for the third quarter opens up. This would probably be reflected in higher prices of copper and brass products. At any rate, production costs, in particular in the mills where strikes are on if labor obtains an increase, are liable to have a greater effect in increasing prices of brass and copper products than advances in raw materials. Prices have been withdrawn where strikes are holding up production because of the uncertainty of future producing costs.

Rolling Stock

Cumberland County Power & Light Company, Portland, Me, has purchased three snow-plows and one snow-sweeper.

Cloyd M. Chapman has resigned from Westinghouse Church Kerr & Company, Inc., and has opened an office at 171 Madison Avenue for the practice of consulting engineering.

Combustion Engineering Corporation, New York, N. Y., announces with regret the resignation of its vice-president in charge of sales, E. P. Moritz, on account of ill health. No successor to Mr. Moritz has been named.

Paulista Railway, Campinas, Brazil, has placed an order with the International General Electric Company for twelve electric locomotives. The eight freight locomotives will weigh 100 tons each and the four passenger type 120 tons each.

Public Service Railway, Newark, N. J., has purchased 100 trailers from the Osgood-Bradley Car Company similar to the type now in use at Cleveland, Ohio. Delivery will be made commencing in September and will be completed by December.

Northern Ohio Traction & Light Company, Akron, Ohio, has placed an order for 111 cars with the J. G. Brill Company. The order includes fifty-six Peter Witt cars, twenty interurbans, twenty-five safeties and ten trailers. Delivery will be made in the fall.

Pittsburgh (Pa.) Railways, noted in the Feb. 7 issue of the ELECTRIC RAILWAY JOURNAL as considering the purchase of a large number of cars, through its receivers, have asked the United States Court for permission to purchase 150 cars to cost approximately $2,000,000.

Track and Roadway

Los Angeles (Cal.) Railway.—It is proposed to extend the Western Avenue, Heliotrope Drive and Temple Street lines of the Los Angeles Railway.

Los Angeles, Cal.—The Los Angeles City Council has ordered that bids be advertised for a franchise to build and operate a double-track line in Temple Street, Los Angeles.

Los Angeles (Cal.) Railway.—The Los Angeles Department of Public Utilities has directed the Los Angeles Railway to extend its Western Avenue line from its present terminus at Melrose and Western Avenues to Santa Monica Boulevard and Western Avenue.

Pacific Electric Railway, Los Angeles, Cal.—It is proposed to extend the Spadra line of the Pacific Electric Railway through Corona to connect with the main line near Pomona.

Connecticut Company, New Haven, Conn.—The Connecticut Company plans to make extensive repairs to its East Avenue line, Norwalk, Conn.

Connecticut Company, New Haven, Conn.—The Connecticut Company will rebuild the roadbed of its Berlin-New Britain line and will install new rails.

Danbury & Bethel Street Railway, Danbury, Conn.—The Danbury & Bethel Street Railway will build an extension from West Street to Lake Avenue, Danbury, connecting its West Street and Lake Avenue lines.

Petersburg, Ill.—It is reported that 76 per cent of the right-of-way of a new interurban line between Springfield and Beardstown, Ill., has been secured. With the exception of three miles leading into Springfield the right-of-way is pledged from that city to Chandlerville, Ill., by way of Salisbury, Petersburg and Oakford. The three-mile entrance into the city of Springfield, Ill., is yet to be secured.

Milford & Uxbridge Street Railway, Milford, Mass.—It is proposed to repair the loop line of the Grafton & Upton Railroad, a subsidiary of the Milford & Uxbridge Street Railway, at a cost of $10,000.

Lincoln (Neb.) Traction Company.—The Lincoln Traction Company will repave its right-of-way in Twenty-seventh Street, Lincoln.

Hershey (Pa.) Transit Company.—The Hersey Transit Company is surveying the route of its proposed extension from Lebanon to Fredericksburg, Pa.

Montreal (Que.) Tramways.—The Montreal Tramways will shortly begin the construction of a line from Ahuntsic station to Boulevard Gouin. The line will be 2¼ miles long.

Piedmont & Northern Railway, Charlotte, S. C.—The Piedmont & Northern Railway will rebuild the roadbed of its Anderson (S. C.) line.

Power Houses, Shops and Buildings

Kansas City-Western Railway, Kansas City, Kan.—The Wolcott car shops of the Kansas City-Western Railway were destroyed by fire on April 15. The blaze resulted from the explosion of an acetylene torch. The loss is estimated at $150,000.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—The Trenton & Mercer County Traction Corporation plans to build a terminal in the center of the city of Trenton.

Dayton & Troy Electric Railway, Dayton, Ohio.—The carhouse of Dayton & Troy Electric Railway at Tippecanoe City, Ohio, was destroyed by fire on April 14. The company will rebuild at once.

Trade Notes

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has opened an office and warehouse at Jacksonville, Fla.

Norton Company, Worcester, Mass., is building a large six-story addition to its plant which will contain 60,000 sq.ft. of floor space.

J. G. White Company, New York, N. Y., has been recognized in an award by the United States Government for distinguished service, loyalty, energy and efficiency in war kork.

Benjamin Electrical Manufacturing Company, Chicago, Ill., has moved its San Francisco office from 590 Howard Street to 580 Howard Street, occupying the entire four-story building.

American Steam Conveyor Corporation, Chicago, Ill., has developed an air-tight ash-pit door which has a number of features that make it attractive to the power-plant engineer.

Square D Manufacturing Company, Detroit, Mich., has purchased the property of the Peru (Ind.) Electric Manufacturing Company, manufacturer of standard and special porcelain wiring devices.

Elliott Company, Pittsburgh, Pa., manufacturer of power accessories, is now placing upon the market an apparatus which removes substantially all of the air and dissolves gases from boiler-feed water.

E. B. Badger & Sons Company, Boston, Mass., has acquired the American Spray Company, including its engineering personnel. The American Spray Company manufactures spray ponds and air washers designed especially for cleaning the air used to cool generators.

Fairbanks Company, New York, N. Y., has appointed Edward J. Jeep, for many years city sales manager of the Commercial Electrical Supply Company, St. Louis, Mo., as manager of its electrical department in its St. Louis, Mo., branch at Seventh and Market Streets.

Hyatt Roller Bearing Company, New York, N. Y., through the manager of the industrial bearing division, D. Gleisen, announces the removal of its offices to 100 West Forty-first Street, where larger quarters have been secured for advertising, sales and engineering departments of the division.

Mitchell-Rand Manufacturing Company, New York, N. Y., has become the agent and representative of the Sterling Varnish Company and will sell its products at factory prices, making prompt deliveries either from a complete New York stock or from the factory direct.

Graphite Metallizing Corporation, Yonkers, N. Y., which manufactures oilless bearings and impregnates carbons for brushes, has appointed as sales engineer Walter S. Hoyt, who has been for two years assistant to C. A. Greenidge, chief engineer of the J. G. White Management Corporation, New York City.

National Carbon Company, Long Island City, N. Y., American Ever Ready Works branch, has appointed H. S. Schott as Eastern sales manager, succeeding J. H. Somers, resigned. Mr. Schott first became connected with the company in 1913 as a clerk, and after a term as salesman he was transferred to the Canadian Ever Ready organization, where he was promoted to be assistant sales manager.

General Electric Company, Schenectady, N. Y., announces that the new addition to the Windsor works of the General Electric Company will be completed about the first of June and will be ready for occupancy about July 1. The building will be 200 ft. x 70 ft. and will contain two floors and basement, providing 40,000 sq.ft. of floor space. Small electric motors of various horsepowers for direct current are manufactured at the Windsor works.

Material Handling Machinery Manufacturers' Association, New York, N. Y., at a directors' meeting held April 6, elected officers for 1920 as follows: Charles Lang, president Lakewood Engineering Company, president; R. W. Scott, Otis Elevator Company, New York, vice-president; L. C. Brown, Elwell Parker Electric Company, New York, treasurer; and Zenas W. Carter, New York, secretary and manager. Calvin Tompkins, the retiring president, was made an honorary member. Three companies, the Whiting Foundry Equipment Company, Harvey, Ill.; Motors Terminal Company, Cleveland, Ohio, and the C. W. Hunt Company, Inc., West New Brighton, N. Y., were elected to membership in the association.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that L. A. S. Wood, prominent in illuminating engineering circles both in this country and in Europe, has been appointed manager of the illuminating section of the supply department of the company, with headquarters at South Bend, Ind. He came to this city in 1911 to introduce the flame carbon lamp and was shortly afterward appointed as arc-lamp expert of the Westinghouse Electric & Manufacturing Company, with headquarters at East Pittsburgh, Pa. Soon after the introduction of the "Mazda C" lamp he became associated with the George Cutter Company of South Bend, Ind., as illuminating engineer, and during the past nine years has traveled extensively, taking an active interest in street-lighting improvements in all sections of the country.

Edward R. Ladew Company, Inc., Glen Cove, N. Y., announces that Vance McCarty, general sales manager, has been made vice-president of the company. Mr. McCarty's connection with the house of Ladew covers the past twenty years and embraces every phase of the leather belting business, including manufacture, sale, branch management and general sales direction. He will continue in direct control of Ladew sales policies and has retained as assistant general sales manager Russell B. Reid, another Ladew belting expert with twenty years of leather-belting experience.

Engineering & Appraisal Company, Inc., New York, N. Y., has added to its engineering staff Ralph G. Macy, who has been elected vice-president of the company. Mr. Macy has accordingly resigned as chief engineer of the construction department of the Walter Kidde Company. Mr. Macy has had a long experience in engineering and industrial work, and prior to the war was in charge of the operation of five plants making liquid oxygen and nitrogen.

Professional Note

L. B. Stillwell & H. S. Putnam, consulting engineers, and the L. B. Stillwell Engineering Corporation, constructing engineers, now at 100 Broadway, announce the removal of their offices on May 1 to 143 Liberty St.

New Advertising Literature

Independent Pneumatic Tool Company, Chicago, Ill.: Bulletin No. 95, describing "Thor" pneumatic motor hoist.

International Register Company, Chicago, Ill.: Catalog No. 5, showing all types of fare register now made by this company, together with register backs and repair parts.

United American Metals Corporation, Brooklyn, N. Y.: A reprint of an address, "Selecting the Babbitt," by H. S. Hood, of this company, manufacturer of Syracuse babbitts.

Standard Underground Cable Company, Pittsburgh, Pa.: Bulletin No. 100-1, describing its products, copper, brass tubes, rods and wires. Additional data are included.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 55 New York, Saturday, May 1, 1920 *Number* 18

"Traction Grab Bills" Defeated at Albany

THIS is the way that several of the New York daily papers announced the disgraceful failure of the New York State Assembly to pass the bills introduced by Mr. Jenks to remedy the defects in the existing public service commission law and bring New York State back in step with practically every other State in the Union so far as the government of traction companies is concerned.

What were the "grab bills"? Did they raise the fares on the railways in New York? No. They simply authorized an investigation of the traction situation by an impartial State tribunal, the Public Service Commission, with power to correct inequalities of fares if any are found. The railways in New York State are admittedly in a deplorable condition. Whether their claims for relief are warranted or not, the companies should at least have the right to present their case for consideration before a disinterested court.

As relief has been granted in similar cases in other states, there is at least a presumption that it is warranted in New York. For this reason the action at Albany in denying the right of a hearing is discreditable to the State as well as injurious to the communities served by the electric railways.

Electric Railways—An Important Factor in Increased Production

THE address of Mr. Pardee at the meeting of the United States Chamber of Commerce in Atlantic City last Wednesday emphasized two important points. The first was the vital service which the electric railway supplies to the economic life of a large part of this country and that no other agency can furnish this service half so well, if at all. The other point made by Mr. Pardee was that, this being admitted, the various systems of transportation should be allowed so to develop that each will perform the functions for which it is best fitted. The logical place of the electric street and interurban railway is midway between the trunk line railroad and motor transport. If the trunk line, for instance, with its large terminal charges, attempts to engage to too large an extent in short-haul traffic of freight and passengers there is an economic loss. In the same way, motor trucks and buses may easily be encouraged, because they do not have to pay for the highways which they wear out, to undertake transport which could more cheaply be done by the electric cars. Mr. Pardee then makes a strong plea for fair treatment of the electric roads so that they can raise the capital necessary for their development, estimated by him to be normally $200,000,000 a year.

The topic of the Atlantic City convention was "increased production," and probably every delegate there realized the necessity, in any plan of increased production, of co-ordinating all agencies of production so as to secure the most economic result. Yet it is quite probable that many of them had not fully understood the connection of this principle with the place in the community occupied by the electric railway. Mr. Pardee's talk on this subject was clear and convincing and we believe that it did a great deal of good.

Efficacy of Connecticut Decision Doubtful

IT SEEMS, after studying the recent zone fare decision of the Connecticut Public Utilities Commission, that an injustice has been placed on both the trolley company and the populace served. The former's rate structure, developed with considerable forethought, has been destroyed after a theoretical study and the latter is subjected to a rate which discriminates in favor of the long-haul passenger.

The commission some time ago was directed by the State Legislature to evaluate the property of the Connecticut Company for the determination of a rate base and for the information of the Legislature in formulating state policy toward the company. Before there is a chance to complete this valuation and even before it has been proved conclusively that the earning power of the scheme of zone fares instituted by the company on Nov. 9 was more or less than needed to meet the cost of service the fare scheme is torn apart. Why? Was it because the commission wanted to placate the howl of the suburban rider that the 2-cent zone fares were discriminatory, or that the fares of the short-haul city rider had not been increased in the same proportion as those of the suburban rider? Under the new rate structure which it has established the commission predicts that the passenger revenue will be increased, whereas it claims that the company's plan of last November failed to earn anything over and above that which the flat 6-cent zone fare normally would have earned had it been in effect.

However, if the commission considered the company's scheme discriminatory because it took into account the density of traffic, we feel that the commission itself has made an even greater mistake when it establishes zone tickets and commutation tickets for specific classes of riders. It is class legislation and more discriminatory in every respect than the previous plan of operation, and the company is entirely justified in its appeal from the decision.

We further question the policy of the commission in the method it has chosen for providing financial stability to the company. If the Commissioners but realize the magnitude of the educational campaign which must be waged before it is possible to secure any remedial legislation or repeal existing legislation, and if they would but see that it is their duty to lead in such a campaign, rather than to alter a rate structure before the company is on its feet financially, they would pursue a more constructive policy. Moreover, such indirect financial assistance would help the company with a much smaller degree of disturbance than changing fares for the advantage of less than 30 per cent of the company's patrons.

Every time fares or fare limits are changed throughout a system of any magnitude it is necessary for the company to conduct an educational campaign, to familiarize not only its own employees but its patrons with the workings of the plan in advance of the date of installation. There necessarily is much confusion in the first few days and the riding public and employees, unless working together, are prone to criticise—not constructively but destructively—and thus create considerable unwarranted hard feeling toward the company, all of which is soon reflected in the service rendered and the spirit with which it is accepted.

Differentiate Between Supervisory Regulation and Management

BUT there is a question involved in the interpretation of this decision which is more important and more fundamental than any mistake the commission may have made in zone lengths or commutation rates. This, we believe, is its failure to distinguish clearly between regulatory or supervisory acts and managerial acts. Or, perhaps, it does not appreciate or agree that the real function of a commission lies in regulation and supervision as differentiated from management. In either case, we believe the commission errs.

We have no quarrel with, but rather commendation for, the broad purpose of the Connecticut commission as we understand it, not only in this case but in its general program. We believe in the commission theory of supervisory regulation and wish by anything we say to offer constructive criticism. But in this instance we see a danger, not infrequently present, of a commission's defeating its own chief purpose by a mistaken move.

To make our point clear, much of the foregoing editorial might have been written in criticism of a company's action in producing such a rate structure as well in criticism of a commission's action. This would indicate that the commission has assumed managerial functions, which properly belong to a company. The fact that the commission says it is willing to take the blame if the rate structure is wrong helps but little, if any. This statement by the commission is in itself an admission of our point. It is the company, though, which must meet the public and suffer the actual consequence, both financially and in public opinion, if the new plan doesn't work.

Commissions very properly are interested in and concerned with the provision of satisfactory service at a just and fair price and they realize that one of the features tending toward such a provision is good public relations. We conceive that commissions will advance their program most rapidly and will place themselves in a much stronger and more useful position when they refrain from trying to substitute themselves for the managements of the various utilities and when they confine themselves to questions of policy and principles. We are not unmindful of the fact that a certain "twilight" or "neutral" zone of action may exist, nor are we unmindful of the fact that commissions are frequently limited and controlled by laws and by court decisions, and some change of attitude may be necessary in those places. But a clearer realization of the situation by the commissions themselves will be a substantial forward step.

Faithful Service Recognized in Kind

FAITHFUL service of its employees is recognized and emphasized by the Public Service Railway Company in granting a voluntary 10 per cent increase in wages to platform men, shopmen, linemen and trainmen. We commend this, not because faithful service is so unusual or because it is not expected, but rather because we believe this move indicates a healthy managerial attitude which recognizes the company's duty to its men to be on a par with the service it expects from its employees.

The obligations of employees have in most cases been assumed, but recognition of corresponding obligations have not always been so readily admitted by managements. But this act is a forward step, and we think the present move means more than this recognition of duty by a modern management. It indicates that every one on the system is pulling together to get a job well done. The present increase is not a bonus reward for faithful service but a recognition of the increased cost of living, granted, we take it, in fairness to the men even before an existing wage agreement terminates, and in appreciation of the faithful service which the men have performed during some past difficult months.

A confidence is thus generated between those who perform the tasks in connection with the operation of the system and those who are chosen to manage the system as a whole. And this serves directly to produce better service, which is the ultimate purpose of the whole organization.

And what more? A management which recognizes its duties and opportunities in one line gains public confidence that it will recognize its duties and opportunities in all lines. And every employee is a booster in building this public confidence. This is what is wanted, a public, an operating force and a management with mutual confidence and sense of obligation. Enlightened management can do a great deal to realize this condition.

Wisconsin Commission Backs Get-Together Plan for Electrolysis Mitigation

ELUSIVE stray currents from electric railway track circuits have a way of keeping everybody upset. Getting together is the only solution of the difficulty. On a nation-wide scale the American committee on electrolysis is doing this in a way that promises much for the future. Its recently formed research sub-committee will be the means of doing continuous and constructive investigational work. The permanent Milwaukee committee on electrolysis, which has been recommended by the Railroad Commission of Wisconsin, is another application of the same principle. It should be able to harmonize conflicting interests and apply locally the results of the work of the national committee.

The studies which have been made in Milwaukee have been referred to from time to time in these columns as illustrations of a serious attempt to get at the facts. Much of the misunderstanding which has prevailed in the past has been due more to lack of data than to natural "cussedness." Acceptable all-around data on this rather complicated subject are difficult to secure, and their acceptability is the more doubtful if they are obtained by one party in a controversy. In this case the railway company took the initiative in petitioning for an investigation for the purpose of silencing criticism if this should prove to be unfounded. The commission also exercised initiative in bringing in the United States Bureau of Standards as investigator. A volunteer committee of representatives of affected interests was formed for the purpose of the investigation and now the commission wants this made a permanent institution. Such a committee will keep up its interest in the continuous investigation, and this can be done if the importance of the subject is kept clearly before the members; it will aid the commission in connection with future orders and will insure justice to all concerned.

The Enticing Ad Which Says: "Ride a Bicycle to Work"

MOST magazines are in the habit of paying for the fiction they print. In this rapidly changing age, however, it appears that some magazines are being paid to print fiction. Thus the most interesting fiction we have seen recently in the general magazines was printed as an advertisement. It was headed "Ride a Bicycle to Work." We are told that to do this would save us money, avoid us the miserable jam of the crowded street car and—get us to work on time. Moreover, the bicycle, according to the ad, "is the most economical form of transportation." "It is convenient—always ready to go—costs practically nothing to operate." Introducing all this was the picture of an executive, in horn-rimmed glasses, leading a bicycle parade of the proletariat.

We confess we are materialists. We are a little different from the writer of the ad, however. Our first desire is to get to work on time. Our second most compelling motive is to save money. This is the orderly sequence. If we succeed in the first, we shall probably succeed in the second ambition. And if we succeed sufficiently well in the second, after a time we won't have to bother about the first. Our time will be our own to go fishing, raise chickens or play golf.

The more we thought about the ad, however, the more it grew upon us. It was like the vice which the poet Pope wrote about. We first endured and then embraced. Years ago we rode a bicycle. Among other mementos of those days that we carry around is the scar on our index finger where we almost lost the digit by getting it caught between the chain and the sprocket. Of course the bicycle is always ready to go. We remember how we used to get ours ready in the old days. After the family had all gone to bed we silently stole into the kitchen and took the whole thing apart. At 3 a.m., when we went to bed, some of the ball bearings were under the sink and the never-leak was all over the kitchen floor. Mother told these facts the next morning. We thought we had put both in the right places, but it usually turned out that we hadn't. They were great days.

As we meditated over the ad the clock struck 11 p.m. We laid our horn-rimmed glasses on the library table and stole into the cellar, where reposed our old Cleveland. Such is the power of suggestion. After looking the old wheel over we decided to go for a ride. Then we thought of our $100 suit. Suppose we should ruin it with machine oil. A happy thought. There was our brother's army uniform. We found the old tires somewhat porous, but after an hour of pumping, we started out as a night rider, garbed in the uniform of a lieutenant of the aviation service. A half hour later we dismounted voluntarily. We went upstairs and took a bath. We needed it. Moreover, we hope our brother will never want to show his uniform to loving friends. They will think he was a member of the sanitary squad, not an aviator.

We knew all along that the ad was fiction. But it gave us a beautiful excuse for trying the old bike again. If the ad does nothing more than this for others it will not have been paid for in vain by the Cycle Trades of America. No! Broadway, La Salle Street and Woodward Avenue will never again be filled with men and women riding to work on bicycles. The Morris Plan Banks have no need to worry about the workers seeking loans to buy bikes. As a means of transportation for the great majority the bike is as dead as the dodo. Advertising—particularly the advertising fiction we have quoted—can never breathe the breath of life into the bike again.

Electrification Demands New Railroading Conceptions

WE VENTURE to assert that the almost universal conception of the significance of railroad electrification is merely the substitution of an electric locomotive for a steam locomotive. True, the possible increase of train loads, the greater ease of conquering grades, the benefits as applied to tunnels and some of the points of increased terminal capacity are appreciated, but there will be much more than this. Wholesale electrification allows entirely new conceptions of railroading, and not only allows but will require them.

Turn to manufacturing for an instant. Do we now hold any appreciable part of our former ideas of mechanical production? Yet the first use of the electric motor was merely to replace the steam engine or waterwheel, still retaining the inefficiency and frequent ineffectiveness of the transmission and application of power. But by a process of evolution and development the application of electricity to industry has today revolutionized our ideas and methods of production. Things heretofore dreamed of as doubtful possibilities are now accomplishments. It has been a development, not an overnight change, though at times some large steps seem to be so, but a comparison of present and former methods show the completely different conceptions due to the application of electricity.

And so in railroading. No statement of the present conditions and necessary steps in transportation improvement is needed. How we are to accomplish the improvement is unknown. When limitations in one direction are reached we need new conceptions and methods, and electrification makes these possible. The ultimate realization must be through development. But we should lose no time in examining from both engineering and economic standpoints the new possibilities. New train weights, new speeds, new divisioning, new methods we have no words or descriptions for must come. It will cost money to start; it will take time to do, but the result will be as revolutionary as has been the result in other places of the application of electricity. We must think along new lines.

This Is Number Two of a Series of Articles on Salient Phases of the Electric Railway Situation

Philip J. Kealy of Kansas City —and His Job

By Edward Hungerford

AS THE SUBJECT for the second of his series of studies on the electric traction situation in the United States Mr. Hungerford has selected Kansas City. He has found that in this city a number of special problems were to be met, and Colonel Kealy has met them. "A two-fisted fellow" is what Mr. Hungerford calls the president of the Kansas City Railways, but constructive fighters were needed in Kansas City as well as elsewhere, and Colonel Kealy is winning out.

He's a regular two-fisted, fighting fellow—this Colonel Philip J. Kealy, who pushes the trolley cars up the great hills of Kansas City. And he has good need of all of his two-fistedness, has Kealy. Seemingly there have been few times since first he came to the presidency of the Kansas City Railways, four years ago, when there has failed to be a premium on the necessity for a fighting man in the president's chair. And no time when it has not needed a regular fellow. For in "K. C.," like ninety-nine out of every hundred American cities, the traction problem for more than a decade has been a constant struggle. Only in the big, overgrown town at the bend of the Missouri the fight has been accentuated by the fact that the local street railway has had as its constant and untiring antagonist one of the best-organized and most capable newspapers in the country—the Kansas City *Star*. In fact Kansans and Missourians long ago began to recognize the very patent fact that to have the *Star* steadily fight an institution was a sort of compliment to the power of that institution.

There is no use going back into history to tell when or how the feud between the *Star* and the street railway began. It is mixed with shadowy hours in earlier Kansas City politics, with memories of Corrigan and the elder Pendergast and Col. William R. Nelson, the builder of the *Star*—himself something of a two-fisted man—and of the Metropolitan Railways, whose dark green trolley cars were the predecessors of the yellow cars of the present system. Out of all the ramifications of that mess and stew the present feud was born. There was nothing that Nelson liked better than a good and healthy and extended feud. Have I not already told you that he too was enlisted in the clan of the two-fisted? The street railway row was close to his heart. He was big and personally very popular. He had vision, too—the neat rows of exquisite little houses in the Rockhill section of Kansas City are proof enough of this. Incidentally those houses were made usable by the extension of the trolley system to their doors. All of which occasionally got by Colonel Nelson.

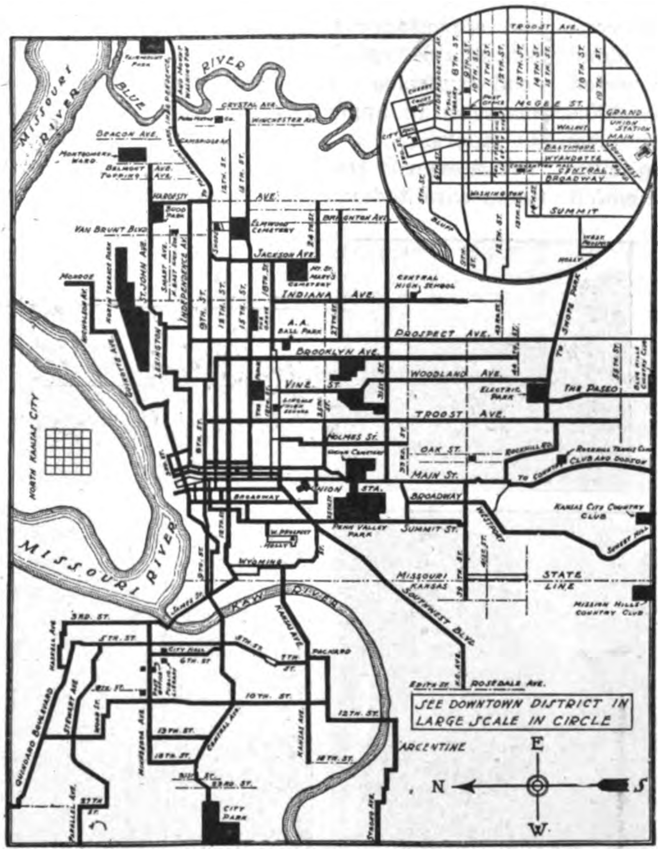
Colonel Kealy's energy is not confined to Kansas City, but he is helping the industry as an officer and most active worker of the American Electric Railway Association.

Not many things, however, have gone by the other colonel. The reason why is so simple as to be obvious. Kealy can't afford to let them get by. For more than a year now he has been up against four big things, almost any one of them terrific enough to scare an ordinary street railway and an ordinary street railway president into bankruptcy and ruin. Influenza epidemics, long-continued epidemics of labor troubles, the severest sort of automobile and jitney competition and the steadily growing prices of fuel, raw material and labor. Not that these things have not counted—and counted big. From a healthy little operating surplus, in something over two years the road came to a point where in the year ended June 30, last, it had achieved an actual operating deficit of $325,000, to say nothing of turning a chilly back upon some interest coupons due and amounting to about $2,000,000. As recently as 1917 the conservative financial advice department of the *Saturday Evening Post* had recommended the 5 per cent bonds of the company—then selling at 98—as the best utility investment then in the market. Last December a block of 160,000 of these same securities changed hands at 36½, a represented shrinkage of some $18,000,000.

City Now Appoints Five of the Eleven Directors

In the blackest days of the old Metropolitan company — in those days when it was already in the hands of a receiver, and the vigorous Colonel Nelson, still alive, was pummeling it morning, noon and night, it never defaulted its interest. As the old saying goes, it kept its face. With a marvelous degree of intactness it held its organization together, so that after the federal courts reorganized it into the present Kansas City Railways (in 1914) and it had been given a franchise by popula vote of the citizens of the Missouri community it seemed to have every possible opportunity for future and continued success. A plan, based very roughly upon the Tayler grant of Cleveland, was used for this franchise. The property was written into the document at an agreed valuation of $30,000,000—about $6,000,000 has since been added—under the supervision and approval of the city authorities. For remember that this approval and supervision, like that in Cleveland, is both constant and close. The franchise says definitely that outstanding stocks and bonds may never exceed capital account value. In addition to this, the sharp-eyed railway commissions of the two sovereign states who share the ownership of the two closely adjoining Kansas Cities reserve—and use—the right of "O.K." upon every dollar of scrip that the railway company may issue. This same franchise puts the supreme operating control of the property into the hands of a board of two men, one chosen from the city (whose salary, nevertheless, is paid by the railway company) and one from, and for, the company. Robert P. Woods represents the city and Colonel Kealy the company. It was suggested at first that a third man be appointed to settle disputes that might arise between the city's representative and the company's. This was opposed as unnecessary and a far less expensive course was adopted, that disputed questions go to the federal courts for arbitration. This was done. And in the six years that Mr. Woods and Colonel Kealy have worked together there has arisen but one question that required court decision, and that was a comparatively minor one.

As in Cleveland, the city, through its representatives, actually supervises the operation of the cars, making and revising the schedules and car-routings, as well as helping make and approve plans and specifications for new work and auditing and approving requisitions and accounts. Its interests, moreover, are further protected by the appointment by the Mayor of Kansas City, Mo. (85 per cent of the population served by the system is upon the Missouri side of the state line), of five of the eleven members of the company's board of directors. These men, each of whom must become the owner of one share of the company's stock, are appointed in rotation, for terms of five years. So far they have been chosen with great wisdom and discretion. They are five most representative citizens; and so well have they filled their posts that as four of the terms have expired they have been filled again by the renomination of their former holders.



The Kansas City Railways serves the cities of that name in Missouri and Kansas.

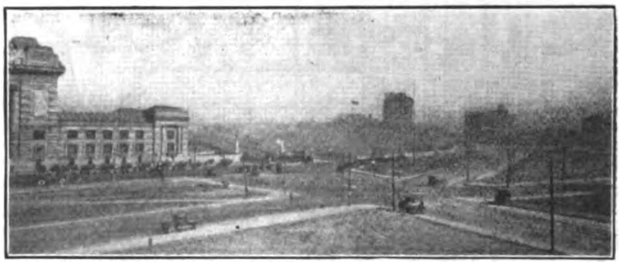
From its net earnings and by the terms of its franchise the Kansas City Railways is entitled to 6 per cent upon its capital value. This is not a guarantee. The company must earn the money. And, as we have already seen, it has not earned it—not, at least, for nearly three years, while there is apparently little prospect of its reaching a dividend basis again for some time to come. Apparently the company is solving its labor problem, of which more in a moment. The jitney and automobile competition, however, is not apt to end so quickly or so easily. There are today some 30,000 automobiles in Kansas City, as compared with 7,000 six years ago. Kealy and his fellows estimate that each of these means on the average two fares a day lost to the company, or, at the present rates, some $4,500 in gross revenues. The fact that the business existence of the average jitney operator is less than three months wots nothing whatsoever. There is always some one to take the place of the expiring transport operator. What was that the late P. T. Barnum said was born one to a minute?

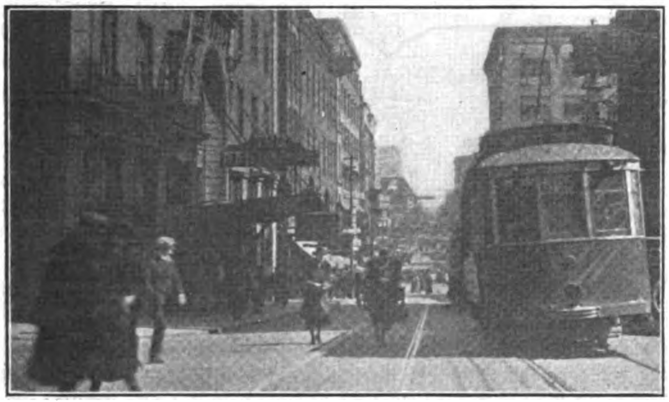
But the largest problem that Kansas City's street railway faces, and must continue to face, is that of the huge physical bulk of the city itself, as well as of its Kansas namesake across the Kaw.

"We rank among the first three or five electric railways of the land in mileage," says Colonel Kealy, "and strive particularly for first place in this standing with Los Angeles and with Portland, Ore. We also have practically the same mileage as both Detroit and Cleveland and with a total population of only about half of either of those cities. Moreover, the aggregate of the corporation limits of the two Kansas Cities is nearly double that of Cleveland—some 81 square miles here as against 47 square miles there."

I asked Colonel Kealy if it had been possible under the stress of war emergency or the increasing use of the automobile as a competitor of the trolley car to abandon any of the excessive street mileage of his system. He gave a decided negative and called my attention to the fact that since its reorganization back in 1914 the company had actually laid down 30 miles of new line.

"As a matter of fact," he added, "we are now in good shape physically to serve Kansas City for twenty years to come, to handle a million folk in these two towns. We have anticipated the growth of the community more than the community itself. By providing good transportation to its outlying districts we have brought about a condition where 70 per cent of the folk of Kansas City own their homes; not the Philadelphia narrow-fronted type of house, you understand, but regular homes, with lawns and gardens round about them, the sort of homes that invariably bring good citizenship in their train. Yet you must remember, and continue to remember, that this property is terribly burdened by the topography of these twin cities, as well as by their vast bulk. In recent years they have spent over $4,000,000 on bridges—you may still recall that flood of 1903 which took out all the bridges along the Kaw—of which this company has paid one-third as its share of construction costs. On one viaduct alone our share of the cost exceeded $450,000. On another we pay $60,000 as an annual rental—6 per cent on a construction cost of an even million dollars—while our line which traverses that viaduct takes in 33 cents a car-mile. And the rental figured out upon a corresponding car-mile basis comes to 27 cents. Not much velvet in that."





The upper view is at the New Union Terminal. The lower views are, at left, traffic conditions in Twelfth Street east from Baltimore Street, and at right, the congestion in Walnut Street, looking north from Twelfth Street, Kansas City, Mo.

It does not look like velvet, to go down to the bottoms along the Missouri and the Kaw and see the repeated great viaducts that already connect the two Kansas Cities, with another still under construction. It looks as if those two ambitious towns were anticipating their growth by fifty years, instead of twenty. It did not look like velvet either to see some other lines taking in 7 or 8 cents to the mile—not quite enough to pay the motormen's wages; on the one-man cars the operator is paid 55 cents an hour, 5 cents more than the motorman, who still shares car honors with a conductor.

It is these thin lines that everywhere form a great special problem for the trolley operator. If a decent minimum service is not maintained, even in the dullest of hours, great public complaint arises—and justly. Here it is then that the small one-man car can easily justify itself. And in Kansas City it is used, not alone on short-haul traffic, as in some other large cities, but on lines 8 or 9 or 10 miles in length. While in the case of at least one route—out to fashionable Sunset Hill—it is used and liked by the very best of the company's traffic. It is with a view to pleasing the most discriminating of its patrons, no matter in what part of the city they may reside, that the company has made these safety-cars much more attractive in finish and appearance than the standard cars of the type. It feels that it is good psychology, and therefore good business, to appeal to the taste of its riders.

And even if the individual cost of these cars today closely approaches that of the last long double-truck cars that the company bought, just after its reorganization, that matters not. The operating savings are the thing that has swung it into the large purchase of one-man cars—seventy at the time I visited the plant in January, ninety-five as these paragraphs come to your eye. One man at 55 cents is certainly a real saving over two at $1 an hour.

Prior to 1900 the company's wages for its platform-men were never in excess of 15 cents an hour. In the fall of that year the scale began slowly to rise—to 16 cents for the two-year men and 17 for the three. Six years later beginners were getting the 16 cents, with three-year men rated at 20. By Aug. 1, 1914, one-year and two-year men were getting 22 and 23 cents respectively, although with ratings up to 28 cents an hour for men ten years in the service. Three years later the wage scales for one, two and three-year men were 26, 27 and 28 cents. The highest pay then was for the six-year men, 33 cents. Nine months later this entire scale was brought up an even 5 cents an hour each. There were two other of these intermediate jumps until the present scale was reached—in October last. It provides 47, 48 and 50 cents an hour for the three different years of service, an arrangement which was reached with the gratuitously offered help of the War Labor Board at Washington.

These cold figures do not tell the labor story of the Kansas City Railways—no, not by one-tenth. That story is told in blood—literally. It begins back in August, 1917, when the Kansas City traction system was forced to abandon the non-union, open-shop policy to which it had held for many years. Kealy at that time was off the job—in camp, in charge of the Third Missouri Regiment, of which he was colonel. He did not return to the railway until five months later, when he had been discharged from the army, for physical disabilities. In the meantime the union of the Kansas City Railways employees had been formed. It had been recognized, but purely and simply under open-shop conditions. In other words, those of the men who desired to belong to it were allowed to do so, yet union affiliation was not a pre-requisite for employment upon the system.

Kealy came back from the army to real trouble. He foresaw it and he began to roll up his sleeves in preparation for the real fight of his life. He had it. Trouble began to rumble from that summer day of 1917, when under the changing industrial conditions due to our actual participation in the war the Amalgamated set up shop in the carhouses of the two Kansas Cities. Three months later trouble became an actual rupture. For it was in March, 1918, that a trivial wage disturbance of the laundrymen there at the great bend of the Missouri quickly fanned itself into a labor conflagration that tied up 30,000 of the cities' workmen in a useless and utterly asinine "sympathy strike." The street-car men went out too. One might almost add, "of course." They had been looking for some such rare opportunity to show their new-found strength. For four days no trolley cars moved in the streets of either Kansas City and a big hyphenated American community had full chance to see what local transportation meant to it. A delegation of three union agents walked into Kealy's office, with a boss plasterer as its talking chairman. He did not talk much there. He had hardly begun his enunciation of principles before Colonel Kealy asked him if he was a street-car man. The walking delegate stammered. Kealy made it clear that he would be glad at any time to meet with the president of the Street Railwaymen's Union or any other employee of the company, but did not see where he had any street railway matters to discuss with men representing other trades in Kansas City.

These three illustrations show, respectively, at top, another view of the New Union Terminal; at left, Twelfth and Walnut Streets during a rush hour, and at right, a view of Main Street looking north from Twelfth Street, Kansas City, Mo.

"Are *you* a street railway man?" he repeated.

"No," stammered the union agent, "but—"

"No buts here," said Phil Kealy, his finger swinging in a great arc and beginning to point, with menacing definiteness. "The elevator is at the end of the hall. The stairs are nearer, quicker—and safer."

The committee took a single look into Kealy's eyes, saw the two fists and remembered an engagement elsewhere. After which one W. D. Mahon, big chief of the Amalgamated, came to Kansas City from Detroit and listened to Kealy's reminder that the trolley company looked to Amalgamated to play fair with a concern that was making and keeping pay contracts and endeavoring to play fair on its own account. Mahon did not hesitate. He is too much of a diplomat. He saw the force of Kealy's argument and ordered the trolleymen back to work. And for eight months there was peace.

But not the peace that cometh of perfect understanding. Rather was it the peace that camouflageth a wealth of misunderstanding, and so eventually must break asunder. In the Kansas City case it took those eight months to come to the rending point. This time the trolleymen struck—and struck for fair. Kealy decided that he would fight the matter out, to a fine finish. The war was over; labor conditions already were descending from the abnormal. And so with the press of the town solidly behind him—even the *Star*—the commercial organizations and the retail merchants—already in the vortex of Christmas shopping—he fought it out.

It was a glorious fight. Technically it is not over, even yet. The strike order of Amalgamated still stands against the Kansas City Railways. But within forty-eight hours of the big walkout of its workers the company had forty-five of its normal service of 650 cars back in operation again. It stuck fast and with the help of more than a thousand national guardsmen of Missouri, 500 United States marshals and some 700 policemen—to say nothing of conservative citizens—kept those forty-five cars going, and day by day added to their number until the service had been brought back to normal. Today as many people are riding in its cars as in the same days of 1918. And while the gross business is still 10 per cent below that of 1917, the patronage is increasing daily and in large volume.

Yet do not let this last statement beguile you into underrating the serious phases of a strike that lasted actively from December, 1918, till May, 1919, and that almost developed into open warfare. More than seventy-five of the company's cars were attacked and wrecked by dynamite or rocks or other projectiles. Not only did its property loss run high, but the loss in riding was terrific. No wonder that its fiscal year over that winter showed an operating deficit.

But it did not give up. Kealy won his fight—honestly and fairly. To the mere 200 out of the 1,500 trainmen who stood by the company he recruited a brand new force. He used no strike-breaking agencies. He found his new men very largely in Camp Funston, which was then rapidly demobilizing. The boys came in their uniforms and ran the cars. They liked the excitement. It made up in some small part for the big fight that they had missed overseas.

And when two of them would bring a badly smashed car into the carhouse one of them would be sure to say to the depot supervisor:

"A bit of bad luck, boss. Give us another and we'll see if we can't do better with her."

What the Force Is Today

No panic, that. Out of such stuff has the new operating force of the Kansas City traction system been upbuilded. It has strength and force and courtesy. And even if the *Star* does persist in printing front-page stories about the courtesy of Mr. Mitten's conductors over in Philadelphia and overlooking the courtesy of the boys in Troost Avenue, that does not feaze the K. C. boys. I have not often ridden upon cars where the platform-men were of a higher, cleaner or more obliging type than those I found upon the cars there. The traction company has abandoned its former rather elaborate system of "welfare work"—what a disgusting sound that very word is beginning to have. It feels—and I think very rightly—that it would prefer to pay its men a fair wage and that they would prefer to buy their own entertainment and luxury.

Today its wage schedules are well ahead of those that rule in Kansas City for clerks or elevator men or many other trades that call for the same equipment of education and training. It brings to its platforms men from all of these ranks, and finds no difficulty whatsoever in keeping these platforms filled. For three months now its elaborate employment offices, which it was forced to open even before the coming of the strikes, have been closed. And a labor turnover of more than 300 per cent in war days has been reduced to 25 per cent annually.

Moreover, the morale of the working force is coming back—definitely and in large measure. When, last fall, the strike of the soft-coal miners began to paralyze eastern Kansas—the traction company for some weeks was forced to burn oil in its boilers, at an enormously increased expense—some 200 of the platform-men of the traction system came forward voluntarily and offered their services, either to go down into the Kansas mining field or else to help replace the switchmen at the Kansas City steam railroad terminals, who had gone out in sympathy with the striking miners.

The public pays. It generally does. And yet for reasonably good service—a full-hour service amounting to 65 per cent of that in rush hours—good cars, good men, Kansas City pays no more than St. Louis or a number of other cities—8 cents a single fare, two for 15, five for 35 cents—an increase far less than those of wages or of materials, to say nothing of most of the other necessities in a man's life.

The city which regulates the service and the wages also regulates the rates of fare. The men who represent it upon the board of the Kansas City Railways know that the fares must represent these other things and that the plant must be kept ready and waiting for the coming of the million people that are expected at the bend of the Missouri.

Who Will Build the Railways of the Future?

One thing more. I could not leave Colonel Kealy without asking him for a stray thought or two on the future of the traction industry across the land. He had expressed his disbelief in the zone system and the motor bus, at least so far as Kansas City at the present time and in the immediate future was concerned. What then were his constructive beliefs? He stated them fairly and frankly, as seems to be his way:

"Ordinarily I am one of the most optimistic people in the business," said he. "All my life I have fought pessimism out of things. Yet it looks to me as if the really big problem of this business was not even reached as yet. Every large street railway across this land is in a growing community; our urban centers are developing at a fearful rate. Their transportation facilities are nowhere near keeping pace with them. They need development upon a tremendous scale. Yet, how can they be developed without capital? The industry is bankrupt. Its credit is *nil*. For the life of me I cannot see how a bankrupt industry can respond to the growth needs of the community which it is supposed to serve. Here is a problem that municipal ownership today cannot solve. The most of our American cities are already deeply in debt and are petitioning their state legislatures for relief—along new lines of taxation. Few of them can or will help their street railways. And as for the general public, today the holder of traction securities feels stung to the limit. No sane man feels that he wants to buy trouble—or a lawsuit.

"Let me repeat: The whole structure of our rapidly growing urban centers of America is predicated upon adequate transportation. It forms their arteries, through which must move the very blood of their civic life. If there were anything else to replace this arterial structure I should say 'discard it.' But we cannot discard. We must work out our own salvation with the material in hand, no matter how inadequate it may seem, no matter how overwhelming our problem. It seems to me that the biggest step that the traction companies have gained was in getting away from the 5-cent fare. That was 90 per cent of their trouble in recent years. If the business is to continue its cost must be met. There is no more relation between a 5-cent fare and the cost of service than there is between dollar wheat and a loaf of bread. While the traction problem is a national problem and must remain a national problem, there is no more real relation between the fares in Kansas City and in New York City—to make a definite comparison—than there is between labor or fuel or fare costs."

You are quite right, Col. Phil J. Kealy. Neither is there any more relation between these things in Kansas City and the city of New York than there is relationship between the definite and scientific franchise scheme under which you are operating and the clubbing-to-death method by which the Mayor of New York is trying to solve the terribly vexatious and involved traction problem of the community that he heads. At least your course is definitely laid for you. Your fares have been increased—a little at least. Your property is protected—in no small degree. And I am willing to believe that there are few security holders in either Interborough Rapid Transit or Brooklyn Rapid Transit that would not gladly exchange their holdings for those of the Kansas City Railways. Personality does count, whether it is in a City Hall or in a street railway office. And your personality might well be written down as an asset for the Kansas City Railways system. Optimism—you tingle with it. If you had not been an optimist you would not have won that long-drawn internecine struggle. If you were not an optimist today you would be coolly sitting back in your office, handling your plant and calmly waiting for Kansas City to grow up to it. Strength to your fists and quick growth to Kansas City!

Brief Review of World's Traction Situation

Some Notes Based on a Study of Electric Railway Literature in All Countries

IN THE latest issue of the "Jahrbuch der Elektrotechnik," dated 1919 and covering 1918, a chapter is devoted to electric transportation and motor applications. The subject of electric main line and street railways is treated by Dr. W. Kummer.

As this chapter gives a bibliography of the important literature of the year 1918, from the standpoint of this authority, and as he digests the various articles and papers for convenient reference, an abstract of parts of the chapter is given here. Reference to the bibliography appended to the article are given at appropriate points throughout the text.

Dr. Kummer says that among the contributions which have added most to our knowledge of the fundamental principles of train movement, there should be mentioned a work by J. Jahn[1] on the relation between wheel and rail with regard to the factors of force and motion. This study furnishes the first useful figures on sliding friction losses that take place at the periphery of the wheel when the forces reach the friction limit. That these friction losses in electric locomotives, where the coefficient of adhesion is a maximum, are of great importance is explained in an article by Dr. Kummer,[2] which develops equations for the efficiency at the wheel periphery of a driving axle, taking into account the complete torque and velocity losses. The knowledge of train resistances encountered in practical railroad operation with special reference to electrical operation has been materially increased by a report by V. Glinski[3] covering tests made by the Prussian-Hessian Railroad Administration. These resistance tests shed light on such factors as variable loading, wind and weather. A new railroad system which combines the friction and gear systems has been designed by H. H. Peter. It is distinguished by a gear rack with horizontal tooth contact. This system was described in detail by S. Abt[4]. Full reports on the corrosion from earth currents were given by the general secretary of the Swiss Electro-Technical Society.[5] Our knowledge of the influence of railroad currents, especially alternating currents on signal, telephone and telegraph circuits, has been increased by articles contributed by H. S. Warren,[6] as well as by J. Perret.[7] G. Gut[8] contributed a graphical method of determining the rating of railroad apparatus under intermittent load conditions.

ADVANCES IN HEAVY ELECTRIC TRACTION

As was the case last year, notable advances were made in the development of regenerative braking. The most important result is that reported by the Oerlikon Company,[9] which employs a simple connection of the standard single-phase series motor. The A. Scherbius system (E.T.Z., 1912, page 164), which divided the armature and field circuits with the series transformer into two circuits coupled inductively, was improved by introducing in the field circuit a voltage of the same frequency as that on the line. This connection is then brought to its most simple form by substituting a choke coil for the series transformer. The characteristics and method of operation of this system were described in detail by H. Behn-Eschenburg.[10] The principal contribution to regenerative braking with direct current series motors was made by W. F. Coors.[11]

Since the art of regenerative braking with direct current and alternating current has progressed to such a point that the energy saving can be computed, irrespective of the kind of current used, W. Kummer[12] calculated the effect of regenerative braking on the cost of train operation, taking into account its effect upon load variations in heavy traffic. Calculations and test results on disturbing motions in electric locomotives with relation to the driving mechanism were presented by P. Leboucher.[13] This report was based on tests of six trial locomotives having the same running gear and the same power, and took place on the French Chemin de Fer du Midi. According to these tests, locomotives with connecting rods and jack shafts develop a series of critical speeds corresponding to the following disturbances: Transverse, oscillations, jerking, vertical oscillations, swaying and shivering, while locomotives with the triangular frame and sliding prism develop critical speeds for only jerking and vertical oscillations; and locomotives with rotating driving mechanism possess no critical speeds for any of these disturbing motions. Engineer A. Causse and H. Goua,[14] who belong to the same railroad organization, gave a thorough demonstration of a hydraulic peak-load power station which absorbs the short period peak loads by means of a special water feeder-chamber. The automatic substations for railroad operation, described in the 1917 Jahrbuch, have quickly developed in America into the automatic primary power plant. An installation of this kind for the Iowa Railway & Light Company was described by J. M. Drabelle and L. B. Bounett.[15] M. Osnos[16] described a novel method of speed control for a 450-kw. single-phase railroad motor by means of a choke-coil connected in parallel with the field winding and oversaturated with direct current. M. Vidmar[17] gave approximate formulas for estimating the current rise when transformers are thrown on the line, which constitutes one of the minor troubles experienced in single-phase railroad operation.

As the section in the Year Book devoted to conditions in the United States and other countries on this continent contains material which is familiar to the readers of the ELECTRIC RAILWAY JOURNAL, no attempt will be made to abstract it here. However, the footnote references numbered 18 to 26, inclusive, will be of interest.

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[1] J. Jahn, Z. Ver. D. Ing., pp. 121, 145, 160, 248, 339, 651.

[2] W. Kummer, Schweiz. Bauztg., Vol. 72, p. 215.

[3] V. Glinski, Glaser's Annalen, Vol. 83, pp. 48, 53, 91.

[4] S. Abt. (H. H. Peter), Schweiz. Bauztg., Vol. 71, pp. 7, 13.

[5] Bull. Schweiz. EV., pp. 135, 157.

[6] H. S. Warren, Proc. Am. Inst. El. Eng., p. 1119.

[7] J. Perret, Rev. Gén. El., Vol. 4, p. 281.

[8] G. Gut, Bull. Schweiz. EV, p. 35.

[9] Maschinenfabrik Oerlikon, Schweiz. Patent 77,317.

[10] H. Behn-Eschenburg, Bull. Schweiz. EV, p. 239. ETZ, p. 481. Rev. Gén. El., Vol. 4, p. 877.

[11] W. F. Coors, Gen. El. Rev., p. 412.

[12] W. Kummer, Schweiz. Bauztg., Vol. 71, p. 191.

[13] P. Leboucher, Rev. Gén. El., Vol. 4, p. 914.

[14] A. Causse and H. Goua, Rev. Gén. El., Vol. 4, p. 658.

[15] J. M. Drabelle and L. B. Bounett, Proc. Am. Inst. El. Eng., p. 497.

[16] M. Osnos, ETZ, p. 224.

[17] M. Vidmar, El. Masch.-Bau., p. 273, Schweiz. Bauztg., Vol. 72, pp. 233, 247.

In Europe the scarcity of coal has made electrification projects possible to almost all railroads. In no land, however, has electrification made such progress as in Switzerland, where in 1918 foreign dealers raised coal prices to fantastic heights. Therefore there has now come into being a comprehensive electrification program of the entire state railroads[27] system which will be worked out at the most in thirty years. The private railroads have similar[28] plans. The Gotthard line, the electrification of which has been pushed hard, will soon reach not only between Erstfeld and Bellinzona, but through Bellinzona to the southern boundary near Chaisso.[29] In order to speed up the beginning of electrical operation, sample locomotives[30] were put through test runs, and the main order for electric locomotives put through as rapidly as possible. Excellent reports on these studies of the Oerlikon Company were made by H. Studer.[31] Large orders for locomotives were given in 1918 by the Berne Dekret Railroad.[32] Electrical operation was begun upon the Scherzligen-Berne[33] branch of the Lötschberg and Simplon lines, work on the electrification of which was begun the year before. The Rhät railroad has begun extension of the electrical operation of its Engadin lines by equipping are Filisur-Bevers[34] section, which has an unusually large number of tunnels.

THREE-PHASE IS AHEAD IN ITALY

After Switzerland, Italy, represented by the Italian State Railroads, is the center of the greatest European activity in electrification. At the beginning of 1918 the system had 279.1 miles of electrified line, 242.7 miles with three-phase distribution and 36.4 miles with direct current distribution. Members of the railroad organization had a sharp difference of opinion regarding the advantages of three-phase distribution some time ago, as was reported in the Jahrbuch for 1916. At present in Italian electrical circles the discussion of the question of electrical systems best suited for railroad electrification has reached an acute point. Among the discussions especially noteworthy are those of Ignis[35] and P. Lanini.[36] The firm Brown, Boveri & Company[37] described a new Italian express locomotive which was equipped by them. It was mentioned in the Jahrbuch for 1917.

In Germany the new electrical locomotive for the Schlesen Mountain Railroad should be interesting on account of its novelty. The construction of this locomotive was described in great detail by P. Müller.[38] According to this article the locomotive is equipped with a driving mechanism which may be denoted as of a reversed double side-rod type, in which one motor drives two countershafts. This motor has a capacity of 2,200 kw. and weighs 22 metric tons. Fundamental traffic questions from the Berlin Express Traffic were brought out in open discussion by Giese.[39]

The States Railroad Administration[40] in Austria in the winter of 1917-1918 published a monograph on the studies and preliminary work of a plan for the utilization of the water powers and the electrification of the main-line railroads. From this report it appears that at the end of 1917 the administration had eighteen concessions for water-power plants, having an average capacity during the year of 121,000 kw. F. Sabertsching[41] described a clever method of locating the feeding point in the distribution system of a branch road on the Bludenz-Schruns line which has a certain technical interest.

In France and England the technical circles have been actively engaged in the discussion of the latest project by Engineer A. Sareiaux[42] for tunneling the channel, which naturally involves electric transportation.

In Scandinavia the border railroad from Narvik to Kiruna and from there to Lulea is the principal topic of discussion, and various technical details[43] have recently been published.

ELECTRIC STREET RAILWAYS

The elements of traffic problems for street railways and allied subjects were treated by W. Bethge[44] and Ph. Pforr.[45] A. Bieber[46] in a serial covered the questions of maintenance and repair of street cars. The use of safety control in street car operation was advocated by R. Wolff,[47] while H. Engel[48] gave connections and rules for the use of multiple control. Street railway accounting was covered by contributions by C. Redtmann[49] and A. Paul.[50] Pure electrical braking of street cars was discussed pro and con by E. Volkers[51] and H. Sauveur.[52] The contribution to the use of street cars for the transport of freight was made by P. Loescher.[53] In the line of economy of material, there should be mentioned a proposal of R. Wolff[54] to substitute single pole for double pole brake couplings and from Ph. Scholtes[55] and W. Riechers[56] a plan for introducing three-conductor operation on street railways. R. Zehnder[57] described a device for automatically greasing the rail. From the Zurcher Street Railway Administration, some details of which were described in the 1916 Jahrbuch, reports were rendered on the changing over from the trolley wheel to bow by U. Winterhalter[58] and on optical signals between trailer and motor car by H. Schaub.[59] The mercury converter is used for the first time on 800 volts direct current in the substation Meziers[60] of the suburban line Lausanne-Mondon. Out of the great number of new Swiss railways for high-tension direct

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[18] F. H. Shepard, El. Rlwy. Jl., Vol. 51, pp. 237, 559.
[19] A. H. Armstrong, El. Rwy. Jl., Vol. 51, p. 561.
[20] G. M. Eaton, Electr. (Ldn.), Vol. 80, p. 700.
[21] A. J. Hall, Electr. (Ldn.), Vol. 80, p. 722.
[22] El. Rlwy. Jl., Vol. 51, p. 799.
[23] E. R. Hill, El. Rwy. Jl., Vol. 51, p. 556.
[24] El. Rlwy. Jl., Vol. 51, p. 1043.
[25] W. G. Gordon, Proc. Am. Inst. El. Eng., p. 1285.
[26] Electr. (Ldn.), Vol. 81, pp. 511, 530, 550.
[27] Schweiz. Bauztg., Vol. 72, pp. 74, 161.
[28] ETZ, p. 78.
[29] Schweiz. Bauztg., Vol. 72, p. 92.
[30] Schweiz. Bauztg., Vol. 72, p. 9.
[31] H. Studer, Schweiz. Bauztg., Vol. 71, p. 213. ETZ, p. 293. Gén. Civil, Vol. 72, p. 437.
[32] Mitt. Brown, Boveri & Company, p. 202.
[33] Schweiz. Bauztg., Vol. 72, p. 237.
[34] Schweiz. Bauztg., Vol. 71, p. 178.
[35] "Ignis," Elettrotecnica, pp. 242, 270, 356.
[36] P. Lanini, Elettrotecnica, pp. 277, 346, 411.
[37] Mitt. Brown, Boveri & Company, pp. 87, 112, 134.
[38] P. Muller, El. Kraftbetr., pp. 129, 137.
[39] Giese, ETZ, pp. 29, 461.
[40] El. Masch.-Bau., p. 20, ETZ, p. 96.
[41] F. Sabertsching, El. Masch.-Bau., p. 167.
[42] Rev. Gén. El., Vol. 3, p. 665. Schweiz. Bauztg., Vol. 72, p. 85.
[43] ETZ, p. 495.
[44] W. Bethge, El. Kraftbetr., pp. 37, 73.
[45] Ph. Pforr, El. Kraftbetr., p. 82.
[46] A. Bieber, El. Kraftbetr., pp. 9, 105, 154, 161, 251, 257.
[47] R. Wolff, ETZ, p. 365.
[48] H. Engel, El. Kraftbetr., p. 145.
[49] C. Redtmann, El. Kraftbetr., pp. 209, 217.
[50] A. Paul, El. Kraftbetr., p. 225.
[51] E. Volkers, El. Kraftbetr., p. 243.
[52] H. Sauveur, El. Kraftbetr., p. 289.
[53] P. Loercher, El. Kraftbetr., pp. 1, 31.
[54] R. Wolff, El. Kraftbetr., p. 236.
[55] Ph. Scholtes, ETZ, pp. 161, 347.
[56] W. Riechers, Mitt. Ver. Elektricitätswerke, p. 50.
[57] R. Zehnder, Schweiz. Bauztg., Vol. 72, p. 62.
[58] M. Winterhalter, Schweiz. Bauztg., Vol. 71, p. 204.
[59] H. Schaub, Schweiz. Bauztg., Vol. 72, p. 185.
[60] Mitt. Brown, Boveri & Company, p. 42.

current up to 2,000 volts, which were described during the report year, it appears to us of interest to mention the Schöllen Railway[61] because it employs regenerative braking.

Practical Ideals for the Claims Department*

By H. K. Bennett

General Claim Agent Eastern Massachusetts Street Railway, Boston Mass.

If any class of men need a superabundance of gray matter, keenness, alertness, adroitness, intuition and the various other attributes that go to make up men with convincing power, it is the men who go out day by day to handle the personal injury claims of any electric railway company. When an adjuster goes out on a case he is master of the situation and is the company itself. His every word and action will be judged accordingly. By the manner in which he approaches claimants, their animosity can be dispelled and adjustment can be made with comparative ease.

The claims adjuster should be able to meet all kinds and conditions of people. He should be able to state facts and back them up, right wrongs if such exist, put himself "on the other side of the fence" and see the case through the eyes of the other man.

I have always believed that the claims department should act in an advisory capacity, especially to the operating and rolling stock departments. The claims men are out among the public as are no other officials of the company. They observe trainmen while the latter are on duty, and are in a position to see changes that could advantageously be made. Claims men ride the cars, and they have the best opportunity in the world to note such defects as loose floor boards, protruding nails and screws, saw-tooth platform edges, slippery treads, loose lamp sockets, bad rails, loose wires, line corners where hedges or bushes need trimming, etc. A claims man of the right sort has a golden opportunity to make friends for his company. He is in daily contact with the public, with doctors, with lawyers, with men of all nationalities and beliefs, etc. If he does not keep peace with the public and treat its members in a manner absolutely aboveboard and on the level, he is sealing his own doom and that of his company.

With all due respect to the publicity men, I am firmly of the belief that claims departments can mold public opinion to a large degree. When a claims department has made a friend of a claimant, the news will spread quickly through the neighborhood in which the latter resides, even if this has been antagonistic.

I have thought at times that there are those who do not always see beyond the results produced by a claims department, who do not give enough thought to the ways and means by which the results are accomplished. Oftentimes large settlements are frowned upon, and at the same time hundreds of settlements that are made in the course of daily work for small amounts entail labor that sometimes seems almost superhuman. The changing of a claimant's attitude to one of receptivity for the ideas of the claims adjuster is done at the expense of bodily energy. While this is, of course, all in the day's work, it would be well for the managers to get behind the scenes occasionally and see how the work is performed.

As to the question of higher cost of claims, I have four reasons to suggest for the increases. These are higher wages, general social unrest, increased cost of living and the increased extent to which claimants take advantage of a situation where the liability cannot be denied.

The greatest menace that confronts railway companies today is the automobile accident. It is not alone the damage to the automobile, but the claims for injury to the occupants. When one considers the fact that the negligence of a driver cannot be imputed to the person or persons riding with him the importance of this subject is evident.

The roads are choked with pleasure cars and trucks of all sizes, driven often by irresponsible persons who always feel themselves to be in the right, and they pull in front of a car going in the same direction without giving the motorman half a chance to stop, putting all of the burden upon him and expecting him to be a mind reader. In case of accident the burden is always on the defendant to prove that the plaintiff was negligent. How long is the claims department going to stand for this sort of thing? When are we going to get our legislatures to pass commonsense laws and to put restrictions on securing automobile licenses so as to bar the lame, the halt and the blind from securing these? If we all push forward to a common goal, we can go over the top in this matter and stir public opinion to the point where greater stringency will be demanded of the commissions that have the matter of licensing automobiles in charge.

Let us get together in all matters that relate to the prevention of accident, even if this means treading on the toes of the mighty, and calling attention to the deficiencies of those in whose hands the remedial power lies. Let us never stop until we have attained our object.

Welfare Work Progressing at Baltimore

According to the annual report of the United Railways & Electric Company for the year ended Dec. 31, 1919, the welfare work begun in 1918 was continued under the auspices of the United Railways Association of Baltimore. This association has its own corps of doctors and nurses who give free medical and nursing attendance to employees. The company also continued its pension and insurance plans.

The association during its first fiscal year expended: For sick benefits, $22,091; for hospital expense, $4,091; for doctors' and nurses' expense, $13,779; for contributions, $1,205, and for Christmas and miscellaneous expense, $260; a total of $41,426.

During the year the company spent $66,834, exclusive of what the association had spent for pensions, insurance and other welfare work, as follows: For pensions and gratuities, $9,686; for insurance, $32,492; for contributions to United Railways Association, $12,200; for miscellaneous items, $5,072, and for welfare expense, $7,584; a total of $66,834.

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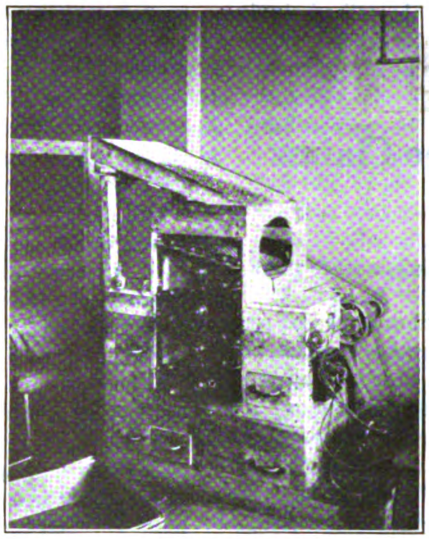
[61] Mitt. Brown, Boveri & Company, pp. 23, 47, 71.

Bibliography—Key: Bull. Schweiz E. V.—Bulletin des Schweizerischen Elektrotechnischen Vereins. El. Kraftbetr.—Elektrische Kraftbetriebe und Bahnen. El. Masch.-Bau.—Electrotechnik und Maschinenbau. El. Rwy. Jl.—ELECTRIC RAILWAY JOURNAL. Electr. (Ldn.)—Electrician, London. ETZ—Electroteknische Zeitschrift. Gén Civ.—le Génie Civil. Gen. El. Rev.—General Electric Review. Mitt. Brown, Boveri & Co.—Mitteilungen von Brown, Boveri & Company. Mitt. Ver Elektricitätswerke—Mitteilungen der Vereiningung Elektricitätswerke. Rev. Gèn. El.—Revue Générale de l'Electricité. Schweiz-Bauztg.—Schweizerische Bauzeitung. Z. Ver D. Ing.—Zeitung des Vereins Deutscher Ingenieure.

*Abstract of address before the New England Street Railway Club, Boston, Mass., April 29, 1920.

DEVICE DESIGNED BY COMPANY AND USED TO SEPARATE COINS AND TOKENS FROM TICKETS



THIS MACHINE, ALSO DESIGNED BY THE COMPANY, SORTS THE COINS AND TOKENS INTO COMPARTMENTS

THESE COUNTING MACHINES ARE USED FOR COUNTING TOKENS, NICKELS AND CENTS

Handling Increased Fares Mechanically

Kansas City Railways Perfect Mechanical Devices to Handle Counting and Sorting of Tokens, Tickets and Coins Resulting from Increased Fare

WITH the advent of a higher fare and a resulting increase in the use of tokens and tickets, new counting problems confronted the Kansas City Railways. These have been largely overcome by the development of certain mechanical devices which have been substituted for hand-counting methods.

It was found that the metal token and the paper ticket, both of which are sold at a rate lower than the cash fare, supplanted to a large extent the cash previously collected. The first step taken in an effort to simplify the handling of this class of fares was to equip all cars with non-registering fare boxes. With these a separate check is not made of the individual conductor, but the returns are considered as line or division returns. In order further to increase the use of tickets and tokens, the token is sold on the car by the conductor at 7½ cents and the paper ticket is sold off the car in books of seven rides at a rate of 7 cents per ride. While the fare box eliminates the individual car check, it does not involve the consideration of the poor line with the prosperous line of the division, as the returns are tabulated by lines.

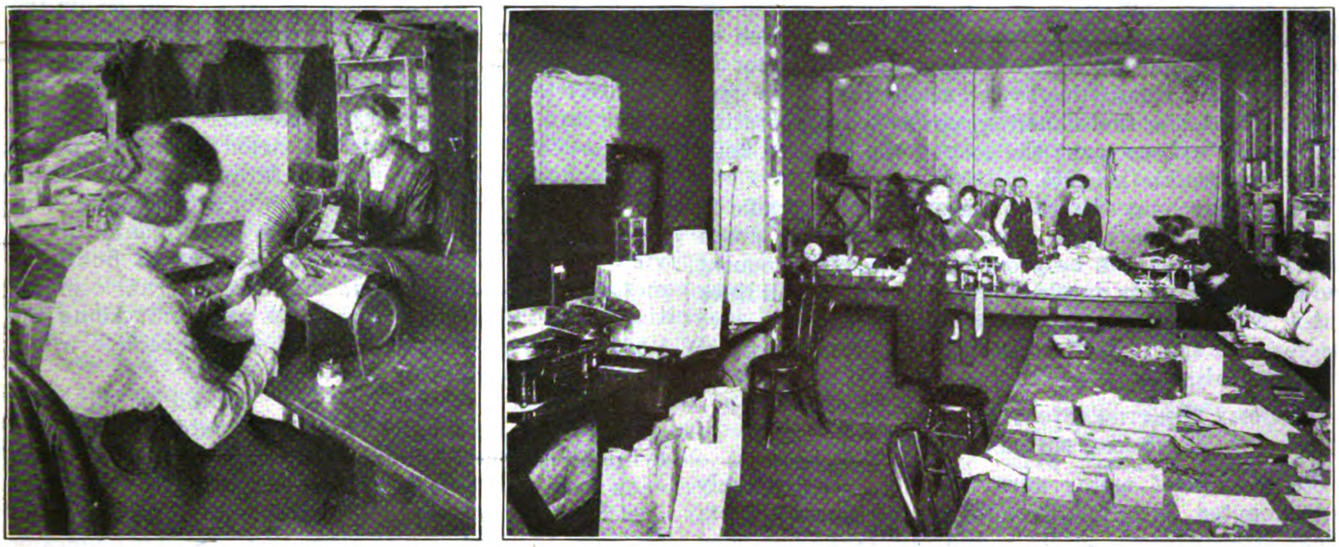
The counting of fares is done at the general office of the company. The locked magazines are removed from the fare boxes at the division points and are placed in a vault. The contents of the magazines are collected daily by the money car, the magazines being emptied into a metal strong box. A separate box is provided for the receipts of each line and after collection the box is locked and tagged to show the line and division from which it is taken. In addition each box bears a painted number as a further means of identification. Collection on one-half of the system is done during the early morning hours in order to provide work for the counting force in the early part of the day. While the counting of this collection is being handled in the accounting department, the boxes are picked up by the money car from the remaining division points on the system.

EQUIPMENT USED IN SORTING MADE BY RAILWAY COMPANY

In the accounting department in handling the contents of the boxes they are sorted, counted, checked by meter, weighed, packed and prepared for banking in the order given. The separation of the tokens and coins from the paper tickets is accomplished by a machine constructed by the company. This consists of a hopper, a swinging tray and a series of receptacles, and in fact is patterned very much after the ordinary "jig" separator used in the ore-mining industry. The contents of the boxes are emptied into the hopper of the machine and the swinging tray is agitated by the operator, with the result that the paper remains in the upper tray while the tokens and money are forced by gravity through a series of apertures to the trays beneath.

The trays containing the tokens and coins are passed to another machine which separates the coins into individual compartments for the several denominations and the tokens into a separate compartment. This machine works at the rate of 2,000 coins or tokens per minute. It also was designed and constructed by the company. The sorting of the coins is accomplished by the agitation of the screen over a series of inclines at the rate of 280 movements per minute. From this machine coins of each denomination are passed to a special motor-operated disk counter, of which there are five altogether. Three of these count tokens, one counts nickels and the fifth counts pennies. The coins pass through the registering mechanism of these machines into bags containing respectively 500 tokens, $50 in nickels and $10 in pennies. When the correct amount is deposited in the bags an automatic stop on the meter shuts down the machine.

The count of this machine is checked by weighing the bags on a sensitive scale. The tabulation of tickets is checked in a similar manner, this having been found more satisfactory than counting by automatic machines due to the fact that unevenly torn tickets caused con-



AT LEFT, COUNTING TICKETS, AN OPERATION WHICH HAS LARGELY BEEN SUPPLANTED BY WEIGHING. AT RIGHT, GENERAL VIEW OF THE "CASH ROOM" OF THE KANSAS CITY RAILWAYS

siderable extra labor on the part of the tabulator. After the count has been checked by weighing, the bags of coins are sealed with metal seal and deposited in special boxes, in which they are taken to the depositories. The tokens are again placed in circulation and the tickets are passed from the scale to a masticating machine which mutilates them beyond redemption.

All coins of denomination larger than 5 cents are counted by hand, bundled and prepared for banking. Through the sale of tickets off the cars, the handling of coins of large denomination through the fare boxes has been materially decreased. Such coins reach the counting room through the division cashiers, who supply the conductors and who in turn purchase their supply from the general office. As stated before, the fare-box returns consist largely of tokens and of paper tickets. At present, however, there is a considerable quantity of nickels and coppers. There are, of course, some dimes, but the number of these is decreasing and the outlook is that as the public becomes familiar with the reduced rates at which tickets and tokens are sold there will be a still further decrease in the number of coins of all denominations.

Electrification of Railways in England

Sir Eric Geddes, Minister of Transport of Great Britain, has formed a committee to study the subject of electrification of railways in that country. It consists of the following: Sir Alexander Kennedy, chairman; Sir John Aspinall, A. R. Cooper, Philip Dawson, Sir Alexander Gibb, C. H. Merz, Sir Philip Nash, Sir John Snell, Sir Henry Thornton, Roger T. Smith and Major Redman, secretary. The committee is to report on:

1. Whether any regulation should be made for the purpose of insuring that the future electrification of railways in the country is carried out to the best advantage in regard to interchange of electric locomotives and rolling stock, uniformity of equipment and any other matters.
2. If any such regulations are desirable, what matters should be dealt with, and what regulations should be made?
3. How far it is desirable, if at all, that railways or sections of railways already electrified should be altered so that they may form parts of a unified system?

Is the Non-Electric Street Railway Car a Serious Possibility?

The Author Believes That There Is a Field for a Self-Propelled Safety Car, but Considers the Steam Power Plant to Be Superior to the Oil or Gas Engine for the Purpose

By FERDINANDO C. CUSANI
Milan, Italy

ADVANCE information in the automotive technical newspapers points out the fact that Henry Ford, all criticism notwithstanding, is seriously pursuing his quest for a lightweight, non-electric street car. Many urban transportation experts have been denouncing the Detroit motor-car maker's action as the rankest of follies, taking a certain number of things as granted which perhaps the builder was not even thinking of and laying too much emphasis on some rather optimistic assertions and predictions which will perhaps have to be considered later on.

It is undoubtedly true that the gasoline motor cannot compete for economy of operation, for regularity of torque and horsepower output and for maintenance with the electric motor, while at the same time some of its organs, like the carburetion and ignition apparatus, are very fragile and troublesome at best. But, in the writer's opinion, this fact is not sufficient to debar any non-electric motor from the street railway field or, rather, from some special phases of street railway operation where, if the problem be carefully tackled, such a motor may prove a real help to electric service.

If we consider carefully the question of urban, suburban and branch-line transportation we shall find that there are at least three instances in which a lightweight vehicle, easily operable and totally independent of any outside source of power, would prove a boon to many railway operators, as follows:

(1) During the factory rush hour in medium-sized communities where lines are congested only at the end of the working day, and where it is therefore necessary either to give very inadequate and poor service to factory operatives leaving or going to work or to keep a good part of the generating equipment idle during normal hours.

(2) In the small city which has been presented by too optimistic promoters with a street railway line or system which appears incapable of operation except at heavy loss and where, due to the small size of the generating plant, the fuel handling, power-house operation and general upkeep make the cost of the kilowatt-hour rise to impossible heights.

(3) On the long suburban lines on which traffic is scarce, and where either costly substations or much feeder copper have to be provided for very infrequent and light service, or on the steam railroad branch lines which, being mostly only non-paying propositions, give the few and sparse settlers something quite akin to no service at all.

SOME UNSATISFACTORY EXPERIENCES WITH SELF-PROPELLED CARS

Steam-engined motor cars have been extensively experimented with in all countries of Europe, from Great Britain down to Italy and Hungary, but they have generally failed to give satisfactory results, up to the point that most of their owners are dismantling them or consigning them to the scrap heap. Steam-electric rolling stock, which first appeared in the late '90s in France under the Heilmann patents, has been long forgotten, while gas-electric cars have been developed and built in the United States and European countries with a varying degree of success.

Straight gasoline or oil-motored cars made their appearance about a decade ago both in the United States and in England, the latter country shipping a large number to India as tramway cars and to South America as branch-line and inspection cars. As to these latter types, the writer's experience points them out, generally, as a very indigestible hash of motor-bus motors, automobile appliances and railway rolling stock. He still shudders at the recollection of a certain special type which had been meant for India but had been sent to his own country, and which, weighing about twelve tons and accommodating twenty seated passengers, was supposed to operate under all conditions by means of a 30-hp. London bus engine geared to one single axle. Suffice it to say that the hand brake, which had a fixed handle and an impossible brakegear, was supposed to be operated with the left hand; that the clutch was so designed that it required a 220-lb. motorman to jump with all his might on the pedal and to pull a lever with both hands in order to start the car or to change from low to high gear; that the reversing gear was so located at the middle of the car that, whenever there was any necessity of backing into a switch, etc., the motorman was required to indulge in the aforesaid declutching gymnastics, while the conductor had to kneel on the floor of the center compartment and pull with all his strength at a certain handle which would, and often would not, make the reverse gear mesh in.

No doubt these sad perversions of engineering have created an unfavorable feeling against self-powered cars, but the writer has in mind a totally different type of car which, following the general constructional characteristics of the Birney one-man safety car, should embody as motive power a rather advanced type of power plant which was developed in America a few years ago for the automotive field, that is, the boilerless steam motor.

In the most highly perfected form this power plant comprises an instantaneous high-pressure steam generator, where a forced blast of air and oil is ignited by a catalytic process; steam motor units which are to be geared to the axles, a condensing radiator and an electric generator, to take care of the fuel fan motor and of the lighting of the car. In most of the automobile races and tests the steam cars were barred out because the more regular torque and the better pick-up ability would place these in a privileged class as against the gasoline, speed-gear automobiles. In view of the fact that we look forward to finding a motor with a better torque than the internal combustion motor, a steam engine built as a unit along the lines of gasoline-motor constructional practice would seem rather creditably to fill the bill.

If our ideal steam "one-man" should be equipped with two Doble single-expansion, double-acting, two-cylinder motors of about 25 hp., directly geared with each axle, and located on the truck in the same general way as the ordinary electric motors, it should not be exceedingly difficult to locate the steam generator at the center of the truck, while the electric generator to charge the ignition and lighting battery could be geared to one of the axles or to the crankshaft of one of the motors. A light and compact steam-driven air compressor, which would certainly weigh less and be of much simpler construction than its electric prototype, could easily be located anywhere on the truck or car. The rather small water and fuel tanks could find a place on the trucks, outside the axles, while a condensing radiator, enclosed in a box with shutters controlled by a thermostat in such a way as to minimize the loss of heat in the condensing process under all climatic conditions, could be easily located on the roof, in place of the trolley supporting stool. The controls could be arranged in the same general way as the electric ones, the throttle handle taking the place of the controller handle and the reversing bar taking the place of the reverser of the controller. All safety devices, door-operating mechanism, etc., could be installed following the usual safety-car practice. Heating could be effected through small steam radiators connected in series with the condenser, the variation in condensing surface being taken care of by the thermostat arrangement.

STEAM CAR WOULD HAVE A SIMPLE CONTROL

It was claimed by the makers of the automobile in which this power plant was employed that the use of crude oils as fuel is much more economical and less dangerous than that of gasoline, while it is certain that the expense for lubrication in connection with steam is certainly negligible in comparison with that which must be met with in internal-combustion engines. And, although a well-built steam motor would appear to be almost foolproof, and certainly less delicate than the electric motor with its burnouts, flashovers and the like, in case of damage a simple valve arrangement would allow the cutting off of the damaged motor just as is done with electrical equipment.

The control would simply consist of a throttle, located near the generator, and of the reversing gears embodied in each motor, which all would be easily operated by handles on each platform, through suitable rod connections. This would certainly be, from the standpoint of simplicity, a much better arrangement than the rather heavy and cumbersome electric controllers, with all their complicated sections, fingers, coils and cables which are an eternal puzzle to the average "mote." As to the actual operation of the car, it would be identical with that of the electric cars, inasmuch as it would be necessary to move the reverser forward and then to notch up. Coasting would be as possible as with electric motors and there would be no "idling" necessary during stops, as with the "gas" engine. Moreover, in case of emergency, the reverser could be used as in common practice, a thing by no means possible with internal-combustion motors of the common type.

As for the safety devices, these could all be kept in their present form, barring the breaker-operating cylinder, in place of which an air-operated steam valve ought to be installed between the steam generator and the throttle in such a way that whenever the airbrake should be normally applied, or whenever the controlling handle should not be held down, the steam would be shut off from the motors. This would effectually prevent any brake application with the power on, and at the same time would make the operation of this steam car totally similar, up to the smallest details, to that of the standard safety car.

And now as to the usefulness of this type of car, we might say that while its first cost would not differ essentially from that of the same type of electric car, the rather low cost of the fuel used, the fact that, unlike the conditions with the gasoline motor, coasting would be a regular possibility and idling would be totally unnecessary, and the simplicity of operation would possibly make it not a competitor but rather a helper of the electric safety car.

Let us consider case (1) above: Here the power station maximum output would be kept rather near to the average load during quiet hours; substations and feeders would be distributed along in such a way as to take care of the normal load, thus keeping no power equipment idle; the rush hours would be handled by the regular electric cars, to which would be added a certain number of steam safety cars. It may be objected that in many cases excess power for rush-hour operation may be purchased from local power companies, and that, therefore, no generating equipment would have to be kept idle. But, in any case, both substations and feeders of ample capacity would have to be provided to take care of a few hours' overload.

Looking at case (2), we see that, in a small city where the traffic does not allow for rather frequent headways, the generating station is a rather costly affair. Unless in case of breakdown the service be omitted, it is necessary to have at least two generating units, each of which should be fairly able to carry the load of the whole system. Where this is done by hydro-electric power, and therefore it is only a question of providing converters, the power generation may be cheap enough; but when one considers the boilers, with their complement of condensers, water-circulating pumps, coal and ash-handling devices, and the consequently larger man-power involved, the ratio between the tons of fuel used and the miles run by the cars becomes abnormally low. Here the steam safety car would enable the company to dispose of its uneconomical plant and to run its infrequent service by independently propelled cars, while the power house may be put to better use for commercial purposes, where a more constant power load factor may perhaps be found.

Considering case (3), we find that around many American cities suburban lines have been built in the times when trolley line and land values were booming, while nowadays their operation seems almost prohibitive in sparsely settled country. Many electric railways have inaugurated a policy of retrenchment by cutting off and abandoning these unprofitable lines, where very often a substation has to be operated for a few cars only and where rather heavy cars can be operated only at a heavy loss. The steam safety car would allow the operators to move all their electrical equipment to some more profitable division, to cut down labor expense and track maintenance, while the right-of-way would be conserved for happier times and the good will of the inhabitants of the region would not be lost. In the same way steam railroad branch lines and "jerkwater" roads could be made more profitable through better and more frequent passenger service.

Of course it is not intended that a steam safety car as above outlined may be a panacea for all kinds of street railway ailments; far from it. But a careful study of the question might not be out of place now, when all railways are trying to find ways to cut down costs while at the same time they are endeavoring to furnish their patrons with better and more efficient service.

Swedish State Railway Electrification

REPORTS from abroad indicate that the Swedish State Railways are planning in a broad way for future electrification. The present situation is summarized by Georg Brochuer in a recent issue of the *Tramway and Railway World*, London.

Mr. Brochuer points out that the Kiruna-Riksgränsen section of the Lapland iron ore railway on the Norwegian frontier was the first serious venture. This involved the building of the large Porjus power station.* This section was open for full electric working March 1, 1915. A connecting line between the iron ore company's tunnel station and the iron ore railway station of the State Railways has since been constructed and has been in use since March 4, 1918. Parliament has also sanctioned the electrification of the eastern section from Kiruna to Svarton on the Bothnian Gulf, and the line from Kiruna to Natavara will be the first completed.

This Lapland railway electrification is 15 cycles, single phase, with 15,000 volts on the contact line. Minor difficulties have been eliminated and the system is working very smoothly.

The State Railways have been making estimates as to power requirements and facilities and estimate that in 1925 they will require somewhat over 412,000,000 kw.-hr., not including the Kiruna-Svarton section, the requirements of which are calculated not to exceed 90,000,000 kw.-hr. Other railways of the country will require more than 250,000,000 kw.-hr.

The main object of the electrification is to make the railways independent of importation of coal from abroad, and it is planned to carry out the program beginning with those sections which consume the largest quantities of coal, without electrifying isolated sections. The first on the list stands the railway between Gothenburg and Stockholm; next come the Iarna and Katrineholf-Mahno-Trelleborg lines, etc.

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*See issue of ELECTRIC RAILWAY JOURNAL for Sept. 5, 1914, page 418.

Union Terminal for Los Angeles

If Carried Out as Recommended by Commission, Subway and Elevated Are Suggested for Electric Lines

THE recommendation of the California Railroad Commission for a Union Station at Los Angeles carries with it certain recommendations relating to the Pacific Electric Railway and Los Angeles Railway Corporation. The recommendations are contained in a 600-page report, submitted by the chief engineer of the commission and mentioned briefly on page 300 of the issue of this paper for Feb. 7.

The electric railway changes depend upon the location adopted for the union terminal. If this is at the Plaza, as recommended in the report, an electric subway is proposed from the present Pacific Electric station at Sixth and Main Streets, northerly on Main Street until it passes under the proposed Union Station. The route is then to continue as an elevated railway a short distance to Brooklyn Avenue, where the present tracks and grade would be met.

South from the present Pacific Electric station at Sixth and Main the present elevated line is to be extended to Alameda Street and then south to Fourteenth Street. Later a subway on Sixth Street at right angles to the one already mentioned, by which cars could be through-routed to the Main Street station and also the Hill Street station of the Pacific Electric is suggested as a possibility.

In commenting on the proposed electric railway changes, the report mentions the following general principles as being applicable to the development of a rapid transit system:

For rapid transit lines serving the commuter district, an elongated terminal is better than a stub-terminal, because passengers are not left at a single point but are distributed. Such a terminal would be especially valuable at Los Angeles because of the long and comparatively narrow business district. For hauls beyond the commuter's zone stub-terminals are preferable, but they should be adjacent to the distributing lines.

Through routes are better than loops for rapid transit lines because they require less time and less car mileage.

There should be at least four entrances or trunk lines to the city for the interurban system. The ones opposite should be connected so as to secure through routing.

There should be a transfer point where these lines cross.

The subway should be for interurban lines only. The subway stations are three or four blocks apart and at these points transfers can be issued to the local cars, which will continue to operate as at present.

From an operating standpoint a balanced traffic is desirable.

Coach yards will be required for the long haul lines.

There should be no grade crossings in subways, not even at junctions.

A universal transfer system is desirable if it tends to bring about (a) elimination of duplicate service, (b) better distribution of passengers, (c) uniform fares, (d) a better satisfied public.

Elevated lines are undesirable in commercial, hotel, retail and residence sections on account of the noise, unsightliness, extra climb, detours and the shutting off of light. These factors are of less importance in an industrial or wholesale district.

The justification for a subway is sometimes based upon the density of population along the route, but there are other factors which are of importance, namely, (a) greater safety, (b) greater speed, (c) greater regularity, (d) greater capacity.

Open cut construction is less objectionable than elevated through residential districts, is less expensive than subways, and simplifies the separation of grades.

In developing plans for a rapid transit system, the possibility of ultimate electrification of the steam lines should be kept in mind. Some of the advantages of such electrification are conservation of fuel oil, reduction of noise and smoke and fire risk, and superior tractive qualities.

The report says that the Pacific Electric Railway system operates 1,100 miles of track and serves a population of 1,000,000 in more than fifty incorporated cities and towns located in four different counties. In 1918 about 68,000,000 passengers were carried, divided about equally between interurban and local or 5-cent fare passengers. The passenger revenue was $7,500,000 and the freight revenue was $2,350,000. In 1917 the road carried 65,000,000 passengers, while in the same year the steam roads of the entire State of California carried only 39,000,000 passengers.

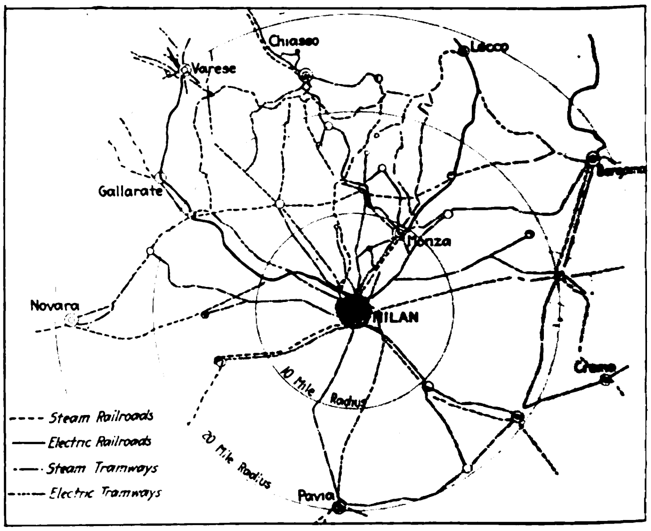
The Los Angeles Railway is strictly a passenger road and operates 390 miles of track and 880 passenger cars. The revenue for 1918 was $6,577,638, and during that year 130,538,704 passengers were carried. Few changes are recommended in the Los Angeles Railway, principally the rerouting of certain lines because of the change in the steam railroad terminal.

In addition, the report recommends a high speed electric line between Los Angeles and Pasadena. At present through service is supplied by two lines of the Pacific Electric Railway and by local service on one of the steam railroads. The proposed new line would follow somewhat the route of the Santa Fé Railroad along the course of the Arroyo Seco.

Milan as Interurban Center

MILAN, Italy, is the center of what is probably the largest interurban electric network in Italy. Certain of these interurban lines were among the first in Italy to be equipped with electric power. The lines in Milan and several of the interurban lines have long been owned by the Italian Edison Company.

Recent reports from Milan refer to the organization of the Lombard Electric Traction Company with a capital of 6,000,000 lire as a subsidiary of the Edison Company, to take over all of the steam and electric railways (outside of the Italian State Railways) radiating from that city. This would mean a total of some 850 miles of track.



THIS MAP DEMONSTRATES THE IMPORTANCE OF MILAN AS A TRANSPORTATION FOCUS

The accompanying map gives a good idea of the situation, showing steam and electric railroads and steam and electric tramways.

Transport 11,000,000,000 Passengers*

Trolley Operation as It Affects Production Discussed Before Nation's Business Men—Plea for the Co-ordination of all Means of Transportation

BY JOHN H. PARDEE
President American Electric Railway Association

I AM before you today as a representative of an industry which has a stake in the prosperity, progress and productivity of the United States, represented by an investment of between six billion and seven billion dollars. The stake of the people of the United States in this industry is not so easily computable in dollars and cents. It is, however, so great that the interruption of the local transportation system of the country would result in the paralysis of business to an extent best understood by those who have experienced the results of an even partial interruption of service in our crowded communities. Thus, a half hour's tie-up of the rapid transit lines of New York City during the morning rush hours means a loss to the employers of the metropolis of at least $50,000. Two hundred thousand people lose thirty minutes of the working day and the lowest prevailing wage for common labor is 50 cents an hour.

More than 26,000 miles of urban electric railway track serve practically the entire city population of the United States, while 18,000 miles of interurban trackage perform a similar service for the people in our rural communities. During 1917 these lines carried 11,304,000,000 passengers, which was an average of 108 5-10 rides for each man, woman and child embraced within the population of the country. When these figures are compared with the statistics for steam railroads, showing a total of passengers carried amounting to 1,102,000,000, an average of 10½ rides per capita, the very close and intimate relation between electric railway operation and the habits and comfort, the convenience and the welfare of our people, as all of these affect productivity, is clearly demonstrated.

Local transportation is the circulatory system of the municipal body corporate, and when circulation ceases or becomes stagnant the body itself either perishes or ceases its development, and so the large modern city is impossible without adequate local transportation. In Toledo, a city of 200,000 population, no street cars moved for a period of twenty-seven days recently, and the loss to the business interests of the city, which loss is entirely aside from that sustained by the individual car rider, was estimated by one of Toledo's business men to be at the rate of $50,000.

Production, in the last analysis, depends upon the efforts of the individual. It is labor that converts raw material into usable commodities and it is labor which produces the foodstuffs which alone sustain human life. To attract labor to industry and to secure from labor its greatest efficiency it is necessary that conditions surrounding the employment of labor should be maintained at such a standard of convenience and comfort to the worker as will meet his reasonable requirements. It was this undoubted truth which led those in charge of production for the United States during the war to bend their efforts in the task of increasing production toward improving the local transportation and housing conditions in connection with the industries whose greatest productivity was necessary to the Government's war program. The two largest users of commodities and foodstuffs during the war were the navy and the army departments, and each promptly organized extensive agencies whose sole business was to accelerate production by the provision of such adequate local transportation and housing for workers.

BRINGS WORKER AND WORK TOGETHER

I have recently read an article by Major Gardner F. Wells, who, under Otto M. Eidlitz, was in charge of transportation matters for the United States Housing Corporation. When the armistice was signed this bureau had already furnished more than six millions of dollars to be used in the improvement of electric railway service in connection with war production plants and had commitments involving the expenditure of some $8,700,000 in addition, had the war continued. Some of Major Wells' observations resulting from his experience at the head of this bureau are pertinent to the question which we are considering. He states that the average per capita expense to the housing corporation of providing dormitories for workers was $550, while to provide houses capable of housing two workers the cost ran from $3,500 to $5,500. With this cost he contrasts the expense of providing local transportation for some 8,000 men so as to make available houses in sections of the community not immediately adjacent to the plant, which was but $35 per capita per year.*

The Bureau of Passenger Transportation and Housing of the Emergency Fleet Corporation performed the same service for shipyards and plants connected therewith. Both of these governmental agencies found it was impossible to control the residential habits of the workers in the various plants under their supervision and that men preferred to select their own places of residence, not in relation to their place of work, but for social and other reasons unconnected therewith.

I have emphasized these phases of the transportation problem because one of the main functions of urban transportation is to bring the factory and the worker together; to permit the worker to enjoy living conditions which are impossible in the usual factory districts, and to decrease living costs as the conditions of existence are improved. This function pertains also to the interurban electric railways serving rural communities. It is not so much the farmer owning and working his own farm that this country lacks today as it is the farmhand working for wages, and this is true because rural population drifts toward the populous centers on account of the more attractive living conditions that are there available. There has been no more potent agency in changing and equalizing these conditions than interurban electric railways. Indeed, the character of a rural district, its population, the prosperity of its people, their degree of contentment, can be judged to a very large extent by the degree to which interurban railways have made them accessible to the larger communities and have made the larger communities accessible to them.

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*Abstract of address delivered at "Increased Production" meeting of United States Chamber of Commerce, Atlantic City, N. J., April 28, 1920.

*See issue of ELECTRIC RAILWAY JOURNAL, Jan. 4, 1919, page 7.

We are apt to think of transportation in its relation to production exclusively from the standpoint of the carriage of goods and commodities and to lose sight of the marked effect upon production of passenger facilities. Yet the latter function of a transportation system is no less important than the former and this is true not only as to city systems but for suburban and interurban systems as well.

NEED OF ALL FORMS OF TRANSPORTATION

We all believe that increased production is the only solution of the problem of high costs. We all know the important part that transportation plays in production. We all know and realize that the transportation facilities of the United States are today very much less than those which are needed for the production required. In this situation it is simply the part of common sense to avail ourselves of every facility which can be utilized to improve, extend and expand such facilities and to bring them into co-ordination with each other so that each may perform the part which it is best fitted to perform. The 18,000 miles of interurban electric railway track which now serves the country is being utilized only to a part of its capacity. It is capable of performing a very much larger and a very much better work in the service of the public. Transportation on rails is of all methods of land transportation the cheapest. To incur large expenditures for new forms of transportation before making the greatest use of those already existing is waste. Of the total revenues of the steam roads of the country approximately 70 per cent are derived from the transportation of freight. Of the total revenues of electric railways less than 3 per cent is derived from freight. Yet three-sevenths of all electric railway trackage is of a character that lends itself to transportation of goods between communities, while practically all of the rest can be put to efficient use in connection with the intramural distribution of commodities.

BUILDING UP A TRANSPORTATION SYSTEM

If, as I believe, there is need in the interest of production for the fullest development of all methods of transportation, and work enough for all to do, then the problem we face is that of assigning to each its proper place in our transportation scheme—of co-ordinating all the facilities which are available and preventing waste in money and in effort through unreasonable and destructive competition.

We know that there is a part of the work of transportation which the steam road can perform more economically and more efficiently than can either the electric railway or the motor vehicle. We know that in its own sphere the electric railway is the most efficient and the most economical, and that for certain service the motor vehicle has no rival. It is, therefore, our business, as men whose primary interest is the increasing of production, to encourage each of these transportation methods to the utmost, so long as it operates within the field to which it is best adapted, and to discourage any attempt it may make to pre-empt, to the detriment of its transportation sister, a field to which it is not adapted and in which its efforts will do no more than cause economic waste, without lasting improvement in service.

AS TO TRANSPORTATION COSTS

We should not deceive ourselves as to transportation costs. In the broader view of all economic problems, which an organization such as the Chamber of Commerce of the United States is in justice to its entire membership bound to take, the cost of transportation must be reckoned not alone upon those charges which any particular agency of transportation is compelled directly to bear, but upon all costs, however paid, incurred in the provision of the service. Thus, the $633,000,000 which, according to the estimates of the United States Department of Agriculture, is available for the construction of good roads during the year 1920 constitutes a capital charge against transportation by motor trucks and motor buses to the degree and extent with which these vehicles make use of such roads, and the cost of road maintenance is an operating charge against motor vehicle operation, just as surely as the cost of construction and maintaining the tracks of either steam railroads or electric railways is a charge against the cost of transportation by such carriers, whether it be reflected in transportation rates or in tax budgets. No accurate measure of the cost of transportation is otherwise possible, and without accurate information as to cost it is business folly to attempt any plan of development and impossible to assign to the various forms of transportation their particular part in the general scheme.

The transportation problem of today in its practical aspects is largely a terminal problem. No large city of the country has at the present time sufficient terminal facilities. Their provision involves such enormous capital expenditures that any means by which terminal congestion can be relieved and terminal requirements reduced must be welcomed not only by the steam roads but by industry. The interurban railway in connection with city systems offers such relief to the extent that the interurbans can relieve the steam roads of traffic within the sphere of their operations. The city which is adequately served by street railway tracks is in an excellent position to solve its distribution problem, in so far as it concerns traffic, both passenger and freight, originating or destined for territory served by its interurbans. The expense involved is the expense of establishing small terminals in such locations as will best serve the population, and is inconsiderable as compared with the enormous expenditures requisite for any great expansion of steam road terminals.

SHORT-HAUL BUSINESS AT A LOSS

It is an admitted fact that, principally because of large terminal charges, most of the short-haul passenger traffic on steam roads in and out of the larger cities is not only unprofitable but is actually carried at a loss. Close analysis will undoubtedly disclose the same condition of affairs as to freight traffic. The loss so sustained is absorbed in charges upon long-haul traffic and is added to the burden borne by the consumer. This loss can to an extent be eliminated by the utilization of trackage and facilities already in existence, while at the same time a quicker and more convenient means of transportation is provided.

I am unfolding to you no Utopian dream. The plan that I am offering is to a limited extent already in operation in several cities, where the roads are being used for the carriage and distribution of lighter freight and express received from connecting interurbans. In the Borough of Brooklyn the extensive Brooklyn Rapid Transit system not only distributes to manufacturing plants cars received from steam railroads, but carries in its own cars commodities between various parts of the borough. An examination of franchises and agreements recently proposed or made effective indicates that this intensified use of street railway facilities is in the minds of those who are now closely studying the electric railway problem. In Chicago, Philadelphia, Montreal, Cincinnati, Denver, Dallas and Youngstown provisions covering the transportation of freight were included in the new grants, while in Boston the right to transport freight had already been given.

FEEDING OUR COMMUNITIES

Most essential of all production is the production of food, while its distribution after production is an equally important factor in the cost of living. The electric railway is a ready-made, an almost already equipped, agency to facilitate distribution and to lower its cost. In co-operation with the motor truck it can do much to solve this immensely important problem. Where there has been this co-operation, and there are many instances, notably those in Illinois, the results have been excellent. Where there is competition, the results have been disastrous to both, and in spite of temporary reduction of transportation charges or improvement in facilities it is the public that has in the end suffered. The community which does not have what they call in the South a "back country," that is, a rural district, producing for it much of the foodstuffs which support its inhabitants, pays extravagant prices for what it eats. The development of such a supporting community is as essential to the progress and welfare of a city as is its own development, and there is no one means of equal potency in this task of development to the interurban.

I am not here to urge upon you the claims of the electric railways as a savior of either the transportation or the production situation. What I believe, and what I know that you believe, is that both those electric roads which serve the cities and those which serve the country have a part to perform in this work of increased production to which this meeting of the chamber is devoted; that their efficient operation is essential to any program which the chamber may decide upon, and that like every other part of the machinery of production they must be put into such a condition of efficiency as well enable them to perform their task.

For your purpose, for the purpose of the people of the country, they cannot be considered as merely private enterprises whose sole object is gain; they must be regarded as public necessities, performing a public service, and, under this concept of their character and functions, be put into such a position, both financially and in the public mind, as will permit them to do the work completely and well.

SERVICE IS CONTROLLING FACTOR

In the marvelous development which in a period of barely three decades has transformed the isolated units of horse or mule drawn cars to the extensive local transportation systems on the surface, above the surface and below the surface the relations of these carriers and the public they serve have become involved, tangled and complicated, so that both the public, and to an extent the operators, have lost sight of the real purpose by reason of which the industry exists.

This is service, and all other considerations are subordinate to it and important only as they affect service. Today these transportation companies are failing in their business of providing service, are failing to utilize to the full in the public interests the possibilities of their facility, because they are so restricted and so hampered by public misconception and public prejudice that they have neither the financial resources nor the public co-operation necessary for their task.

WHAT ELECTRIC RAILWAYS WANT

What they ask in the public interest in order that they may properly serve the public, and in their own interest in order that their money honestly invested be not confiscated, is that the laws, ordinances or agreements which now control them be so readjusted as to make the price at which the product is sold dependent upon the cost of production, and not upon an arbitrary fixed allowance, bound over any considerable period of time to be too large or too great.

Hope for this readjustment, hope for a new era, hope for co-operation, lies in the business men of the country, and until they realize that this highly essential utility, with all its possibilities for public good, can never properly perform its function until the shackles of destroyed credit and public enmity are removed the electric railways can neither assume their full and proper share in the work of increasing production or in providing the service to perform which they were created.

In normal times the capital requirements for extensions, betterments and improvements of the electric railways of the United States are more than $200,000,000 a year. Today, because of deferred maintenance and rehabilitation, a much larger sum is required, and in so far as the operations of electric railways affect production their usefulness is halted by their present inability to secure these funds. Until the flow of new money into electric railway enterprise is resumed they are powerless materially to increase their activities in furtherance of your production efforts.

The plain truth is that their credit no longer exists, that it has vanished because of their inability to earn a living wage, and that as a result a necessary public service is being slowly perhaps, but no less surely, destroyed. This is a fact pertinent to the problem which you are considering. Our ability to help the public depends upon the help which the public extends to us.

Terminal Facilities Called Archaic

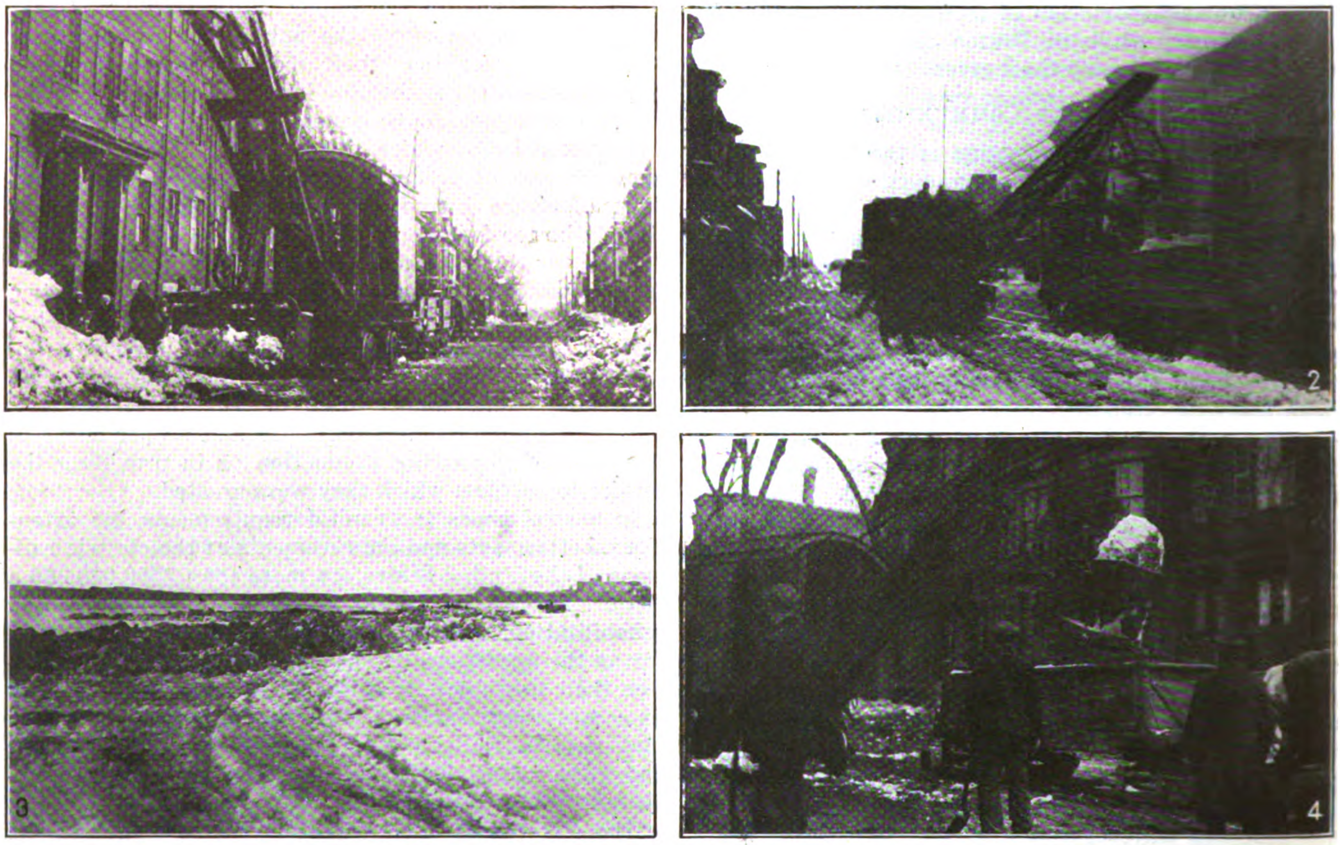
A. H. SMITH, president of the New York Central Railroad, speaking before the Merchants' Association of New York recently, said that the American public is criminally wasteful in its neglect to allow the development of proper terminal and city distribution facilities. He said that New York City is spending at least $200,000 per day in extra terminal and distribution charges, made necessary by this lack of facilities. There has been no substantial progression in this line in twenty-five or thirty years. This is a fundamental transportation problem, basic to the city's well being, and matters cannot stand still much longer.

The public must allow and encourage transportation agencies to develop and take care of the situation.

Removing Snow in Boston

Boston Elevated Railway Finds That the Electric Shovel Cuts Snow-Handling Costs in Half

IN Boston during the past winter several devices were used for removing snow from the car tracks and the adjoining roadway. An opportunity was thus afforded for the preparation of comparative figures on the cost of removing snow by the various methods. In addition to the regular complement of snowplows and sweepers used to keep the lines clear during a storm, this company uses Ridlon horse-drawn snow removers and push scrapers for cleaning around transfer points and terminals and auto trucks, snow sleds, double-tip carts, electric steel dump cars and flat service cars with trailers for cleaning up and hauling snow. Road machines and snow levelers are also used for leveling snow at the side of the street.



METHODS AND DEVICES USED TO REMOVE SNOW IN BOSTON

No. 1. Electric shovel biting out big chunks.
No. 2. Loading a flat car with electric shovel.
No. 3. This snow dump resembles a Sahara Desert.
No. 4. Electric shovel loading snow sleds.

In the territory served by the Boston Elevated Railway there are only a few sewers of capacity sufficient to permit their use for snow-dumping purposes. Even these few are not located within the limits of the territory from which the bulk of the snow has to be removed. Where it is possible to make use of sewers, this results in an average saving of 59 per cent as compared with hauling snow to dumps.

The company is obligated to remove entirely from the streets, level with the curb or leveled sufficiently to make roadways passable, all snow which has been plowed from the railway tracks. The amount that has to be removed depends upon the location, but in all cases the work must be accomplished to the satisfaction of the city superintendent of streets. The railway company does this on all streets in which car tracks are located and has no special agreement with the city whereby obligation areas are consolidated in various sections. No contracts are made with outside interests for the removal of snow, but trucks and carts are hired for this purpose.

Records kept during the work of the past winter indicate that the average cost per cubic yard for removing snow by various methods was as follows: Auto trucks 60 cents, snow sleds 80 cents, electric steel dump and service cars 62 cents, double-tip carts 93 cents. Cars with clamshell buckets were used to clear away drifts and to open up lines that had become blockaded, the snow being picked up and cast to one side. This method resulted in a cost of approximately 3 cents per cubic yard.

Thew electric shovels and derrick cars equipped with clamshell buckets were used with considerable success in some instances for loading snow. This method produced a large saving as compared with hand loading, estimated to be at least one-half of the expense. The accompanying illustrations show these machines in operation. In some cases the snow was loaded onto flat cars, while in others it was dumped into sleds or carts. In addition to this method demonstrations were made of the feasibility of using tractors for hauling snow levelers and plows for breaking up ice. The caterpillar type proved to be most efficient and it is believed that there is a possibility of making use of tractors for this purpose when they have been sufficiently improved to meet the conditions.

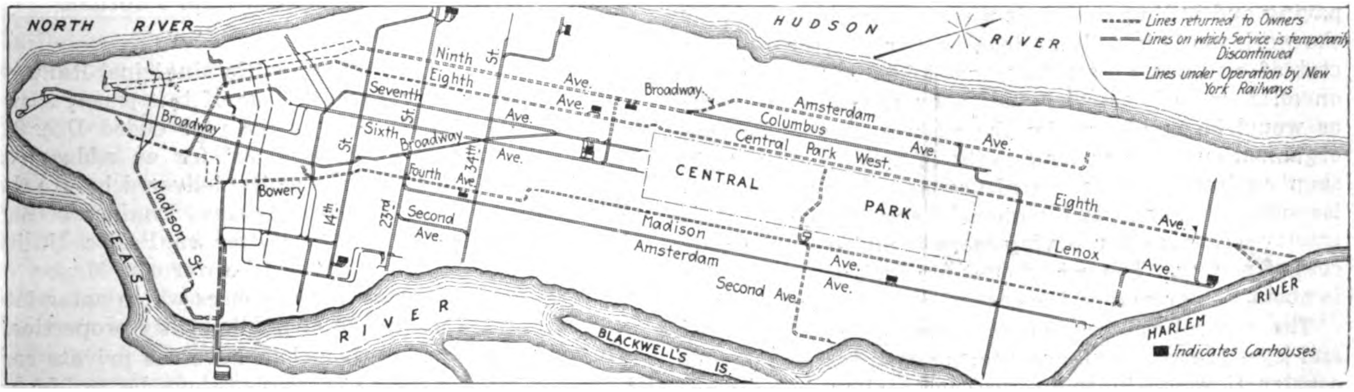
In Boston snowplow routes are determined upon previous to the winter months. Permission is obtained to dump snow from bridges into tide water or sewers, snow dumps are secured and arrangements are made with contractors as to the number of teams, trucks and so forth that will be needed. Additional quarters are also established in some of the outlying districts and a few men are assigned to these for the purpose of looking after snow, hiring men, teams and other equipment.

When a storm begins the plows are sent over the previously arranged routes in sufficient frequency to keep the lines clear. Men are stationed on all special work, around stations and terminals, and keep at work continuously until the storm ceases. The hauling of snow then begins, the most important points being cleaned first. If the company's own forces are not capable of handling the situation extra men, teams, trucks and so forth, previously arranged for, are called upon and the work is kept up almost continuously until conditions again become normal.

The ELECTRIC RAILWAY JOURNAL is indebted to H. M. Steward, superintendent of maintenance of the Boston Elevated Railway, for the above information.

New York Railways Valuation Reported

Complete Stone & Webster Appraisal Shows Values for the Various Component Parts of New York Railways — Four Sets of Figures Offered on Different Bases



TRACK MAP OF NEW YORK RAILWAYS COMPANY AND OPERATED COMPANIES. THE MAP WAS BASED ON MAY, 1919, DATA AND WAS LATER CORRECTED TO INDICATE TERMINATED LEASES AND ABANDONED LINES

AN APPRAISAL of the seventeen companies comprising the New York Railways system is reported to Job E. Hedges, receiver, under date of Jan. 1, 1920, by Stone & Webster. The over-all figures of this appraisal were announced by Judge Mayer on Feb. 5, 1920, as previously indicated in these columns, to be approximately $144,000,000, based on June, 1919, prices, and approximately $89,000,000 based on pre-war prices. The complete appraisal report is now available and it contains some very interesting information as to the value of the various owned and leased companies which make up the New York Railways system as a whole.

The appraisal gives figures for the physical property, general construction costs not easily allocated among the various items of construction, organization prior to construction, working capital and property not used in railway operation. The appraisal does not contain any figures for the following items:

1. Going value of property.
2. Special value of land for railway purposes.
3. Profits of promotion.
4. Discounts on securities.
5. Special value of existing franchises.
6. Net investment in superseded property.

The appraisal covers land, trackage, miscellaneous buildings, such as power stations, substations, carhouses, etc., rolling stock, power and substation equipment, one double-track tunnel, the complete distributing and transmission systems and the shop equipment, tools, furniture and fixtures, etc.

The appraisal is arranged in subdivisions in accordance with the uniform system of accounts of street and electric railways as prescribed by the Public Service Commission for the First District, State of New York. Four price bases were used:

1. Cost to reproduce new, at pre-war prices.
2. Cost to reproduce new, at pre-war prices, less depreciation.
3. Cost to reproduce new, at 1919 prices.
4. Cost to reproduce new, at 1919 prices, less depreciation.

Pre-war prices are defined as the average of prices prevailing during the period 1910 to 1914 inclusive, and the 1919 prices are taken as of date June 30, 1919. Depreciation was figured on a straight-line basis and deductions were made for the portion of expected life which had elapsed up to June 30, 1919. Stone & Webster state that "this 'depreciated value' was computed at the specific request of the receiver, and not because we believe it represents a 'fair value' of the company's property, on which the allowable rate of return should be figured." Costs of construction organization and superintendence, field engineering, factory inspection, etc., which could be allocated and charged directly to specific items were applied by percentages as follows:

	Per Cent
Track work	7
Tunnel	10
Electrical distribution system	10
Rolling stock	0
Power and substation equipment	10
Shop machinery and tools	0
Buildings (average)	10

NEW YORK RAILWAYS VALUATION SUMMARIZED BY SEVERAL ACCOUNTS

	At Pre-War Prices		At June, 1919, Prices	
	New	Less Depreciation	New	Less Depreciation
Land	$10,388,800	$10,388,800	$10,751,850	$10,751,850
Construction and equipment:				
Material and labor	51,657,360	36,283,616	92,843,200	64,696,870
Contractors' services	3,967,028	2,924,655	6,995,479	5,160,715
General construction costs	8,918,004	8,395,526	14,219,916	13,554,413
Total	64,542,392	47,603,797	114,058,595	83,411,998
Organization prior to construction	8,392,475	8,392,475	12,476,025	12,476,025
Working capital	2,882,305	2,845,591	3,264,874	3,204,698
Total property used in railway operation	86,205,972	69,230,663	140,551,344	109,844,571
Property not used in railway operation	2,792,998	2,285,525	3,503,833	2,682,086
Total property	88,998,970	71,516,188	144,055,177	122,526,657

The total amount of the above charges is 7.37 per cent of the reproduction cost of material and labor of the entire property. An allowance of 5 per cent was made for omissions and contingencies on all items, except paving and rolling stock. It was assumed that much of the work would have been done by a contractor, and the cost of contractor's services was taken at 10 per cent on all items of material and labor except such items as would be purchased by the railway company's own organization, such as land, right of way, rolling stock, shop equipment, tools, furniture and fixtures, miscellaneous equipment and materials and supplies. Contractor's charges for paving were included in the unit cost of paving. The net amount for contractor's service is about 7½ per cent of the cost of construction.

The general construction costs include administrative and legal organization, engineering cost, interest during construction and taxes during construction. Organization prior to construction includes the cost of preliminary investigation and the cost of perfecting a permanent organization.

NEW YORK RAILWAYS VALUATION SUMMARIZED BY COMPANIES

	At Pre-War Prices		At June, 1919 Prices	
	New	Less Depreciation	New	Less Depreciation
Property used in railway operation:				
Owned lines:				
New York Railways	$37,594,497	$28,456,454	$60,782,394	$43,848,548
Lexington Ave. & Pavonia Ferry R.R	3,280,850	2,652,820	5,782,681	4,664,563
South Ferry R.R	659,889	546,877	1,128,848	931,880
Broadway Surface R.R	2,011,213	1,714,867	3,546,184	3,022,035
Columbus & Ninth Ave. R.R	1,269,160	1,021,872	2,205,110	1,770,619
Central Crosstown R.R.	202,682	166,110	349,922	284,028
Fort George & Eleventh Ave. R.R	443,328	367,660	766,070	631,537
Total, owned lines	45,461,619	34,926,660	74,561,209	55,153,210
Leased lines:				
Twenty-third Street Railway Co	1,535,267	1,291,460	2,574,873	2,134,159
Broadway & Seventh Ave. R.R. Co	12,593,619	10,802,887	18,233,015	15,166,332
Bleecker St. & Fulton Ferry R.R. Co	886,059	719,447	1,575,345	1,260,399
New York & Harlem R.R. R.R. Co	6,792,019	5,761,722	11,705,740	9,878,675
Sixth Avenue R.R. Co	4,351,239	3,659,684	7,398,700	6,177,800
Forty-second Street & Grand St. Ferry R.R. Co	2,062,043	1,760,374	3,347,254	2,803,879
Christopher & Tenth St. R.R. Co	1,158,764	941,625	2,065,020	1,655,127
Eighth Avenue R.R. Co	6,598,186	5,480,360	10,786,716	8,885,975
Ninth Avenue R.R. Co	4,398,003	3,586,341	7,657,643	6,206,838
Thirty-fourth St. Crosstown Ry. Co	369,154	300,103	645,829	522,177
Total, leased lines	40,744,353	34,304,003	65,990,135	54,691,361
A—Total property used in railway operation	86,205,972	69,230,663	140,551,344	109,844,571
Property not used in railway operation:				
Owned lines	769,114	578,459	1,107,515	791,292
Leased lines	2,023,884	1,707,066	2,396,318	1,890,794
B—Total property not used in railway operation	2,792,998	2,285,525	3,503,833	2,682,086
C—Total property—(A+B)	88,998,970	71,516,188	144,055,177	112,526,657

The accompanying tables indicate better than can be done by words the result of the appraisal and the comparative figures arrived at on the four bases. It also serves to show the complex ownership of the property operated by the New York Railways Company.

With the exception of carhouses and the land on which they are located, which are owned by five or six of the component parts, all the property of the subsidiary owned and leased lines consists of track, paving, underground construction and electrical distribution. The New York Railways Company owns all the rolling stock, shops and equipment and power and substation equipment.

Ole Hanson on M. O.

Former Mayor of Seattle Tells How the Seattle Municipal Railway Became the Football of Politics

THE annual report of the Seattle Municipal Railway, abstracted in the April 3 issue of this paper, showing a net loss of $517,173 for the year ended Dec. 31, 1919, makes a fitting "Exhibit A" for an address of former Mayor Ole Hanson recently delivered before the New England Association of Gas Engineers and reprinted by the Illinois Committee on Public Utility Information. In this address the former Mayor of Seattle pointed out some of the abuses which enter into the political administration of public utility properties.

He explained that, rather than have the private corporation compelled to do impossible things, he, as Mayor, arranged for the purchase of the property at actual cost. This plan was formally approved by the voters, and the Mayor made every effort to keep the cars from running at a loss. Efficiency methods were applied and various non-transportation charges were eliminated so as to preserve the 5-cent fare. "The right thing to have done," said Mr. Hanson, "the thing I wanted to do, was to have the public pay a sufficient increase, commensurate with the cost of hauling, especially as we had to reduce the principal and pay the interest." The former Mayor said that instead of taking the public utility out of politics it became at once the football of politics. Candidates for office promised extensions which could never prove profitable, and it soon became evident that if these programs were to be carried out the municipal street railway system would become a liability and not an asset. As a daily newspaper said in commenting on this situation, "Street cars cannot be run efficiently with politics as their motive power."

Seattle's experience with municipal operation, as related by the former official head of the city government, is likely to prove timely propaganda for those who dislike to see public funds wasted or political corruption practiced in such experiments. If the Detroit voters had assimilated some of the common-sense views of the former Mayor of Seattle it is not likely they would have been so generous in the approval of a proposition to spend $15,000,000 of the people's money to build a competitive system of railways for their city. It required a first-hand statement from the head of the Glasgow tramways system to knock into a cocked hat the municipal ownership aspirations of a former Mayor of Chicago in 1905.

Permanent Electrolysis Committee Suggested

In Ruling Handed Down April 13 Railroad Commission of Wisconsin Outlined Past and Present Conditions in Milwaukee and Recommended Plans for Future Procedure

ON PETITION of the Milwaukee Electric Railway & Light Company, the Railroad Commission of Wisconsin investigated the adequacy of the provision made for preventing interference with service furnished by other public utilities using subsurface metallic structures and formulated general recommendations looking toward further electrolysis mitigation.

Its ruling, handed down on April 13, recites that a hearing on the above matter was held on June 13, 1918, with representatives of the utilities whose property was affected in attendance. The testimony at the hearing consisted largely of a general statement by G. W. Van Derzee of the Milwaukee Electric Railway & Light Company on the causes of electrolysis and methods of mitigation, together with a statement of what had been done to relieve conditions as they developed. The hearing resulted in an understanding that the commission would conduct a survey of the Milwaukee electrolysis conditions, supervised by a representative of the Bureau of Standards, and that the order would be withheld until the work was completed.

The report then goes on to outline the work of a temporary committee which was organized, consisting of one member of the engineering staff of the commission and one from each of the utilities interested. E. R. Shepard of the United States Bureau of Standards was engaged to superintend the work, which was carried to completion about the middle of September, 1918. Elaborate tests were made, and a description of these, together with an abstract of the report made to the commission, was contained in an article by Mr. Shepard printed in the issue of the ELECTRIC RAILWAY JOURNAL for April 19, 1919, page 770.

In general the commission felt that the result of the survey indicated the electrolysis conditions in Milwaukee to be comparatively good, and the present system of mitigation is credited with being principally responsible for this condition. The commission is of the opinion, however, that further improvements can be made which may best be determined by continuing the survey. While it might be possible to lay down definite limits of track gradient, over-all potentials, limits of voltage from pipe to rail, details of rail bonding, etc., which would be proper under present conditions, it would be impracticable to lay down definite limits which would be proper as well for the present and also for the future with the changing conditions which are sure to come.

COMMISSION RECOMMENDS PERMANENT COMMITTEE

The commission expressed the belief that the matter could be much more effectively handled by a permanent committee, consisting of representatives of all of the interested utilities, who should preferably be resident engineers acting with the co-operation of the Railroad Commission. This committee would continue taking the necessary observations and making tests to check the conditions periodically, to prescribe such changes, etc., as are needed to maintain proper conditions and to submit a report of these observations to the commission upon a suitable standard form to be adopted by the committee. At least one general report should be sent to the commission in December of each year, as well as copies of the minutes of all meetings of the full committee.

The commission pointed out that co-operation of all whose interests are affected is necessary, as was emphasized in the statement of Judge Oscar M. Fritz in the case of the City of Milwaukee *vs.* Milwaukee Electric Railway & Light Company, as follows:*

"Those propositions, if accompanied by reasonable co-operation between the parties to the action, and between the defendants and other public service corporations under the supervision of the Railroad Commission, afford the opportunity for a sensible and immediate solution of this engineering problem."

The commission further recommended that the committee be known as the Milwaukee electrolysis committee and that it have officers consisting of chairman, secretary and treasurer, the committee to have supervision over electrolysis mitigation work and the carrying out of such improvements as may be found necessary. The expenses which the committee may incur in the discharge of its work are to be borne by all the utilities represented on the committee in such proportion as may be agreed upon.

It is further recommended that the Milwaukee Electric Railway & Light Company and all other electric railway companies and utilities within the city of Milwaukee or its suburbs which are in the business of transmitting electric street railway current, or whose substructures are subject to electrolysis from this current, fulfill such recommendations as may be made to them by the committee and otherwise co-operate fully with the committee. The committee should be organized at the earliest practicable date and should proceed at once upon its work. The main object of the work should be to prevent the leakage of the negative return street railway current from the rails so far as practicable. This may be accomplished by such additions as are necessary and practicable to the insulated negative return feeder system now in use, by securing of proper rail joint conductance and, if on further investigation the results warrant its adoption, by the use of a three-wire supply system.

The committee should also investigate the drainage of currents from substructures through connections which already exist, taking the necessary steps to secure proper measurement and supervision of the drainage, and should also make such further drainage taps, with suitable provision for maintenance and inspection, as seem necessary to determine to what extent this plan shall be adopted for the disposal of the residual current.

In order to prevent competitive drainage no connections in addition to those at present in use should be made except upon notice to the committee in writing, and these connections should at all times be under the control of and subject to the recommendations of the committee. The temporary or permanent drains should be so installed and controlled as to prevent injury to existing substructures.

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*This abstract is from an interlocutory court order issued by Judge Fritz in branch No. 2 of the Milwaukee County Circuit Court on Feb. 11, 1920, with particular reference to damage to the Maple Street underground water main.

The commission is not disposed to prescribe standards of this kind pertaining to over-all potentials, track gradients, potential differences or joint resistance. It is, however, suggested that the following standard for track bonding be established for the present by the committee, namely, that the resistance of 10 per cent of the rail joints shall not exceed that of 10 ft. of rail, and that this standard be subject to such changes as seems warranted by the committee.

The commission further recommended that the committee should request the Milwaukee Electric Railway & Light Company and other electric railway companies to make regular tests of the joint resistance of their entire systems and to submit to the committee the result of these tests. The committee should then decide whether further bond maintenance should be ordered.

All matters concerning which the committee is unable to come to an agreement should be immediately referred to the commission for a decision. The committee should submit to the commission minutes of all regular meetings and a detailed yearly report of the work accomplished and the electrolysis conditions as they exist at that time. The commission ordered that jurisdiction is retained by it for such further order as may be necessary from time to time with respect to matters which cannot be settled to the satisfaction of the parties through the medium of the voluntary committee recommended above, and for such further orders as may become necessary in the event that such a committee cannot be organized or should not accomplish satisfactory results.

A. I. E. E. Super-Power Committee

PRESIDENT Calvert Townley of the American Institute of Electrical Engineers has appointed the following special institute committee on super-power system:

W. S. Murray, consulting engineer, New York, chairman.
Harold V. Bozell, associate editor ELECTRIC RAILWAY JOURNAL.
H. W. Buck, of Vielé, Blackwell & Buck, consulting engineers, New York.
George Gibbs, of Gibbs & Hill, consulting engineers, New York.
John W. Lieb, vice-president New York Edison Company, New York.
Malcolm MacLaren, professor of electrical engineering, Princeton University.
William McClellan, vice-president Cleveland Illuminating Company.
Charles S. Ruffner, vice-president the North American Company, New York.
David B. Rushmore, General Electric Company, Schenectady.
Charles F. Scott, professor of electrical engineering, Yale University.
Percy H. Thomas, consulting engineer, New York.

This action was taken as the result of a motion adopted at a technical session of the institute during the recent midwinter convention recommending to the board of directors of the institute that a committee be appointed to carry on the movement initiated by Mr. Murray. At a meeting of the board of directors of the institute held in Pittsburg, March 12, President Townley was authorized to appoint the committee.

C. E. R. A. Committees Appointed

"Brown Book" No. 10 Gives Officers and Complete Committee Appointments for 1920 and New Traffic Agreements, Forms, Etc.

THE "Brown Book," which is the official publication of the Central Electric Railway Association, has been issued. It lists the officers and executive committee, which were noted on page 528 of the March 13, 1920, issue of the ELECTRIC RAILWAY JOURNAL, and gives the company members, committee appointments, the president's address at the recent annual meeting, secretary-treasurer's report and various traffic bulletins, interchange agreements, etc. The personnel of the new committees of the Central and its allied associations and of the committees which have been changed from those of last year, as published on pages 736 and 737 of the issue of this paper for April 12, 1919, follow:

CENTRAL ELECTRIC RAILWAY ASSOCIATION

Hotel and Arrangement: W. H. Bloss, chairman, Ohio Brass Company, Mansfield, Ohio; H. A. Nicholl, Anderson, Ind.; L. G. Parker, Cleveland Frog & Crossing Company, Cleveland, Ohio; F. R. Coates, Toledo; W. D. Hamer, W. D. Hamer Company; H. E. Rasmussen, Indianapolis Electric Supply Company; F. N. Root, Root Spring Scraper Company, Kalamazoo, Mich.

Interurban Freight and Motor Truck Competition: A. Swartz, general chairman, Toledo, Ohio. Indiana: Bert Weedon, chairman, Indianapolis, Ind.; J. A. Greenland, Fort Wayne, Ind.; Paul T. Payne, Dearborn Chemical Company. Ohio: F. R. Coates, chairman, Toledo, Ohio; E. F. Schneider, Cleveland; S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio. Michigan: W. S. Rodgers, chairman, Detroit, Mich.; F. W. Brown, Jackson, Mich.; F. N. Root, Root Spring Scraper Company, Kalamazoo, Mich.

Membership: Harry Reid, chairman, Louisville; F. R. Coates, Toledo; S. W. Greenland, Fort Wayne, Ind.; C. F. Smith, Findlay, Ohio; R. A. Crume, Dayton, Ohio; G. T. Seely, Youngstown, Ohio; W. H. Douglas, Willoughby, Ohio; George Whysall, Columbus, Ohio.

National Safety Council: James Harmon, chairman, New Albany, Ind.; H. A. Nicholl, Anderson, Ind.; E. C. Hathaway, Railway Audit & Inspection Company; E. C. Carpenter, Akron, Ohio; R. Feustel, Fort Wayne, Ind.

Program: C. L. Henry, chairman, Indianapolis; John Benham, International Register Company, Chicago; F. D. Carpenter, Lima, Ohio; S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio; H. G. Gilpin, Springfield, Ohio; W. S. Rodger, Detroit, Mich.; W. K. Morley, Grand Rapids, Mich.

Publicity: Harry L. Brown, chairman, ELECTRIC RAILWAY JOURNAL, Chicago; H. J. Kenfield, *Electric Traction*, Chicago; C. J. Laney, Akron, Ohio.

Rules Governing Interchange of Equipment: H. A. Nicholl, chairman, Anderson, Ind.; Harry Bullen, Detroit, Mich.; A. Swartz, Toledo, Ohio; J. W. Glendenning, Jackson, Mich.; E. M. Walker, Terre Haute, Ind.

Standardization: H. H. Buckman, chairman, New Albany, Ind.; R. C. Taylor, Jackson, Mich.; F. J. Foote, Springfield, Ohio; Charles Sigler, Warsaw, Ind.; F. Heckler, Sandusky, Ohio; C. T. Dehore, General Electric Company; Terence Scullen, Cleveland, Ohio; Sylvester Potter, Detroit, Mich.; C. A. Brown, Toledo, Ohio; K. A. Simmon, Westinghouse Electric & Manufacturing Company; J. W. Osborn, Indianapolis, Ind.

Uniform Charges for Repairs to Interchanged Equipment: H. G. Gilpin, chairman, Springfield, Ohio; Irwin Fullerton, Detroit, Mich.; H. R. Biery, Anderson, Ind.

Supply Men: S. D. Hutchins, chairman, Columbus, Ohio; L. G. Parker, secretary; H. C. DeCamp, W. H. Bloss, L. E. Gould, James H. Drew, J. Alexander Navarre, E. C. Folsom, S. W. Crawford, E. F. Wickwire, F. N. Root and E. J. Smith.

Transportation: G. K. Jeffries, chairman, Indianapolis, Ind.; E. Smith, Fostoria, Ohio; H. G. Gilpin, Springfield, Ohio; H. P. Harrsen, Jackson, Mich.; J. F. Keys, Detroit, Mich.; J. C. Schade, Warsaw, Ind.; C. C. Collins, Cleveland, Ohio; W. K. Morley, Grand Rapids, Mich.; R. R. Smith, South Bend, Ind.

Track and Roadway: T. R. H. Daniels, chairman, Indianapolis, Ind.; T. H. Sundmaker, Springfield, Ohio; John Kerwin, Detroit, Mich.; L. A. Mitchell, Anderson, Ind.; A. V. Brown, Sandusky, Ohio; H. D. Sanderson, Jackson, Mich.; E. D. Eckroad, Akron, Ohio.

Electric Railway Express: H. A. Nicholl, chairman, Anderson, Ind.; W. S. Rodger, Detroit, Mich.; E. F. Schneider, Cleveland, Ohio; C. J. Munton, Kendalville, Ind.; H. P. Harrsen, Jackson, Mich.; G. K. Jeffries, Indianapolis, Ind.; S. W. Greenland, Fort Wayne, Ind.

The committee on readjustment has been discontinued.

CENTRAL ELECTRIC TRAFFIC ASSOCIATION

Joint Freight Tariffs: J. H. Pound, chairman, Benton Harbor, Mich.; Bert Weedon, Indianapolis, Ind.; C. B. Grandy, Toledo; C. C. Collins, Cleveland; J. O. Bradfield, Columbus, Ohio.

Joint Exception Tariff: C. O. Sullivan, chairman, Lima, Ohio; J. H. Crall, Indianapolis, Ind.; J. A. Greenland, Ft. Wayne, Ind.; N. Rumney, Detroit, Mich.; J. H. Pound, Benton Harbor, Mich.; W. S. Whitney, Springfield, Ohio; F. D. Norveil, Anderson, Ind.

Joint Weight and Inspection Bureau: J. H. Crall, chairman, Indianapolis, Ind.; F. D. Norveil, Anderson, Ind.; W. S. Whitney, Springfield, Ohio; O. H. Murlin, Dayton, Ohio; W. S. Rodger, Detroit, Mich.; C. P. Ryan, Kokomo, Ind.; W. J. Chisholm, Toledo, Ohio.

Official Interurban Map: J. H. Crall, chairman, Indianapolis, Ind.; O. H. Murlin, Dayton, Ohio; W. S. Whitney, Springfield, Ohio; J. H. Pound, Benton Harbor, Mich.; J. O. Motto, Warsaw, Ind.

Rules Governing Settlement of Freight Claims: M. E. Graston, chairman, Anderson, Ind.; J. S. Moore, South Bend, Ind.; I. Santon, Bluffton, Ind.; C. B. Kleinhans, Toledo, Ohio; C. O. Sullivan, Lima, Ohio; N. Rumney, Detroit, Mich.; W. J. Chisholm, Toledo, Ohio.

The committees on boosting and military traffic have been discontinued.

CENTRAL ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION

Freight and Express: E. O. Reed, chairman, Lima, Ohio; L. W. Van Bibber, Springfield, Ohio; C. B. Baker, Findlay, Ohio.

Light and Power: H. T. Ledbetter, chairman, Toledo, Ohio; C. C. Cash, Toledo, Ohio; C. B. Baker, Findlay, Ohio; R. H. Ewan, Fostoria, Ohio; Irwin Fullerton, Detroit, Mich.

Membership: K. A. George, chairman, Kokomo, Ind.; V. R. Shick, Kendallville, Ind.; Homer Ruhl, Decatur, Ind.

Program and Arrangement: A. C. Van Driesen, chairman, Toledo, Ohio; E. O. Reed, Lima, Ohio; C. C. Cash, Toledo, Ohio.

Readjustment: J. P. Longon, chairman, Hamilton, Ohio; L. T. Hixson, Indianapolis, Ind.; B. E. Bramble, Peoria, Ill.

Safety Cars in Birmingham

Another Large City Successfully Inaugurates Frequent Service as a Business Getter

ON Jan. 25, 1920, the Birmingham Railway, Light & Power Company placed in operation sixteen of twenty-five new safety cars recently purchased. These cars are equipped with Westinghouse 506-A-2 motors and K-63-B control, the air brakes being also of Westinghouse make. Unfortunately the appearance of the new cars was about coincident with that of the influenza epidemic, so that it is difficult to evaluate the results of the first month's operation of the new cars. However, toward the end of February, J. S. Pevear, general manager of the company, stated that for a three-week period following the installation the receipts of the line on which the cars were installed showed a 25 per cent increase over the three weeks previous thereto. A very considerable part of this increase came from other lines, passengers being attracted by the great improvement and frequency of service. Another part came from a bus line which had been operating in competition with the railway.

Mr. Pevear states that so far as the public is concerned there has been nothing but favorable comment, and there has been no trouble whatever in handling the negro patrons. He attributes the success with the public in general, and with respect to the race question, to the fact that the experience of other companies using safety cars has been applied in Birmingham, and the company has gone a little further than others in that 97 car-hours per day on the line in question have been replaced with 214 car-hours with the safety cars.

Contrary to the general practice in introducing safety cars, a local advertising campaign with newspaper advertisements, placards, etc., was not conducted. The new plan was announced to the public simply by the distribution of a small printed explanation to the patrons of the one line on which the cars were to be operated. The notice was distributed the day before the line was converted.

The local public spirit in accommodating itself to the new car is indicated by the fact that there was no confusion, even though the people at Birmingham had not been accustomed to pay-as-you-enter cars, and in addition the segregation of the races in the new cars was reversed from that in the older cars. Formerly the negroes entered at the front door and were seated from the front door to the rear, while the white patrons entered by the rear door and were seated in the rear of the car, the division point being indicated by signs on the back of the seats.

The safety cars are used on the Highland Avenue-Lakeview line, a double-track loop line which serves one of the best residential sections in the city. Formerly, four two-man double-truck cars were operated in each direction on a ten-minute headway. Now, eight safety cars are operated in each direction on a five-minute headway. The schedules are staggered so that the outer section of the loop is given a two and a half minute headway, counting both directions.

In the downtown section the safety cars operate over ten blocks of the most congested business district and over the same tracks as a number of lines using double-truck cars. No confusion has been experienced due to the mixing of the two types of cars.

The safety cars are equipped with signs on the two ends, the signboards being lettered on one side "Please have exact fare ready" and on the other "Car full." No specified limit of passengers has as yet been set before the "Car full" sign is displayed, this being left to the judgment of the operator. No complaints have as yet been made due to the use of this sign, and the railway officials anticipate none, due to the shortness of the headway on which the cars are operated.

A 6-cent fare is charged in Birmingham and no tickets are used. A noticeable feature has been the encouraging extent to which the passengers are co-operating with the managment by having exact fare ready.

The newspaper comment upon the introduction of safety-car operation in Birmingham was highly appreciative, the *Ledger*, *News* and *Age-Herald* publishing enthusiastic articles. Among other things the *News* said editorially:

> The great advantage of these new one-man cars to the public is that they increase the revenues of the company and reduce its expenses. That result is too apparent for detailed elaboration. . . . The one-man car is . . . one of the chief ways in which the public can co-operate with the company. By all means . . . the whole people, white and colored, should welcome this admirable effort of Receiver Bradley and should see to it that it is appreciated and made successful.

Skip Stop for Trains Only, Mixed in with Single-Car Units

Plan Adopted by New Orleans Railway & Light Company to Permit Use of Trailers as Means of Increasing the Service

A SKIP-STOP, regular-stop scheme of operation on the Canal Street line of the New Orleans Railway & Light Company is being followed, primarily as a means of utilizing trailers to increase the number of seats per hour. Incidentally, the plan makes it possible for those riders who object to the skip-stop plan to select a car which will stop at their particular street, and it may further serve gradually to educate the public to the advantages of the skip stop, it having been necessary to abandon the skip-stop practices adopted in war time.

The real reason for the present skip-stop plan was to make it possible to haul trailers behind part of the cars on the line and at the same time maintain the schedule of the single-car units. The company was faced with the imperative need for additional equipment, and as trailer cars but no additional motor cars were available, the use of the trailers was made possible by the adoption of this combination scheme of operation.

Between the hours of 7 and 9:30 in the morning and 4 and 7 in the afternoon certain of the motor cars operated on the all-day schedule haul trailers having a seating capacity of sixty-four passengers. Eight of these trailers are now operated on the Canal Street line. These two-car trains are marked on the front dash with a "two-car train" sign and of course the project was thoroughly advertised before it was inaugurated. All single-car units on the line make all stops. The two-car trains, when signaled, make stops which are spaced two or three blocks apart, depending on the length of blocks. The stops for the trains are marked by a yellow band on the trolley pole or a special post. Passengers about to board a car know that at the points marked with this yellow band any car will stop for them, while at intervening points only the single-car units will stop.

This plan has worked out satisfactorily in supplying the additional seating capacity required, and it saves some energy and one man. In addition, it is inducing passengers to walk a short distance after getting off the car on the way home, for the sake of the more comfortable ride which results from the fewer stops, and in boarding cars in the outlying sections, to walk a short distance for the sake of being at a point at which all cars stop. It is thought that the people may gradually acquire this habit, looking toward an ultimate complete skip-stop installation.

The motor cars which are used to haul these large trailers are each equipped with two G. E. 57 motors. There was some misgiving about the ability of these motors to carry the extra load, but they have worked out very satisfactorily. The trailers were equipped with air brakes and supplied with air from the motor car by means of hose couplings.

WAR SKIP-STOP MEASURE ABANDONED

As in many other cities, the skip-stop plan installed by the Fuel Administration as a coal-conservation plan had to be abandoned in New Orleans after the war, because of public demand. The war skip-stop plan was inaugurated in New Orleans on Sept. 15, 1918, whereby every other street was made a stop for all cars. The public kicked about having to walk the extra blocks in rainy weather, so the plan was later altered so that all stops were made in inclement weather. But this did not seem to allay the criticism and it became necessary on Dec. 17, 1918, to discontinue the skip-stop plan altogether. Then the plan outlined above was installed in the late summer of 1919, and, thus far, it seems to be meeting with the approval of the riders.

Fire Insurance Rate Cut

IN 1910 the Philadelphia Rapid Transit Company carried fire insurance of $18,500,000, at a one-year rate of 50 cents per $100. By effective inspection on the part of the company the rate was cut to 25 cents in 1914, and commencing Jan. 1, 1919, the company set up its own insurance fund and assumed about $8,000,000, or approximately one-third, of its entire fire risk, then covered by expiring fire insurance policies.

Before a year had expired, namely, in December, 1919, due to the superior "housekeeping" of the company's inspection bureau, the good work of its supervisor of insurance and its fire insurance brokers, an offer was received from approved fire insurance companies to assume the insurance of its entire fire risk, which had increased to an insurable value of $27,000,000, at a rate of 52 cents per $100 for three years. This offer was accepted. This rate is equivalent to 17⅓ cents per $100 per annum and represents a saving of over $88,000 per annum when compared with the rate in effect in 1910.

The first insurance fund which was set up on Jan. 1, 1919, has been abolished.

Meeting of Commerce Chamber

Addresses and Resolutions of Electric Railway Interest at Atlantic City Meeting — Referendum Ordered on Resolution Forbidding Strikes on Utilities

WHILE the address of President John H. Pardee on April 28 was the outstanding feature of electric railway concern at the annual meeting of the United States Chamber of Commerce at Atlantic City this week, it was not the only event of interest to utility men at that meeting. Several resolutions affecting electric railways directly or indirectly were passed and the board of directors was increased to thirty-four, to represent not only geographical divisions but in certain cases also national activities, such as transportation, finance, civic development, foreign commerce, etc. Thus in the future there will be two members on the board who will directly represent transportation and communication. The two representatives of transportation elected on April 29 were Howard Elliott and L. B. Stillwell.

An abstract of the address of Mr. Pardee on electric railways is published on page 897 of this issue.

On Wednesday evening there was an address by James H. McGraw on "The Function of the Business Press in Relation to Increased Production." On Thursday, Joseph H. Defrees was elected president for the ensuing year.

THE RESOLUTIONS PASSED

The principal resolutions passed of electric railway interest follow:

AGAINST PUBLIC OWNERSHIP OF UTILITIES

This annual meeting considers it especially appropriate that, in view of the subject to which it has given attention, it should set out and reaffirm the declaration of the seventh annual meeting respecting the principles which should govern the relations of government to business, as follows:

The very essence of civilization is that there be placed upon the individual only that degree of restraint which shall prevent his encroachment upon the rights of others, thus releasing to the utmost individual initiative in every proper direction.

Our form of government most effectively expresses and maintains this principle. Within our basic law exists ample provision for such changes as may from time to time be necessary to safeguard our people. It is therefore essential that our government should scrupulously refrain from entering any of the fields of transportation, communication, industry and commerce or any phase of business when it can be successfully undertaken and conducted by private enterprise. Any tendency of government to enter such fields should be carefully weighed in the light of its possible effect upon the very genius of our institutions.

GOOD TRACTION SERVICE IS INDISPENSABLE

Every phase of the life of a community is affected by the success or failure of its traction lines in providing a service which is indispensable to the public. Careful regulation, joined with concern for the business stability and success of traction lines, should prevail in each city of the country. Adequacy of service at the lowest rate compatible with continued efficiency is the paramount consideration from the public point of view, and neither factor can be sacrificed to the other without public detriment. Each community is urged to consider the situation of its traction service from these two points of view, in order that it may ascertain and apply proper remedies if the increased costs common to all business have been unaccompanied by added revenue sufficient to maintain the service requisite for the industrial and commercial efficiency of the community.

PREPARATION FOR INTERRUPTION OF NECESSARY SERVICES

Continuous supply of the necessaries of life and of industry is essential to the public welfare. Preparation to meet emergencies arising from unexpected stoppage to the supply of such necessaries should be undertaken by each community. Information should be collected for immediate and effective use when occasion arises respecting available supplies of such necessaries as food and fuel, the trucks and other means of transportation that can be called into use and the men who are willing to respond and serve from patriotic motives.

ANTI-STRIKE RESOLUTION REFERRED

The resolutions committee announced that there were a number of resolutions upon which, for a variety of reasons, the committee could not recommend declarations by the annual meeting. Sometimes the organizations from which resolutions have come have requested that they should be referred to the board of directors for further consideration before action is taken. In other cases declarations which are recommended to the annual meeting cover portions of resolutions, and the remaining parts are of such importance as to warrant further consideration. In several cases the board of directors has already arranged for early referenda upon committee reports involving similar propositions. With this explanation the committee recommends reference to the board of directors of the resolution on anti-strike legislation, originally submitted by the Philadelphia Bourse and reading as follows:

Whereas, it is most desirable that all strikes or lockouts in connection with railroads or other public service corporations should be prevented; and

Whereas, while we recognize the opposition of the leaders of organized labor to such legislation, we contend that the services to be rendered by these corporations through their officers and employees are of such vital necessity that they must be considered in a different light from those performed by agencies of other classes, where if necessary they can be dispensed with temporarily or be performed by other corporations or individuals to a greater or less extent, and that therefore these corporations, their owners, the stockholders, their officers and those who voluntarily become employees must be subject to different rules and regulations than would be considered desirable for other industries or employments which are not vitally necessary for the welfare of practically the entire nation; and

Whereas corporations engaged in the transportation of passengers, mail and freight, or in transmission of messages, as well as those supplying water, light, heat or other similar necessities of life, are regarded by custom or law as performing a public service, and as a rule, which is only just, their franchises being limited monopolies are granted upon the condition that service is continuously performed, and they are subject to control and regulation in the interest of the public service by the several states in which they operate and by the United States; and

Whereas these public service corporations can only render service to the public through the medium of numerous operating employees, who voluntarily enter the employ of such corporations and thereby assume duties and obligations to the public which become paramount to any personal claims; and

Whereas these employees by virtue of their positions are public servants and as such owe a duty to the public which cannot be lightly disregarded any more than the corporations may disregard theirs, nor should they, after voluntarily assuming the duties of their positions, be any more free as a body to refuse their services to the public than the corporation should be to arbitrarily discontinue operating its lines; and

Whereas it should not be possible for either the corporation or the employees to stop the operation of these public services, upon which commerce and industry and the welfare of the entire nation are dependent; now, therefore, be it

Resolved, That we urge the enactment of federal and state legislation which will declare operating employees of public service corporations to be public servants and as such not free to leave the service simultaneously or approximately so, or at any time except upon due and sufficient notice, and which will also forbid the corporations discontinuing operation by "lockouts" or similar methods; and be it further

Resolved, That such legislation should provide for the settlement of all questions concerning wages and working conditions by the representatives of the separate corporations and of the employees of the same, if possible, but provision should also be made for arbitration (where other methods have failed) before a board upon which the employee, the employer and the public shall be represented. The arbitration should be compulsory and final and provision made for the enforcement of the award or the punishment of either party refusing to accept it.

Association News

Meeting of Valuation Committee

THE American Association committee on valuation met in New York on Monday, April 26. The committee agreed that the present report on valuation should be reviewed and probably increased to take care of rate of return.

The committee expressed appreciation and suggested indicating formal recognition of the work of the Illinois State Electric Association, the Illinois Electric Railways Association and the Illinois Gas Association in their work along these lines and suggested co-operation with them in further consideration of the subject of valuation. There was discussion of requesting the National Electric Light Association and the American Gas Institute to get up reports on valuation and rate of return similar to the American Association report. It was thought there should be separate reports by the three associations rather than a joint report.

The principle of joint inventories and joint prices on inventories was approved. It was further suggested that one or two appraisal experts might be added to the commmittee personnel with advantage.

Heavy Traction Committee Active

AN ALL-DAY meeting of the Engineering Association committee on heavy traction was held at association headquarters on April 28. Those present were: Sidney Withington, New Haven Railroad, chairman; J. C. Davidson, Norfolk & Western Railway; G. M. Eaton, Westinghouse Electric & Manufacturing Company; C. H. Quereau, New York Central Railroad; L. S. Wells, Long Island Railroad. J. H. Davis, Baltimore & Ohio Railroad, was represented by Mr. Bellew. Members of the committee unable to attend were: A. F. Batchelder, General Electric Company; R. Beeuwkes, Chicago, Milwaukee & St. Paul Railway; J. V. D. Duer, Pennsylvania Railroad; R. C. Taylor, Michigan Railway. The list is given in full as it has not previously been published.

The meeting was taken up with the preparation of a questionnaire on electric switching locomotives; with the planning of an amplification of the data collected by the 1915-1916 committee, and by starting a scheme for co-operating with the corresponding committees of other national associations.

Committee on Schedules Meets

THE committee of the T. & T. Association on economics of schedules held its second meeting of the year at the offices of the United Railways & Electric Company of Baltimore on April 24. Those present were: Edward Dana, Boston, chairman; H. E. Hicks, Rochester, N. Y.; Alexander Jackson, Newark, N. J.; J. A. Stoll, Baltimore, and L. H. Palmer, Baltimore, sponsor.

The committee, after discussing the reports submitted by the members showing the relation of dead time to live time on their respective properties, prepared a detailed analysis of what constitutes car-hours. This analysis covers both revenue and non-revenue cars, and if followed will make schedule statistics of various roads comparable, whereas at the present time this is impossible due to the lack of standardization. Definitions with regard to speed were also prepared to show what items in the analysis were to be combined in order to obtain the proper information.

To round out its report, Mr. Jackson is to prepare a discussion on the effect of increasing schedule speeds on platform expense, on investment and on traffic, and Mr. Stoll a paper outlining the methods in use for making traffic checks for use as a basis for schedule making.

Express and Freight Traffic

THE committee on express and freight traffic facilities and costs held its organization meeting at association headquarters on April 26, 1920. There were present in addition to Chairman P. P. Crafts, Eastern Massachusetts Street Railway, T. H. Stoffel, Westinghouse Electric & Manufacturing Company; C. E. Thompson, Chicago, North Shore & Milwaukee Railroad, and G. T. Seely, Mahoning & Shenango Railway & Light Company, sponsor.

The committee is to confine its activities to the question of basing freight rates on actual costs and plans to formulate what might be termed later a standard method upon which local and interline rates can be figured. In order to substantiate its data the committee will send out a questionnaire to a few of the electric railways which conduct freight business.

The American Electric Railway Association is sending out a data sheet asking for information on motor bus companies, whether auxiliary to, the competitor of or providing service on routes independent of electric railways. The questions related to equipment of buses, operating expenses, municipal and state regulations, etc.

Burning Tie Rod Holes in Rails

A LARGE electric railway company in the Middle West has experienced a great many rail breakages in a stretch of track laid in concrete foundation and paving and in which the holes for the tie rods had been burned with an acetylene flame instead of drilled. This process is so much cheaper than drilling that it was considered worth experimenting with, despite the fact that it has been pretty well established that the burning process has a deteriorating effect upon the high-carbon steel in rails.

This company is inclined to believe, however, that the cause of many of the breakages may be attributable more to the execution of the work of burning the holes than to the method. In other words, it is inclined to believe that if the hole could be started at its center and enlarged into a perfectly smooth hole of proper diameter the weakening of the rail at this point would not be serious. However, the burning as done by the average track mechanic is likely to produce a hole with a jagged circumference, which then has a great tendency to tear or crack away from the hole and so weaken the rail as to result in a break. The experience has been such, however, on the trial made that the company will not make further use of this method until it has determined more exactly just what effect the burning of the hole has on the surrounding metal.

Recent Happenings in Great Britain

Labor Matters Are Reviewed—London County Council Boosts Fares —Many Other Important Developments

From Our Regular Correspondent

The most important matters in connection with British tramways during March were the prolonged negotiations and the final settlement of the demand of the employees for an increase of 10s. a week in wages. The Joint Industrial Council for the industry, brought into operation for the first time, proved a useful medium, but the agreement conceding 6s. a week increase could hardly have been reached without the Government promise of new legislation for increasing fares. The following brief narrative of events will be interesting to American electric railway authorities.

THE proceedings in the application, which was on behalf of all the tramway workers of Britain, struggled along during March. On the eleventh of the month the Joint Industrial Council discussed the report of a committee on the financial position of the undertakings, but no agreement was reached. The employers' representatives appeared to admit that a case had been made out for some advance, but they considered that the question of the amount should not be determined until the Prime Minister had promised that the Government would enable tramway undertakings to meet their obligations by an increase of fares. The case for both parties was subsequently laid before the Minister of Labor and the Minister of Transport. The latter informed the representatives, after he had studied the matter, that a government bill would shortly be introduced in the House of Commons to enable tramway undertakings to raise their fares above present maxima, as otherwise there would soon be no municipal tramways running.

Union Impatient

The Joint Industrial Council continued its meetings in the latter part of the month, but failed to come to an agreement. Despite the prospect of the Government bill, the union leaders, on March 27, sent out notices calling a strike of all tramway men in Britain on April 3.

Interesting events followed in rapid succession. On March 29 the Minister of Transport stated in the House of Commons that the Government had no authority to increase the charging power of tramway undertakings owned by local authorities. There was power, however, under the ministry of transport act to raise charges in the case of company-owned undertakings, but it could not be done if the municipal undertakings could not get the same advantage. Therefore a bill was necessary. The promised bill was introduced on March 30, and on the following day, in view of Government action, the Joint Industrial Council reached an agreement. An increase of 5s. a week in wages was granted as from March 29, with another 1s. a week as from June 1, making the total advance above prewar wages 40s. The strike notices were accordingly withdrawn.

New Bill Ready

The bill will probably pass into law within a very few weeks. It is called the tramways (temporary increase of charges) bill. It removes limitations under an existing act, and provides that orders may be made by the Minister of Transport authorizing in the case of municipal undertakings increases in fares necessary to enable the undertaking to be carried on without loss, and in the case of company undertakings increases sufficient to provide for interest on loan capital and for a reasonable return on share capital. The Minister is to act with the advice of an advisory committee. The powers are to remain in force till Feb. 15, 1923.

The proposals for substantial increases in fares on the London County Council Tramways led to a struggle at a meeting of the Council. The Labor party opposed the recommendations, and it was only after an all-night sitting that the majority carried the new scale on a vote. The new fares, which are almost the statutory maxima, are 1d. for 1.2 miles, 2d. for 2.4 miles, 3d. for 3.6 miles, and 4d. for any greater distance. Workmen's fares are also increased. The highways committee, however, agreed to withdraw the proposal (now rendered unnecessary) that application should be made to the Ministry of Transport for authority to raise the fares above the statutory maxima, and also consented to the appointment of a special committee of inquiry into the whole question of the finances of the tramways. The main argument put forward by the opposition was peculiar, namely, that no increase in fares would be necessary if the tramways were more efficiently managed. If that were true, then every tramway undertaking in the country must be badly managed.

Committee Suggests Changes

The special committee of inquiry above referred to reported to the County Council in the end of March. The only change which it proposed was a somewhat novel one, namely that during the slack hours of the day—from 10 a.m. to 4 p.m.—there should be a uniform fare of 2d. for any distance beyond the 1d. stage. The object is to encourage shopping and pleasure traffic. At present, although a reduced service is run in the middle of the day, the cars are only sparsely occupied, and the hope is that passengers may increase to such an extent that more instead of less revenue will be obtained. The committee also hopes that people who can do so will be induced by the low middle-day fare to avoid traveling during the rush hours. Another point is that if a more frequent service can be run during the day long spreadover duties for the employees would be minimized. The Council sanctioned the scheme as an experiment.

The bill promoted by the London underground electric railway companies to enable them to double their maximum fares and to abolish workmen's fares was read a second time by a large majority in the House of Commons on March 25. As a result, however, of an agreement between the London members of Parliament and the promoters a motion was adopted instructing the committee to which the bill was referred to amend the bill so as to provide that the maximum powers of charge shall not be more than are required to provide for working expenses, efficiently maintaining and renewing the undertakings, and a reasonable return on capital; and that workmen's return fares shall not exceed the single ordinary fares, with a maximum fare of 3d.

The Minister of Transport is to have power over all the work and proposals of authority. To carry out the suggested scheme legislation is necessary, but there is more hope now that it will be put through than in past times when various commissions and committees reported in vain in favor of the establishment of a London traffic board.

The Ministry of Transport announced on March 24 that the members had appointed the following committee to consider and report to the Minister on the question of the electrification of railways: Sir Alexander Kennedy (chairman), Sir John Aspinall, A. R. Cooper (representing the London Electric Railways), Philip Dawson, Sir Alexander Gibb, C. H. Merz, Sir Philip Nash, Sir John Snell, Sir Henry Thornton (representing the Railway Companies' Association), and Roger T. Smith. Secretary, Major Redman. Of these, Sir A. Kennedy, Mr. Dawson and Mr. Merz are consulting engineers; Sir J. Aspinall, formerly engineer and general manager of Lancashire & Yorkshire Railway, is consulting mechanical engineer to the Ministry of Transport; Sir A. Gibb is director-general of civil engineering to the Ministry; Sir P. Nash is director-general of traffic to the Ministry; Sir J. Snell is chief electricity commissioner under the electricity supply act passed last year; Sir H. Thornton is general manager of the Great Eastern Railway; R. T. Smith is electrical engineer of the Great Western Railway; and A. R. Cooper is civil engineer to the London underground railways. The terms of reference to the committee are to report:

> Whether any regulation should be made for the purpose of ensuring that the future electrification of railways in this country is carried out to the best advantage in regard to interchange of electric locomotives and rolling stock, uniformity of equipment and/or other matters. If any such regulations are desirable, what matters should be dealt with and what regulations should be made. How far it is desirable, if at all, that railways or sections of railways already electrified should be altered so that they may form parts of a unified system.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Bond Issue for Relief

Portland, Ore., to Ask Votes to Approve $5,500,000 of Securities to Help Railway

The special committee of the City Council of Portland, Ore., has decided to submit to the voters, at the general election, a bond issue of $5,525,000, the proceeds to be used to carry out the suggestions of the Public Service Commission, with the exception of the acquisition of trackage, which is considered impossible because of constitutional restrictions.

DETAILS OF BOND ISSUE

The bond issue that is proposed will take care of license and franchise taxes, removal of the major portion of the present bridge tolls, abandonment of free carriage of city employees and deferred paving reconstruction, which should have been handled in 1919. In addition the relief to the company planned in the bond issue would relieve it of a portion of the costs of new paving and of the costs of reconstructing old hard surface streets during the next thirteen years.

Authority will be sought to issue one-year bonds, to bear not to exceed 6 per cent interest, and to run for a period of thirteen years. It is planned to issue not to exceed $500,000 of bonds each year, and retire such bonds at the expiration of year from the date of issuance. Thirteen years is the term of life of the present franchise ordinance held by the Portland Railway, Light & Power Company. If the bond issue is approved, the Council will be able to extend the company relief to the amount of $392,000 yearly.

Under the plan, the abutting property owners on streets where carlines have been established will pay for the costs of pavement on the same basis as do property owners on streets where cars are not operated. Extra charges for pavement, resulting from necessity of laying reinforcements under rails, and all extra required by reason of the presence of tracks in the streets, will be assessed to the railway. The remaining charges removed from the company will be paid for from the proceeds of the bond issue, it was announced.

CITY ATTORNEYS PREPARING PAPERS

Deputy city attorneys have been instructed to prepare the necessary papers incident to the submission to the voters, and the committee will then submit the proposal to the entire Council. Members of the special committee express the belief that with the relief granted to the company, an increase of 1 cent over the present fare will cover the annual deficit which is now faced by the railway and on which is based its application for increased rates. This deficit has been placed by City Engineer Laurgaard at $1,220,000, and the relief measures included in the bond issue total almost $400,000 annually. However, it will devolve upon the Public Service Commission to reopen the fare case as soon as the decision of the voters on the bond issue is known.

COUNSEL HOLDS PLAN LEGAL

City Counsel La Roche had previously filed an opinion which stated that it would be legal for the voters of Portland to remove most of the so-called "burdens" of the company, through action recommended by members of the Public Service Commission, as a possible alternative to an 8-cent fare. The application of the company for an increase in fare was held in abeyance recently by the commission.

Fight for Labor Freedom in Buffalo

The International Railway, Buffalo, N. Y., will insist on an open shop in its new agreement with its employees. The closed shop has been in effect since the strike in Buffalo, Niagara Falls and Lockport seven years ago. Herbert G. Tulley, president of the International Railway, says the company will not continue to operate on the closed shop principle.

The attitude taken by the International Railway is indorsed by the Buffalo *Commercial*, one of the leading daily newspapers. That paper has attacked the other Buffalo newspapers for their failure to aid the company in its fight for the open shop. In commenting editorially upon the change in policy on the part of the railway officials, the *Commercial*, under the caption of "A Cowardly Press," says:

> Could anything better illustrate the cowardly servility of the other daily papers of Buffalo to the labor unions than their failure to come to the support of the officers of the International Railway in the latter's refusal to concede the principle of the closed shop to the organization of employees with which the officers have been negotiating for a new working contract?
>
> Here is the prospect of a struggle over a basic principle of our industrial life. Here is an issue that has not merely passed from the academic to the stage of reality, but to a stage that has become acute. Either the officers of the International Railway are right in their position and should be sustained by public sentiment, or they are wrong. If they are right a free press will sustain them. If they are wrong a free press will condemn them.
>
> The *Commercial* is proud to stand by the exhibition of true Americanism made this week by the officers of the railway. It takes them by the hand and offers its congratulations. And we know they are going to insist that their employees shall themselves elect whether to be union men or not, and that men who do not so elect shall not be refused employment and that those who withdrew from such organization shall not be discharged for doing so.

Springfield Making Progress

Campaign in Massachusetts City for a Fair Deal for the Trolley Well Under Way

Springfield, Mass., finding that its electric railways are near death from starvation returns, has adopted a policy like unto that pursued by cities in the eastern part of the State, but has gone those cities one better. Here are some big things that Springfield has decided to do:

> Provide a $300,000 bond issue to finance extensions of the Springfield Street Railway in the East Springfield and Van Horn district, through a bond issue to be subscribed by public spirited citizens.
>
> Practically give the railway a monopoly through the following restrictions on jitneys:
>
> Bond of $10,000 for each jitney.
>
> Jitneys to provide for not less than sixteen passengers each.
>
> License fee for each car of $100 a year.
>
> Fixed routes for each jitney, no deviation except by permission of police commission.
>
> Fare on each line to be not more than unit fare of railway (7 cents).
>
> Driver must not make change or collect fares while vehicle is in motion.

Of the $300,000 bond issue to be raised for the purpose of railway extension, $100,000 has already been subscribed. The proposed extensions are continuance of double tracking of the St. James Avenue line into East Springfield and extension of a new single-track line through Carew Street to the heart of East Springfield and over Page boulevard to connect with the Indian Orchard line in Berkshire Avenue.

PRESIDENT PROMISES QUICK ACTION

Clark V. Wood, president of the Springfield Street Railway, promised that as soon as the sales should reach a point where the success of the campaign was assured, petitions would be presented to the City Council to allow the proposed extensions. Already preliminary surveys have been made by the company. Mr. Wood asserted that the company would use some of the material it now has on hand to start construction of the extensions.

Peter Witt, the transportation expert, told a meeting of interested citizens that the plan for extensions was a perfectly sound one. He asserted that electric railway transportation, far from being moribund, was just coming into its own, and that ten years from now people would laugh over the attitude taken toward the various electric railways today. Electric railway transportation, Mr. Witt said, was naturally monopolistic, and the more fares collected by the street car the lower the rates of fare. Mr. Witt said:

> The time was never better to invest in real railroad securities than now. The day of large dividends has passed, but the water has been squeezed out of the stock and the investor can be reasonably sure of a fair return and a reasonably safe investment

Valuation the Final Issue

Both Sides at Toledo Agree That This Question Shall Be Left to the Last for Settlement

Considerable progress has been made at Toledo during the week in the meetings of the federal court commission drafting a cost-of-service ordinance and Henry L. Doherty, principal owner of the lines. The discussion has involved the provisions for financing, the control of interurbans, regulation of service by the Council, lease clauses, option clauses, condemnation provisions, and amortization plan. Very little agreement has been made on any of these subjects. Most of them have been passed for future consideration. Both sides have agreed to leave the question of valuation for the final tilt. Mr. Doherty has made it clear to the commissioners that many of the mooted questions will probably be aired in the federal court before any agreement is reached.

EARLIER in the week Mr. Doherty told the city representatives that the going street railway transportation system was worth more than $100,000,000 to the city and that it was entirely up to the city to keep what it has already allowed to be put into the development of the lines and properties. The declaration of the company representatives to take the matter into court was accompanied with such a show of confidence that all company contentions could be upheld in court that immediately the commissioners and city representatives became more conciliatory.

MR. DOHERTY WANTS HEARING

Although Judge Killits of the federal court set April 22 as the date for filing a petition for a hearing on the present fares and opened the way for either side of the controversy to present a case, Mr. Doherty declared he would ask for a hearing at this late date unless an agreeable draft could be obtained in a short time.

He has now decided to ask for a hearing as a "healthful" thing in clearing up many of the arguments over the whole question which have been dragging along for years. He said the city would be given thirty days' notice of such an action. The matter will hinge directly upon a further increase in fares. He pointed out as his intention in asking for a hearing to prove that the present fare of 7 and 2 cents is not compensatory. This will probably mean the final award of 10-cent fares, it is claimed by the company officials who have presented their figures to the city and whose records have been examined by city accountants and verified.

WILL CONTEST VALUATION

The hearing will also seek to show that the Goodwillie-Riggs valuation of $7,110,000 for the railway property is low and on a basis which has been shown in court to be untenable. Mr. Doherty has said that he believes he can prove in court that the property of the railway lines is of greater value than the price of $11,000,000 which he has made to the city. This he believes will hasten a settlement of the franchise question.

Another problem which will be cleared up is the one in which the power prices have been the contention. The city has claimed that the Acme Power Company, a subsidiary of the Toledo Railways, Light & Power Company, has been charging the railroad a high rate for power and the Doherty interests thus profit materially.

Mr. Doherty declared that the court investigation would be so planned as to determine the status of a public utility. He claims that the Acme Company is not a utility and that it was not built for that purpose. He said it was a part of a large scheme for a chemical plant to furnish a necessary supply of chemicals to this part of the State. He said the future of that project and of similar companies would depend largely on whether or not they would be immediately classed as public utilities and regulated as such. Mr. Doherty has told the commissioners he is confident he can show that the present rates charged for power are fair.

The city will ask Council for an appropriation of $20,000 to furnish the necessary legal talent for a hearing in federal court as soon as Doherty gives notice that the action will be asked.

In the discussions of the ordinance several Toledo attorneys and financiers have been called into the meetings. Attorneys for the interurbans drew that part of the ordinance which applied to the outside companies and defended it when provisions were called in question by Mr. Doherty. He asked that the company be allowed to deal with the interurbans as in the past, without compelling them to adhere to provisions of the ordinance when they were not parties to the contract. No decision was reached. The commissioners were desirous of letting the city and outside lines come to their own agreement.

The financing provisions of the Milner commission were approved by Toledo financial men and bond dealers, whom Doherty characterized as "nice men but not necessarily experts in large public utility issues."

Mr. Doherty told the city representatives that he had evidence prepared for filing a suit to test the many questions involved in the controversy over a permanent settlement. He said:

> But we do not want to take snap judgment on the city, nor throw any dust. And we will agree to give notice if the city cares to take more time. We want the city to make the contest as aggressive as possible, as that will enable us to present our own case that much more vigorously.

The commission which is drafting a municipal ownership ordinance has its measure ready to present to Judge Killits with the exception of some minor details in connection with approval by the full board.

May 1 is the date on which the extension to the application of the ouster ordinance expires. The federal court, by order of which the cars are now operating, has pointed out that the Milner public utility abandonment law is applicable to the Toledo case. It is quite probable that service will not be interfered with even though the ouster ordinance does become effective so far as the City Council is concerned.

Municipal Ownership Again Urged for Washington

A resolution has been introduced by Senator Jones, Republican, Washington, D. C., calling for an expression by the Senate on the question of the federal government or the government of the District of Columbia taking over the electric railways in the district. The resolution expresses it as the sense of the Senate that Congress act to that end and directs the committee on the District of Columbia to formulate the necessary legislation.

The matter came up for a discussion on April 16. Mr. Thomas said that to his mind the resolution brought to the attention of Congress a subject of prime importance and one upon which summary action should be taken if possible. He said that to have the Public Utilities Commission of the District deliberately place an increased toll upon the earnings of the people of the District by raising fares "for the purpose of saving a corporation from bankruptcy, whose embarrassment is a direct consequence of its own conduct, cannot be justified upon any system of reasoning or logic which I am capable of comprehending."

Mr. Jones explained that the resolution did not pretend to pass upon the merits or demerits of the demands of labor for an increase of wages. He had not inquired into this question, but was prompted to submit the resolution in order to call attention to the situation. He was not generally in favor of government ownership of enterprise, but he had come to the conclusion that about the best thing for the district and the best way to furnish proper and adequate service was for the government to take over the local lines and operate them as one system.

Mr. Nugent fully agreed with this proposal of Mr. Jones, but considered that the action of the Public Utilities Commission in ordering further increase in fares was an outrage. Mr. Dial agreed with Mr. Nugent that if an enterprise could not be run by charging a reasonable compensation for its service, it should be sold out. Mr. Jones explained that he expected to call the resolution up at the very first opportunity. He had no doubt that every Senator's mind was practically made up as to what would be the wise thing to do, and if it should be the sense of the Senate as declared in the resolution, then it will be a direction to the committee to formulate the legislation.

Electric Railways Profited by Switchmen's Strike

Paralysis of Steam Road Freight Service Has Given Electric Lines an Opportunity to Demonstrate Their Service to Many New Customers

The electric railways of the country equipped to handle freight performed a very valuable service during the outlaw strike of the switchmen. This was particularly true of the roads in the Central West, especially those operating out of Chicago. There were some similar isolated instances of the performance of such roads in the East, but as most of the lines there do not, even in ordinary times, go in for this class of business, the aid they were able to lend in the emergency was rather circumscribed. Not only did the roads in the West profit individually, but some of them appear to have profited beyond the immediate moment by winning customers who seem likely to remain with them permanently, and thus become a valuable asset. From the seeker of business on their own account, the electric railways were changed over night to the sought for. The unusual difficulties of travel that prevailed made an intimate canvass of the roads in the Central West impossible, but facts gathered at Chicago about the roads near that city serve to illustrate how the emergency was met there. The press dispatches indicate that elsewhere than at Chicago the conditions differed only in degree and not in kind from those that prevailed near the lake city. The cases are reviewed of a number of the companies.

THE Chicago, North Shore & Milwaukee Railroad has been hauling about forty cars of l.c.l. and carload shipments a day as compared to twenty-five carloads normally. About as much business was offered as the company could handle expeditiously. A point was made of maintaining the usual rapid service, whereby practically all shipments were cleaned up every day. In this connection it is interesting to note that the trucking companies which have been delivering freight to the Wilson Avenue terminal of the North Shore line fell down badly under the greatly increased business offered. This led to a decision by Britton I. Budd, president, to buy three 15-ton tractors and fifteen trailers for use in a pick-up and delivery service in Chicago. The plan will be to drop off empty trailers at a loading point and later pick them up with the tractors when loaded, thus avoiding idle standing time for the motor trucks.

A., E. & C. WORKING TO CAPACITY

The Aurora, Elgin & Chicago Railroad reports that the express strike in March resulted in an approximate doubling of the l.c.l. freight business handled by that company and that this has again been nearly tripled as a result of the freight strike. The Burlington Railroad, which serves much the same territory as the A., E. & C., has been accepting some freight throughout the strike. Nevertheless the great bulk of the perishable shipments has been handled by the electric lines and there has also been a lot of shipments made over this route for reshipment at Aurora over the Burlington line from there on. The company has been working practically to capacity, but has accepted all shipments offered and delivered them with the usual promptness by using clerks and all other available help in the terminals.

The Chicago & Joliet Electric Railway reports an increase in l.c.l. freight between 200 and 300 per cent of normal. All shipments offered were accepted and delivered promptly through the use of open and gondola cars in addition to the regular express cars. The limiting feature in this connection has been not the capacity of the railway but the difficulty of trucking companies in an outlying section of Chicago.

The Chicago, Lake Shore & South Bend Railway formed about the only outlet for Chicago shipments to the East and South. As a result this company accepted shipments for points as far East as Cleveland and as far South as Louisville, requiring interchange over a number of electric lines. More than 1,500 applications for shipments to these distant points and numerous intervening points beyond the South Shore line's own terminals were accepted. An unfortunate limitation on the amount of such business that could be handled was brought on by a strike of chauffeurs at South Bend, where interchange to the Chicago, South Bend & Northern Indiana Railway requiring trucking had to be made. The local shipments handled by the South Shore line both l.c.l and carload increased materially, however, and were taken without limitation.

The Michigan Railway handled about 50 per cent more freight than ever before in its history, including many shipments for Ohio and Indiana points. The capacity of these cars was increased through the co-operation of the shippers in quickly removing freight and in having the cars loaded and unloaded. Every employee of the road worked to keep the freight moving and every available piece of rolling stock was pressed into service.

Some of the automobile industries in Michigan were able to continue operation only through the service provided by the electric lines. The Reo auto plant in Lansing received bodies from Detroit and the Scripps-Booth Company in Detroit received material from Lansing, the same electric cars being used for the shipments both ways. Any number of Detroit, Jackson, Grand Rapids and other Michigan city industries used this service for shipments to Chicago and to points South and East reached by electric lines. The Michigan situation was further relieved beginning on April 20 with the opening of boat service on Lake Michigan through shipments over the electric lines to the various lake ports.

Detroit Program to Proceed

The Detroit (Mich.) United Railway still has faith in the integrity of the public of the city of Detroit. This is evidenced by the reply of Frank W. Brooks, the company's president, to a recent communication from the Board of Street Railway Commissioners inquiring about construction of the so-called St. Jean Avenue line.

In his letter President Brooks outlines the construction plans of the company for the present year, and states that the program for additional equipment provides for the expenditure of $2,500,000 for double-truck cars of the general type recently put in service in Detroit. Included in the construction program are the following lines:

Completion of the Twelfth Street line to Elmhurst Street.

Completion of the so-called St. Jean line from Gratiot Avenue via Harper, Montclair, Shoemaker and St. Jean Avenues to Jefferson Avenue.

Harper Avenue, double-track from Van Dyke Avenue to Gratiot Avenue.

West Warren from Walton "Y" westerly to the east town line of Springwells.

East Warren Avenue to point near Easterly limits of city.

It is expected to have the Twelfth Street line in operation about July 1, and to complete the other roads as speedily as possible.

The company officials warn that the same elements which have, heretofore, been able to block railway progress may succeed in interfering and preventing the company from carrying out the extension program as announced.

Planning for New Texas Interurban

Details of plans for financing the Dallas-Wichita Falls interurban line will be worked out at a meeting in Dallas, Tex., during the first week in May, of a party of Eastern capitalists, officials of the Dallas Railway and Dallas and Wichita Falls citizens interested in the construction of this line. Engineers have estimated that the line can be built at a cost of $7,500,000, with about $2,000,000 additional for power stations and transmission lines. Citizens of Dallas, Wichita Falls and other towns on the line will be asked to put up in cash in advance an equity of 20 per cent of this amount, which sum is to be duplicated by the Strickland-Hobson interests in lieu of the commitments made in 1917. The Eastern capitalists then will complete the financing of the project. Owen Young, New York, vice-president of the General Electric Company, will be a member of the party of New York capitalists that will meet in Dallas.

The proposed interurban is to be constructed by the Dallas (Tex.) Railway in lieu of two interurban lines each at least 30 miles in length as provided in the service-at-cost franchise granted to the Dallas Railway by the city of Dallas in 1917.

10 Per Cent Advance in Jersey

A voluntary increase in wages for employees of the Public Service Railway, Newark, N. J., effective on May 1, was announced by President Thomas N. McCarter of the company on April 27. The raise will apply to motormen and conductors and to shopmen, linemen and trackmen. It approximates 10 per cent of the present wages and will mean an additional outlay for payrolls of practically $100,000 a month. Between 6,000 and 6,500 men will be benefited.

The company's action was decided upon notwithstanding a contract covering rates of pay which was entered into with the men last August to cover a period of two years. This contract does not expire until August, 1921. Mr. McCarter said:

> Changed conditions which could not have been foreseen last August prompted the company to increase the wages of its employees. When the present scale was fixed upon it was thought that the peak of high prices had been reached and the cost of living would gradually recede. This has not proved to be true, however, especially in the case of rents and some lines of foodstuffs, and the directors of the company authorized me to make the advance in pay at this time to meet the higher costs and the pretty general increases in rents which become effective with the first of May.
>
> It is a tremendous additional burden which the company is assuming. To add $1,200,000 a year to the operating expenses means that the volume of business will have to be greatly augmented to meet it and I hope that the public will, to the extent of giving added patronage, join the company in showing appreciation of the good work done by the men in maintaining service during the heavy storms of last winter and during the more recent emergency arising out of the railroad strike.

Short Strike in Scranton

The trainmen of the Scranton (Pa.) Railway struck on April 21. They were out just ten hours. The strike appears to have been precipitated by the inability of the representatives of the company and the men to agree upon the personnel of an arbitration board. Finally, one of the local newspapers made a suggestion which was acceptable to both sides. The strike order, however, had been given previously, and the men went out. They returned to work at noon on April 21 and will continue running cars until their demands are disposed of by the newly appointed board.

Subway Proposal Defeated

The proposal to issue $15,000,000 of bonds for the construction of a subway in Cleveland, Ohio, was defeated in a referendum at Cleveland on April 27 by a vote of 13,099 for and 30,107 against it.

Mayor Harry L. Davis, who originated the idea, expressed disappointment at the result, but said that the plan is not killed but only delayed until people feel that conditions are favorable to the expenditure of money for this big improvement.

The proposition was approved by the board of directors of the Cleveland Chamber of Commerce, notwithstanding an adverse report by the special committee to which it had been referred. The Automobile Club and a number of organizations had also approved the plan. The subway was, however, opposed by the Cleveland Engineering Society, Civic League, Cleveland Real Estate Board, the Cleveland Association of Building Owners and Managers and several other similar but smaller organizations.

Dispute Over Admissibility of Evidence

In a letter to the Cleveland (Ohio) Railway, officials of the local branch of the Amalgamated Association declare they will not discuss any form of open shop or the employment of women on the cars before a board of arbitrators. These questions, they contend, have been decided for all time.

J. J. Stanley, president of the company, says the next step is arbitration. If, after meeting in an endeavor to select a third man, the two arbitrators fail to agree, then the appointment will be made by Judge D. C. Westenhaver of the Federal District Court. Mr. Stanley contends the company has as much right as the carmen to make proposals for arbitration. He regards the board of arbitration as a court with power to decide what is relevant in the controversy.

The men have named Judge Virgil J. Terrell of the Municipal Court to represent them on the board. Harry J. Crawford will act as counsel for C. Loomis Allen, the company's member of the board.

Mr. Crawford and Judge Terrell conferred on April 23, but without result, because the men would not agree to the selection of a third man until Mr. Stanley had consented to an agreement on the points before they are given to the board of arbitration.

Dubuque Tie-Up Continues

The strike of trainmen of the Dubuque (Ia.) Electric Company continues. It has completely tied up the system there since March 1. The details of this situation were quite fully presented in the ELECTRIC RAILWAY JOURNAL for April 17, page 824. In that story reference was made to certain expected developments from an election which was held April 5. It is now reported that in this election the socialist-labor people put three of the five Aldermen in office. The other two men ran on a non-partisan ticket.

Different citizens' committees have sought to present solutions for the existing tie-up, but as these propositions contained no consideration for the needs of the company and looked only to the advantage of the merchants and traveling public, none of them has been acceptable.

The suit in the United States Court for a mandatory order compelling the company to operate was set for hearing on April 27.

London Men Threaten to Strike

A strike of the employees of the London (Ont.) Street Railway is set for May 1 unless the demand of the men for higher wages is met by that date. The employes ask 60 and 65 cents, against 39 and 44 cents an hour, the present scale. The company is operating under a franchise secured twenty-five years ago, giving nine limited and seven unlimited rides for a quarter.

The men struck for more money last July. To settle the trouble, the City Council by by-law allowed the company to sell six and eight tickets for a quarter instead of seven and nine. The company gave the men the increase asked, and they went back to work. Then a citizen got a judgment in the courts declaring the by-law illegal, unless it had the sanction of the people. In January the voters defeated the by-law, but the men continued to draw the increased wages though the company went back to the old scale of fares.

The company declares it cannot meet the new wage demand. A way out of the difficulty may be found in the fact that the Supreme Court at Toronto has upset the finding of the high court judge and has declared that the City Council has the power to permit an increase in fares without the sanction of the voters.

Trenton Suburban Men Strike

The strike of the employees of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., declared on March 24, has been marked with violence, and members of the Pennsylvania State Constabulary, together with Sheriff Hunsberger of Bucks County, had to be called to prevent bloodshed. Traffic on the entire system is tied up. The first two days of the strike two cars were run on the Bristol-Doylestown division, but the operators were stoned and service had to be abandoned. The only cars running out of Trenton are those carrying milk and United States mails. These are not molested.

General Manager Thompson said that the strike was not a question for arbitration. He said:

> What we need is more money and it is not possible that the arbiters would grant more revenue. Our expenses are greater than the receipts and it is impossible to grant any further increases to the employees. We are paying good wages; in fact, higher wages than the Public Service Railway. The wage scale is the same as that of the Trenton line, whose agreement runs for another year. The strike is a great loss to the company, to the employees and to the community at large. We carry between 3,000 and 4,000 passengers daily and the strike means a loss of about $500 daily to the company and employees.

More than 100 men are involved in the strike, including motormen, conductors, powerhouse men, trackmen, etc. The new demands call for 62 cents an hour for motormen and conductors of two-man cars and $1 an hour for operators of the one-man cars, with double time for Sunday and holidays. The men are now being paid 50 and 55 cents an hour.

Service-at-Cost Decision Soon

City and Company Before Indiana Commission in Effort to Afford Local Indianapolis Company Relief

As a result of the conference between the members of the Public Service Commission of Indiana and officials of the city of Indianapolis, which was reported in the ELECTRIC RAILWAY JOURNAL for April 10, page 770, the city of Indianapolis filed a petition with the Public Service Commission proposing that the company abandon its franchise temporarily during the present emergency of high prices and suggesting a service-at-cost plan of operation. The city requests that the present fare of 5 cents with free transfers be continued until hearings have been held by the commission and an equitable plan adopted for providing service at cost.

SOME of the principal features in the plan proposed by the city are as follows:

The appointment of a street railway commissioner by the Mayor, at a salary of $6000 a year to be paid by the railway together with office expenses of approximately the same amount.

The valuation of the property of the railway for rate-making purposes to be fixed at $15,000,000.

The maintenance of a surplus fund of $150,000 and setting aside of 20 per cent of gross receipts for maintenance, repairs and renewals.

The railway to be allowed to earn between 5 and 7 per cent on its investment.

The interurban companies entering Indianapolis, it was suggested, should pay the city company a higher rate for the use of tracks and terminals in Indianapolis.

The service-at-cost plan to terminate when the company is able to maintain a surplus fund of $150,000 for three successive months on a 5-cent fare.

The rates of fare proposed by the city vary from a maximum of a 6-cent cash fare with a 1-cent charge for transfer down to a minimum of the original fares provided in the franchise, viz., six tickets for 25 cents and twenty-five tickets for $1 with free transfers.

COMPANY SUGGESTS MODIFICATIONS

A formal hearing was held at 9:30 a.m. on April 9, at which attorneys for the Indianapolis Street Railway contended that the law establishing the Public Service Commission gave that commission full jurisdiction over all utilities in the State and nullified franchises such as that between the Indianapolis Street Railway and the city of Indianapolis. It was held that the public utility commission act is in itself a basic service-at-cost order, and it is the duty of a commission in all cases to see that service is furnished to the public at the lowest rate possible, at the same time preserving the financial integrity of the various utilities.

Representatives of the company have suggested several modifications to the plan proposed by the city, the salient features being as follows:

That automatic regulation of fares should be provided in accordance with the operations of the fare index fund in a similar manner as provided in the city of Memphis, so that the list of rates of fare would at all times contain at least two rates of fare above and two rates of fare below the rate in effect at any time; the commission to extend this list either upward or downward as might be necessary from time to time.

That instead of the plan being for temporary or emergency relief, it be given the element of permanency, subject only to the general authority of the Public Service Commission to fix rates. It must, therefore, entirely supersede the existing franchise rights and obligations as to fares.

That the physical valuation of the property should be approximately $18,933,101, this being the valuation fixed by the state tax board and being a valuation at which a 7 per cent return will meet all the obligations of the company.

That the maintenance fund of 20 per cent of gross receipts should be subject to increase or decrease on order of the Public Service Commission to meet the carrying cost of maintenance. The net income should be enlarged so as to provide for all items which the company must pay to properly maintain its credit and keep alive. If there should be a surplus arising from the agreed rate of return, it should belong to the company for proper corporate purposes and should be put into improvements, thus building up the value of the property behind the company and securities.

That the board of public works of the city of Indianapolis should continue to have authority over the operation of the company, including schedules, types of cars and equipment used, extensions to be made, etc. etc. If the board wishes to appoint an expert to give all of his time to the study of railway operation, such commissioner should be appointed and paid by the city. The accountants of the Public Service Commission could audit the accounts of the company as often as might be desired by the city, and submit such audits to both the city authorities and the Public Service Commission. The company pointed out that this plan would eliminate the possible evils of building a political machine out of street railway commissioners.

Several suggestions were also made in regard to the surplus or fare index fund with modifications of the percentage of surplus revenue paid into the fare index fund when the rate of fare reaches certain points. It was suggested that as a reward for and an inducement to efficiency and economy in operation there should be a provision that a varying portion of any excess earnings applicable to the index fund above the cost of service as established, depending upon the rate of fare prevailing when the excess was earned, should go to the company, and only the balance to the surplus or fare index fund.

The suggestion of the company is, briefly, that between operation under the maximum rate of fare and the minimum rate of fare there would be certain stages at which a varying proportion of excess profits would be diverted to the city or to the company. That is, varying from a central point in the fare list, as the rate of fare might be gradually reduced, the company as an inducement to and reward for efficient operation would receive an increased proportion of excess profits above the amount paid into the fare index fund, until when the absolute minimum fare was reached all of this excess would go to the company. The reverse would operate in case the fares were advanced, the city receiving a gradual increase in its proportion of the surplus revenue until the maximum rate of fare was reached, when it would receive all such surplus above the amounts paid into the fare index fund.

A further hearing was held before the Public Service Commission on April 24, when a full discussion was had, principally regarding the city's contention that the company should revert to operation under the present franchise as soon as the emergency period is over.

The commission announced that a decision would hardly be reached for two or three weeks.

Strike on Staten Island

Electric railway service on Staten Island, New York City, has been stopped entirely. The Midland Railway there ceased to run cars last January after a dispute with the city over fares. On April 27 the trainmen of the Richmond Light & Railroad Company went out on strike. They have been getting 45 cents an hour. They want 75 cents, an eight-hour day and time and one-half for overtime. There is steam service on the island, but this is only just recovering from the effects of the outlaw railroad strike.

The representatives of the union place the blame for the suspension of service on the company. They say that at the request of the officers of the company the strike was put off until the men learned the fate of the Jenks service-at-cost bill, defeated by the Legislature in its closing hours. The spokesman for the union says that, had the bill been passed, it would have meant an increase in wages for the men. The company took the position that wage increases were impossible without higher fares. Mayor Hylan, through Commissioner of Plants and Structures Whalen, made a fruitless attempt to settle the difference between the company and its men.

Municipal buses in use in Manhattan and Brooklyn were rushed to Staten Island by the city in order to afford the residents there some measure of relief. There are 125,000 people on Staten Island. The buses, of course, are by no means a substitute for the electric railway service, but they have saved the residents from being practically marooned.

On April 28 the company was thrown into receivership, as noted elsewhere in this issue.

Mr. Whalen is calling for permanent municipal operation of both the electric railway and the electric lighting service on the island. He bases the city's right peremptorily to seize the property on the ground that the company by its failure to provide service has laid itself liable to such seizure.

Wages Increased in Colorado Springs

The Colorado Springs & Interurban Railway, Colorado Springs, Col., has agreed to advance the wages of its trainmen 5 cents an hour. The request of the men was for an advance of 12 cents an hour. There is no intention at present to advance fares. The company has, however, addressed the City Council on the matter, stating plainly the adverse conditions under which it is operating. The letter was filed with the Council because that body has jurisdiction over the public utilities operating in the city.

News Notes

Another Park Abandoned.—An order has been made by the Public Utility Commission to the Bridgeton & Millville Traction Company, Bridgeton, N. J., to sell Tumbling Dam Park in Deerfield township, Cumberland County. The park was operated by the company for many years as an amusement resort. It contains thirteen acres.

Atlantic City Men Want More.—The employees of the Atlantic & Suburban Railroad, Atlantic City, N. J., have presented demands to the company for an increase in wages of from 50 to 75 cents an hour, or from $4 to $6 a day. For a ten-hour day the men would receive $7.40. An increase in pay was granted the men last fall. A. J. Purinton, receiver of the company, told the employees that the court, to which he is responsible, would probably have to settle the matter.

Wage Increase in Manchester.—Announcement was made on April 16 that a 5 per cent increase in wages had been granted the employees of the Manchester (N. H.) Street Railway after the final conference between the management and the men. The uniform men will now have wages of from 50 to 60 cents an hour with time and a half for overtime; carhouse men 50 to 58 cents an hour and an eight-hour day; and the track men 55 cents an hour. Some 200 men are affected.

Hospital Service for Employees.—Arrangements have been made by the Northern Ohio Traction & Light Company, Akron, Ohio, to establish a hospital room at Silver Lake Junction, in charge of a graduate nurse. It will be in operation about June 1. This is the first step toward taking care of employees all along the line. If it proves beneficial and effective, hospital rooms will be established at each division point. There are 469 employees on the northern division.

Wage Conference at Springfield.—Representatives of the roads controlled by the New England Investment & Security Company met on April 14, with C. V. Wood, president of the company, and presented for consideration a schedule of wages calling for a maximum of $6.40 a day as compared with $5.13 a day now received. An eight-hour day is asked. The lines involved are the Springfield, Worcester Consolidated, Milford, Attleboro & Woonsocket and Interstate Consolidated.

Public Service Bills Fail.—All of the measures regulating electric railways, telephone and telegraph companies, the rate fixing power of public service commissions, telephone rates and the measures calculated to represent the wishes of the water power interests, as well as the measures relating to hydro-electric development, failed of passage in the New York Legislature just adjourned. Not even local bills permitting certain municipalities to acquire their own electric light plant were passed.

Transportation Committee for Chicago Engineers.—The Western Society of Engineers has appointed the following men as the members of the urban transportation subcommittee of the public affairs committee: H. H. Easterly, A. L. Drum & Company; E. J. Blair, organization engineer, Chicago Elevated Railways; R. F. Kelker, Jr., transportation supervisor, City of Chicago; D. J. Brumly, terminal engineer, Illinois Central Railroad; and J. V. Sullivan, assistant to the president, Chicago Surface Lines.

Commission Bill Proposed for Texas.—At the direction of Mayor Frank P. Wozencraft of Dallas, Tex., the legal department of the city of Dallas has drafted a public utilities commission bill, creating such commission and placing all public utilities in Texas, including electric railway systems, under its direction. This bill will be presented at the meeting of the Texas League of Municipalities to be held in Dallas, May 14-16. It is hoped to secure the indorsement of the measure by the league. Steps will then be taken to have the measure introduced in the Legislature.

Sentiment Against Odd Coins.—According to a newspaper dispatch from Washington no enthusiasm is being shown on Capitol Hill in connection with the proposal that 7 and 8-cent pieces be coined to meet the demand for their use in the payment of electric railway fare. Members of the committees concerned seem to be of the opinion that this would tend to sanction the permanent retention of fares at that level. In addition it is feared that the existence of coins of those denominations would be an inducement for the immediate advance of telephone rates at coin phones as well as the advance of many articles which are sold for 5 cents.

Wage Discussion Renewed.—On April 22 officials of the Northern Ohio Traction & Light Company and representatives of the branches of the Amalgamated Association at Akron, Canton, Massillon and Cuyahoga Falls resumed consideration of the wage question at Canton. It is rumored that the men will drop other demands if they are granted a wage of 80 cents an hour straight time. Company officials stated that every cent added to the trainmen's wages would mean an increase of $15,000 in the annual expenditures. A. C. Blinn, general manager, is quoted as saying the men probably need and should have an increase in wages, but that the company's expenditures must be kept within its income.

Proposed Railway Elects Officers.—The Peoria & Chillicothe Electric Railway held its annual meeting at Chillicothe, Ill., recently for the purpose of electing officers. This company proposes to build an interurban line between the two towns in its name, but it was stated that there is no intention of undertaking the construction work until prices of material and labor are more reasonable. The officers elected were: President, O. A. Brock, Peoria; vice-president, E. V. Mattice, Chillicothe; treasurer, E. A. Mitchell, Chillicothe; secretary, Walter E. Emery, Peoria. The former president, John F. Lynch, resigned on account of moving to Oklahoma, and Frank N. Coon, Chillicothe, was elected to fill his place as a director.

At Work on Enabling Legislation.—The private bills committee of the Legislature of Ontario on April 15 spent the majority of the morning on a bill authorizing the city of Ottawa to acquire its street railway. Alderman Pinard insisted that a money by-law be first ratified by the ratepayers. A referendum had already been carried, but in the opinion of Mr. Pinard many who had voted on this were not property owners. Mayor Fisher of Ottawa took issue with Mr. Pinard on the question. Mr. MacBride urged that arbitration proceedings should be first carried on. To this Mayor Fisher objected on the ground that the railway is not to be taken over until 1923. A salaried commission of three is to be appointed to operate the railway. Members of the City Council are ineligible. Consideration of the bill will be continued at the next meeting of the committee.

Court Against Deferred Pavement Payment. — Judges Hamilton and Shohl of the Court of Appeals, in a joint opinion rendered on April 12, held that the city of Cincinnati could not issue bonds amounting to $60,800 to be paid back with interest by the Cincinnati Traction Company in ten annual installments for the purpose of improving car tracks on Freeman Avenue on the ground that a municipality cannot lend its credit to a private enterprise. Judge Cushing, in a dissenting opinion, maintained that the procedure was not a lending of credit but a species of assessment. The decision reverses the opinion of Judge Frank R. Gusweiler of the Superior Court that the city could replace worn-out car rails at the time it improved the street because this act came within the police power of the city. Saul Zielonka, City Solicitor, said the matter would immediately be taken up to the Ohio Supreme Court.

Programs of Meetings

Missouri Association of Public Utilities

The Missouri Association of Public Utilities will hold its next convention June 3, 4 and 5 at Jefferson City, Mo.

Iowa Electric Railway Association

The Iowa Electric Railway Association will hold its annual convention at the Fontanelle Hotel, Omaha, Neb., on May 20 and 21.

Financial and Corporate

Will Offer Bonds Locally

Company at Houston Proposes to Ask Subscriptions at Home — Mr. Bradley Explains

Luke C. Bradley, district manager for Stone & Webster in Texas, has announced that the Houston Electric Company proposes to offer a security of the company to the public of Houston which will yield the rate of return fixed by the court, 8 per cent, less the actual cost of sale.

SMALL DENOMINATION BONDS

By this arrangement it is hoped to establish a partnership between the riders and the company. The obligations will be sold in small denominations. The money so obtained will be used to purchase cars, provide additional trackage facilities and make other improvements. Mr. Bradley said:

> There is no room for prejudice in the discussion of the problem of the street car transportation. The matters under discussion are governed by serious business facts. No city can expand or develop without a fully maintained and efficiently operated railway system. Stagnation of growth is bound to result if the electric railway does not keep pace with the city's growth.
>
> The new order of things is co-operation. In discussing this phase of the situation I want you to consider the matter from the standpoint of transportation purely; transportation for yourself and for the people of Houston—not only the Houston of today but the Houston of tomorrow.
>
> Think of it as a means of transportation, more than 45,000,000 passengers per year. When you consider the providing of means for transporting this enormous number of people in twelve months it must appeal to you at once as a great big business proposition. It is one which prejudices cannot solve. It is in the interest of those 45,000,000 people that I want to call your attention to some of the things which can be effected through the co-operation of that triangle—the public, the city and the street railway company.
>
> I should like to ask you if you regard Houston as a finished city? I should like to ask you to measure your hopes, your aspirations for Houston; to compute the possibilities of the future as you can see it, and then tell me if you think it possible for Houston to gain that position unless it is helped and fostered by a street railway system that meets every demand which its people may properly make upon it.
>
> The extent to which co-operation obtains will determine absolutely the rate of fare per passenger which must be charged in order to provide a transportation system which will adequately meet the needs of the Houston of today and the Houston of tomorrow.

MR. BRADLEY SUGGESTS ECONOMIES

Then Mr. Bradley took up a long list of subjects bearing on the railway situation. He declared that the heating of cars is impracticable on account of the great investment in equipment that would lie idle ten months out of the year. He advocated fewer safety stops, a distribution of peak loads by means of the industrial plants turning out their employees at different hours each day and more skip stops. He said the company should be relieved of the necessity of paving between the tracks in residential districts. He also said the use of more "safety cars" would bring better service.

When it came to jitneys, Mr. Bradley said:

> I am not going to say very much about this, the greatest of all parasites, which for over five years has sucked the very blood out of your transportation system.

He said the matter was one for the public to decide and that the decision would have a great deal to do with the fares to be charged on street cars.

Mr. Bradley scored the railroads for frequent blocking of railway crossings. Other subjects he took up had to do with automobile traffic regulation, accidents, transfer privileges, taxation, rerouting of cars, etc. He touched only briefly on the question of a new franchise.

The fixing of a value for the property was reviewed in the issue for March 20, page 622.

P. R. T. Earnings Increasing

The income account of the Philadelphia (Pa.) Rapid Transit Company for March and for the three months ended March 31 follows:

March	1920	1919
Operating revenue..	$3,179,961	$2,883,594
Operation and taxes	2,234,354	2,021,329
Operating income.	945,607	862,264
Non-operat'g income	45,109	46,533
Gross income	990,716	908,798
Fixed charges......	816,476	806,060
Net income......	$ 174,240	$ 102,737

Three Months Ended March 31—

	1920	1919
Operating revenue..	$8,921,677	$8,217,117
Operation and taxes	6,499,627	5,882,412
Operating income.	2,422,050	2,334,704
Non-operat'g income	123,997	142,123
Gross income	2,546,047	2,476,828
Fixed charges......	2,446,666	2,418,064
Net income......	$ 99,380	$ 58,763

Another Receiver on Staten Island

On April 28 Capt. John J. Kuhn was appointed receiver for the Richmond Light & Railroad Company, Staten Island, New York City. The receiver was appointed by Judge E. L. Garvin in the federal court, Brooklyn, to serve until June 30, 1920, on application of the Westinghouse Electric & Manufacturing Company. The receiver's bond was fixed at $25,000. The receivership is due to a strike of trainmen upon refusal of the company to grant their demands for wages aggregating 75 cents an hour, an eight-hour day and time and a half for overtime.

An investment of $5,111,657 is involved, represented by $2,871,750 of stock and $2,200,000 in bonds. The railway proportion is estimated at 67.4 per cent of the total and covers 32 miles of track, 123 motor passenger cars and the necessary storage yards and shops.

July Maturity Discussed

Present Problem for Interurban Railway $800,000 Which Must Be Paid on July 1

Bondholders of the Lockport & Olcott Railway Company, operated as a part of the International Railway, Buffalo, N. Y., held a meeting on April 15 to determine what can be done relative to $800,000 of bonds payable in July. Elliott G. McDougal, president of the Bank of Buffalo and chairman of the bondholders' protective committee of the International Railway, said the International Railway cannot handle the securities and that unless some way is found to tide over the demand another receivership will ensue.

$420,000 IN INTEREST DUE

There is $420,000 in interest due on the outstanding issue of $17,200,000 of International Railway improvement and refunding bonds. The International Railway must also pay $475,000 in July for city and state taxes. With the men demanding a wage increase which will amount to $4,000,000, Mr. McDougal explained the situation is critical.

The bondholders' committee, Mr. McDougal said, has mapped out a plan to take up the $800,000 by issuing to each Lockport & Olcott bondholder a five-year 7 per cent bond on a par for par basis to be secured by $1,200,000 of improvement and refunding 5s.

The Lockport & Olcott is an interurban division of the International running between Lockport and Olcott Beach, a summer resort on lake Ontario. A large amount of freight and express is carried over the line. It is in the heart of the Niagara County fruit belt.

Charlottesville Company Prosperous

According to the annual report of the Charlottesville & Albemarle Railway, Charlottesville, Va., for the year ended Dec. 31, 1919, gross earnings from railway operation increased from $40,107 in 1918 to $50,957 in 1919—equivalent to 27.5 per cent. The railway revenues were 33.3 per cent of the total gross earnings of the company. Operating expenses for the railway were $35,977 in 1919 as against $33,249 in 1918, an increase of 8 per cent. Railway expenses represented 45.5 per cent of total operating expenses of the company. Net earnings from the combined operation of the railway, light and power departments were $73,850, an increase of 38.5 per cent over 1918.

The amount available for dividends in 1919 was $40,736, as against $21,172 at the end of the previous year, equivalent to a 6.43 per cent return on the $500,000 of common stock after payment of a 7 per cent dividend on the $122,700 of outstanding preferred stock. In 1918 this return amounted to only 2.51 per cent. A dividend of 5 per cent was paid on the common stock for the year 1919. None, however, was paid in 1918.

Utility Men and Bankers Discuss Financing

Tremendous Rates Now Asked for Loans Prohibit Utility Financing—$100,000,000 Needed for Chicago Utilities

A number of Chicago's most prominent public utility men and bankers appeared before the Illinois Public Utilities Commission in Chicago on April 29 to present evidence in a special hearing called to consider the general financial difficulties of all the utilities of the State. Samuel Insull, president of the Commonwealth Edison Company, People's Gas Light & Coke Company, Public Service Company of Northern Illinois and chairman of the board of the Chicago Elevated Railways; Henry A. Blair, president of the Chicago Surface Lines, and B. E. Sunny, president of the Chicago Telephone Company, presented a survey of the situation with respect to their several companies. Following this the problem was presented from the bankers' point of view by E. D. Hulbert, president of the Illinois Trust & Savings Bank and the Corn Exchange National Bank; H. L. Stuart, of Halsey, Stuart & Company; General Charles G. Daws, president of the Central Trust Company of Illinois; Chester Cory, vice-president of the Harris Trust & Savings Bank; David R. Forgan, president of the National City Bank, and Charles S. Schweppe, a partner of Lee, Higginson & Company.

THE utility men showed the very large sums of new money that are now necessary for capital expenditures due to the postponement of work during the war and gave their experience in trying to float these expenditures. They declared that the utilities have lost their credit because the public is frightened over the value of public utilities securities already outstanding and because there are so many industrial investments on the market offering higher rates of return and with more favored conditions surrounding them. The utilities in many cases cannot get money at any price. Even the securities of such companies as the Commonwealth Edison and the Chicago Telephone Company, which have an unquestioned credit standing, can be marketed only at a cost that is prohibitive.

Mr. Insull said that utilities of Chicago alone need $100,000,000 to bring facilities up to normal. He attributed the inability of the utilities to get new money very largely to two things:

1. The public has been driven away from this class of investments by the continuous agitation in the community against one or another utility company led by some politician who talked ostensibly for the good of the people but usually for the good of that individual.
2. The effect of valuations for rate-making purposes upon the junior securities.

As regards the second Mr. Insull said the valuations have been so held down that the junior securities are very seriously affected. This had a very important bearing on the present deplorable condition.

Mr. Blair and Mr. Sunny outlined briefly the needs of their companies. They also told the experience they have had in getting a market for permanent financing.

The substance of the testimony of the three utility men was to urge upon the commission the necessity for permitting rates that will produce earnings sufficient to maintain the credit of the company and provide a return to junior securities holders so that their confidence can be restored.

The bankers brought out that about $450,000,000 of bonds and notes of utility companies and industrials have been placed since Feb. 1 and that, despite the unprecedented quantity of money in circulation, there was such a great demand for funds for investment that there was really a serious shortage. They pointed out the features which make industrials more attractive than utility securities and were unanimous in stating that the utilities must be permitted to earn a greater margin over their interest requirements as a factor of safety.

General Daws doubted the practicability of a commission establishing a fixed rate of return. This could not possibly meet the varying conditions of the money market. He also denounced the manner in which the utilities are dragged into politics and decried the fact that the people do not get the arguments about the utilities on the square. These things, he pointed out, were among the most serious causes of the loss of confidence of investors.

High income taxes, the enormous issues of Government bonds, the large amounts of these bonds in the Federal Reserve Bank, and the practice of utilities in continually refunding their bonded indebtedness instead of taking it up were also among the reasons cited for high rates and the poor market for public utilities securities and the tightness of money generally.

Conference on Kansas City Finances

The financial affairs of the Kansas City (Mo.) Railways were discussed on April 14 when three Chicago members of the bondholders' protective committee conferred with the city transportation committee of the Chamber of Commerce which recently recommended "service-at-cost" and suggested readjustments of the company's securities.

The session was executive. Those who attended were Arthur Reynolds, vice-president of the Continental & Commercial Bank, Chicago; H. L. Stuart of Halsey, Stuart & Company, Chicago; John E. Blunt, Jr., vice-president of the Merchants' Loan & Trust Company, Chicago, and J. F. Downing, Kansas City, of the protective committee. Committeemen from the Chamber of Commerce who attended were Frank D. Askew, chairman; J. M. Bernardin, Conrad H. Mann, F. L. Hall, Herbert V. Jones and John A. Prescott.

Mr. Askew is reported to have said after the meeting that a receivership for the railway was a remote possibility. It was the consensus of opinion that the chief trouble is the company's inability to borrow money. With its present schedule of fares the company is making money, but it is unable to secure funds with which to make improvements without borrowing at rates that are ruinous.

Chicago Elevated Earnings Deficient

The earnings of the Chicago Elevated Railways for February, 1920, the first month's report under the 7½-cent rate of fare put in effect on Feb. 1, showed a net deficit of $37,524 as detailed below. Net earnings of $167,424 are compared with $218,090 for the month of January, when an 8-cent fare was in force.

Gross earnings	$1,231,511
Total expenses	1,064,087
Balance for interest	167,424
Fixed interest charges	204,949
Net deficit for February	37,524
Payroll for February, 1920	$637,660
Per cent of operating expenses paid to labor	59.9
Total passengers carried February, 1920	15,099,464
Cost of carrying each passenger in February, allowing for fixed interest charges	8.4 cents

Small Connecticut Company Doing Well

Richter & Company, Hartford, Conn., are offering at $145 a share, subject to sale and change in price, stock of the Bristol & Plainville Tramway, Bristol, Conn. This company operates an electric railway connecting the towns of Bristol, Plainville, Forestville and Terryville, furnishes electric power which it buys from the Falls Village plant of the Connecticut Power Company, in these towns, and operates a gas and heating plant in Bristol and Plainville. The bankers say that the electric railway branch of the business operates at a substantial profit and "has the distinction of being about the only street railroad to show a profit on a 5-cent fare." The present capital is $825,000. The original capital was $250,000 and this was increased to $375,000 in 1908 by a 50 per cent stock dividend. In August, 1914, the capital was increased to $562,500; in October, 1916, to $618,000, and in July, 1919, to $825,000, the present amount outstanding, all of this new stock being offered to stockholders at par. The company has paid dividends continuously since 1899. The present rate is 10 per cent. Including the value of rights which have accrued, the average return on par value during the past eight years has been about 13½ per cent.

Financial News Notes

Certifies to Stock Increase.—The Eastern Texas Electric Company, Beaumont, Tex., has filed an amendment to its charter with the Secretary of State at Austin increasing its capital stock from $2,500,000 to $4,850,000.

Lincoln Company Retires Bonds.—The $250,000 of Lincoln (Neb.) Traction Company 5 per cent bonds due Jan. 1, 1920, were retired at maturity. The company issued one-year notes in an amount sufficient to meet the bonds. The earnings of the company for the year 1919 are reported as follows: Gross revenue, $1,061,008; interest and taxes, $157,452; net revenue, $50.306.

Colorado Line May Be Abandoned.—It is stated that Judge Horace G. Lunt, attorney for the Colorado Springs & Cripple Creek District Railway, Colorado Springs, Col., is to make application to the federal court for permission to discontinue operation over most of the line. This is due primarily to lack of freight shipments and the consequent loss in operating revenue.

Relief from Tax Refused.—The City Commission of Tulsa, Okla., has denied the petitions presented by the Tulsa Street Railway and the Oklahoma Union Traction Company asking exemption from the payment of the gross revenue tax of 2 per cent levied by the city and also from payment of $100 per car per year bonus assessed by the city. These assessments are provided by the franchises which were granted to each company.

$4,200,000 Issue Before Commission.—The United Railways, St. Louis, Mo., has filed formal application with the Public Service Commission for the issuance of $4,200,000 of receiver's certificates. Of this amount $1,900,000 is to be used to take up a similar amount of bonds of the Broadway line, which mature on May 1, and the remainder is to take up $2,300,000 of receiver's certificates issued last Aug. 18, to mature in one year. The rate of interest asked to be approved for the new certificates is 7 per cent.

Scrip Dividend Covering Four Quarters.—The scrip dividend of 6 per cent which was declared on March 31 on the preferred stock of the Kentucky Securities Corporation, Lexington, Ky., represents the four accumulated quarterly dividends of 1½ per cent each of Oct. 15, 1918, Jan. 15, April 15 and July 15, 1919, being all the accumulated and unpaid dividends to April 15, 1920. This dividend scrip is payable in cash at the company's option on or before April 10, 1925. It will be mailed to holders of the preferred stock on or before April 30, 1920.

Boston Company Would Use Subway Fund.—H. Ware Barnum, general counsel for the Boston (Mass.) Elevated Railway, on April 15 requested for the trustees permission of the State Department of Public Utilities to use $3,081,000 of the funds received for the Cambridge subway for payment of outstanding notes. The trustees desire to use $1,500,000 for the redemption of notes of the Boston Elevated Railway and $1,581,000 to take up obligations of the West End Street Railway. By this proposed transaction, Mr. Barnum said, a substantial saving in interest will be made. There was no opposition to his petition.

Preparing to Foreclose.—The Guaranty Trust Company, New York, N. Y., through its attorneys, Stetson, Jennings & Russell, has filed in the County Clerk's office a lis pendens preliminary to foreclosing a mortgage aggregating $18,061,289 against the property of the New York Railways. The mortgage covers all of the rolling stock, franchises and other property. The company is now in the hands of Job E. Hedges as receiver. The action was taken by the trust company to protect its interests. The mortgage, dated Jan. 2, 1912, was to secure an issue of New York Railways thirty-year first real estate gold bonds.

Texas Road Sold Under Foreclosure.—The property of the Greenville Railway & Light Company, Greenville, Tex., has been sold at public auction under a decree issued by the United States Court for the Northern District of Texas to satisfy a judgment in favor of the Dayton Savings & Trust Company, Dayton, Ohio. The property was sold to the Dayton Savings & Trust Company for $26,000. The trust company held bonds issued by the railway and light company to the amount of $444,170, on which interest payments had been defaulted. It is announced that the company will continue to operate under the new ownership without material change in management or policies.

Brooklyn Lines Discussed at Inquiry.—The affairs of the Brooklyn City Railroad were discussed at length at the session of the Board of Estimate of New York City on April 28. W. D. Loudoun, Deputy Commissioner of Accounts, testified concerning the operating income of the Brooklyn City lines. He declared that the company had provided $300,000 to pay a dividend of 2½ per cent on a capitalization of $12,000,000 for the first quarter of the fiscal year 1920. Dr. John Bauer, financial adviser to the corporation counsel, discussed the financial condition of the New York Municipal Railway Corporation. He declared that the company was overcapitalized. The board will resume the traction inquiry on May 5.

Abandonment May Follow Wage Demands.—Demands of employees of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., for salary increases aggregating more than $80,000 annually may result in the abandonment of the interurban line between Buffalo and the Pennsylvania State line. George Bullock, receiver for the road, proposes a conference with members of the bondholders' committee at which he will probably recommend that attorneys for the road ask for an order directing the sale of the property under foreclosure. If the main line is abandoned, it is expected that the Fredonia-Dunkirk branch will be continued, because this division is said to be the only stretch of the road which is meeting expenses.

Berlin Bonds Appear to Be Bargain.—Von Polenz & Company, Inc., New York, N. Y., and Berlin, Germany, own and offer for "spot delivery at New York" 4,000,000 marks of 4 per cent bonds of the Electric Elevated & Subway Railway incorporated in 1897 and operating about 17 miles of standard gage elevated and subway railways in Berlin. The bonds are in denominations of 500 and 1,000 marks. They are being offered at $20.50 per 1000 marks. At the normal rate of exchange the bonds would be worth about $238 per 1000 marks. If the coupons are cashed at the present low rate of exchange the bonds net 4 per cent. The annual interest figured at normal exchange would amount to $10.71, or more than 50 per cent.

Plan an Appraisal Board.—An ordinance has been introduced in the City Council of Seattle, Wash., providing for the appointment of a board of appraisers to determine a purchase price at which the city may acquire the lines of the Seattle & Rainier Valley Railway. The bill provides for three appraisers, one appointed by the Mayor, one by the company, and the third by the two appointed members. The bill also provides an appropriation of $5,000 from the general fund to recompense the board, the company to furnish a like amount. The company recently offered the city its lines for $1,656,000. Councilman William H. Moore, empowered by the utilities committee to make an appraisal for the city, fixed the valuation at $837,565. The appraisal board is expected to adjust the discrepancy in the two valuations.

Dallas Earns Small Return.—The Dallas (Tex.) Railway earned a return of 4.98 on its investment during March, according to figures given out by Richard Meriwether, vice-president and general manager. Gross earnings amounted to $248,372 and total expenditures to $211,921. A total of 5,395,000 passengers were carried during the month, of which number 13.3 were transfer passengers. Street cars during the month traveled 619,336 car-miles, averaging 8.7 passengers per mile at an average speed of 9.1 miles an hour. Approximately $78,000 was spent in improvements during the month. Included in this sum was the Myrtle Street extension and reconstruction work on Ervay Street and Jefferson Avenue. Of the total amount of expenditures $37,558 was for repairs to track and $21,986 on equipment.

Traffic and Transportation

Utilities Board Abolished

British Columbia Electric Railway Finds Itself Face to Face with Anomalous Conditions

The Public Utilities Commission of British Columbia has been dissolved by the Legislature of the province. The act on April 17 only required the signature of the Lieutenant Governor to become law. Very little scope had been left to the commission as the railway lines of the British Columbia Electric Railway had been taken from the control of the province and placed under the Dominion Railway Board.

WANTS LOCAL REGULATION RESTORED

Petitions had been presented to the Dominion Government to have the railway restored to provincial control. The removal of this railway from the jurisdiction of the provincial commission was clearly established as being a mistake on the part of the Dominion House of Commons, and already reports have been received in Vancouver that the act has been passed amending this control and placing the British Columbia Electric Railway back under provincial jurisdiction.

The provincial Legislature of British Columbia provides in repealing of the public utilities act for the revival of all agreements binding the railway as if the public utilities act had never been passed. Just what effect this will have upon the 6-cent fare charged in Vancouver, New Westminster and other communities is somewhat doubtful. The company's franchise provides for a fare of 5 cents. The 6-cent fare was granted until April 9, 1919. Consequently the provincial government, by the public utilities act, extended this privilege until the Public Utilities Commission could investigate the necessity for such a fare.

CONFIRMED BY RAILWAY BOARD

That is, the British Columbia Electric Railway was removed from the jurisdiction of the province, its fares were confirmed by the Dominion Board of Railway Commissioners, and it is now under such confirmation that fares are being charged. If the Dominion government should cancel this jurisdiction over the company, this would throw the company back on original agreements, and it would then be without recourse to either Dominion or provincial commissions.

Another curious feature of the repealing act of the provincial government is a clause which might be said to confiscate one-half of some $48,000 now held in trust by the railway. It was decided in the public utilities act that the provincial government continue the 6-cent fare after April, 1919, and that the additional cent over the 5-cent statutory fare should be paid into a fund until such time as the provincial commission could investigate the merits of the 6-cent fare. If it transpired that the company was not entitled to this additional cent, the fund was to go to the Vancouver General Hospital for its benefit.

$48,000 FUND FOR DISTRIBUTION

The contributions to the fund up to July 7, 1919, amounted to about $48,000. They stopped on that date owing to the company coming under the jurisdiction of the Dominion government and having its fares approved. The repeal act now contains a clause to the effect that this fund shall be divided equally between the railway and the Vancouver General Hospital without suggesting that any investigation whatever as to the merits of the fund be made. Whether or not this is confiscation it is difficult to say, but it appears quite probable that the cost of giving service from April to July 7, 1919, warranted much more than a 6-cent fare, in which case the British Columbia Electric Railway would be entitled to the whole of the fund.

New Buffalo Fare in Effect

The 7-cent fare authorized several months ago by the Public Service Commission was put into effect on the Buffalo, N. Y., lines of the International Railway at 6 a.m. on April 18. Four tickets are sold for 25 cents. The tickets were placed on sale in the company's ticket offices three days before the fare increase went into effect. The tickets are now sold by conductors and ticket salesmen stationed at congested points.

The effort failed that was made by the municipal authorities to stop the increase from becoming effective through formal application for a stay pending a review of the Public Service Commission's decision. The court refused to grant a stay. The International Railway at its own request was made a party to the proceeding, which was argued in the Supreme Court in Troy on April 17.

The International Railway still is trying to have the city join with it in an application to the Public Service Commission to restore the basic 5-cent fare and make a 3-cent charge for the first transfer and a 2-cent charge for the second transfer. The city insists upon a 2-cent charge for the first transfer and a 1-cent charge for the second transfer, pending a final solution of the traction problem through a service-at-cost plan.

Service at Cost Proposed

Rochester Mayor Takes Action to Relieve New York State Railways—Wants Service Improved

Several years of legal warfare over the question of the 5-cent fare in Rochester, N. Y., culminated on April 27 in a recommendation by Mayor Edgerton that the Common Council enter into a new agreement with the New York State Railways for a service-at-cost plan. The Council was requested to make an investigation at once, and if it deemed such an agreement advisable to direct the preparation and execution of a cost-of-service contract. The company has announced its willingness to accept the new plan.

It was pointed out to a representative of the ELECTRIC RAILWAY JOURNAL by Corporation Counsel Charles L. Pierce that any agreement which might be entered into embodying the ideas set forth in the Mayor's communication to the Council would not abrogate the contract now existing between the city and the company. The law committee of the Council will determine, after a public hearing, whether the plan shall be given a trial, and it is predicted that a favorable report will be presented on May 4.

The Council will be called upon to designate a basis for arriving at a valuation upon which a return is to be fixed. The three courses open to the Council, one of which must be adopted, follow:

1. Base it upon the original cost of the company's physical property, add cost of extensions and deduct depreciation.
2. Set the valuation at the present cost of replacement of the company's equipment.
3. Make it the cost of replacement under pre-war or normal conditions.

Since the rejection of the city's plea to the Public Service Commission to compel the company to improve service the Mayor has apparently become convinced that the establishment of better service is dependent upon allowing the company a higher fare. Mayor Edgerton stated in his letter to the Council that the company had agreed to accept the following terms:

> That they are willing that the arrangement shall include a system of bookkeeping which shall positively disclose all transactions within the city of Rochester, in order that we may know exactly what the income is from the city system and what is done with the money, the books to be kept under the supervision of representatives of the city, who shall be paid by the company.
>
> That the contract shall also provide for operation under the absolute control of a commissioner to be appointed by the city and paid by the company, in whose hands shall be placed the matter of schedules, routing, equipment, extensions, and all other things having to do with operation.
>
> The representatives of the company further indicate that they are ready to agree that the company shall receive from operations in the city of Rochester as its sole compensation, only such an amount as will equal a fair return, to be fixed by agreement, upon the value of the property actually used in the service in Rochester; this value to be agreed upon if possible, and if not, to be determined by arbitration. The return which the company will get under such an agreement will have no relation whatever to the amount of its capital stock or bonds and the rate of fare charged will always be fixed at just enough to pay the cost of operation and upkeep and the aforesaid return on the value of the property used.

Favors Canton Increase

Peter Witt Recommends Straight 5-Cent Fare with 1-Cent Transfer Charge—Matter Before Council

After making an examination of the books and a survey of the Canton (Ohio) city lines of the Northern Ohio Traction & Light Company, Peter Witt, Cleveland traction expert, has recommended a straight 5-cent fare, with a charge of 1 cent for transfers. The rate is now six tickets for a quarter, no charge being made for a transfer. An effort was made to have Mr. Witt's report acted upon at the City Council meeting on April 20, but the matter was finally referred to the Council's public utilities committee. The company desires a decision as soon as possible because of the negotiations that are now under way with employees on the question of a new wage scale.

Last year the company received from fares $651,915. The number of revenue passengers carried was 14,821,152 and the number carried on transfers was 2,689,410. If the amount due the property from the receipts had been put back into it, Mr. Witt said the books would have shown a loss of $26,236. The company claims that it will need an additional $125,000 this year to take care of the increase it must grant employees and the higher prices it must pay for materials. This, Mr. Witt said, he does not dispute. This sum added to the receipts of last year, plus the amount necessary to recoup the loss, shows that $803,151 will be needed to furnish the same service that was given last year.

WOULD YIELD $886,034

Mr. Witt estimates that there will be an increase of 15 or 20 per cent in the traffic this year and that the rate he has suggested will yield about $886,034, which should allow a net dividend of $83,152. While this would be wholly inadequate as a return on the investment, Mr. Witt says there are certain economies which can and should be put into effect that will result in a saving large enough to finance the improvements which the lines need.

Mr. Witt finds that cars are not kept in good condition because the ordinance against smoking and spitting on the floor has not been enforced. He suggests that the ordinance requiring car doors to be left open when crossing steam and electric railway tracks be repealed. This recommendation will likely be adopted, as there appears to be a sentiment in favor of it.

A portion of the report reads:

> In the light of what has happened wisdom decrees that whatever changes are made should be made with a clear understanding that if the rate of fare to be provided proves at some future date to be too high the right of the city to order a reduction should not be questioned; should it prove to be too low a corresponding right should lie with the company for an increase, in order that it may protect its property and be assured of an income that will make possible the financing of the extensions and betterments the conditions of the city will require to take care of Canton's growth.

Mr. Witt was employed by the city of Canton to make a survey of street railway conditions and report his conclusions to the City Council. In return for an increase in the rate of fare he holds that the company should double-track its line throughout the city. Adequate service, he points out, is impossible without this improvement. Mr. Witt suggests that three of the five tracks in the public square be removed. He also advised the erection of shelter sheds for waiting passengers in that location.

Seven Cents in Parkersburg

The West Virginia Public Service Commission has granted an increase of 2 cents on fares to the Monongahela Valley Traction Company. The new fare is 7 cents on all local lines and on the interurban lines will be 7 cents in each zone between Parkersburg and Williamstown. Through fare from Parkersburg, W. Va., to Marietta, Ohio, will remain at 25 cents as heretofore.

The following schedules will prevail regarding the selling of books and special ticket books:

Book containing fifty tickets, each ticket good for 7-cent fare, $3.25.

Book containing 100 tickets, each ticket good for 7-cent fare, $6.50.

Strips of fifteen tickets, each ticket good for 7-cent fare, $1.

Strips of ten tickets, each ticket good for one continuous fare between Parkersburg and Greenmont, 70 cents.

Scholar's book containing twenty tickets, each ticket good for 7-cent fare, 70 cents.

Scholar's book containing 100 tickets, each ticket good for 7-cent fare, $3.50.

Scholar's book containing twenty tickets, each ticket good for one continuous passage between Williamstown and Central, 70 cents.

Scholar's book containing twenty tickets, each ticket good for one continuous passage between Parkersburg and Greenmont, 70 cents.

School tickets shall be good for transportation of any school child on any day during the school year between the hours of 7 a.m. and 6 p.m.

Transportation News Notes

Wants More in Texarkana.—The Southwestern Gas & Electric Company, Texarkana, Ark., has announced that it will shortly apply for an increase in fare from 5 cents to 7 cents. The company operates in Texarkana, Ark., and Texarkana, Tex.

Two Killed in Head-On Wreck.—A head-on collision involving two of the cars of the Northampton (Mass.) Street Railway on April 15 resulted in the death of two persons and in the injury of several others. The motormen of both cars were killed.

Fare Increase Suspended.—The New Jersey Board of Public Utility Commissioners recently suspended a rate schedule of the Jersey Central Traction Company, Keyport, under which the company proposed to raise its rate in each zone from 7 cents to 10 cents.

Six-Cent Fares Continued.—The Illinois Public Utilities Commission has issued an order continuing in effect until May 30 next the 7-cent fare now being charged by the Quincy Railway. The 6-cent fare charged by the Evanston Railway is also continued in effect until May 30.

Asks Higher Token Rate.—The Lincoln (Neb.) Traction Company has applied to the State Railway Commission for permission to raise the price of tokens from four for 25 cents to three for 20 cents. The commission some time ago authorized the company to charge a cash rate of 7 cents for a period of six months.

May Raise Grand Rapids Rate.—The Grand Rapids (Mich.) Railway has intimated that it will shortly make application for a higher fare, owing to increase in operating expenses. The company operated at a loss of $17,425 in March, bringing the deficit for the first three months of the present year to $37,016, as against $1,427 for the corresponding period in 1919.

Ten Cents on Maine Road.—The Atlantic Shore Railway, Sanford, Me., has filed with the State Public Utilities Commission a tariff, effective May 5, under which it proposes to raise its fare from 8 cents to 10 cents in each zone. The ticket rate will be increased from seven tickets for 50 cents to ten for 90 cents. The rate between Sanford and Springvale will remain unchanged.

Parallel Parking in Akron.—An ordinance providing for parallel parking of all vehicles on all streets and limiting the duration of parking to one hour on the downtown streets has been adopted by the City Council of Akron, Ohio. This measure will provide an effective relief to the passage of electric cars through the downtown district, and by thus speeding up the service will provide better transportation facilities.

Three-Cent Line in Need.—An increase in fare from 3 cents to 4 cents is asked by the Van Brunt Street & Erie Basin Railroad, Brooklyn, N. Y., in an application filed recently with the Public Service Commission for the First District. The road proposes to install the new rate on May 6. The company operates 3 miles of line. An application for a 4-cent fare was denied by the commission several months ago.

Connecticut Zone Order Appealed.—The Connecticut Company on April 29 presented a formal appeal to Judge Hinman in the Superior Court from the recent decision of the Public Utilities Commission with respect to the modification of the system of zone fares in use on its lines. It is said that the company is preparing to comply on May 9 with the commission's order. The case of the railway against the commission may not come to trial until some time in the fall.

Refuses to Enjoin Commission.—The Supreme Court of Florida on April 18 denied the application of the city of Pensacola for a writ of prohibition to restrain the State Railroad Commission from taking jurisdiction of the application of the Pensacola Electric Company for an increase in fare to 7 cents. The court some time ago, in the case of the Jacksonville Traction Company, ruled that the commission had power to fix rates of fare, municipal franchise provisions limiting the fare notwithstanding.

Additional Zone Authorized.—The Ohio Valley Electric Railway, Huntington, W. Va., has received permission from the Interstate Commerce Commission to install an additional 5-cent fare zone on its line between Huntington and Ceredo, W. Va. The price of a round-trip ticket between Huntington and Ceredo has been fixed at 25 cents, and between Huntington and Camden Park at 15 cents. The new rates went into effect on April 15.

Fares Up on Penn Line.—The Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., has filed with the State Public Service Commission a new schedule of rates, effective May 12, and increasing existing rates. Coupon books will be sold at the existing rate of $1, but the number of tickets therein is decreased from eighteen tickets to sixteen. The zone rate is increased from 6 cents to 7 cents and the round-trip ticket between Pen-Mar and Blue Ridge is withdrawn.

Asks Lines' Co-operation.—The Connecticut Public Utilities Commission has asked the street railways and steam roads of that State to co-operate in the transportation of seeds, nursery stock, fertilizer and agricultural implements and supplies of all kinds. The commission points out that the necessity for agricultural production was never more imperative than at the present time, and that every reasonable assistance should be given to insure maximum results.

Bus Line Starts in Wilmington.—The People's Bus Line, Wilmington, Del., has begun the operation of motor buses in competition with the line of the Wilmington & Philadelphia Traction Company, between the Pennsylvania station and Thirtieth and Washington Streets. The fare is 5 cents, while the trolley fare is 7 cents, or four tickets for 25 cents. A number of the carmen of the Wilmington & Philadelphia Traction Company recently protested to the Wilmington Streets & Sewer Department against the bus competition, asserting that delays incident to it interfered with car schedules.

Would Raise Halifax Fares.—A bill has been introduced in the Nova Scotia House of Assembly which, if enacted, will permit the Nova Scotia Tramway & Power Company, Ltd., Halifax, to raise its cash fare to 7 cents. The measure calls for the sale of four tickets for 25 cents and sixteen for 90 cents. The bill provides that the company shall not be required to use a paving material more expensive than that which the city uses on its portion of the work. Another provision of the bill is that after July 1, 1921, the Board of Public Utilities shall have jurisdiction over the rates to be charged by the company. At present this is solely the prerogative of the Legislature.

Eight-Cent Fare Petition Filed.—Formal application has been made to the Georgia Railroad Commission by the Georgia Railway & Power Company, Atlanta, for an increase in fare from 6 cents to 8 cents. The commission has set June 1 for a hearing on the company's petition. The company also seeks an increase of approximately 30 per cent in gas rates and of 20 per cent in lighting and power rates. The petition points out that no dividends have been paid by the company on any class of stock since August, 1914, and that accumulated dividends owed on preferred stock now total 24½ per cent or $2,000,000. The company's payroll for the current year will, it is estimated, exceed that for 1919 by $450,000.

Asks 7 Cents in Denver.—Application for a 7-cent car fare has been made to the City Council of Denver, Col., by the Denver Tramway through initiated petitions bearing the signatures of 4,700 residents. Under the charter 2,548 signatures were necessary. The petitions were attached to an initiated ordinance that seeks to take the place of the present 6-cent fare ordinance. Under the charter the Council must either pass the initiated measure within thirty days or refer it to the people at the election in May, 1921. The company has made application for an increase in fare to meet the recent advance in wages, from 48 cents to 58 cents an hour, granted the 1,100 members of the carmen's union by an arbitration board.

Wants Commission Enjoined.—The Charleston-Isle of Palms Traction Company, Charleston, S. C., has brought suit in the Federal District Court to annul the order of the South Carolina Railroad Commission refusing the company permission to establish a zone-fare system on its line. The court has set May 5 for a hearing of the case. The commission allowed the company to charge a straight fare of 3 cents a mile and a minimum fare of 5 cents between stations. However, when the company attempted to put into effect the zone system it was prohibited by an order of the commission, on the ground that the fares charged would be in excess of 3 cents a mile, which is the amount set in the statutes of the State for railway passenger fares. The company alleges that the order of the commission was confiscatory, and for that reason is in contravention to the Constitution of the United States.

Long Island Increase Approved.—The Public Service Commission for the Second District has issued an order authorizing the New York & North Shore Traction Company, Roslyn, N. Y., to increase its fare from 5 cents to 7 cents in each zone, with an 8-cent fare in each of the two zones between Mineola and Hicksville, where the fare is now 6 cents. The commission's order is effective on five days' notice. The Public Service Commission for the First District last August authorized the road to increase its rates on its line within the corporate limits of New York City. On Feb. 2 last the Board of Supervisors of Nassau County, through which the company operates, adopted a resolution modifying the road's franchises so as to permit the fare increase which has now been sanctioned by the Second District Public Service Commission. Owing to blocking of the line by snow and ice the road suspended operation on March 1.

Wider Powers for Ohio Commission.—The powers of the Ohio Public Utilities Commission are materially augmented by the terms of the Robinson law, which became effective on April 16. Under the new statute, when a public service corporation wishes to make an increase in its service schedules, a copy of the new rates must be filed with the commission at least thirty days prior to the effective date. Should protest be made the new schedule may be suspended pending investigations and hearings. However, the schedule may be put into effect if the company furnishes a satisfactory bond or undertaking, guaranteeing the refund of the additional charge in case the rates are found unjustified. Patrons or consumers must be given notice through advertisements of the intention of the company to increase its rates. This is to be done by placing advertisements in one newspaper at the seat of each county where the rates apply or one newspaper of general circulation covering the entire territory affected.

Congestion Due to Narrow Streets.—Narrow streets are given as a leading cause of congestion in the business district of Los Angeles, Cal., in a report recently issued by George B. Anderson, recently appointed manager of service of the Los Angeles Railway. Mr. Anderson has been making a study of traffic conditions in Los Angeles and other cities for several months past. His report indicates that, with possibly one exception, Los Angeles probably suffers more from congestion than any other city in the country. The report points out that in an area twenty-three blocks square only 22.5 per cent of the space lies between the curbs which parallel the streets. The sidewalks take up but 11.9 per cent of the space and alleys and private streets 2.5 per cent, while business blocks occupy 63.1 per cent of the area. Mr. Anderson points out that Portland gives over 34.41 per cent, Seattle 32.20 per cent and San Diego 40.6 per cent of the streets in the business district to roadways, while Los Angeles gives only 22.5 per cent of the area to thoroughfares. A drastic "no parking" ordinance was recently put in effect in Los Angeles.

Personal Mention

Promotion for Mr. Boyce

Superintendent of Beaver Valley Lines Made General Manager—A Pioneer in Public Relations Work

William H. Boyce, superintendent of the Beaver Valley Traction Company, New Brighton, Pa., has been promoted to the position of general manager of the company. Mr. Boyce has also been made general manager of the Pittsburgh & Beaver Street Railway. Together the two systems operate more than 50 miles of railway line and serve Beaver Falls, New Brighton and other towns in the Beaver Valley of Pennsylvania.

W. H. BOYCE

Mr. Boyce has made a substantial place for himself in the electric railway field as one of its most progressive operators. He has been very successful in his relations with labor and in his general public relations work. This is so far true that his advice is sought on civic and other problems. His courtesy and accident prevention campaigns in particular have attracted attention and been the subject of review in this paper.

Long ago publicity became a regular feature on the Beaver Valley line. There is also a service bureau to handle all complaints, service suggestions and accident prevention measures. This bureau was established early in 1919, but long before that time Mr. Boyce laid the foundation for its conduct by his policy of frankness and his expressed willingness to accept suggestions about the company from outside sources. He is serving this year as a member of the committee on merchandising transportation of the American Electric Railway Association.

Mr. Boyce entered electric railway work in 1902 as a trainman with the Terre Haute Traction & Light Company, Terre Haute, Ind. In 1903 he went to Dallas, Tex., as superintendent of the meter department of the Dallas Electric Light & Power Company. He was later made assistant superintendent of the company, but shortly thereafter was transferred to Sherman, Tex., where he served for several months as superintendent of the Sherman Gas & Electric Company. In 1906 he returned North, and for the next three years served as assistant superintendent of transportation of the Pittsburgh Railways. He resigned from this position in 1909 to become superintendent of the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway.

W. E. Wood, New Houston Manager

W. E. Wood has resigned as general manager of the Galveston (Tex.) Electric Company to become general manager of the Houston Electric Company and the Galveston-Houston Electric Railway, with headquarters in Houston, Tex. Both the Galveston Electric Company and the Houston Electric Company, as well as the Galveston-Houston interurban road, are Stone & Webster properties. Mr. Wood succeeds E. L. Milliken, who has been transferred to the Boston office of Stone & Webster. Mr. Wood will divide his time between Galveston and Houston for the present.

Mr. Wood has been in charge of the Galveston property since September, 1918. He has been connected with the Stone & Webster organization since his graduation from the Georgia Institute of Technology in 1907. He spent the year following his graduation in the home office of Stone & Webster, in Boston, Mass., and was then transferred to the Jacksonville (Fla.) Traction Company, where he worked in several departments as a student. In 1912 he was made superintendent of the Jacksonville system, continuing to serve in that capacity until 1916, when he was transferred to Houston as general superintendent of the system there. He was subsequently appointed manager of the El Paso Electric Company and, still later, manager of the Galveston Electric Company.

E. L. Milliken, manager of the Houston (Tex.) Electric Company, has been transferred to the home office of Stone & Webster, Boston, Mass. Mr. Milliken was appointed manager of the Houston system in the fall of 1919. Prior to that time he was manager of the Houghton County Traction Company, Houghton, Mich. A biography of Mr. Milliken was published in the ELECTRIC RAILWAY JOURNAL for Nov. 8, 1919.

W. M. Casey in Buffalo

Joins International Railway as General Superintendent—Formerly in Washington and Denver

William M. Casey, whose appointment as general superintendent of the International Railway, Buffalo, N. Y., was briefly noted in last week's issue, goes to Buffalo from Washington, D. C., where for the past year and a half he has held the position of superintendent of transportation of the Washington Railway & Electric Company. Mr. Casey assumes the position with the International left vacant by the resignation of J. O. Weigel, noted in last week's issue.

W. M. CASEY

Mr. Casey was born in Ireland in 1870. Coming to the United States with his parents at an early age, he lived for several years in Lawrence, Mass., where he received his schooling. In 1888 he went West and enlisted in the United States Army, then engaged in putting down insurrections of the Indian tribes. Promoted to the rank of sergeant, he served with distinction in several campaigns, receiving an honorable discharge in 1891. In the following year he entered the employ of the Denver City Cable Company as a motorman. He was promoted to carhouse foreman in 1893, serving in that capacity until 1902, when he was advanced to the position of division superintendent of the Denver Tramway. Seven years later he was again promoted, being made trainmaster in charge of traffic and discipline and later general superintendent of transportation.

He resigned his connection with the Denver system in 1916 to join the staff of John A. Beeler, traffic expert, then engaged on a survey of the electric railway lines in Washington, D. C. During his association with Mr. Beeler, Mr. Casey had an opportunity to broaden his knowledge of transportation subjects. In 1918 he was appointed superintendent of transportation of the Washington Railway & Electric Company, and served in that capacity until his appointment at Buffalo.

More Chicago Changes Announced

Rolling Stock Maintenance Department, Chicago Surface Lines, Reorganized—Several Promotions Announced

For the purpose of securing increased efficiency the personnel of the rolling stock maintenance department of the Chicago (Ill.) Surface Lines has been reorganized. H. H. Adams, superintendent of shops and equipment, has announced the following appointments: Donald McGill to be assistant superintendent of shops and equipment, in charge of the South Side shops and the South Division carhouses. Thomas H. Shaughnessy to be assistant superintendent of shops and equipment, in charge of the West Side shops and the North and West Division carhouses. Howard Alton to be general foreman of the South Side shops and the South Division carhouses. Benjamin Phillips to be general foreman of the North and West Division carhouses. E. J. Sigwalt to be chief clerk, shops and equipment department, with headquarters at the West Side shops. Harold Page to be chief clerk of the South Side shops and the South Division carhouses.

DONALD McGILL has been with the Chicago City Railway and the Chicago Surface Lines for more than twenty-five years. Entering the employ of the lines on March 29, 1895, as a car wireman, he progressed through the positions of foreman of car wiring and foreman of the armature department to that of general foreman. Later he became superintendent of the Vincennes shops, now known as the South shops of the Chicago Surface Lines. Mr. McGill was born at Knoxville, Ill., on May 12, 1872. He received his education at Kearney, Neb. He then spent two years in power house work with the Kearney Light & Power Company. For two years thereafter he was employed by the Harter Construction Company, Chicago, electrical contractors, where he had charge of the electrical installation work in various plants, including some of the World's Fair buildings.

Thomas H. Shaughnessy began his career in the electric railway field in the mechanical department of the City & Suburban Railway, Baltimore, Md. After serving this company for nearly two years he became a carhouse foreman and later mechanical inspector for the Philadelphia Rapid Transit Company, continuing in these positions from 1894 to 1908. From 1908 to 1912 he was general foreman of carhouses under the receiver of the Metropolitan Street Railway, New York City. He then left New York to become master mechanic of the Essex Division, Public Service Railway of New Jersey, remaining in this position for more than a year. Going to Chicago in June, 1913, he became general foreman of the West Side shops of the Chicago Railways. He continued in this position until his recent promotion to assistant superintendent of shops and equipment with jurisdiction over carhouses and the general maintenance of cars.

Howard Alton was born in Wheeling, W. Va., in 1872. He began his railway experience with the Milwaukee Electric Railway & Light Company, working in the armature room for about one year. In 1894 he started work for the Chicago City Railway, bonding the track in connection with the electrification of the Halsted Street line. Shortly thereafter he was placed in charge of night repair work at the Sixty-ninth Street carhouse, and later was made foreman of the carhouse at Sixty-first and State Streets. In 1901 he was promoted to the position of assistant master mechanic in charge of all carhouses of the City Railway. Six years later he went to Galesburg, Ill., as general superintendent of the People's Traction Company. Remaining in this position about two years, he returned to the Chicago City Railway in 1909 to accept the position of general foreman of the Vincennes shops, which position he has held until receiving his present promotion.

Benjamin Phillips assumes the position of general foreman of the North and West Side carhouses, reporting to Mr. Shaughnessy, after eighteen years' service with the North and West Side railway lines of Chicago. He entered the employ of the Union Traction Company in 1902 as a workman in the mechanical department. He was promoted in 1907 to the position of foreman of the Devon Avenue carhouse. In 1911 he was made general foreman of the North and West Side carhouses of the Chicago Railways. Upon the consolidation of the surface railways in 1914 he was made assistant general foreman of the North, West and South Side carhouses, continuing in this capacity up to the present time. Mr. Phillips was born in Pennsylvania in 1877. He gained his first railway experience as a motorman with the Scranton Railway. He spent six years in this work, then joining the Union Traction Company.

E. J. Sigwalt has served the Chicago Railways and its successor, the Chicago Surface Lines, as a clerk in the shops and equipment department since 1912. Prior to that he was an inspector at the railways shops for the Board of Supervising Engineers, Chicago Traction, this work dating back to 1909. He also served the Twin City General Electric Company, Ironwood, Mich., for one year as an electrician.

Harold Page was born at St. Cloud, Minn., in 1893. He entered railway work with the Chicago City Railway in 1912. His first work was in connection with the efficiency and time studies made of various shop operations at the Vincennes shops. In 1916 he left the company for a few months, but returned to take charge of this time study and efficiency work, continuing in this capacity until his present assignment as chief clerk of the South shops and South Division carhouses.

E. J. Mehren to Investigate European Conditions

E. J. Mehren, editor of *Engineering News-Record*, controlled by the McGraw-Hill Company, publishers of the ELECTRIC RAILWAY JOURNAL, sailed for Europe on the *Adriatic*, April 24. He will study conditions in the civil engineering field in England, France and Germany and will be abroad until the latter part of August. Mr. Mehren has also been appointed special agent for the United States Bureau of Public Roads, and will secure certain information while abroad for that organization.

C. R. Lewis, superintendent of the Wichita Railroad & Light Company, Wichita, Kan., has resigned.

E. H. Rowell has succeeded H. W. Patten as superintendent of the Topeka (Kan.) Railway. Mr. Rowell was formerly claim agent of the company.

E. L. Lewis, for a number of years general superintendent of the Los Angeles (Cal.) Railway, has been made assistant to the general manager.

H. W. Patten, superintendent of the Topeka (Kan.) Railway, has been appointed superintendent of the Wichita Railroad & Light Company, Wichita, Kan., to succeed C. R. Lewis.

J. E. Watkins has succeeded W. H. MacAloney as superintendent of rolling stock of the Winnipeg (Man.) Electric Railway. Mr. Watkins was formerly connected with the British Columbia Electric Railway, Vancouver, B. C.

Frank Van Vranken, assistant superintendent of the Los Angeles (Cal.) Railway, has been advanced to the position of general superintendent. Mr. Van Vranken succeeds E. L. Lewis, who becomes assistant to the general manager.

Robert P. Woods, city member of the board of control of the Kansas City (Mo.) Railways, has been elected vice-president and general manager of the Kansas City, Clay County & St. Joseph Railway, succeeding J. R. Harrigan, who died recently.

J. B. Mack, formerly publicity manager for the municipal electric railway at Calgary, Alberta, has become associated with the New Brunswick Power Company, St. John, N. B., of which Thomas H. McCauley, formerly of Calgary, is now general manager.

George B. Anderson, who for some time past has been in charge of the bureau of public relations of the Los Angeles (Cal.) Railway, has been appointed manager of service of the company. In his new capacity Mr. Anderson will direct the training and disciplining of the system's employees.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Electric Sheet Mills to Book Orders

One Mill Now Accepting Business and Others Are Expected to Follow During May

Producers of electric sheets have not in general opened their books for third-quarter or second-half year buying. The one producer who did open his books about the middle of April is reported to have based his prices on those suggested in the Industrial Board schedule. Prospective output is being allotted to the company's regular customers. It is expected that the other electrical sheet producers will open for the next quarter and half year some time between the tenth of May and the end of the month. As far as can be learned it is thought that the prices will be no higher than those ruling for the present term. The feeling is that prices are sufficiently high as they are and that a feeling of relief would follow a halt in the upward movement of steel products.

Mills can do no more than to apportion out their sheets as they did earlier in the year. There is little more capacity available now than formerly, although one mill expects a bigger output about September. No bigger volume of ordering is expected. The demand is about that which existed over the earlier part of the year, and that demand was not satisfied, so a greater demand certainly cannot be filled. What new customers in the field will do for sheets it is hard to predict. Probably a good part of their demand can be satisfied through the jobbing interests at a rate higher than that of the producers. The regular customers will be pretty well cared for, however. Recent shipments have been badly held up by the railroad strikes. Some mills will not be able to clean up on their second-quarter deliveries until along in August because of curtailed production, shortage of raw materials and stoppage in freight movement.

New Westinghouse Company

The recent organization of the Westinghouse Union Battery Company in Pittsburgh marks an important new entry in the field of storage battery manufacture. The new company will produce storage batteries for train lighting and railway signals, starting and lighting, trucks, tractors, motor boats, airplanes and for home lighting systems.

A. L. Humphrey, president of the Westinghouse Airbrake Company, is chairman of the board of directors; D. F. Crawford, vice-president and general manager of the Locomotive Stoker Company is president, and T. R. Cook, formerly chief engineer and general production manager of the Willard Storage Battery Company, is vice-president and general manager; T. S. Grubbs, vice-president of the Union Switch & Signal Company, is also vice-president and secretary of the new organization.

The company is now occupying three floors of the Union Switch & Signal Company's factory at Pittsburgh. The initial production will be from 1,200 to 1,500 batteries a day and the employees to start with will number about 500. The present working quarters will be occupied instead of building a new factory at once, in order to lose no time in getting into production. The company is prepared to build a factory of from two to three times its present capacity on adjoining property.

Three Hundred Cars for Jersey

Two Hundred One-Man Cars and 100 Trailers Included in Order Just Placed—New Snow Equipment Also

The Public Service Railway, Newark, N. J., has placed orders for 300 new cars. Of these 200 will be of the one-man safety type and 100 will be trailers. The trailers were reported as being placed in last week's issue of the ELECTRIC RAILWAY JOURNAL. The safety cars will be 30 ft. in length and will seat thirty-four persons each, while the trailers will be 50 ft. in length with a seating capacity of sixty. Similar trailer cars are in use in Cleveland, Detroit and Pittsburgh.

The cars will be built by the Osgood-Bradley Car Company, Worcester, Mass. The builders have promised to deliver the first 100 of the safety cars in June and July and the remaining 100 during October and November. Deliveries of the large trailers are promised between Nov. 1 and Jan. 1. Orders have also been placed with the same company for additional snow-fighting equipment, consisting of fifteen single-truck steel sweepers and fifteen double-truck snowplows. The installation of the safety cars will mark a departure on the Public Service system.

The trailer cars will also be an innovation on the Public Service property. They are intended primarily for extra heavy lines in the Essex and Hudson divisions, where the demands of the large industrial sections present a serious rush-hour problem. The trailers will be of the center-entrance and exit type and with the regular motor equipped cars will form two-car trains. When the trailers are used the carrying capacity of each transportation unit will be more than double.

During the past winter the snow-fighting equipment of the company was severely taxed in keeping the lines open, and the importance to the public of preventing interruptions to service during heavy snows has prompted the company to add to its fleet of sweepers and plows. The new sweepers will be of the Public Service standard high-speed type with motor-driven brooms and the plows will be driven by four motors of 50 hp. each, the plows and wings being capable of clearing 16-ft. width of roadway in a single operation. This equipment will be ready for next winter.

Trolley and Bell Cord Active

Deliveries Quoted from One to Two Months—Prices Firm at $1.13 to $1.25 Per Pound in Coil Lots

Demand for trolley and bell cord is at present healthy, with manufacturers working hard to keep in sight of orders and with firm prices ruling. Deliveries in June and July are being quoted on moderate-sized orders. As a rule, manufacturers are in better shape to care for this business than to meet the demand for their allied products used in the building trade. Orders so far in 1920 are running perceptibly ahead of the corresponding period of last year.

Raw material has been held back from delivery to the factories by railroad embargoes, but conditions here are not as bad as in some other lines, owing to the substantial stocks of cotton maintained in the bell and trolley cord plants. "Fictitious" factory stocks of finished cord were accumulated during the railroad tie-up, but these are now rapidly moving by express shipments, and soon there will be virtually no factory stocks. Normal requirements of the railways, however, are being met reasonably well and regular purchases by transportation companies are helping to stabilize the market for these staple products. A definite tendency can be seen to substitute braided cotton cord for leather bell cord, the claim being that not only is the first cost lower in the case of cotton but that increased life is obtained from its use.

Prices have been steady since Feb. 1, and in manufacturing circles it is said that an effort is being made to prevent any further increase. Shortage of labor handicaps production and if labor could be secured for braiding cord at night the output of some mills could probably be increased 25 per cent.

Trolley cord is now selling to the railways in coil lots at about $1.13 per pound, mahogany bell cord quoting $1.25 and drab bell cord $1.18.

Manufacturers are concentrating effort upon the higher grades of product, and it is said on good authority that the profit on these grades is relatively lower than was the case when the cheaper grades were being pushed harder. The outlook is for steady business rather than for a greatly accelerated volume of trade in this well-settled branch of the industry.

Brushholder Orders Improving

Sales of brushholders, controller handles, controller fingers and other small parts, such as fittings, are improving gradually. There is a continuous demand for rebushed controller handles, fingers, etc., but the volume of sales in some of the items is not up to what it should be.

Business done on the whole is slightly less than it was last year. However, at least one manufacturer has not advanced prices and, according to reports, is doing quite well.

Stocks are plentiful and all orders for controller handles, brushholders and small controller repair parts can be filled promptly.

Rolling Stock

Philadelphia Rapid Transit Company, Philadelphia, Pa., has exercised its option with the J. G. Brill Company to purchase 100 steel elevated cars for the Frankford elevated lines, as a result of an agreement between the City Council and officials of the railway.

Public Service Railway, Newark, N. J., noted in the April 24 issue as having placed an order with the Osgood-Bradley Company for 100 trailers, has purchased 200 safety cars from the same company. In addition, fifteen single-truck steel sweepers and fifteen double-truck snowplows have been ordered.

Tampa (Fla.) Electric Railway, noted in the Feb. 21 issue of the ELECTRIC RAILWAY JOURNAL as having placed an order for eight safety cars, has specified the following details on this equipment:

Number of cars	8
Builders	The J. G. Brill Co.
Type	Birney safety
Total capacity	70
Length over all	28 ft. ½ in.
Truck wheelbase	8 ft.
Rail to trolley base	12 ft. 6 in.
Width over all	8 ft.
Body	Semi-steel
Interior trim	Mahogany, light
Roof	Arch
Air brakes	Safety Car Devices Co.
Armature bearings	Ball
Axles, diameter	3⅜ in.
*Bumpers	
Car signal system	Faraday
Car trimmings	Bronze
Conduits and junction boxes, National code,	
Control	K-63, double end
Compressor	West D H 16
Couplers, 1½ in x 36 in. flat end for 1½ in. rim	
Curtain fixtures	Side wnidows and vestibule
Material	Fabrikoid or Pantasote
Designation signs	Hunter
Door operating mechanism	Safety Car Services Co.
Fare boxes	Center platform
Wheelguards	Six bar, H. B. lifeguard
Gears and pinions	Pressed steel
Governor hand brakes	West S 6 A Norway iron
Heater equipment, not specified	
Headlight	Golden Glow S. M.-95
*Journal bearings	
*Journal boxes	
*Lightning arresters	
Motors	2-West, 506-AM-2
Paint	Varnish, light mahogany
Registers	Stone & Webster standard
Sanders	Air, furnished by builder
Sash fixtures, not specified	
Seats	Heywood Bros, 57-SF steel mahogany
Seating material	Rattan, 16 in. x 32 in. cushions
Slack adjuster, not specified	
*Springs	
Step treads	½ in. x 10 in.
Trolley catchers or retrievers	Ideal
Trolley base	1½ in. x 16 in. x 16 in.
*Trolley wheels or shoes	
Trucks	Brill 29 E-1
Ventilators	Utility standard
Wheels (type and size)	Southern Wheel Company, standard
Special devices, etc., 24 in. dia., 2½ in. tread; 1 in. flange; ⅜ in. deep	

*In general no new departure from American Electric Railway Association standards.

Track and Roadway

Kenmore, N. Y.—Louis P. A. Eberhardt of Kenmore proposes the formation of a company to finance the construction of a double-track electric line along the Buffalo city line between Delaware Avenue and the River road, a distance of two miles. The line would connect the village of Kenmore with the new Niagara River industrial district.

Montreal, (Que.) Tramways.—Engineers representing the city of Montreal and the Montreal Tramways are making a survey of the route of a proposed electric railway line over Mount Royal from Shakespeare Road to Mount Royal Avenue.

Abilene (Tex.) Street Railway.—The track and equipment of the Abilene Street Railway will be repaired at a cost of $60,000.

NEW YORK METAL MARKET PRICES

	April 1, 1920	May 1, 1920
Copper, ingots, cents per lb	18.50	19.25
Copper wire base, cents per lb	22.25	23.00
Lead, cents per lb	9.25	9.25
Nickel, cents per lb	45.00	45.00
Spelter, cents per lb	8.70	8.45
Tin, cents per lb	63.75	61.50
Aluminum, 98 to 99 per cent, cents per lb	33.00	33.00

OLD METAL PRICES—NEW YORK

Heavy copper, cents per lb	16.50 to 17.00	16.50 to 16.75
Light copper, cents per lb	14.25 to 14.50	14.00 to 14.50
Heavy brass, cents per lb	9.75 to 10.25	10.25 to 10.50
Zinc, cents per lb	5.00 to 5.25	5.00 to 5.25
Yellow brass, cents per lb	9.00 to 9.25	9.00 to 9.50
Lead, heavy, cents per lb	7.75 to 7.87	7.25 to 7.75
Steel car axles, Chicago, per net ton	35.00 to 36.00	33.00 to 34.00
Old carwheels, Chicago, per gross ton	39.00 to 40.00	36.00 to 37.50
Steel rails (scrap), Chicago, per gross ton	30.50 to 31.00	29.00 to 30.00
Steel rails (relaying), Chicago, gross ton	34.00 to 35.00	31.50 to 32.50
Machine shop turnings, Chicago, net ton	16.50 to 17.50	12.50 to 13.00

ELECTRIC RAILWAY MATERIAL PRICES

Rubber-covered wire base, New York, cents per lb	30.00	28.00 to 30.00
Waterproofed wire (100 lb. lots), cents per lb	30.00	28.00
T rails (A.S. C. E. standard), per gross ton	55.00 to 57.00	55.00 to 57.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	55.00 to 57.00	55.00 to 57.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton*	45.00 to 47.00	45.00 to 47.00
T rail, high (Shanghai), cents per lb	3.00	3.00
Rails, girder (grooved), cents per lb	3.00	3.00
Wire nails, Pittsburgh, cents per lb	4.00	4.00 to 4.50
Railroad spikes, drive, Pittsburgh base, cents per lb	3.35 to 3.85	3.00 to 5.00
Railroad spikes, screw, Pittsburgh base, cents per lb	7.50 to 9.00	7.50 to 9.00
Tie plates (flat type), cents per lb	3.00 to 4.00	3.00 to 4.00
Tie plates (brace type), cents per lb	3.00 to 4.00	3.00 to 4.00

ELECTRIC RAILWAY MATERIAL PRICES

	April 1, 1920	May 1, 1920
Tie rods, Pittsburgh base, cents per lb.		
Fish plates, cents per lb	3.50 to 4.25	3.00 to 4.00
Angle plates, cents per lb	3.50 to 4.25	3.00 to 4.00
Angle bars, cents per lb	....	2.45 to 4.00
Rail bolts and nuts, Pittsburgh base, cents per lb	4.50 to 6.50	4.50 to 6.50
Steel bars, Pittsburgh, cents per lb	3.00 to 5.00	3.75 to 4.00
Sheet iron, black (24 gage), Pittsburgh, cents per lb	5.00 to 8.00	5.00 to 8.00
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	6.27 to 8.27	6.00 to 8.00
Galvanized barbed wire, Pittsburgh, cents per lb	4.60	4.60
Galvanized wire, ordinary, Pittsburgh, cents per lb	4.20	4.20
Car window glass (single strength), first three brackets, A quality, New York, discount†	77%	77%
Car window glass (single strength), first three brackets, B quality, New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York, discount	79%	79%
Waste, wool (according to grade), cents per lb	24 to 29	24 to 29
Waste, cotton (100 lb. bale), cents per lb	18	18
Asphalt, hot (150 tons minimum), per ton delivered	....	....
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton	32.00	32.00
Asphalt filler, per ton	30.00	30.00
Cement (carload lots), New York, per bbl	2.80	2.80
Cement (carload lots), Chicago, per bbl.	2.00	2.00
Linseed oil (raw, 5 bbl. lots), New York, per gal	1.77	1.90
Linseed oil (boiled, 5 bbl. lots), New York, per gal	1.79	1.92
White lead (100 lb. keg), New York, cents per lb	15½	15½
Turpentine (bbl. lots), New York, cents per gal	2.16 to 2.36	3.00 and upward

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* U. S. Steel Corp.

† These prices are f.o.b. works, with boxing charges extra

Central Texas Electric Railway, Waco, Tex.—The Central Texas Electric Railway, which proposes to build an electric interurban line from Waco to Temple, a distance of forty-five miles, has awarded the contract for the construction of the first unit of the line to the Central Texas Engineering & Construction Company, Waco. The work will be done on a cost-plus plan, the interurban company furnishing all materials. The first unit of the line will extend from Waco to Robinson, a distance of 6½ miles. Motor cars will be used on this unit until electric power can be provided. C. A. Ryfle is president of the company.

Power Houses, Shops and Buildings

Decatur Railway & Light Company, Decatur, Ill.—The Decatur Railway & Light Company has under construction a 33,000-volt transmission line between Decatur and Riverton, Ill.

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—The Illinois Public Utilities Commission has issued an order granting the Bloomington & Normal Railway & Light Company a certificate of convenience and necessity for the construction of an 11,000-volt transmission line between Osco and Lynn.

Boston, (Mass.) Elevated Railway.—The Boston Elevated Railway plans to install a large terminal yard at Forest Hills. The cost of construction is estimated at $1,000,000. Edward Dana, general manager of the company, has applied to the State Department of Public Utilities for approval of the undertaking. The company seeks authority to purchase a large tract of land near Hyde Park as a site for the project.

Interborough Rapid Transit Company, New York, N. Y.—Transit Construction Commissioner John H. Delaney of the Public Service Commission has opened bids for the construction of a new steel inspection shed at the 100th Street yard of the Interborough Rapid Transit Company. Bids were as follows: Bethlehem Steel Bridge Company, $129,470; Terry & Tench Company, Inc., $135,960; Bainbridge Construction Company, $142,560; Bigelow & Nichells, $134,640, and McClintic-Marshall Company, $144,100.

Central Texas Electric Railway, Waco, Tex.—The Central Texas Electric Railway, which proposes to build an interurban line from Waco to Temple, Tex., will shortly begin work on a power station at Waco. C. A. Ryfle, Waco, is president of the company.

Trade Notes

American Steel & Wire Company, New York, N. Y., has transferred Charles R. Sturtevant of Worcester, educational director, to Cleveland, Ohio.

Crouse-Hinds Company, Syracuse, N. Y., manufacturer of condulets, is planning to build an addition, 70 ft. x 260 ft., to its foundry.

R. D. Nuttall Company, Pittsburgh, Pa., has appointed L. H. Klein general sales manager. W. H. Phillips has been made manager of equipment.

Bryant Marsh Division, National Lamp Works of the General Electric Company, Chicago, Ill., will occupy its new offices at 623-33 South Wabash Ave., Chicago, after May 1.

Standard Electric Welding Company, Philadelphia, Pa., has removed its plant from Emerald and Firth Sts. to 1939-41 East Sergeant St. The company is planning to install new electric welding apparatus.

J. H. White has been appointed manager for Cuba for the Westinghouse Electric International Company, with headquarters in the Royal Bank of Canada Building, Havana.

Wayne Oil Tank & Pump Company, Fort Wayne, Ind., is bringing out some new oil filters for turbines and engines and a complete oil-burning equipment for use under boilers.

Roller-Smith Company, New York, N. Y., announces the removal of its Cleveland office from the Williamson Building to the Vickers Building, Sixty-fifth St. and Euclid Ave. J. E. Wood, district manager, will continue in charge of this office.

Osgood-Bradley Car Company, West Boylston St., Worcester, Mass., manufacturer of electric cars, etc., is planning to build a three-story addition to its plant, to cost with equipment about $300,000.

Lincoln Electric Company, Cleveland, Ohio, is building an addition to its factory which will increase its manufacturing floor space by about 70 per cent. The new building will be used to increase the production of alternating-current motors and arc welders.

Western Electric Company, Inc., New York, N. Y., has established an office at 233 Harris Ave., Providence, R. I., in charge of N. I. Allen. The Rhode Island trade will be given special attention from this headquarters.

The Canadian Line Materials, Ltd., of Hamilton, Ont., has been incorporated by Thomas H. Barnard, John L. Counsell, Ralph R. Bruce and others. The company is capitalized at $200,000 and proposes to manufacture electric transmission and electric railroad line materials, etc.

National Conduit & Cable Company, Inc., Hastings-on-Hudson, N. Y., has during the past year made extensive improvements to its mills, having entirely remodeled and enlarged its cable mill. New equipment has been installed throughout, with a greatly enlarged capacity, to meet the ever-increasing demands for cable, etc.

Illinois Testing Laboratories, Inc., Chicago, Ill., electrical engineers, have moved into new and larger quarters at 430 South Green St. This change was made necessary on account of increasing business. It is proposed to increase the scope of the work, particularly along the lines of developing new apparatus and doing an increased amount of testing and engineering work.

Harrison Safety Boiler Works, Philadelphia, Pa., formerly conducted as a copartnership by Joseph S. Lovering Wharton, William S. Hallowell and John C. Jones, has been incorporated as the H S B W—Cochrane Corporation, with the following officers: President, Mr. Wharton; vice-president and general manager, Mr. Jones; secretary and treasurer, Mr. Hallowell; general sales manager, Horace E. Sibson; general works manager, Axel B. Wallem.

Link-Belt Company, Chicago, Ill., is expanding its works in Chicago, Indianapolis, Philadelphia, Seattle and Toronto. New manufacturing facilities have been added to the several plants and the personnel of both the factories and sales offices has been increased. The company announces its purchase of the Fairmount foundry, at Philadelphia. A new administration building is also under construction at the Philadelphia plant, a similar building is to be erected at Chicago and a new warehouse is under construction at Seattle. A. C. Johnson, formerly chief engineer of the Chicago works, has been elected a vice-president of the company and resident general manager at Chicago. He succeeds Prentiss L. Coonley, who recently resigned to become president of the Isko Manufacturing Company.

New Advertising Literature

General Electric Company, Schenectady, N. Y.: Bulletin No. 48,020, on reversing planer motors.

Star Fuse Company, New York, N. Y.: A folder listing and illustrating its fuses under it most recent prices.

Standard Underground Cable Company, Pittsburgh, Pa.: Bulletin No. 500-T, a forty-page illustrated booklet on "Standard Rubber Insulated Wire," for all purposes.

Root Spring Scraper Company, Kalamazoo, Mich.: A pamphlet, "Evidence," containing a list of railways now using this company's scraper. A spring scraper for safety cars or any city car is shown.

Condensite Company of America, Bloomfield, N. J.: A booklet, entitled "Condensite," for engineers, designers and purchasers, in which it describes the properties of condensite, shows how it is molded, how to design it and how to specify it.

All-Steel-Equip. Company, Aurora, Ill., manufacturer of electrical boxes and specialties, etc.: A new price sheet, No. E-25, on its outlet box covers, showing the addition to its line of the several "approved" covers, and also the addition of covers to take the P. & S. sign receptacle. Previous covers were unapproved, while now all covers are made in the approved style.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 55 New York, Saturday, May 8, 1920 *Number* 19

Will He Hoist? He Has

NELLIE, the beautiful sewing machine girl, has indeed fallen upon evil days. Her habiliments cost more, a great deal more, than they formerly did. Her hallroom costs her more. The movies cost her more. And now her New York *Evening Journal* is going to cost her 3 cents. Willie Hoist, alias Hearst, says so. And Mr. Hoist knows. He is a law unto himself when it comes to fixing prices. No franchise provision or public service commission stands between him and the attainment of a profit. He is after all the traffic will bear. On one day's notice Nellie had to choose whether it were better to do without "Advice to the Lovelorn" and the great serial "When a Girl Marries" or pay 3 cents each evening where she formerly paid 2 to learn how to distinguish between a lounge lizard and a young man with honorable intentions. It was serious business for Nellie. We know now why Mr. Hearst fought to save Nellie from the robber traction barons of New York City. It turns out that he wanted Nellie for himself.

Potential Competition Is Nature's Corrective of Excessive Fares

IN ALL this pother and turmoil concerning demands, or rather implorings, for higher rates of fare the communities which recklessly reject such application regardless of merit fail to consider the fact that the electric street and interurban railway of today is no longer a monopoly. Even a monopoly, as the old expression went, could not afford to "charge more than the traffic would bear." Today the electric railway cannot lightly afford to charge more than the competing jitney bus and private automobile do. We all know how easy it is in these times to extemporize a makeshift transportation service which, though far inferior to the railway, has served the politician as a club up to the day when the jitney drivers over-reach themselves. Not all railways have either the courage or the resources of a Doherty. They have so exaggerated a fear of subsidized, ragamuffin competition that it is hardly conceivable that they would ask for a fare high enough to induce such competition to become permanent. Another corrective is the private automobile. So much has been said about the automobile's advance in smaller cities that its fare-regulating force there calls for no argument. Such a large percentage of the population now possesses cars that it is only by making the service attractive that traffic will be held at its maximum, at least in pleasant weather. For these reasons the electric railway can no longer be considered a monopoly. Electric railways must therefore tread so warily in the matter of fare increases that their own common sense will keep them from asking for more than they can reasonably expect to get from a public that can fall back upon the jitney, the automobile, the motorcycle and the still-vigorous bicycle.

Organized Employees Must Live Up to Their Agreements

LAWLESS labor has again been rebuked. The occurrence was at Rochester, N. Y. There the men in the employ of the New York State Railways, taking things into their own hands, went out on strike in direct violation of the principle of arbitration. They were out three days. It was as raw an instance of its kind as has been witnessed recently. And that is saying a great deal. The people of Rochester, however, were in no mood to be trifled with. They reacted to the strike in a way similar to that of the general public in the recent outlaw railroad strike. President Mahon of the Amalgamated acted after the damage had been done. He threatened to revoke the local charter. In the outlaw railroad strike he was quick to issue a warning to the members of the organization of which he is the head. Of course, it may be that he was not sufficiently well in touch with affairs in Rochester to have appreciated the attitude which the men there took it upon themselves to assume. This attitude could hardly have been unknown, however, to the local president of the Amalgamated. Even this official had to threaten to resign before the men came to their senses. Syracuse and Utica men have also heeded the warning.

Out in Cleveland a situation existed somewhat similar to that in Rochester. The public there was becoming aroused. The *Plain Dealer* declared there should be no strike. A truce was apparently reached there on May 5, but all danger does not seem to be over. Mr. Mahon's opportunity has not been destroyed. He should act promptly. No doubt should be allowed to remain in the minds of union men anywhere that they can disregard agreements entered into solemnly without incurring the wrath of the parent labor body of which they are a part.

Every Employee Should Be a Capitalist

THE most satisfactory employees for a public service company, or for any other employer for that matter, are those who have invested some money in good securities, real estate or building and loan association shares. These employees realize that people are not divided into two classes, laborers and capitalists, but that the normal condition of the laborer is to have some capital accumulated, while the so-called "capitalist" is likely to be at least as diligent a laborer as those who are often referred to as such.

Much of the present unrest has been caused by false conceptions of work. As was pointed out by James H. McGraw in his paper read before the Chamber of Commerce of the United States at Atlantic City last week, "We have come to believe that the men who provide the management ability, the men who provide the money and the men who provide the manual skill and the labor of production are different kinds of men." A little knowledge of economics would show the fallacy of this, for as soon as a manual worker begins to use his head and to practice thrift he finds himself a tripartite personality at once.

To the extent that it can be done without paternalism, an employer is warranted in encouraging his employees to save and invest. He can do this with good grace if he is paying equitably for the service which he receives. He should in fostering thrift, we think, be frank as to why he does it, explaining that employees who own their own homes or who have money working for them are more desirable than those who do not.

The average employer cannot tell his workers that, as capitalists, on however small a scale, they are also better citizens. They would resent this as "preaching," but it is true nevertheless. The irresponsible agitators in this country as elsewhere are those who have nothing to lose and everything to gain (they think) by stimulating unrest and unproductiveness. The countries in which bolshevism has not taken root are those in which the ratio of investors to population is high.

As is pointed out by a writer in the current *North American Review*, capital is the surplus of production over consumption. Obviously those who are consuming more than they produce are contributing to the destruction of capital, which in the last analysis is neither more nor less than the means for providing people with the opportunity to work. The only man who knows anything about capital, and what it can do to make life easier and pleasanter, is the one who has accumulated some and put it to work.

Lessons of the Switchmen's Strike for the Electric Railways

PARTICULARLY in the Middle West the electric railways have been called upon to handle freight shipments in unprecedented quantities due to the outlaw strike of the railroad switchmen. This has given them an opportunity to demonstrate to hundreds of new customers the really fine service they are able to give. They have been placed in the favorable position of having their service sought after by many large shippers who have heretofore been little interested in the electric way. A permanent benefit will come from this emergency, for many of the new friends thus made will be retained. This is assured because, despite the suddenness with which this freight business has increased, the electric railways have been able, from all reports at hand, to maintain their practice of moving all merchandise offered the same day it is received.

Several lessons can be drawn from the experience of the electric railways during the switchmen's strike. One weakness, which was forcibly emphasized in Chicago, was the remoteness of location of the interurban receiving stations. The exceedingly long hauls thus made necessary for the shippers' trucks and the trucking companies whose service was largely used in this connection really formed the limiting feature in the amount of business which the electric railways handled. This forms a lamentable commentary on the inability of the surface line companies and the interurban companies to develop an arrangement for moving merchandise shipments to these outlying terminals during the small hours of the night, when the street car service is infrequent. A determined and concerted action should now be undertaken to bring about this arrangement, for it would not only produce a good revenue for the city lines but would multiply several times the amount of merchandise dispatch business which the radiating interurban lines could secure. This is a condition not confined to Chicago, but Chicago offers one of the finest opportunities for this manner of developing the value of the electric lines to the community.

This trucking limitation has also pointed out the desirability and almost necessity of a pick-up and delivery service to be operated under the control of and in conjunction with the interurban companies. Britton I. Budd, president Chicago, North Shore & Milwaukee Railroad, has blazed the way in this connection in Chicago by placing an initial order a few days ago for three tractors and fifteen trailers to be used in feeding merchandise shipments to the electric lines. The inauguration of this pick-up and delivery service, coupled with receipt of the merchandise by the consignee almost invariably within twelve hours from time of shipping, will certainly give a most effective inducement to the shipper to route his merchandise the electric way. It means better than express service at freight rates.

One other phase of the electric freight service during the strike is worthy of comment. A great deal of freight was offered to the Detroit United Railway and Michigan Railway in various Michigan cities for shipment to points south, west and east and to the Chicago, Lake Shore & South Bend Railway in Chicago for shipment to points south and east. These shipments were accepted in large numbers and delivered to points as remote as Louisville on the south, Cleveland on the east and Chicago on the west. While such shipments were delivered with reasonable expedition, the transportation involved a most circuitous routing in many instances. For example, shipments from Chicago to Cleveland had to be routed over nine different roads from Chicago to South Bend, to Elkhart, Peru, Fort Wayne (Ind.), Lima, Findlay, Fostoria, Fremont and Cleveland—these towns marking the route and the interchange points between different lines. What it is desired to point out here is that the number of interchanges could be reduced to four, the mileage and time reduced by nearly one-half, and perhaps the shortest route from Chicago to Toledo, Detroit and Cleveland established by the building of only about 15 miles of new line between Angola, Ind., and Pioneer or Bryan, Ohio.

Moreover, the building of a link of less than 15 miles between Ridge Farm and Paris, Ill., or better, a 30-mile link from Danville, Ill., to La Fayette, Ind., would connect up the great Illinois Traction System with all of the network in Indiana, Ohio and Michigan.

The possibilities that this simple connecting up of systems would offer for through l.c.l. shipments in normal times as well as in an emergency are very great. To handle a through interchange of carload freight would of course involve many other considerations, but the through movement of l.c.l. shipments could be built up immensely by building this short gap and simplifying the interchange between lines. Even now the interchange arrangements at the termini of the various lines are the only barriers to the development of through shipments of l.c.l. freight from Bay City and Grand Rapids or Milwaukee on the north, Cincinnati and Louisville on the south, Aurora and Elgin on the west and Detroit, Toledo and Cleveland, and even Buffalo, on the east.

There are numerous limitations at present to the full realization of such a program, but are these not really small compared with the opportunity which their removal would open up for the development of the electric railways? What we need is an Insull of the electric railway field to preach the advantages and economies of the interconnection of electric railways—power systems and tracks—just as it is being talked and developed in the power and lighting industry.

Laying Bare the Facts a Good Omen

IN CHICAGO last week the Public Utilities Commission held the first of a series of public hearings for the purpose of receiving testimony as to the financial difficulties of the public utilities. These hearings were asked for by the utility companies after a careful consideration of what means might be effective in alleviating their inability to finance capital expenditures for much-needed extensions and betterments. A number of them are unable to float any securities at any rate of return; others, even those with the most satisfactory record of earnings, are able to float new permanent financing only at a rate considered prohibitive.

This hearing was characterized by an unusual degree of candor on the part of utility and bank executives in describing the situation. The difficulties were attributed chiefly to the general stringency in the money market resulting from an overextension of credit, to the political demagogues whose continual attack upon the utilities has brought grave distrust of their securities and to the fact that the net earnings of the majority of the utilities have been too meager to stimulate or even preserve interest in their securities as sane speculation or safe investment. These combined causes have brought all utility companies, weak and strong alike, into the same predicament as regards new financing. The only difference is a matter of degree.

Some question arises as to what good can come from such a hearing which brings into full public view the really serious conditions which surround utility stocks and bonds. The strong companies may not only not profit by such frank statements made by men who know but they may actually suffer as a result. These stronger companies could afford to pay temporarily the higher rates for new money. So the hearing was not called for their benefit. Nor was it with the idea of educating the commission, for its members know the situation.

Its real purpose then was based on the hope that, risking a possible detriment to the few sound utilities for the sake of the whole utility field, there would come out of the hearing a goodly amount of publicity tending to show the public the correctible causes for the present plight and convince it that higher rates must be approved to save these great services, thereby providing support rather than condemnation for the commissioners in their task of adjudicating adequate rates.

At the time of this writing, three days after the first day's hearing, it may be said that the hoped for result has been realized to a gratifying degree. Fortunately, General Dawes, a prominent banker and highly esteemed citizen of Chicago, who has no favors to ask nor anything to lose, made a telling attack on the unscrupulous politicians in the City Hall who have continually made the utilities the issue on which to ride into office, saying they were directly responsible for the present financial and service weaknesses of the companies. He referred particularly to the transportation companies. This ingenuous and ardent flaying of the City Hall, coming from a man of broad reputation, gave just the "punch" needed for publicity, and all the newspapers gave front page space and large headlines to the General's statement and the testimony of the other witnesses. The news of the hearing has been followed up by a number of editorials in several of the Chicago papers. These have discussed the problems of the utilities in a very satisfactory way, showing that the editors have derived a new grasp of these problems and, incidentally, that it is very much worth while to get the bankers to discuss the public utility credit situation.

So it may be said that while, for the moment, such a hearing as the one in Chicago brings forth a lot of gloom about utility securities, the ultimate outcome will be beneficial. Certainly there is no better way to clear up the situation when it is controlled by the public than to go to the public with the facts, for nearly every one concedes that the great American public is fair. The problem is mainly that of getting the true situation before it.

Will the Curve Start Up Again?

IN LINE with this hopefulness for an ultimate beneficial outcome appears the discussion this week by O. B. Willcox, of Bonbright & Company, whose connection with the Investment Bankers' Association as chairman of its committee on public service securities has given him an especially good opportunity to judge conditions in the utility field.

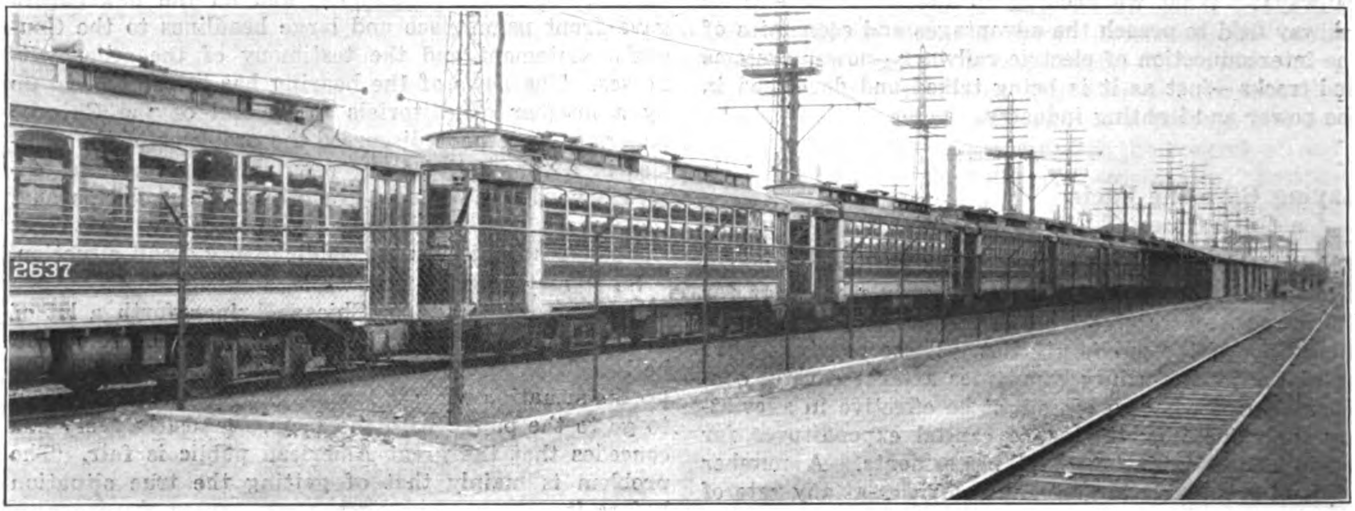
We might say that Mr. Willcox describes or plots the curve of public utility financing up to the present, and from this and from his conception of the present fundamental public attitude he predicts the future trend. The situation as described in the Chicago hearing, a report of which is also published, might be said to represent a point on this curve, the last point which we have been able to plot, and this we would emphasize, that the two positions, conflicting as they might seem at the first glance, are really complementary.

No curve of human events ever merely happens. The fact that an upward trend in this curve is predicted does not mean it will come of itself. Rather is there indicated necessity for that human endeavor, that intensive and fearless thinking which seems to have been present at the Chicago hearing. Mr. Willcox has indicated that there is now fertile ground from which satisfactory results may be obtained, and that there is a better conception on the part of the public than ever before of the dangers of low fares and confiscatory values and of the necessity from a purely selfish standpoint of fair treatment of utility enterprises. But this does not mean that hard work to confirm this situation is not necessary. We believe an outstanding effort to assist in this movement has been made by the Chicago hearing.

Handling Shipyard Traffic at Sparrows Point

How the United Railways & Electric Company of Batimore, Md., in Co-operation with the Government and the Bethlehem Steel Interests, Solved a Difficult Peak-Load Transportation Problem

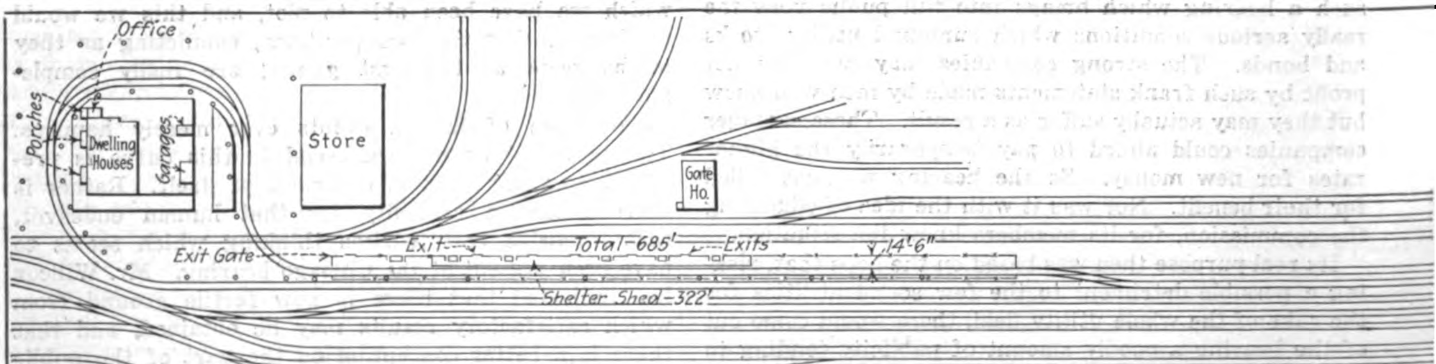
BY L. H. PALMER
Assistant to the president, United Railways & Electric Company



ENCLOSED AREA WITH ELECTRIC TRAINS IN PLACE AND ROW OF ENTRANCE GATES LEADING TO ENCLOSURE
Note non-scalable fence. Cars are those purchased by Emergency Fleet Corporation

ONE of the effects of the war was a tremendous stimulation of the shipbuilding industry in many parts of the country. It was natural that Baltimore should participate in this development, partly because of its natural advantages as a manufacturing city through being on tidewater and near the coal and iron fields and partly because Sparrows Point, close to Baltimore, was already the site of large steel mills belonging to the Bethlehem Steel Company. The Bethlehem Shipbuilding Corporation, a subsidiary of the steel company, erected a great plant here. The transportation of the workers to it and the steel plant, the total being increased more than fourfold by the war activities, imposed a heavy transportation problem upon the United Railways & Electric Company, whose line ran about one-half mile from the shipbuilding plant, and upon the Pennsylvania Railroad, whose track ran directly to the shipyard entrance. The Baltimore & Ohio Railroad also had a line to Sparrows Point, but it gave freight service only in this district.

Negotiations were initiated by the shipbuilding company looking to the construction of a branch of the electric railway to the gate of its plant, and in due course a contract to this end was signed by the Emergency Fleet Corporation, the Bethlehem Shipbuilding Corporation, the Bethlehem Steel Company and the United Railways & Electric Company for the construction of a double-track spur to the shipyard gates. This article



DETAILS OF ENCLOSED AREA AND ENTRANCE GATES SHOWN IN PICTURE ABOVE—ON OPPOSITE PAGE, TRACK AND SIGNAL LAYOUT AT STEAM ROAD CROSSINGS AND JUNCTION WITH UNITED RAILWAYS' MAIN LINE deals with the layout and operation of this extension, including a rather elaborate prepayment station. I understand that the editors of this paper have arranged for a special article on the signal system to appear soon.

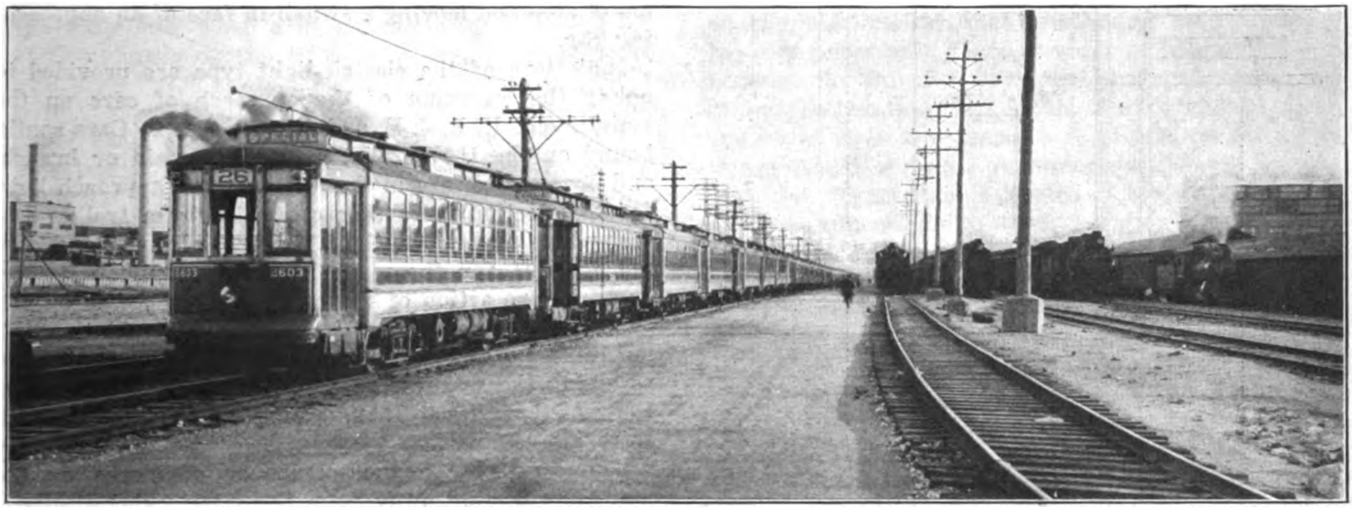
The Emergency Fleet Corporation had financed the purchase of fifty new cars for use in handling shipyard workers and assisted in the financing of this track extension to the yards on right-of-way furnished by the Bethlehem corporation.

As the sidings used by the Pennsylvania Railroad for passenger train service to the shipyard are located to the west of the electric railway tracks, in order to make room for the construction of this spur it was necessary to rearrange the yard tracks of the steel company and the shipbuilding corporation and to relocate the spur tracks used by the steam passenger trains. Involved in this relocation was the moving of brick sheds, approximately 1500 feet long, where furnace-lining bricks were stored. This one task itself was of no mean magnitude, particularly when performed under war conditions.

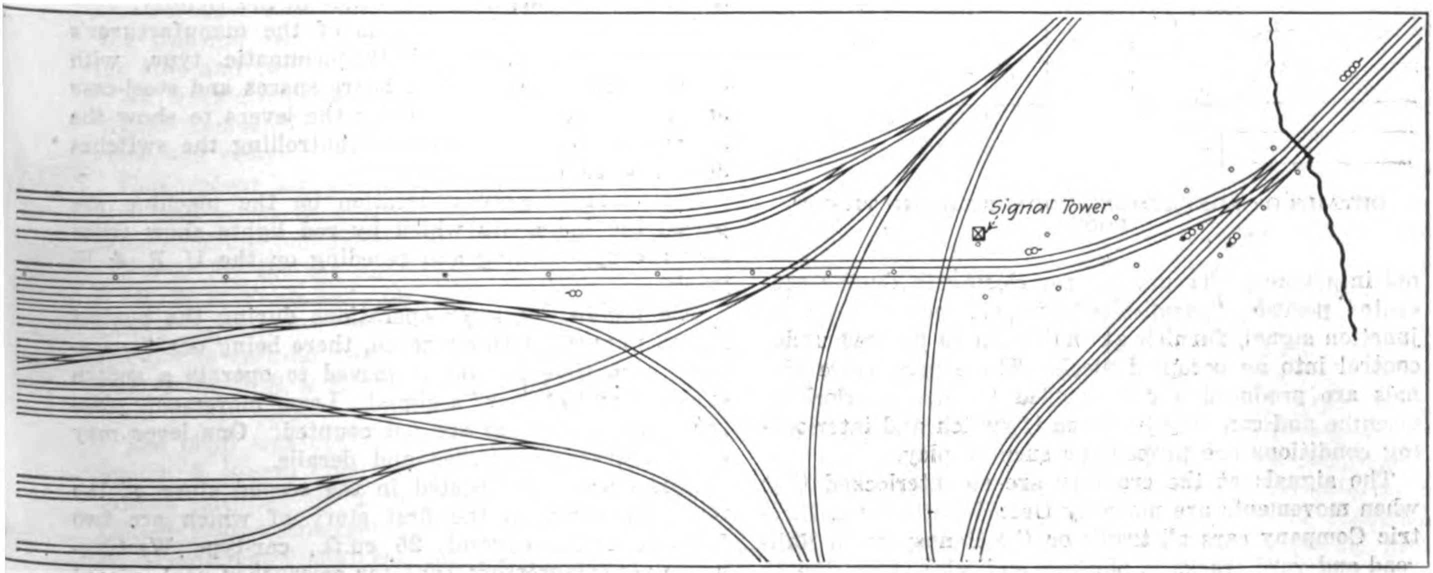
The electric railway spur consists of a double track, terminating in a loop at the main entrance to the yards, with an inner loop track. The track crosses the Pennsylvania main-line track to Sparrows Point and two freight tracks of the Bethlehem Steel Company, all of which are protected by an electro-pneumatic signal and interlocking plant which governs the movement of trains on the electric tracks to and from the main line.

The main line of the electric railway at this point was equipped some time ago with continuous track circuit-controlled automatic block or spacing signals, and in order to handle safely, economically and without unnecessary delay the heavy traffic into and out of the new branch an interlocking plant, with suitable signals and derails, was required. After careful study the electro-pneumatic type of track circuit signal was selected as one which would provide safety with required speed of operation and a contract for the latest type material and its erection was awarded to the Union Switch & Signal Company of Swissvale, Pa., the same company which had equipped the main line with automatic signals.

This interlocking plant controls the two branch-off switches, two switches in the yard tracks, two Hayes derails on the U. R. & E., four Hayes derails on the yard tracks, seven color light-type signals on the U. R. & E., two high main-line-type position-light signals on the P. R. R. and four dwarf-type position-light signals on the yard tracks.

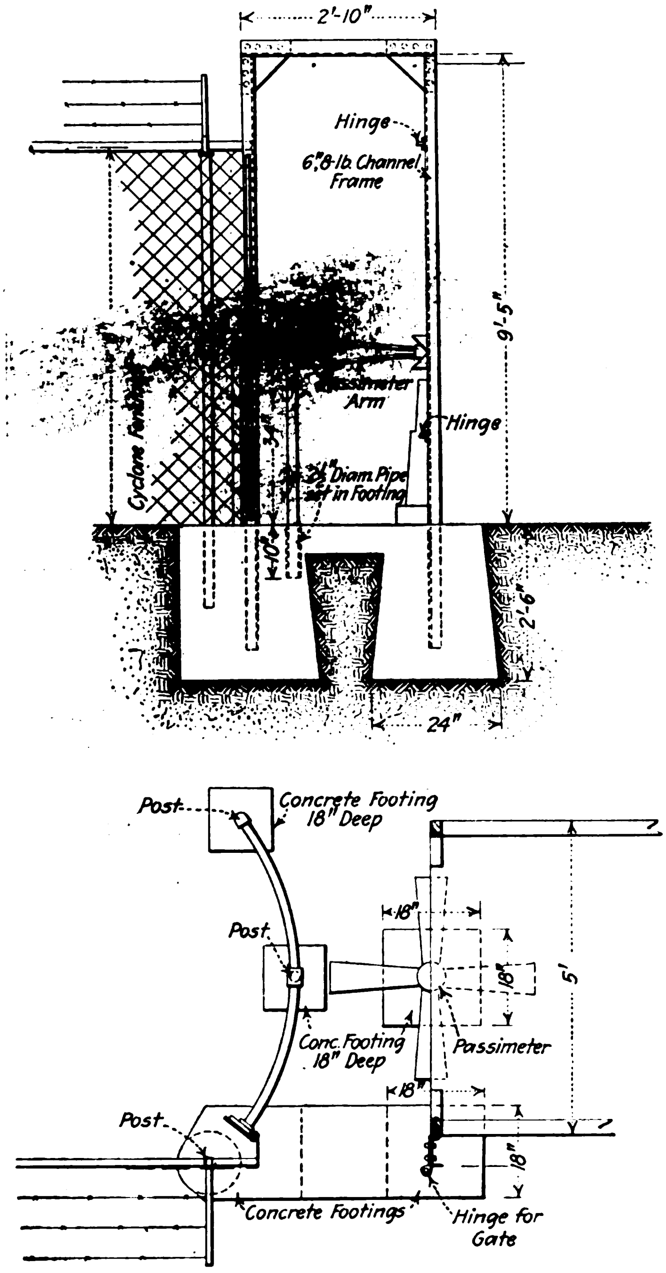


PARKED ELECTRIC AND STEAM TRAINS READY FOR THE 4 O'CLOCK CROWDS



The signaling at the branch-off or junction is such that southbound cars are given either an indication to the main track (straight) or to the branch and northbound cars from the main line or from the branch, the signals being selected according to routes established by the position of the switch in advance.

These signals are also a part of the block system and as such are controlled by track circuit to the next signal in advance. To provide for closing in during congested periods, "permissive" signals, located on each junction signal, furnish an indication to proceed under control into an occupied block. These permissive signals are produced and controlled by the interlocking machine and can only be given if switch and interlocking conditions are proper for such display.



DETAILS OF PREPAYMENT TURNSTILE AND TICKET BOOTH

The signals at the crossing are so interlocked that when movements are made by United Railways & Electric Company cars all traffic on the Pennsylvania Railroad and yard tracks is blocked, and, vice versa, the U. R. & E. cars are blocked when traffic moves on the P. R. R. or yard tracks.

Further junction and crossing protection is furnished by track circuits which require cars to be clear of the junction or the crossing before opposing or conflicting movements can be made.

All switches and derails are controlled by track circuits and they cannot be moved when cars are standing upon them.

Approach locking is also provided to prevent the machine leverman from suddenly placing a proceed signal at stop and moving a switch in face of an approaching car.

Indicators of the electric-light type are provided to notify the leverman of the approach of cars on the main line of U. R. & E. and from the loop. Cars southbound on the U. R. & E. may go to main or branch, and properly to inform the leverman the approach light for this section is further controlled by a trolley contact which flashes the light if for the branch and does not flash if for the main line, this result being secured by the action of the car in taking power or not according to the desired destination. Should the trolley contact be improperly operated, the motorman, on receiving the wrong signal, presses a key located near the junction signal L-12, giving in code information as to his destination.

The occupancy or non-occupancy of blocks on the main line leading away from the interlocking limits is also indicated by lights placed under the levers on the machine.

The installation of this branch-off or loop created a traffic that was too dense for the blocks on Bear Creek trestle north of the branch-off, with ruling time of eighty seconds on the northbound track and 100 seconds on the southbound track. Accordingly, two new blocks were added on each track and the ruling block between this interlocking and north end of draw is now forty-five seconds on the northbound track and forty-five seconds on the southbound track. During rush hours cars enter the main line every ninety seconds from the branch.

INTERLOCKING PLANT HAS ALL MODERN FEATURES

This signaling is invaluable, particularly during the heavy fogs which sometimes prevail due to the low-lying land and large area of water in the vicinity.

The interlocking machine is of the manufacturer's latest model, No. 14, electro-pneumatic type, with eleven working levers, four spare spaces and steel-case and light-type indicators under the levers to show the leverman when track sections controlling the switches are occupied or unoccupied.

In the same general location on the machine are placed the indicators which by red lights show when cars are approaching and receding on the U. R. & E. tracks.

The number of lever operations during the busiest fifteen minutes is thirty-seven, there being one "operation" each time a lever is moved to operate a switch or derail or to "clear" a signal. Lever movements placing a signal to stop are not counted. One lever may operate several switches and derails.

This machine is located in the second story of the tower building, in the first story of which are two 600-volt direct current, 25 cu.ft., car-type Westinghouse air compressors (one for emergency use), placed one above the other, and the relays in a steel cabinet with glass doors. The compressors are automatically controlled to hold the air pressure between 40 and 50 lb.

During rush hours the motor compressors operate only two out of thirty-seven minutes.

Suitable condensing pipes and tanks for collecting all moisture in the air are located on the outside of the building.

The compressed air is used to operate the switches and Hayes derails through the medium of cylinders and movements with electro-magnetic valves, which require air only when a movement is to be made.

The signals on the U. R. & E. are the manufacturer's style "N," electric light, with 6-in. lenses, which give a range of 1500 ft. under severe sunlight conditions, each lens being equipped with two 23-watt, 110-volt lamps burning in multiple. Yellow is used for "proceed," red for "stop" and red with small yellow underneath for "permissive" indications.

The position-light high signals on the P. R. R. tracks display four lights of yellowish tinge in a horizontal line for stop and four in a vertical line for proceed. The position dwarf signals have two lights horizontal for stop and two at 45 deg. for proceed.

All track-circuit apparatus is of the Union Switch & Signal Company's manufacture, with latest model 15 vane-type relays.

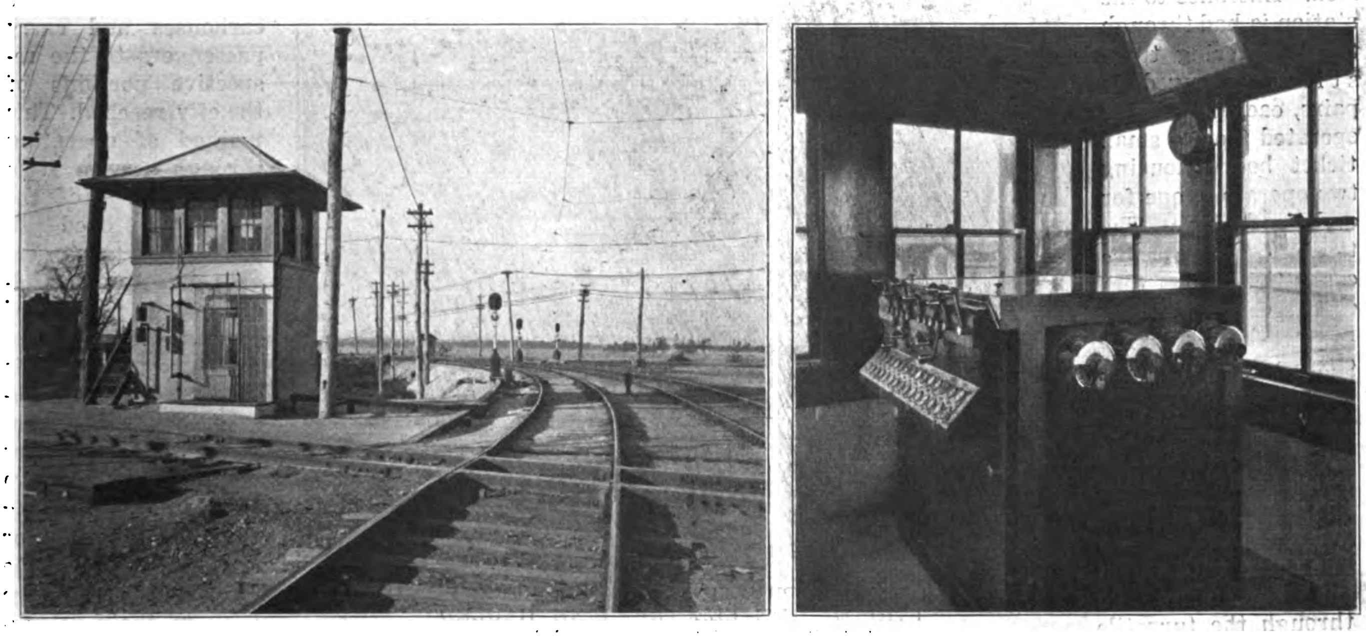
Compressed air is distributed by 1-in. galvanized pipe and wires in grooved lumber, both mounted on same concrete foundations placed every 7 ft.

Power for the air compressors is supplied from the U. R. & E. Company's 600-volt feeders and the alternating current for signals, switch valves and track circuits is secured from the 2200-volt, 25-cycle mains used in the U. R. & E. Company's signal system, stepped down to 110 volts.

The plant was designed and installed by the Union Switch & Signal Company in accordance with specifications outlined by J. J. Coleman, engineer of the United States Emergency Fleet Corporation, and W. W. Wysor, chief engineer, and H. C. Bushnell, superintendent of power, United Railways & Electric Company.

After passing interlocking territory the electric cars proceed to the prepayment area, discharge their passengers and proceed around the loop. Most of the cars that run to the shipyards, after completing their morning work, are stored on the inbound track during the day, a shuttle car being operated on the outbound track from about 9:30 to 2 and a two-car train shuttle from 2 to 4.

The latter is necessary on account of the coming of the men to work for the afternoon shift. This shuttle connects at the interlocking tower with the main-line service. There is more or less casual travel between the shipyard office and the city, which makes it imperative to provide this shuttle service during the hours when the demands for traffic do not necessitate through service. A representative of the transportation department is located at the shipyard all day and has supervision of the operation and storing of cars. During the day a representative of the shops department goes down to this location and gives the cars a running inspection, remedying any slight defects which the inspection may disclose or making such adjustments as are necessary.



AT LEFT, SIGNAL TOWER AT CROSSING OF MAIN TRACK OF P. R. R. AND DOUBLE TRACK OF U. R. & E. CO. AT RIGHT, INTERLOCKING MACHINE IN SIGNAL TOWER

In the afternoon, shortly before 4 o'clock (when the shipyards dismiss), the crews of the stored cars, who had been sent home in the morning, report back and are assigned to their places and prepare the cars for carrying the traffic back to the city. The cars are loaded in the prepayment area and as soon as they have received their passengers proceed around the loop and back to the city, without making a stop until they have crossed the Bear Creek trestle.

The shipyards dismiss from 6,500 to 7,000 employees in twelve to fourteen minutes, a recent check showing that 6,900 workers had left the premises in thirteen minutes, barring a few stragglers who remain behind for one reason or another. The releasing of such an army of workers in so short an interval of time illustrates the acuteness of the traffic conditions which the electric railway faced. Thus, in order properly to handle its portion of the traffic it was essential to provide a prepayment area, so that the loading of individual cars could be controlled. This has been successfully accomplished. Within four minutes after the 4 o'clock whistle blows the first of the trains of two and three cars begins to move, and by 4:25 thirty-five or forty cars have left the loop and are on their way back to Baltimore.

As will be seen from the accompanying illustrations, the prepayment station consists of a loading platform, which is 685 ft. long and 14½ ft. wide, enclosed by a non-scalable wire fence. For a distance of 322 ft. in the center of the station a shed has been erected to protect passengers during bad weather. The rear side of this is closed in, forming the fence for this portion of the prepayment station. The roof and sides consist of corrugated iron, supported in the metal framework of the building, which, with its fittings, is also galvanized.

VIEW AT 4 P.M. ON APRIL 14 DURING THE RECENT RAILROAD STRIKE. THE ELECTRIC LINE HAULED SUCCESSFULLY THE WHOLE LOAD.

The openings for the entrance and exit of the cars are guarded by watchmen. Entrance to the station is had through ten registering turnstiles arranged in pairs, each pair being operated from a small ticket booth housing two operators, one for each machine. The ticket takers receive cash, tickets or fare checks, as the case may be, making change when necessary. Tests show that each turnstile is capable of admitting, as a maximum, from forty-five to fifty passengers per minute. The speed with which the passengers go through the turnstile is accelerated by the use of tickets, which employees of the steel company can purchase at its office, or by the use of metal fare checks. To simplify fare collection, all passengers entering the cars through the prepayment area are required to pay two fares, which carry them to the eastern city limits. Passengers living in the single-fare zone board other cars on the inner loop and pay their fare in the usual way to the conductor.

Located at convenient intervals in the fence are sliding exit gates, 7 ft. wide, which are normally left open, so that passengers arriving at the shipyard can readily pass out to the yard entrances, the prepayment station being used as such only at the 4 o'clock rush hour. Just prior to this time the station is cleared of all persons, the exit gates are closed and locked, the watchmen station themselves at their appointed places and the ticket takers go to their respective booths.

The prepayment station can accommodate thirteen standard cars, and there is sufficient track space outside for thirty-seven additional. The cars are operated in units of two or three per train. Due to the track and road layout at the entrance to the shipyard, it was not deemed feasible to locate the prepayment station at the outgoing track, so that the cars must go around the loop after they have been loaded. The cars are entirely enclosed, with door under the control of the crew, so that this plan has worked out without any hitch. When the station was opened, on June 26, 1919, 1,000 people were carried on the electric cars. For the first two weeks from 1,600 to 1,700 two-zone passengers were handled daily in normal weather, while now the average number of passengers handled on weekdays approximates 2,300 to 2,400.

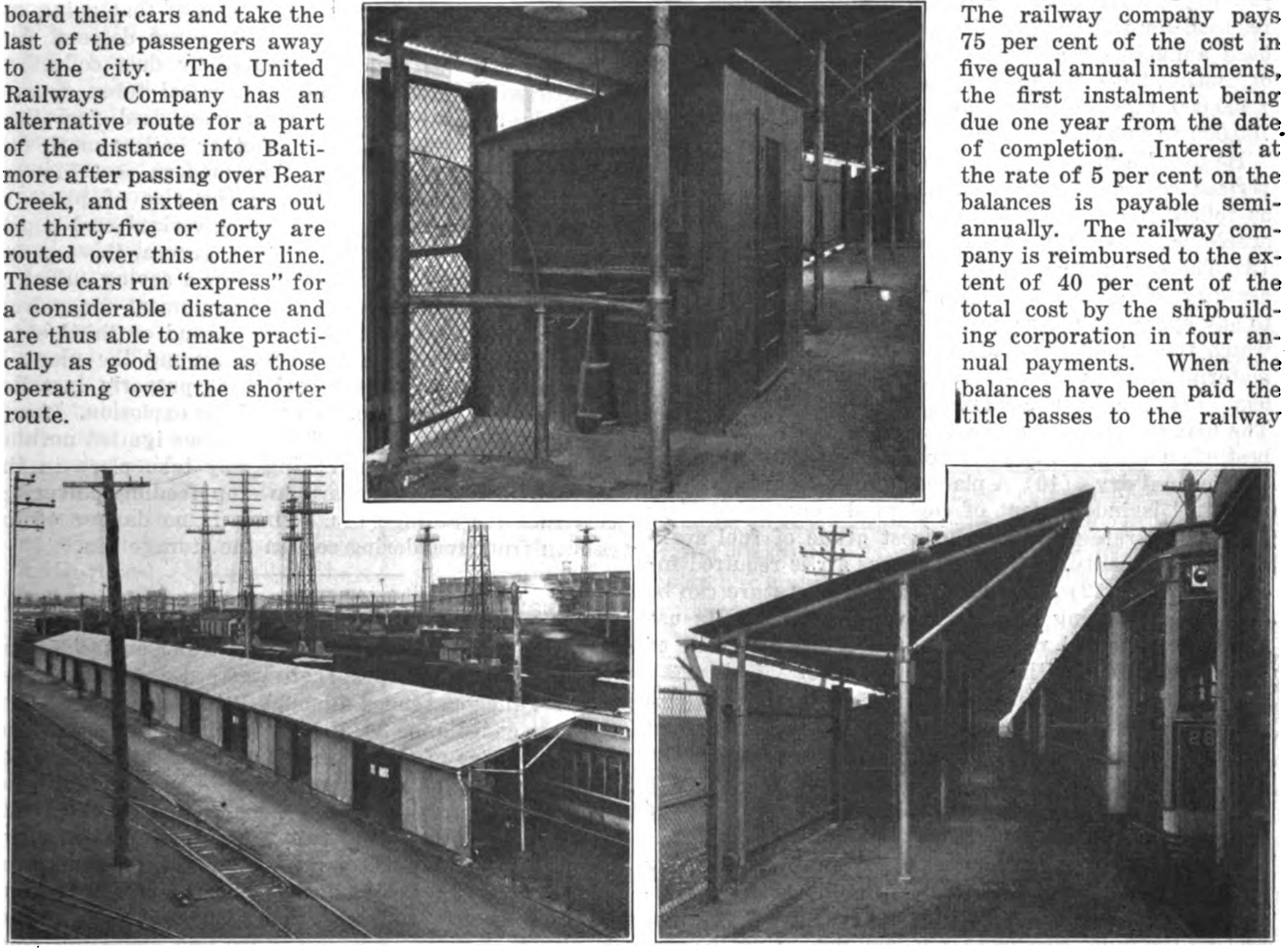
OTHER SPECIAL SERVICE TO SHIPYARDS

In addition to the regular service handled from the carhouse serving the Sparrows Point line, twenty cars (made up into ten two-car trains) are operated from five different carhouses located at other points on the system. These cars leave their respective carhouses on schedule time in the morning and pick up passengers along their routes for the shipyards. In the evening on their last trip they return to their carhouses and carry passengers to the respective portions of the city reached. This method of operating through service from other sections of the city has proved advantageous to passengers and provides additional flexibility of service, so far as the railway company is concerned. It is, however, somewhat expensive, because after making one or two trips in the morning the cars lie over for the balance of the day, when they go back to their respective carhouses.

On one of the heaviest days approximately 2,700 people passed through the turnstiles in twenty minutes. Thirty-six cars operate into the shipyard siding in the morning and thirty-nine at night. The Pennsylvania Railroad operates four trains in and out of this location, hauling approximately fifty coaches. One of the impelling reasons for government assistance in the cost of construction of this new branch was that, due to the tunnel through which the Pennsylvania Railroad operates to reach the center of Baltimore, the railroad was up to its capacity and could not put on any more trains to handle the increasing number of employees at the shipyards and steel mill. Thus it was necessary for the United Railways to take care of a large part of the additional forces put on.

HOW THE TICKET-TAKING FORCE IS RECRUITED

The ticket takers who serve for short periods at the ten turnstiles are employed during the balance of the day by the shipbuilding corporation, the railway company paying them a small amount for about a half-hour's service each day and furnishing them with transportation. A dispatcher from the operating carhouse of this route goes down every afternoon, checks out the ticket takers and takes care of the collections. One man from the transportation department, located at this point, is in charge of the operations and handling of the situation. He is assisted at night by three or four special officers, and to help man the entrances and generally assist in the loading of cars he moves up the crews from the cars scheduled to go out last and has them aid him in this work. As the crowd dwindles away these men board their cars and take the last of the passengers away to the city. The United Railways Company has an alternative route for a part of the distance into Baltimore after passing over Bear Creek, and sixteen cars out of thirty-five or forty are routed over this other line. These cars run "express" for a considerable distance and are thus able to make practically as good time as those operating over the shorter route.



ENTRANCE GATES, TURNSTILE, TICKET BOOTH AND PLATFORM AT SPARROWS POINT

The conductors on the cars that load up in the prepayment station do not ring up any fares on the register for passengers who pay as they go through the turnstiles, but collect and ring up all fares received from passengers picked up west of Bear Creek. They are, however, required to enter on their manifests each day a record of the number of passengers on their cars leaving the prepayment station.

Among the interesting features of the agreement made in November, 1918, between the Emergency Fleet Corporation and the three companies interested is that the railway receives an easement and a perpetual right-of-way for its double-track branch and terminal loop. The railway pays one-half the cost of operation and maintenance of the interlocking plant and the shipbuilding corporation the other half.

The steel company owns all of the property at Sparrows Point and the steam railroads and the electric railway company receive a lease on their right-of-way. All the expenses of this improvement, including the moving and rearranging of steam railroad tracks and of the brick piles and the yard, are covered by the contract. Until the payments are completed the right and title to the easement is vested in the fleet corporation. The steel company can change the tracks, put in crossings, bridges, etc., in the future, if necessary, at its own expense.

No general overhead was charged against the cost, but only actual time spent upon the work, including supervision and engineering. The railway company pays 75 per cent of the cost in five equal annual instalments, the first instalment being due one year from the date of completion. Interest at the rate of 5 per cent on the balances is payable semi-annually. The railway company is reimbursed to the extent of 40 per cent of the total cost by the shipbuilding corporation in four annual payments. When the balances have been paid the title passes to the railway company, which is obligated to keep the branch in good repair. The fleet corporation was indemnified by the railway company, which is required to operate and to be responsible for operation.

This contract was approved by the Public Service Commission of Maryland and to date has operated satisfactorily and to the advantage of the parties concerned in their efforts to furnish adequate service under difficult operating conditions. During the recent "outlaw" strike on the steam railroads the Sparrows Point patrons ordinarily handled on steam trains were cared for successfully on the electric cars. The result is pictured in an accompanying illustration.

During construction and since completion of the work the Emergency Fleet Corporation, through its department of transportation, has co-operated with the officials of the Bethlehem companies and the United Railways in bringing the undertaking to a successful issue.

Pulverized Coal for Boilers

Expert for Well-Known Producer of Pulverizing Machinery Tells of Application to Power Plant Work

AT A CONVENTION of the Association of Edison Illuminating Companies, held in New London, Conn., Sept. 18, 1919, Fred A. Scheffler, manager department of pulverized coal for steam power plants, Fuller Engineering Company, read a paper on the subject of pulverized coal for boilers, which has just been released for publication. He said that 6,000,000 tons is used annually in pulverized form in the manufacture of cement, 2,000,000 tons in the iron and steel industry, 1,500,000 tons in the production of copper and from 100,000 to 200,000 tons in the generation of power.

He listed a number of claims as to advantages of pulverized coal over lump coal firing by hand or stokers as follows: (1) Troubles due to poor coal are largely overcome. (2) The coal burning system is more flexible. (3) The combustion is smokeless. (4) There is great rapidity of combustion. (5) The system is applicable to any operation where heat is required, except those in which the ash of the coal might be detrimental to the material acted upon. (6) It solves the clinkering problem. (7) Standby losses are practically eliminated. (8) The firing operation can be stopped instantly. (9) The best efficiency and operating conditions obtain when the coal is fired dry. (10) A plant equipped to burn pulverized fuel is independent of coal producers and dealers and can operate with the cheapest grade of fuel available in its locality. (11) Less excess air is required for combustion. (12) Troubles of high temperature can be controlled by using proper gas velocity. (13) Its use is based on sound principles. (14) Practically all of the combustible in the coal is consumed.

Up to the date of the presentation of the paper there were more than 100 boilers in the United States and British Columbia operating with pulverized coal. The government nitrate plant at Muscle Shoals, Ala., was equipped with a pulverizing plant with a capacity of 384 tons per twenty-four hours.

As to cost of pulverizing coal, in one plant burning 36,682 tons per annum the cost, including labor, operating material, repairs to all machinery, power for operating the mills, conveyors, etc., and delivering the coal to the point at which it is to be fired, amounted to about 31½ cents per ton. In another plant, burning 63,016 tons, the cost was 27½ cents.

Mr. Scheffler stated that he had been asked a number of questions in regard to the use of pulverized coal under boilers and he repeated a number of these, giving answers to them. Some of the points brought out in these answers are as follows: With pulverized fuel the efficiency obtained is practically the same with fuels of all grades provided that the coal is properly prepared. Slag does not form on tubes when furnace capacities are not exceeded. The air pressure used in the Fuller plants is 2½ oz. for conveying the pulverized coal into the burner, and the air expands, before entering the furnace, to a pressure of ½ in. of water. The company has had no explosions in boiler furnaces; flarebacks are due to carelessness or ignorance when they occur. In starting a flame, a small wood fire can be used until the firebrick is sufficiently hot to support combustion. In a properly designed furnace all carbon and other combustible matter is consumed. When furnace capacity is not exceeded dust or slag will not be formed in the boiler. If slag does develop it can be readily removed by having the furnace arranged with a hopper bottom, so that the slag can run down and accumulate at a point convenient for its removal. Only coals having an ash of low melting point will slag seriously. A boiler operated twenty-four hours a day and using per hour 1,200 lb. of inferior bituminous coal containing 10 per cent ash, and with a combustion chamber properly designed for the operating conditions, would need to be cleaned out approximately once in eight hours. About 30 to 50 per cent of the dust or ash passes out of the stack. Most of that going out of the stack is so fine that it does not descend, but objectionable dust can be removed by dust collectors. Boilers with vertical or nearly vertical tubes require no more frequent blowing with pulverized fuel than with hand or stoker firing. In other boilers more frequent blowing is necessary, but modern soot blowers simplify this operation. While the size of plant in which it is economical to install pulverized coal equipment cannot be definitely fixed, in general those using more than 100 tons daily could show a saving sufficient to warrant the investment. The equipment for pulverized coal can be installed on the second or third story in the power house where space around the plant is limited. In a pulverized coal plant properly installed and managed there is no danger from explosion. If pulverized coal in the storage bins becomes ignited nothing can happen except that coking may take place in the bin and it will be necesary to stop feeding pulverized coal into the storage bin. There is no danger of explosion from smoldering coal in the storage bin.

Traffic Off in Kansas City During 1919

INSTEAD of a normal increase in traffic on the Kansas City (Mo.) Railways, there was a decrease of 20 per cent for the year ended June 30, 1919, as compared with the year ended June 30, 1917. This loss is attributed by the Committee of One Hundred of the local Chamber of Commerce, in a recent report on the street railway situation, to many causes. Some of these are private automobiles, jitneys and motor buses, poor service, increased fares, public disfavor and the epidemic and strikes in 1919. Losses due to private automobile competition amount to more than $2,000 daily and are inevitable, but losses due to jitney and motor-bus competition can be prevented, if desired.

Jitney and motor-bus competition is held to be unfair in that it takes the short-haul business and is not subject to fixed schedules, twenty-four hour service or taxes and assessments, which in general are required of a street railway company. The report also points out that it is unfair in that there are numerous operators and owners, and service, routes and schedules are irregular.

The daily loss to the trolley car company is 60,000 passengers through this form of unfair competition and at a 7-cent fare the loss is estimated to be $4,200 per day. This loss is one of the causes for increased fares and means that the relatively small number of passengers who rode in the jitneys actually penalized the many who rode on the street cars. At the present time the number of licensed jitneys is about 1,300. About 350 of these run regularly during the day, while 300 additional operate but two or three trips in the morning and evening rush hours. The balance make one trip each way per day or work irregularly.

Status of Public Utility Securities

Present Basis of These Securities Far Stronger Than Ever Before—Outlook Good for Early Future Expansion in Central Station Industry—Financial and Investment Position of Electric Railways Should Constantly Advance

By ORLANDO B. WILLCOX
Vice-president Bonbright & Company, Inc., New York

REGULATION of the rates which may be charged by public utilities for their service was established in response to the recognition of the universal need in every phase of modern life for the service provided by electric light and power, gas, street railway and telephone companies and the public interest in continuous service and in low rates.

The nickel fare for the usual street railway ride was well established. In other branches of public service the normal growth of the business, the construction of larger plants, with improvements in the art permitting economies of operation, and the adoption by the companies of the principle in operation that large turnover at reasonable rates made for safe and profitable business, led constantly to lower rates for service. The public utilities were in the formative stage and had not yet been standardized. Naturally, the economic principles involved in both adequate service to the public and adequate return to the investors were not fully worked out, and these principles, as well as full appreciation of the larger interests of the people which were to be protected and served through regulation, were only gradually developed. The public interest appeared to be primarily in low rates. The effect on the communities and on the industry of the country of cramped or poor service and their need for first-class and constantly expanding service were not yet fully apparent.

Mr. Willcox concludes as to electric railways:

The street railway companies are sharing the improvement in public utility conditions; the fetish of the nickel fare is losing its hold on the public mind and has been overcome in hundreds of communities where more riders are paying higher fares. Many street railway companies are showing good earnings and a safe and increasing margin above charges, and the financial condition and investment position of street railways may be expected constantly to advance.

The public service commissions, during a period of low costs and increasing economies made possible by larger units of operation, were appealed to only to reduce rates, and while the reductions made voluntarily by the operators in efforts to increase gross earnings and spread overhead and fixed charges over a larger gross income probably exceeded those enforced by the public interest, nevertheless the duty of the commissions seemed to them in nearly all the early cases of regulation of rates to require the reduction of the net earnings of utilities through decrease in the rates charged for service. In some cases it might have been suspected that the purpose of regulation was the reduction in earnings of the operating companies rather than the reduction in rates for service.

The principle was adopted that rates should be fixed so that they should provide no more than a fair return on the property devoted to public use, and in working out the problem the value of the property involved was considered and appraised, sometimes without recognition of elements of real value and substantial cost, thereby reducing the total amount on which the return through rates was to be fixed. The rates, on the other hand, were sometimes fixed so low as to permit only a bare interest return on the value of the property.

Even under these handicaps the growth in population and of the demand for utility service, the expansion of plants and systems, the improvements in the art and the economies effected afforded some protection to utility companies and the capital invested in their properties, and while the earnings on the equities were limited, the senior securities were usually protected and commanded a good market. The argument of the public utilities against appraisals and rates unduly low were that investors in such properties should be treated fairly, that private property, even if devoted to public use, could not be taken under our Constitution without just compensation, and that appraisals or rates might even escape the confiscatory level without giving that fair return to which capital so invested is entitled. These arguments did not always prevail. The public interest in low rates was assumed to be greater than the public obligation to safeguard the owners of utility properties and securities.

The results were soon apparent and directly affected the public interest, not alone in losses sustained on the investments already made but also in the refusal of free investment capital to flow into public service in preference to more profitable opportunities in unregulated industries. The large amount of capital required for the expansion of public service to meet the demands of a rich and growing population could not be readily obtained from the investor, and the public service suffered in consequence. This condition was much emphasized during the war by the increased costs of operation as well as the increased requirements for all kinds of public utility service. The dependence of the public generally in all their activities and the dependence of industry stimulated by the war's demands on the common service of the public utility companies became apparent and was reflected in the declarations of officials, the comments of the press and in the insistent demands of the communities, the industries and the individuals unable to obtain the amount and character of utility service required for their comfort, convenience and efficient functioning. There was very general demand for more electric power and electric light, extended and more efficient wire communication, better and more satisfactory local transportation. The required expansion and improvements in the service could only be provided by additional capital expenditures and the investors of the country refused to provide the necessary funds by the purchase of utility securities.

This condition led rapidly to the recognition by the commissions, as well as by officials and the public generally, of these important principles: That the public required for its well being adequate and constantly expanding public utility service; that the real interest of the public was in good service, expanding rapidly enough to take care of increasing demands, rather than in cheap service and low rates; that such service could not be afforded by companies which were insolvent or threatened with bankruptcy; that the investors of the country would not provide the very large sums necessary to refund maturing obligations and to provide the expansion of utility service demanded by the growth of population and of industry unless their investments were both protected and assured an adequate return comparable with the profits offered in unregulated industries, and that, under public regulation, rates must be so fixed that they would provide a fair return on the capital invested and give the operating companies such surplus and such credit as would attract new capital into public service under private operation.

Those principles found their way into the decisions of the public utility commissions, not only in cases where applications had been made to reduce rates but also in those cases in which applications were made on behalf of the operating companies for an increase in rates on showing that such increases were required in the public interest to provide the required quantity and character of service, as well as for the protection of invested capital.

The responses of the public utility commissions throughout the country were more prompt and effective than might have been possible except for the compelling force of the conditions resulting from the war, which had so largely and so rapidly increased the costs of operations, as well as the demands for expanded service. The electrically equipped interurban and local transportation lines have not yet all fully worked out their problems, although reports indicate that street railway fares have been increased quite generally to meet higher costs and to assure continued service (New York City is a notorious exception); that notwithstanding higher fares more people are riding on street cars than ever before, and that many street railway companies are earning a fair margin over all charges. Other classes of utilities reflect, in their increased gross and net earnings, the recognition of their real importance as an essential part of the great American industrial system and as well the flexibility of public regulation in accommodating its functioning to changing industrial and economic conditions. These increased earnings of the utility companies mean more than protection to investments or inducements to new capital. They mean appreciation by the public and its official representatives that the public interests in provision for time and labor and money saving machinery through privately owned public utility enterprises can be served not by low rates, which will imperil invested capital and repulse new capital from these industries, but only by such treatment in appraisals of the value of property devoted to public use and in the regulation of rates as will give these companies credit in financial markets and such measure of prosperity as will attract capital and encourage expansion.

The result to the power and light and similar utility companies is reflected in their increased earnings, which may be said now to have substantially overtaken the increased costs of operation due to high labor, coal and material costs, as is apparent in the rate of earnings applicable to interest and dividends.

CONFIDENCE NOW FELT IN FINANCIAL FUTURE

The peak of high operating costs seems to have been reached and is passing, if it has not already passed. The more favorable attitude of customers resulting from the shortage of service and the perils to the public of inadequate financing of utility companies is indicated in the acceptance of higher rates for service as part of the general advance in all commodities. The public has seen that utility rates must move up in times of higher costs, and not always down, and that the successful operation of public service companies with resulting good service requires a sufficient financial return on the investment and the payment of current rates for new money for expansion. The operators feel new confidence in their properties and their future. The money market provided more money for utilities in 1919 than in any year during the war. The credit of utilities is improving and, with a continuance of the rate of earnings indicated by the current reports, is in a fair way to be re-established, by a history of stability of market and gross receipts and adequate margins above charges, on a basis again commanding the confidence of the investors and permitting permanent financing at reasonable rates for the very large new capital required to keep up with the demands for growth of the industry.

STATEMENT OF CONCLUSIONS

Several conclusions may be drawn, then, from the history and present conditions of such utility companies:

1. The public and the officials have fairly recognized the essential character of such utilities in modern industry, the need of their expansion to meet the demand for their service and the necessity of fair earnings, predicated upon fair appraisals and fair rates, to establish the credit necessary to attract free capital for expansion. The dangers to the community of low rates and confiscatory values have been recognized and return is not probable because the public served would be the greatest sufferers and not the owners of public utility securities.

2. If, as competent authorities are pretty well agreed, the peak of commodity prices and other items of the costs of operations has been reached it may be expected that the present favorable showing of such utility companies will continue and that their operating costs will consequently, if gradually, decrease, with resulting increase in their net earnings and the margin above interest and dividend charges.

3. The recognition of these conditions by bankers and investors should undoubtedly lead to a substantial increase in the price level of the outstanding securities of those utility companies, especially the electric power and light and the gas and telephone companies, which have survived the disorders of the past few years; this

increase in the price level should, because of the factors involved, be more rapid than the increase in the price level of long term bonds generally, which should follow the approach of a normal ratio between commodities and the dollar.

4. The electric power and light companies particularly are not dependent upon large amounts of labor and are therefore relatively free from the effects of labor unrest and disorders.

5. The high costs of labor generally, which will undoubtedly prevail for some time, makes ever-increasing demand for time and labor saving machinery, which in modern industry is dependent upon electrical energy. Central station power can be provided cheaper than power from isolated manufacturing plants. Therefore, there must be a great expansion of the electrical business in the United States, with resulting offers of electrical utility securities.

6. Both commissions and operators have recognized depreciation and obsolescence of plants as proper charges as one of the costs of operation, and electrical securities will be increasingly protected by adequate reserves against these costs.

7. Many unregulated industries will be unfavorably affected by competitive production and falling prices, which on the other hand should act favorably upon electric companies.

8. The street railway companies are sharing the improvement in public utility conditions; the fetish of the nickel fare is losing its hold on the public mind and has been overcome in hundreds of communities where more riders are paying higher fares. Many street railway companies are showing good earnings and a safe and increasing margin above charges, and the financial condition and investment position of street railways may be expected constantly to advance.

Difficulties in Utility Financing

Leading Utility Men and Bankers Give Reasons Before Illinois Commission for Inability of Utilities to Secure Additional Capital

A BRIEF telegraphed report covering the financial difficulties faced by the public utilities as presented at a hearing called by the Illinois Public Utilities Commission April 29 was published in last week's ELECTRIC RAILWAY JOURNAL. Some of Chicago's leading bankers and public utility men appeared before the commission as witnesses on this occasion. The principal thoughts expressed in their testimony are given in what follows:

Samuel Insull, who is the controlling figure in a number of the public utility companies of the Middle West, was the first witness to be heard. He prefaced his testimony by stating that the gas, electric railways, electric light and telephone utilities of Chicago represent a combined investment of $620,000,000, and it would cost from one to one and one-quarter billion dollars to duplicate their properties today. Their annual receipts total $135,000,000, and they have 41,600 employees. Mr. Insull stated that at the present time, due in large part to the necessity to postpone all work requiring new capital during the war, the utilities of Chicago are in almost imperative need of $100,000,000 for new capital expenditures. Of this amount the Chicago Surface Lines required $25,000,000 and the elevated roads $10,000,000 in order to bring their facilities up to what they would normally have been if they had not been forced to discontinue all new work.

How to finance these needed expenditures is the great question, Mr. Insull pointed out. He said that there has arisen a distrust of public utility securities in general which makes it practically impossible to sell them. This situation is felt by the strong companies as well as the weak ones, or those whose credit has been lost, because of a general disinclination on the part of the public to purchase any public utility securities whatever on account of the onus that has now come upon them. Mr. Insull gave two reasons as being fundamentally responsible for this situation. The first was that the constant agitation against first one utility and then another (he referred particularly to Chicago, although it applies generally) has caused the people to be very skeptical about purchasing any securities which are constantly subjected to the turmoil of political harangue. He declared that this was the most serious problem which the commission has to meet in adjudicating the rates for public utility services. "When you can get a first class farm mortgage yielding 7 per cent, why would any one buy utility securities which are subject to continual attack, ostensibly for the good of the people, but usually for the good of the individual making the attack," said Mr. Insull.

The second reason for the inability to sell securities, Mr. Insull said, was that the market for the junior securities is very seriously affected by the low valuations established. These have been so low that the rate of the return allowed did not provide anything for payment of dividends, so that the market for junior securities has almost completely disappeared.

Mr. Insull then cited some instances to show the difficulty of securing new money at all, and when it is secured, the very high rate and unusual security provisions which must be met to get it. The 5 per cent bonds of the Commonwealth Edison Company have for years been floated with practically no discount, but are now bringing only 81, despite the fact that the company has unquestioned credit. Mr. Insull said he could not explain, or could not understand, why the securities of this company should be selling so low, for no bond interest or dividend has been passed and the earnings of the company are very satisfactory. The only way that this company can raise the four to five million dollars which it will have to have this year is to issue short-time securities with bonds as collateral and pay 8 or 9 per cent. He cited another case in the gas field, where a manufacturing company of excellent financial standing was able to finance a $13,000,000 bond issue to cover a new gas plant installation only by backing this up with an equal amount of securities under conditions which specified that they should not be public utility securities.

Speaking of the Chicago Elevated Railways, Mr. Insull said that it was impossible to get new money. There are $12,000,000 of notes overdue outstanding at this time, and he said if these notes were backed up by property rather than securities the roads would be in a receivership now.

In view of the great demand for capital and the severe competition with government securities and industrials which are selling on a big investment return, Mr. Insull pointed out that it is now impossible to float public utility securities, if at all, for less than 8 to 10 per cent, dependent on the credit and standing of the individual company. He advocated that the commission permit a rate of return for public utilities which would maintain their credit and give sufficient return to the junior security holders so that confidence in these might be restored. He explained that he did not mean by this that a rate of return on the property equal to the present cost of money should be permitted, but that there should be a rate of return high enough to provide for the high cost of money needed, whatever that cost may be.

B. E. Sunny, president Chicago Telephone Company, testified that his company had recently offered $10,000,000 in 7 per cent notes secured by 5 per cent bonds, but had withdrawn this when it was found this money would cost 9 per cent. He told the commission that the only solution of the present financial situation for the utilities was a general increase of rates that would permit of the companies taking money at the existing high rates. He pointed out that it was not a matter of money but of service, and that it was entirely possible and practicable to make rates high enough to provide for this present high money cost. He advocated that the companies be given a free rein, a *carte blanche*, for a considerable period, as this would make it possible to work out of the present difficulties. He pointed out that the holders of public utility securities are frightened about their investments, and said that the difficulty was not a question of the credit of any individual company, but rather the result of a general feeling of apprehension in regard to all utility securities as a class. The problem then was to make all present security holders confident that their investment was sound, and then the market for them would come back and be able to take its place in competition with industrials.

Henry A. Blair, president Chicago Surface Lines, declared that his company could not sell bonds at any rate of return as long as the earnings of the company are where they are now. Capital expenditures exceeding $150,000,000 are needed for this property within the next ten years and 300 to 400 new cars are required to meet the service requirements. Mr. Blair said that every effort had been made to finance the purchase of 200 new cars ordered by the commission, but that so far the cost of financing them had been so great that they could not be purchased. In this connection he called attention to the fact that whereas these cars could formerly be purchased for $6,700 each, they now cost over $15,000. Mr. Blair said that expenditures of between fifteen and twenty million dollars were needed this year, but that bankers who had supplied money to the surface lines heretofore had refused to finance any further until the earnings of the company were materially improved.

E. D. Hulbert, president of the Corn Exchange National Bank, the Illinois Trust & Savings Bank and the Merchants Loan & Trust Company, all in Chicago, said there is at present a greater shortage of money and more difficulty in getting credit than there has been in fifteen years. He said there was a strong feeling among bankers that no new issues should be put out. He pointed out also that the time when a 6 per cent return on investment was adequate was gone, and that the price of money had gone up the same as everything else. He gave as one reason for the inability to market 6, 7 and 8 per cent securities the fact that the large investors who used to be depended upon do not buy these securities at all now because, with a 40 per cent income tax, they cannot afford to buy utility securities when they can buy government and municipal bonds which are tax-free.

Mr. Hulbert referred to short-term financing as being very unsound. He said that it could not be expected that utility securities could be sold unless they could show a satisfactory margin over their interest requirements. He said they should not be permitted to earn as large a margin as industrial enterprises because of their monopolistic character, but that they should be allowed to show at least a 10 per cent earning or no new expenditures could be financed. He gave as the principal reason for the unpopularity of utility securities the fact that people feel that the utility cannot readily pass on the increasing cost of its product, whereas the industrial company can.

Mr. Hulbert said there was a great feeling of anxiety among bankers as to the financial outlook next year and that one of the principal causes of this was the very large quantity of government securities held by the Federal Reserve Bank. He said this was largely responsible for the panic talk now going around.

Gen. Charles G. Dawes, president Central Trust Company of Illinois, made a scathing attack upon the politicians who are continually making a political football of the public utility enterprises. He said he did not know how it was to be done, but the utilities must be taken out of politics. He said that the only way there could be any hope for the re-establishment of public confidence in utilities so that their bonds could be sold for somewhere near what they were worth would be to do something to stop the political play upon the utility, which is done without regard for the ultimate results and without regard to the effect upon the people, who must suffer from any deterioration in the ability of the company to give service. "We need somehow to give assurance that the true interest of the people is being sought after and to have politicians who will stand up for what is really to the interests of the people. The difficulty is that the people do not have the arguments on the square," he declared.

Harold L. Stuart, of Halsey, Stuart & Company, made the broad statement that there was not a utility company in the United States the market price of whose securities is equal to the original cost of the property. Some of the commissioners took issue with him, but were unable to substantiate their objections. He advocated that the fair guaranteed minimum rate of return should be sufficient to cover the value of money at the time it was invested, and that in addition there should be a margin above the interest charges as an insurance to the investor that the interest would be paid. He thought that where 7 per cent securities were involved there should be earnings of at least 9 per cent.

Chester Cory, vice-president Harris Trust & Savings

Bank, brought out that in the four weeks beginning March 22, 1920, there had been floated of major issues of bonds and notes of utilities and industrials some $245,890,000. These cost the companies issuing them from a minimum of 6.90 per cent to 10.75 per cent, with an average, he was sure, not far from 8.5 per cent. He said that borrowing money at such rates as these was merely a question of whether a management could afford it, assuming its credit was all right.

He pointed out that one vital difference between industrial bonds and public utility bonds was that, when due, the former are taken up, while the utility bonds are refunded, not necessarily because this is the best policy, but usually because the company cannot do otherwise. He gave this as one reason why industrial bonds have been popular the last few years. In other words the earnings of the industrial company are large enough so that it is possible to take up the debt, whereas a utility can earn barely enough to continue the debt. He declared that no utility can long enjoy credit if it has no other means of paying for extensions than with borrowed money. Such a company, he said, is destined for a financial graveyard sooner or later. To enjoy credit permanently there must be money for extensions made available from the proceeds from the sale of stock and from excess earnings. Unless a public utility can show earnings sufficient to cover all costs, interest charges and dividends, and a comfortable surplus, its credit is not good even though it can go out and borrow more money. The problem of a utility is not merely to get money now but to keep its house in order so that it can continue to get money. He pointed to the great danger of an undue preponderance of funded debt.

David R. Forgan, president National City Bank, said that there never had been so great a demand for permanent financing of both utilities and industrials and that as a result the credit facilities of the country had been extended to the limit. He said he thought when the Federal Reserve Bank was created that it would never reach its limit of liabilities, but that not only had the Federal Reserve Bank of Chicago reached the 40 per cent limit but had been forced to borrow $40,000,000 from another Federal Reserve Bank. He said that he would like to see the credit of his own bank reduced 25 per cent and felt certain that every other banker felt the same way.

He cited several instances of the very high rates being required for permanent financing and said that he did not believe this to be a temporary situation, for he could see no relief for many months ahead. If public utilities borrow money, he said, they will have to do it at a net cost of about 8.5 per cent. Speaking of public utility stocks, he said that any one who was not now a partner in a public utility and wanted to become one needed a guardian. Like one or two of the previous witnesses, he said that so long as utilities must compete in the money market with industrials they should be allowed to earn a margin over interest requirements, stating this should be at least twice the interest charges.

Charles H. Schweppe, of Lee, Higginson & Company, testified that $450,000,000 of bonds and notes, industrial and public utility, have been issued since Feb. 1. He said that he thought many of these had not yet reached the ultimate consumer. He spoke of the fact that few companies have a sinking fund to protect their investors and emphasized the fact that a rate of return great enough to make possible the setting aside of a liberal sinking fund allowance must be allowed.

Bus Routes Multiply About Los Angeles

THE accompanying table showing bus lines operating regular trips for long distances from Los Angeles, Cal., gives a good idea of how the bus transportation in southern California is extending.

Owing to the favorable climatic and topographical conditions in southern California, backed up by the extensive system of paved roads, it is possible for automobiles to operate every day in the year. The accompanying table is from an extended article on motor passenger and freight transportation in southern California by K. Q. Volk, which appeared in the *Engineering News-Record* for March 18, 1920.

TABLE SHOWING PRINCIPAL STAGE COMPANIES OPERATING OUT OF LOS ANGELES, EQUIPMENT, DISTANCES AND COMPARISON OF RATES

		Equipment			By Stage			By Steam or Electric Road		
						Fare*			Fare	
Los Angeles To	Company	No. Cars	Seating Capacity	Destination	Mileage	One-way	Round Trip	Mileage	One-way	Round-Trip
Bakersfield and San Francisco	Eldorado Stage Co.	11	8	Bakersfield	125	5.40	None	171	5.56	None
		6	12	Taft	162	6.48	None	216	7.61	None
				San Francisco	416	14.04	27.00	484	15.34	None
Santa Barbara	Pickwick Stages	2	12	Santa Barbara	103	3.24	5.94	104	3.40	5.67
San Francisco	Nor. Division	23	8	San Luis Obispo	221	7.29	13.50	223	.....	.....
				San Francisco	458	14.04	27.00	475	15.34	None
	United Stages	4	8	Santa Barbara	103	3.24	5.94	171	5.56	None
San Diego	Pickwick Stages	12	8	San Diego	135	3.24	5.59	126	4.09	6.75
	So. Division	..	..	San Diego	185†	4.32	8.10	.....	.....	.....
	United Stages	10	8	San Diego	135	3.24	5.94	126	4.09	6.75
	A. R. G. Bus Line	23	8	San Diego	135	3.24	5.94	126	4.09	6.75
Ontario Riverside San Bernardino Redlands	A. R. G. Bus Line	19	20	Ontario	39	.92	1.35	40	1.09	1.85
				San Bernardino	59	1.35	2.16	60	1.74	2.92
				Riverside	56	1.35	2.54	63	1.89	3.16
				Redlands	66	1.57	2.54	65	2.21	None
Ontario	....	..	..	Ontario	39	.92	1.35	40	1.09	1.85
San Bernardino	White Bus Co	14 2	16 25	San Bernardino	59	1.35	2.16	58	1.74	2.92
San Bernardino	Golden State Tours	3	7	Gilman & Hot Spgs	112	3.24	5.40	95	3.51	None
Anaheim	White Bus Line	12 5 2	16 22 25	Whittier	13	.30	.49	17.5	.41	.75
				Anaheim	28	.81	1.35	27	.86	None
	Valley Stage Line	8	16	Same	Same	Same	Same	Same	Same	Same
	A. R. G. Bus Line	6	20	Same	Same	Same	Same	Same	Same	Same
San Fernando	Original Stage Co.	7	15	San Fernando	23	.54	.97	28	.78	1.32
Santa Paula	United Stages	3	8	Santa Paula	68	2.00	None	65	2.21	None
Lancaster	Golden State Tours	2	7	Lancaster	85	2.60	4.86	78	2.60	4.86

* All rates include war tax.

† Inland route via Riverside.

Making the Best Use of the Car Equipment

The Author Describes a Method for Studying Car Operation by Means of Which, with the Aid of a Few Curves, the Effects of Varying the Several Component Parts of the Schedule Can Be Determined Quickly

By E. H. SCOFIELD
Engineer of Power and Equipment, Twin City Rapid Transit Company, Minneapolis, Minn.

AT THIS time, when the necessity for economy in electric railway operation is being impressed more forcibly than ever before on all operating companies, it is well to look into the adaptability to the service and the efficiency in use of the car equipment.

For any particular service to be performed, certain inter-related elements of operating costs exist, which, upon analysis, may be grouped under the headings of power costs and time costs. Outside these two groupings will remain other costs, such as fixed and overhead charges, and certain maintenance costs having no relation to the amount of service rendered. It is the purpose of this article to deal only with the former and to explain a method for determining the proper relation between service rendered, power costs and time costs.

Under power costs are included electric power for operating the cars and such maintenance and other costs as depend directly upon the mileage run. Time costs include platform expense, car heating and other costs determined by the hours in service of the car equipment. In the application of the results of this method certain limitations must be recognized, such as heating of the motors at various seasons, traction under various rail conditions, safety to passengers in starting and stopping, safety with regard to other traffic on the street, nervous strain on the trainmen and passengers as a result either of too fast or too slow a schedule.

The main factors governing the service which may be given and the costs resulting may be listed as follows: (1) Track conditions, (2) grades, (3) curves, (4) line voltage, (5) weather, (6) car equipment weight, (7) passenger load, (8) motor equipment, (9) gear ratio, (10) condition of equipment, (11) length of run, (12) accelerating rate, (13) braking rate, (14) coasting rate and time, (15) standing time, (16) traffic interference, (17) personal element—motorman, conductor, passenger, (18) supervision, (19) over-all economy.

The effect of all these factors may be satisfactorily analyzed by the method proposed, providing proper data and constants are applied, namely, resistance-speed curves for factors (1), (2), (3), (5), (6), (7) and (10); motor-characteristic curves for (4), (8) and (9); traffic surveys of conditions and established practice.

The speed-time curve has been used satisfactorily for the solution of a simple, specific problem, but is inadequate for the general consideration of problems involving several factors. This method takes the idea of the speed-time curve, developing it through two additional stages and producing a form of chart showing the relative effects, throughout the practical operating range, of all factors considered.

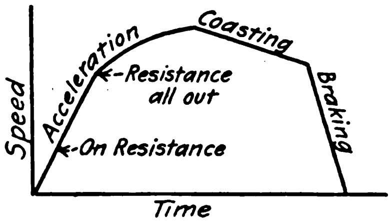


FIG. 1

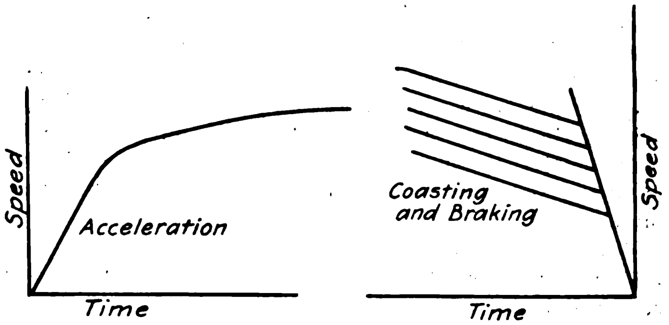


FIG. 2

FIG. 1. PARTS OF THE TIME-SPEED GRAPH. FIG. 2. DIAGRAM ILLUSTRATING COMBINATION OF ACCELERATION AND RETARDATION CURVES

The evolution of this method from the more cumbersome ones is briefly this: In its usual form the time-speed graph of the operation of a car is made up of three parts: one representing the accelerating period, the sec-

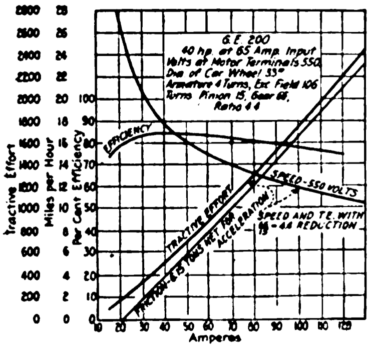


FIG. 3

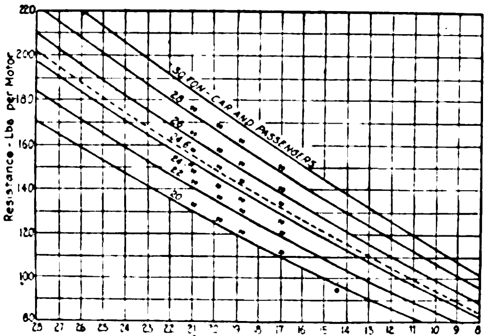


FIG. 4

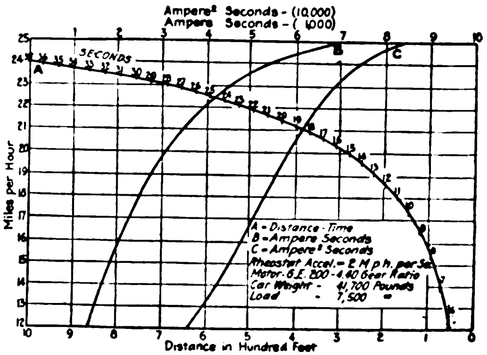


FIG. 5

FIG. 3. CHARACTERISTIC CURVES FOR GE-200 MOTOR. FIG. 4. FRICTION CURVES FOR ASSUMED CONDITION OF TRACK, ETC. FIG. 5. ACCELERATING CURVES SHOWING RELATION OF DISTANCE, TIME AND SPEED, AMPERE-SECONDS AND AMPERE-SQUARED-SECONDS

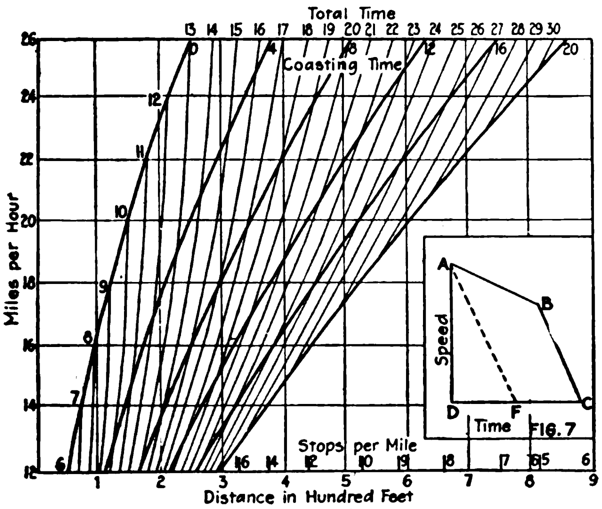


FIG. 6

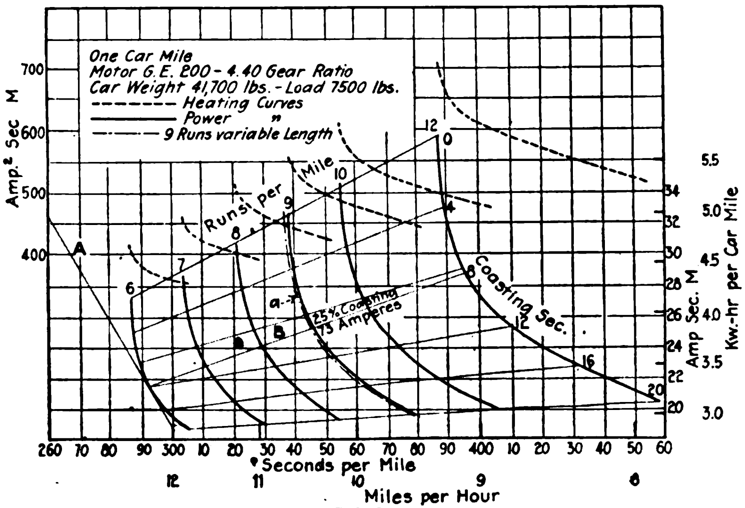


FIG. 8

FIG. 6—RETARDATION CURVES SHOWING RELATION OF DISTANCE AND SPEED, TIME AND COASTING TIME. FIG. 7—DIAGRAM REPRESENTING COASTING-BRAKING PERIOD. FIG. 8—APPLICATION OF METHOD TO ONE MILE RUN

ond the coasting period and the third the braking period. These are shown in Fig. 1. If now we have two independent graphs, one for acceleration showing the relation of time and speed, but indefinitely extended as shown in Fig. 2, and the other, also represented in Fig. 2, showing the relation of time and speed during the coasting-braking period, also indefinitely extended from the point of zero speed, then by combination of these the effect of lengthening or shortening the time of the cycle of operations can be determined graphically. The intersection of the two lines shows the maximum speed, the area under the combined graph is proportional to the distance covered, and other desired quantities can be calculated. This operation assumes that the braking period is fixed, but by assuming a number of different braking periods and plotting the corresponding coasting lines the solution is somewhat improved. However, the tediousness of calculations by this plan is obvious, and the same results can be accomplished much better by plotting sets of curves on a distance rather than a time base, and this is the plan which is followed here.

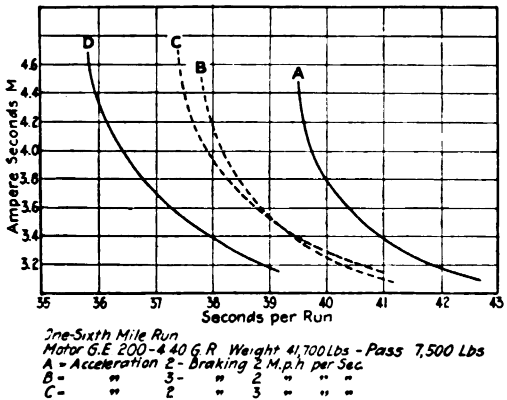


FIG. 9

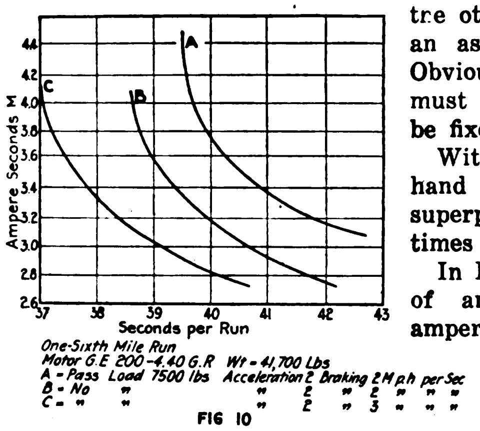


FIG 10

FIG. 9—SPECIAL APPLICATION SHOWING EFFECTS OF RATES OF ACCELERATION AND BRAKING ON TIME AND ENERGY CONSUMPTION. FIG. 10—WEIGHT EFFECT OF LIGHT LOAD

The fundamental or primary curves required for the calculations are the characteristics of the motor which is to be used and a set of friction or resistance curves. The former will include the effects of gear ratio, wheel diameter and line voltage. A sample set of such curves is shown in Fig. 3. The latter will provide for the condition of the track, the weather, the weight and condition of the equipment under consideration, with due allowance of tractive effort to compensate for grades and curves where these are present. Sample curves are given in Fig. 4.

From these primary data, by standard calculations presently to be taken up in the necessary detail, the acceleration distance-speed curve shown in Fig. 5 and the set of curves between maximum speed and the distance covered in coasting and braking as given in Fig. 6 are calculated. In Fig. 6 there are really two sets of curves, one calculated on the basis of several assumed values of coasting time, and the other calculated on the basis of an assumed series of total times. Obviously one or the other of these must be assumed, but both cannot be fixed.

With these two sets of curves in hand they can be combined by superposing one set on the other, times and distances being additive.

In Fig. 5 are plotted also a curve of ampere seconds and one of ampere-seconds squared, which are useful as a measure of the heating of the motors under a given schedule.

Having outlined the general principle of the method, it now remains to give first the detail of the calculations underlying the curves and then to show what can be done with the curves when they have been plotted.

All calculations for the tables and curves in this article are based upon the characteristic curves (Fig. 3) of a GE-200 motor with 4.4 gear ratio. A 4-motor equipment is mounted under a car loaded to 24.6 tons total weight. The resistance curves used are those of Fig. 4, in which the broken line curve gives the tractive effort per motor to overcome friction. Deducting this from the tractive effort curve of Fig. 3, by reference to the speed scales, a net tractive effort per motor for acceleration is obtained. From this there are tabulated in Table I, for each mile-per-hour differential, the average current and the average net tractive effort.

TABLE I—AVERAGE CURRENT AND AVERAGE NET TRACTIVE EFFORT FOR EACH MILE-PER-HOUR DIFFERENTIAL

NOTE—Equipment Data. Motor GE-200 — 4.40 Gear Ratio.
Weight 41,700 + Load 7,500 = 24.6 Tons. Acceleration 2 m.p.h. p.s.

From Characteristic Curves for one Motor			Time $\frac{\text{Tons} \times 100}{4 \times \text{T. E.}}$		Distance $\frac{\text{Tons} \times 100 \times \text{m.p.h.}}{4\times\text{T.E.} \times 0.6821}$		Ampere Seconds 4xAve.Current x Time		Amp.-Squared-Seconds Ave. Current Squared x Time	
Speed, Miles per Hour	Average Ampere	Average Net Tractive Effort	Differential	Int.	Differential	Int.	Differential	Int.	Differential	Int.
26										
..	21.7	23	26.7							
25				48.39		1,408		6,448		81,005
..	23.0	50	12.30		442		1,130		6,500	
24				36.09		966		5,318		74,505
..	24.4	80	7.70		265		750		4,585	
23				28.39		701		4,568		69,920
..	26.0	110	5.55		183		577		3,750	
22				22.84		518		3,991		66,170
..	27.9	150	4.10		129		457		3,190	
21				18.74		389		3,534		62,980
..	30.2	196	3.14		94		380		2,870	
20				15.60		295		3,154		60,110
..	33.0	252	2.44		70		322		2,660	
19				13.16		225		2,832		57,450
..	36.6	324	1.90		52		278		2,540	
18				11.26		173		2,554		54,910
..	41.5	425	1.45		37		240		2,500	
17				9.81		136		2,314		52,410
..	47.5	550	1.12		27		212		2,520	
16				8.69		109		2,102		49,890
..	55.0	710	0.866		20		191		2,620	
15				7.82		89		1,911		47,270
..	65.0	905	0.68		14		176		2,870	
14				7.14		75		1,735		44,400
..	75.5	1,130	0.544		11		164		3,100	
13.2	81.0			6.6		64		1,571		41,300
Mult.	80.0	1,230	3.3		64		1,055		21,100	
.....	79.0							516		20,200
Ser.	78.25	1,230	3.3				516		20,200	
Start.	77.5									

Using the mean values of speed, current and net tractive effort for the rheostat period and each 1 m.p.h. differential, or fractional period, differentials of time, distance, ampere-seconds per car and ampere-squared-seconds per motor are calculated by simple formulas. Adding these differentials from the starting point gives aggregate quantities for any range of operation. The values for rheostat period are determined by the assumed rate of acceleration during this period.

The formulas and their derivation for these calculations are as follows:

The accelerating force required per ton for an accelerating rate of 1 mile per hour per second is

$$F = \frac{2000}{32.16} \times \frac{5280}{3600} = 91.1 \text{ lb.} \qquad (1)$$

To this add 10 per cent for acceleration of rotating parts.

$$F = 100 \text{ lb. per ton weight of car and load} \qquad (2)$$

$$\text{Accel. rate} = \frac{\text{net tractive effort per motor}}{\dfrac{F \times \text{tons}}{4}} \qquad (3)$$

$$\text{Dif. time} = \frac{\text{dif. speed}}{\text{accel. rate}} \qquad (4)$$

Combining equations (2), (3) and (4) above we have

$$\text{Dif. time} = \frac{\text{dif. speed} \times 100 \times \text{tons}}{\text{net tractive effort} \times 4} \qquad (5)$$

$$\text{Dif. time} = \frac{\text{tons} \times 100}{4 \times \text{net T. E.}} = \left(\begin{matrix}\text{sec. for speed dif.}\\ \text{of 1 m.p.h.}\end{matrix}\right) \qquad (6)$$

$$\text{Dif. distance} = \text{average speed} \times \text{dif. time} \qquad (7)$$

Combining with equation (6) above we have

$$\text{Dif. dist.} = \frac{\text{tons} \times 100 \times \text{ave. m.p.h}}{4 \times \text{net T. E.} \times 0.6821} = \left(\begin{matrix}\text{ft. for speed dif.}\\ \text{of 1 m.p.h.}\end{matrix}\right) \qquad (8)$$

$$\text{Dif. amp. sec.} = \left(\begin{matrix}4 \times \text{ave. amp. per}\\ \text{motor} \times \text{dif. time}\end{matrix}\right) = \left(\begin{matrix}\text{power demand}\\ \text{per car}\end{matrix}\right) \qquad (9)$$

$$\text{Dif. } \overline{\text{amp.}} \text{ sec.} = \overline{\text{ave. amp.}}^{2} \times \text{dif. time} = \left(\begin{matrix}\text{heating effect}\\ \text{per motor}\end{matrix}\right) \qquad (10)$$

Integrating the differential quantities derived from equations (6), (8), (9) and (10) we have total amount from point of start to any point of accelerating run.

From this data are constructed the accelerating curves, Fig. 5, showing for any distance traveled the relation of time, speed, ampere-seconds and ampere-squared-seconds.

Retardation curves, Fig. 6, are constructed, showing for any distance traveled the relation of speed, time and coasting time. The data for these curves are calculated by formula, assuming values for braking and coasting rates. The curves of Fig. 6 are made on celluloid or other transparent material for the purpose of using them superposed on the curves of Fig. 5.

The formula for retardation curves is based on assumption and derived as follows (see diagram Fig. 7):

ABC = Retardation time-speed curve
AD = Speed co-ordinate in miles per hour
DC = Time co-ordinate in seconds
AB = Coasting curve = ¼ m.p.h.p.s.
BC = Braking curve = 2 m.p.h.p.s.

$$\text{Speed reduction by coasting} = \frac{\text{coasting time}}{4}$$

$$\text{Speed reduction by braking} = \text{braking time} \times 2$$

Total time in seconds from maximum speed to stop is:

$$T = \frac{\text{maximum speed}}{2} + \tfrac{7}{8} \text{ coasting time}$$

Total distance in feet run from maximum speed to stop (= Area $ABCD$) is

$$D = \left[1.466 \frac{\text{maximum speed}^{2}}{4} + \tfrac{7}{8} \text{ coasting time} \times (\text{maximum speed} - \tfrac{1}{8} \text{ coasting time})\right]$$

By the use of these formulas, distances and times are calculated and tabulated for various ranges of speed and coasting time, and from these data the curves of Fig. 6 are constructed.

With Fig. 6 superposed on Fig. 5 at any lateral position, the distance and time scales become additive, for the reason that the coincidence of any point on the accelerating curve with any point on the retardation chart is at a common maximum speed, and the time and distance elements on both charts are calculated from this speed to no speed. A chart is thereby formed, for a certain length of run and any coasting time, showing the relative time—accelerating, coasting and braking; distance-accelerating and retarding; maximum speed attained; ampere-seconds used and ampere-squared-seconds heating effect. These data, for various lengths of runs, are entered in Table II and, being multiplied by the number of runs per mile, show the performance per mile run, an allowance for standing or interference affecting time being added to the running time. Data from this table may be shown graphically on charts, and covers the full practicable operating range for any fixed set of conditions. By varying one or more factors other data may be obtained and the results directly compared on such charts.

ILLUSTRATION OF WHAT CAN BE DONE WITH THE CHARTS

Fig. 8 illustrates the application of this method to a one-mile run and by it certain general results may be observed. To a base scale of time (seconds per mile or miles per hour) are shown a measure of the energy (ampere-seconds or kilowatt-hours per car-mile) and the heating effect (ampere-squared-seconds), for a various number of stops per mile through a range of coasting from zero to twenty seconds per run. A 1-mile run made up of four ⅛-mile runs, one ⅙-mile and four $\frac{1}{12}$-mile runs, making up a mile of nine stops, see curve *a*, Fig. 8, is seen to have a slightly faster time for the same energy usc than a mile of nine runs of uniform length.

Assuming values for energy and time costs (one cent variable per kilowatt-hour and $1.90 variable per car-hour), a slope line *A* of constant over-all cost may be established. This line will have the same slope at all positions on the chart and its point of tangency to the various power curves is the point of highest operating economy in each case.

It is found that the points of highest economy on the several curves fall approximately on a straight line *B;* also that these points correspond approximately with a coasting of 25 per cent and a current demand of 73 amp. per car. This relation of approximately uniform coasting percentage and current demand for any number of stops per mile extends throughout the range from no coasting and 95 amp. to 40 per cent coasting and 60 amp., the variation being within 2 per cent. The relation of reduction of power to coasting is 0.8 per cent to 0.9 per cent kilowatt-hour per car-mile, or 0.9 per cent to 1 per cent current demand for each 1 per cent increase in coasting.

Referring to heating effect, it is found that for the same coasting percentage, the heating rate is approximately 25 per cent greater at twelve than at six stops per mile, although the heating amount per car-mile is 70 per cent greater.

A special application of the method is illustrated by Fig. 9, in which is shown the effect of rates of acceleration and braking on time and power.

Curve *A* — 2 m.p.h.p.s. accelerating — 2 m.p.h.p.s. braking

Curve *B* — 3 m.p.h.p.s accelerating — 2 m.p.h.p.s. braking.

Curve *C* — 2 m.p.h.p.s accelerating — 3 m.p.h.p.s braking.

Curve *D* — 3 m.p.h.p.s accelerating — 3 m.p.h.p.s braking.

Runs ⅙ mile in length.

Three miles per hour per second for both acceleration

TABLE II—DATA OBTAINED BY SUPERPOSING FIG. 4 ON FIG. 3, THE DISTANCE AND TIME SCALES BECOMING ADDITIVE

NOTE—Equipment Data. GE-200—4.40 Gear Ratio—49,200 lb. Accelerating 2—Coasting ¼—Braking 2 m.p.h.p.s. In each case, upper number relates to one run and lower number to one mile.

	Seconds	Ampere Seconds, Thousands	Ampere Square Seconds, Thousands	Seconds	Ampere Seconds, Thousands	Ampere Square Seconds, Thousands	Seconds	Ampere Seconds, Thousands	Ampere Square Seconds, Thousands	Seconds	Ampere Seconds, Thousands	Ampere Square Seconds, Thousands	Seconds	Ampere Seconds, Thousands	Ampere Square Seconds, Thousands	Seconds	Ampere Seconds, Thousands	Ampere Square Seconds, Thousands	Seconds	Ampere Seconds, Thousands	Ampere Square Seconds, Thousands
Runs per mile	6.0			6.5			7.0			8.0			9.0			10.0			12.0		
Stand per stop, second	8.3			8.1			7.9			7.5			7.2			7.0			6.7		
Stand per mile, second	50.0			52.5			55.0			60.0			65.0			70.0			70.0		
No coasting	39.5	....	....	37.4	....	....	35.5	....	....	32.7	....	....	30.4	....	....	28.5	....	....	25.6	....	....
	287	....	....	295	....	....	303	....	....	321	....	....	338	....	....	355	....	....	387	....	....
	....	4.50	....	....	4.30	....	....	4.10	....	....	3.83	....	....	3.60	....	....	3.45	....	....	3.12	....
	....	27.0	....	....	28.0	....	....	28.7	....	....	30.6	....	....	32.5	....	....	34.5	....	....	37.4	....
	....	....	68.8	....	....	67.7	....	....	66.2	....	....	64.5	....	....	62.2	....	....	61.2	....	....	59.0
	....	....	413	....	....	440	....	....	464	....	....	516	....	....	560	....	....	612	....	....	708
Four sec. coasting	39.6	....	....	37.5	....	....	35.6	....	....	32.8	....	....	30.5	....	....	28.6	....	....	25.7	....	....
	288	....	....	296	....	....	304	....	....	322	....	....	340	....	....	356	....	....	389	....	....
	....	4.15	....	....	3.97	....	....	3.80	....	....	3.50	....	....	3.25	....	....	3.05	....	....	2.75	....
	....	24.9	....	....	25.8	....	....	26.6	....	....	28.0	....	....	29.2	....	....	30.5	....	....	33.0	....
	....	....	66.2	....	....	65.3	....	....	64.0	....	....	61.8	....	....	60.0	....	....	58.7	....	....	56.0
	....	....	397	....	....	424	....	....	448	....	....	494	....	....	540	....	....	587	....	....	672
Eight sec. coasting	39.8	....	....	38.0	....	....	36.0	....	....	33.2	....	....	30.9	....	....	29.1	....	....	26.2	....	....
	289	....	....	299	....	....	307	....	....	326	....	....	343	....	....	361	....	....	394	....	....
	....	38.5	....	....	3.68	....	....	3.50	....	....	3.20	....	....	2.95	....	....	2.75	....	....	2.40	....
	....	23.1	....	....	23.9	....	....	24.5	....	....	25.6	....	....	26.5	....	....	27.5	....	....	28.8	....
	....	....	64.3	....	....	63.3	....	....	61.5	....	....	59.5	....	....	57.5	....	....	55.5	....	....	52.5
	....	....	386	....	....	411	....	....	431	....	....	476	....	....	517	....	....	555	....	....	630
Twelve sec. coasting	40.4	....	....	38.7	....	....	36.8	....	....	34.0	....	....	31.8	....	....	30.1	....	....	27.5	....	....
	292	....	....	304	....	....	312	....	....	332	....	....	351	....	....	371	....	....	410	....	....
	....	3.57	....	....	3.40	....	....	3.20	....	....	2.92	....	....	2.63	....	....	2.45	....	....	2.10	....
	....	21.4	....	....	22.1	....	....	22.4	....	....	23.3	....	....	23.7	....	....	24.5	....	....	25.2	....
	....	....	62.3	....	....	61.0	....	....	59.5	....	....	57.5	....	....	55.0	....	....	52.7	....	....	49.0
	....	....	374	....	....	396	....	....	416	....	....	460	....	....	495	....	....	527	....	....	588
Sixteen sec. coasting	41.2	....	....	39.7	....	....	37.8	....	....	35.3	....	....	33.2	....	....	31.5	....	....	29.4	....	....
	297	....	....	310	....	....	320	....	....	342	....	....	364	....	....	385	....	....	433	....	....
	....	3.33	....	....	3.13	....	....	2.95	....	....	2.60	....	....	2.40	....	....	2.20	....	....	1.88	....
	....	20.0	....	....	20.4	....	....	20.6	....	....	20.8	....	....	21.6	....	....	22.0	....	....	22.6	....
	....	....	60.5	....	....	59.0	....	....	57.4	....	....	54.5	....	....	52.2	....	....	50.0	....	....	45.8
	....	....	363	....	....	383	....	....	402	....	....	436	....	....	470	....	....	500	....	....	550
Twenty sec. coasting	42.7	....	....	41.0	....	....	39.3	....	....	36.7	....	....	34.9	....	....	33.5	....	....	31.5	....	....
	306	....	....	319	....	....	330	....	....	354	....	....	379	....	....	405	....	....	458	....	....
	....	3.08	....	....	2.90	....	....	2.70	....	....	2.42	....	....	2.18	....	....	2.00	....	....	1.69	....
	....	18.5	....	....	18.9	....	....	18.9	....	....	19.3	....	....	19.6	....	....	20.0	....	....	20.3	....
	....	....	58.6	....	....	57.0	....	....	55.5	....	....	52.5	....	....	49.8	....	....	....	47.5	....	42.5
	....	....	352	....	....	370	....	....	388	....	....	420	....	....	448	....	....	....	475	....	510

and braking is seen to give 8 per cent less time for the same power when compared with 2 m.p.h.p.s. for both. High rate of braking is slightly more effective than high rate of acceleration.

Fig. 10 shows the weight effect of light load; also the possibility of speeding up for light load by a higher rate of braking, 7 per cent being gained for the same power consumption. In a similar manner other comparisons may be made, showing effect of change in gear ratio, field control, grade, two motors versus four motors, line voltage, series running, various motor and car equipments.

While this method entails a large number of calculations, yet if a process such as outlined is followed and each step tabulated, the data for any modification of an equipment are easily deduced from the original data and a set of curves for any fixed conditions obtained by a few hours' work. While the author recognizes that certain steps in the calculations may be open to criticism, from an accurate mathematical standpoint it may be stated that the results are affected only in their absolute values and for all practical purposes and in their relative values they are within the range of observational error.

Queue Loading in Cadillac Square, Detroit

THE queue loading practice which was started three years ago by the Detroit United Railway at the plant of the Ford Motor Company, with the co-operation of the automobile manufacturing officials, has recently been applied to Cadillac Square, in the heart of the city. The scheme was installed with the co-operation of the Police Department in connection with the looping back at Woodward Avenue of five east side car lines. The cars of these five lines stop for loading on the outbound trip along the two sides of Cadillac Square. There is space along one side of the square for the simultaneous berthing of six cars. As the cars stop for loading collectors take up a position at the front end of each car and a line of passengers forms at the front and rear of each car. Passengers in the line entering the front end of the car pay the collector as they step aboard and those in the line at the rear end pay the conductor in the usual manner. This front end collection scheme and the orderly lining up of the passengers make the loading extremely rapid.

ORDERLY QUEUE LOADING IN CADILLAC SQUARE WITH WHICH DETROIT PEOPLE HAVE WILLINGLY COMPLIED

In installing the queue loading plan in Cadillac Square it was supervised at the beginning by the Police Department, but the passengers will soon be educated and will take up this formation without police direction, unless the experience in this location is different from that at previous installations. In speaking of the queue loading plan, W. E. Cann said that the replacing of the rowdy rushing of the cars at the Ford plant with this orderly lining up of the passengers had spread into general use throughout the city. At heavy transfer points of Ford workers the passengers almost invariably line up. For example, at the Grand Belt and Woodward line transfer point a line 100 ft. long or more is often seen. The passengers often line up along Woodward Avenue also. Mr. Cann says that where this is seen it is a pretty safe bet that there are Ford workers in the line.

How Automatic Train Control Works

IN A written discussion of a paper on "The Automatic Train Control Problem," by H. S. Balliet, delivered before a recent meeting of the New York Railroad Club and briefly abstracted in the March 27 issue of the ELECTRIC RAILWAY JOURNAL, page 640, Frank J. Sprague emphasized the importance of automatic train control and described the system developed by his company. The discussion by Mr. Sprague was illustrated by a diagram showing what happens with the use of this particular system of speed-brake control when trains entering a block adhere to or disregard the signals.

Briefly, the system includes the division of a block into two sections, permissive and controlled. Along the roadbed and clear of all equipment limitations there are provided certain protective track magnets under the full or partial control of the track circuit relays. In each block is a brake application magnet in the rear of the entrance, called the "distant" magnet; another at the beginning of the controlled section, called the "home" magnet, and a third, called the "reset" magnet, differentially positioned near the end of the block. On the locomotive are carried suitable receivers which register with the track magnets, and the necessary relays, air valves and means for initiating both service and emergency braking. The receivers and relays are sealed and free from interference by the engineer.

If a train enters the block, against a distant signal indication, at 60 m.p.h. the engineer will receive visible, audible and touch-responsive signals, which will clearly indicate to him the condition of the advance block. There will also be initiated a service brake application which in rate and amount of air reduction, if undisturbed, is that suited to the particular class of train the locomotive is hauling. The control of his valve is, however, immediately returned to the engineer before any actual braking takes place, and he can accept the automatic braking or increase or diminish it at will.

If the engineer proceeds at undiminished speed and the advance block is not cleared when he reaches the "home" magnet, entering the danger zone of the block at a reckless speed, an emergency brake application will take place. If on the other hand he accepts his initial warning and permits the automatic service brake to come on, or manually brakes his train down to a slower speed, meeting the requirements of the high limit of speed for which the train can be safely manually braked, there will be no emergency application of the brakes. If, however, he attempts to beat the operation while slowing down before reaching the control speed he will get an emergency brake application.

Business Press and Increased Production*

Low Production Can Be Overcome by Correction of False Conceptions of Work, Increased Use of Automatic Machinery, Improved Methods of Manufacture and Distribution and Maximum Skill in Management—Business Press a Potent Factor in All These Lines

BY JAMES H. MCGRAW
President McGraw-Hill Company, Inc.

LOW production per man is an accepted axiom in industry throughout the world today. The Great War shattered some fundamental conceptions of responsibility, which are having their reaction the world over in the minds of men. Low production today is a state of mind. To bring about increased production we must change the state of mind, as well as the physical elements.

No greater force for practical accomplishment exists at hand than the business press of America. Linked as it is with the heart of industry, in practical contact with what can be done and how it can be accomplished, it presents a great dynamic, educative force to raise the standard of thinking of men in industry.

Production, in fact, is not a matter of theory, but of the practical putting together of labor, of materials, of machinery and of management, to supply the economical wants of the work. This huge fabric of industry is threaded by more than 2,400 business papers, trade papers, engineering papers, technical journals and industrial papers. In practically every line of industry and every phase of industry there is a journal for the man who seeks to accomplish more in his particular line, no matter what his trade or calling or profession. Records available show that 819 of these publications of which check could be made have a total circulation of 6,351,059.

HOW PROBLEM OF PRODUCTION IS MADE UP.

The one great problem of how to increase production which is facing the world today divides itself into several major problems. If the business men of America will intelligently consider these major problems, if they will recognize the slow, but sure, process of education in the solution of these problems, the business press stands ready as one all-embracing medium through which the vital and intimate needs of the separate trades or professions may be consistently and comprehensively developed.

WORKMEN TODAY MANAGERS TOMORROW

Take the world-old problem of labor and capital. False conceptions of work have been developed until we popularly have come to believe that the men who provide the management ability and the men who provide the money and the men who provide the manual skill and the labor of production are different kinds of men.

As a matter of cold fact, if we may emphasize, as we can emphasize, through the business press that the majority of the industrial leaders of America were once workmen, that eleven out of the twenty-four railway presidents, for example, today were once messenger boys or clerks, that dozens of managers and superintendents and hundreds of capitalists and financial men were one time store clerks or farmer boys or mill men; if we can only emphasize that the thing which separates them into a class is not a distinction in the kind of work they do, but in the kind of thinking they do, we will have at least gone part way toward the solution of the so-called labor problem. And no force exists today better able from a practical point of view to point out the difficulties as well as the opportunities of industry, to stand as a third party and admit the abuses of power on both sides, than the trade press.

America is still a land of opportunity in industry, and hundreds of business papers today are pointing out individual opportunities for men, literally acting as text books for the teaching of common-sense economics in industry and pointing out the practical plans that have been and are being worked out in individual plants for bringing men and management together. We can make rules and we can agree on fundamentals with regard to the relations between men and men, but no plan will succeed unless the "white-collared" workers in the office, who are responsible for carrying it out, have an actual working contact, either themselves or through others in sympathy with their ideas, with the overall-clad workmen in the factories.

INFLUENCE OF INVENTION AND APPLICATION OF MACHINERY ON INCREASED PRODUCTION

Take the second great condition of increased production—the invention and the application of machinery to increased man power. Automatic machinery does not replace men, it multiplies the thinking of men and increases production. If this one thought could be developed among the men in industry there would be a more willing acceptance of automatic machinery as a basis of accomplishment by the great group of workmen known as "common labor" or "unskilled labor."

No nation in the world has set the standard for ingenuity in finding mechanical ways of increasing output more than the United States. No nation has been more ready to put its thoughts into type than the American inventor and the American manufacturer, and who shall say that this fluid interchange of thought between industry and between men in industry is not one of the potent factors in making our country the reservoir of ideas that it today is in mechanical invention and the mechanic arts?

Leonardo da Vinci left a personal literature of invention. You can go back in the writings of this man of fertile imagination and individual resourcefulness and find the suggestion or the actual prototype of many of our present day common-place machines. He thought of the airplane and devised a model that might fly, yet for five hundred years his inventions remained the inventions of the individual and remained buried in records. Who shall say that if there had been a technical press in his day, if he had contributed his imagination to a public technical press, instead of burying it in a diary, the airplane would have flown five hundred years ago, instead of in 1908? Today the mechanical and machinery papers carry pages of information that have to do with new means and methods. These are read by the men who can put the new ideas into operation.

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*Abstract of address presented at meeting of Chamber of Commerce of the United States, Atlantic City, N. J., April 28, 1920.

I have pointed out certain fundamental factors in industry in connection with the relation of the business press to increased production. Just now all these problems are related to the one great problem of the present. We are in a period of credit deflation. Every careful business man in America today is making his plans with this as his major premise. The trade and business paper has a very definite relation in getting things accomplished under these conditions. There are, broadly, two huge classes of trade papers, one of those dealing with the problem of distributing and marketing goods, which are more correctly known as "trade" papers, and the other having to do with the engineering and technical problems of administration and production, which are exactly termed "technical" or "professional" papers.

As a nation we are today relatively efficient in making goods. We are relatively very inefficient in distributing them. The editors of the trade papers have the opportunity for leadership in pointing out and making generally understood better methods of distribution. They look upon the merchant and the dealer not as a slot machine for distributing merchandise for which there is an existing demand, but as a man who is also creating new demands locally. The editorial pages of a trade paper are used to teach the dealer how to capitalize his own position in creating more business for himself. The local merchant pays money for his subscription to a trade paper to get sales-building ideas, and every new idea he gets must tie up with some manufacturer's merchandise. In a similar manner, the technical papers bring to the engineer and the professional man the newest information with regard to progress in the art and science with which he is associated.

RAW MATERIALS MUST BE TREATED SCIENTIFICALLY AND RESEARCH ENCOURAGED

We are faced today with shortages in scores of raw materials that form the third great group in consideration of an increased production program for our nation. We must be better miners and be betters users of by-products. We must find out how better to distribute, how to improve our transportation, how to improve utilization, to make ten parts go as far as a hundred did before. Our engineers and our technical experts, our chemists, our transportation men are at work on these problems today, and the technical and engineering press of the country is the great medium of exchange of ideas on how to get more done for less money, how to overcome wastes. Our patent laws protect the business interests of our nation, but one of the problems facing this country today is the need of better understanding of the value of engineering thinking and the analytical approach to the problem which the engineer contributes to industry. Only by making the individual industries conscious of their professional relation, only as a practical matter of seeing the opportunity through the columns of the technical and engineering press for molding and leading thought and opinion, can these things be accomplished quickly.

Our nation today is short of research men. Business men must establish more laboratories. They must see that opportunities are offered to the technical man, the trained investigator, so that it is worth the while of serious-minded young men to enter these branches of industry. It is for this sort of thing that the technical and business press of the country stands, and it is this sort of thinking that will ultimately solve our raw materials problem and the technical problems of extraction, of transportation and of utilization.

SKILLED MANAGEMENT AS ESSENTIAL AS SKILLED LABOR

I have said that increased production and the possibilities of increased production is a state of mind. No body of men is more responsible for this state of mind than the management, which is the fourth great factor in production. There is just as much opportunity for the development of the intelligent application of management to industry as for the intelligent application of machinery to the processing of materials. Human engineering and business engineering are two new terms in our dictionaries which have come out of a new kind of thinking in industry. We shall never have maximum production until we have maximum skill in labor, minimum use of materials and maximum skill in management. The business press sees men and machinery and material and capital put together and made a co-ordinated whole by management.

It does no good to arouse the nation to action, or to arouse the individual to action, unless there is also suggested how some one has turned that action into practice. This is an educational process. This is a function, and a vital function, of the business press. It is one of the reasons for a business press, and in forwarding such movements and in explaining and interpreting them in the practical language of the particular industry, the press has an opportunity for increasing production which is second to none in any of the great educational mediums of the nations.

LEADERSHIP OF BUSINESS PRESS IN NATIONAL PROBLEMS

In all this work the business press has a double relation. It is evident from what has been said that one of its values is based on the vitality of its editorial relation to the industry which it serves. It must draw, and in worth-while business does draw, its editors from the industry. They may be and are men of knowledge of their particular lines.

But of more importance possibly than the relation of the business press as a recorder and a clearing house of ideas is its professional relation to its industry or trade. The editors of the business press have the opportunity to be both a part of an industry and to stand on the side lines looking out over industry. They can see, because of their exceptional opportunities for investigation and association with leaders of their particular fields, the general trend of an industry. They can help and do help point out and chart the way of the industry, and they have a sense of responsibility toward the public which that particular industry may serve, which is one of the fundamental values of the business paper.

Two concessions for the installation of electric street car lines in the city of Guatemala are said to be now before the government of that country, with indications that they will be favorably acted upon. At present there are no electric roads in the country, although it has vast water power resources.

Railway Census Figures Issued

Report Shows a Growth of 9.2 Per Cent in Mileage and 22.7 Per Cent in Rolling Stock from 1912 to 1917—During This Period Traffic Increased 19.5 Per Cent—Operating Expenses Fail to Reflect Present High Costs

STATISTICS of the electric railways in the country for the fourth quinquennial census report, which were obtained by the Department of Commerce, Bureau of the Census, in 1917, have just been published in book form by the bureau. The report analyzes the conditions existing in the industry in the usual complete manner and gives comparative data in all tables covering the conditions of 1912, 1907, 1902 and in some cases 1890.

Some preliminary statistics have already been published in the columns of the ELECTRIC RAILWAY JOURNAL for April 26 and May 3, 1919.

The report for 1917 covers 943 operating and 364 lessor companies which operate 32,548 miles of line, involving in all a total of 44,835 miles of single track, 94.8 per cent of which is operated by overhead trolley, 3.8 per cent by third rail and 0.7 per cent by conduit or underground trolley. The miles of line and miles of single track show an increase of 6.9 and 9.2 per cent respectively over the 1912 census.

The rolling stock owned, however, increased 22.7 per cent over 1912. The total number of cars of all types reported was 102,603, 77.9 per cent of which were passenger cars, 11.2 per cent were classified as "express, freight, baggage and mail cars" and 10.9 per cent as service cars. The number of cars equipped with motors was 74.5 per cent of the total and represented a growth of 20.4 per cent in the last five years.

CAPITALIZATION

The capitalization of the operating and lessor electric railways was found to include a considerable investment in non-railway properties, such as power installations for light and power purposes and other auxiliary operations. In computing the net capitalization per mile of track, the investments in stocks and bonds of other companies, in treasury securities and in other permanent investments have been deducted from the outstanding capital stock and funded debt securities. Table I presents the statistics for 1917 compared to 1912 and 1907.

TABLE I—Capitalisation, Including Floating Debt

	(4) 1917	(4) 1912	(4) 1907	Per Cent of Increase [1]		
				1907-1917	1912-1917	1907-1912
Capital stock	$2,473,847	$2,379,346	$2,097,709	17.9	4.0	13.4
Common	2,012,190	1,970,385	1,776,920	13.2	2.1	10.9
Preferred	461,659	408,961	320,789	43.9	12.9	27.5
Funded debt	3,051,179	2,329,222	1,677,064	81.9	31.0	38.9
Real estate mortgages	7,198	6,097	4,060	77.3	18.1	50.2
Floating debt	166,593	296,162	278,927	—40.3	—43.7	6.2
Total	5,698,816	5,010,823	4,057,759	40.4	13.7	23.5
Stocks and bonds of other electric railway companies and treasury securities	390,489	360,105	237,896	64.1	8.4	51.4
Net capitalisation	5,308,327	4,650,718	3,819,863	39.0	14.1	21.8
Investments in other securities and non-railway properties	251,773	105,145	136,768	84.1	139.5	—23.1
Net capitalisation based on electric railways:						
Inclusive of floating debt [2]	5,056,554	4,545,573	3,683,095	37.3	11.2	23.4
Per mile of track	115	112	108			
Exclusive of floating debt [2]	4,889,962	4,249,415	3,404,168	43.6	15.1	24.8
Per mile of line [3]	153	141				
Per mile of track	111	105	101			

[1] A minus sign (—) denotes decrease. [2] Includes real estate mortgages.
[3] Miles of line represented: 1917, 31,968.95; 1912, 29,991.42.
[4] All totals in thousands of dollars—last 000's omitted.

TABLE II—Income of Operating Companies, by Source

ACCOUNT	1917	1912	Per Cent of Increase [1]
Income from all sources	$730,108,040	$585,930,517	24.6
Operating revenues	709,825,092	567,511,704	25.1
Railway operations	650,149,806	535,996,122	21.3
Passenger	603,129,620	502,651,637	20.0
Baggage, express, and milk	4,965,566	3,687,947	34.6
Parlor, sleeping, dining, and special car	957,966	1,036,520	—7.6
Mail	614,678	723,640	—15.1
Freight	18,546,504	10,165,616	82.4
Miscellaneous transportation revenue	1,066,138	1,919,413	—44.5
Power revenue	6,710,099	5,515,475	21.7
Rent of tracks, equipment, and other railway property and facilities	7,413,335	10,295,874	37.5
Other railway operating revenue	6,745,900		
Auxiliary operations	59,675,286	31,515,582	89.4
Non-operating income	20,282,948	18,418,813	10.1
PER CENT OF INCOME FROM ALL SOURCES			
Operating revenues	97.2	96.9	
Railway operations	89.0	91.5	
Passenger	82.6	85.8	
Parlor, sleeping, dining, and special car	0.1	0.2	
Freight, mail, baggage, express, and milk	3.3	2.5	
Other railway operating revenues	3.0	3.0	
Auxiliary operations	8.2	5.4	
Non-operating income	2.8	3.1	

[1] A minus sign (—) denotes decrease.

The gross capital liabilities, exclusive of floating debt, which approximates $166,500,000, averaged $126,021 per mile of track in 1917, $116,435 in 1912 and $111,569 in 1907.

FINANCIAL OPERATIONS

The reports of the financial transactions of the electric railways conformed in practically every case to the standard system of accounts adopted by the I. C. C. All income from railway operations is shown, therefore, as originating with the operating companies, while the income of the lessor companies (rentals) is reported as an expense by the operating companies.

The income from all sources of the 943 operating companies according to source and the percentage that each bears to the total is shown in Table II. Notable factors are the relatively large increase in auxiliary operations, chiefly in light and power business, and the decrease in mail and special car revenues.

Table III illustrates the differences in the relative importance of the several classes of operating revenues for electric railways and steam railroads.

The classification of companies as to size is based upon income from railway operations, hence income from auxiliary operations, of which the chief is light and power service, and other non-transportation revenues do not affect the classification, however large they may be. Table IV shows what percentage of the operating revenue is received from various sources, depending upon the size of the company.

OPERATING EXPENSES

Because of the many and varied factors involved in operating expense, such as the differences in character of the systems, in power and the source of power, in character of roadbed, rolling stock and the territory served, comparisons of the costs of maintenance and operation are only of value as illustrating general conditions. Tables V and VI give comparative figures for the last three census years of the five general or main expense accounts, together with changes and per cent distribution of the accounts. Auxiliary operations, chiefly light and power business, constitute an important factor. Considering railway operating expenses, the expenses for conducting transportation constituted 41.5 per cent in 1917, 40.5 per cent in 1912 and 39.6 per cent in 1907. Power expenses amounted to 18.3 per cent of the same total in 1917, 16.8 per cent in 1912 and 17.9 per cent in 1917.

A classification of companies by income, as in Tables VII and VIII, shows that considering railway operating expenses solely, the expenses for conducting transportation constitute a greater proportion of the total for the larger companies than for the smaller companies and power expense is a greater proportion of the total railway operating expenses for the smaller than for the larger companies.

TAXES AND OTHER DEDUCTIONS

At prior censuses taxes were treated as a deduction from income, together with rentals for leased lines, interest, charges for sinking funds and other deductions, but in accordance with the system of ac-

TABLE III—Per Cent Distribution of Operating Revenues by Source

CLASS OF SERVICE	Electric Railways			Steam Railways		
	1917	1912	1907	1917	1912	1907
Operating revenues	100.0	100.0	100.0	100.0	100.0	100.0
Passenger	92.8	88.8	91.5	20.6	23.2	21.8
Freight	2.8	1.8	1.3	70.3	69.3	70.4
Mail	0.1	0.1	0.2	1.5	1.8	1.9
Express	0.8	0.6	0.4	2.7	2.6	2.2
All other	3.5	8.7	6.7	4.9	3.2	3.6

TABLE IV—Per Cent Distribution of Operating Revenues, by Source, of Companies Classified According to Income from Railway Operations

ACCOUNT.	Class A—Over $1,000,000		Class B—Over $250,000 to $1,000,000		Class C—$250,000 and Less	
	1917	1912	1917	1912	1917	1912
PER CENT DISTRIBUTION OF OPERATING REVENUES						
Operating revenues	100.0	100.0	100.0	100.0	100.0	100.0
Railway operating revenues	94.1	96.7	85.0	89.9	80.4	84.9
Passenger	88.4	91.7	74.8	81.2	71.2	76.5
Baggage, express, and milk	0.5	0.4	1.2	1.3	1.3	1.1
Parlor, sleeping, dining, and special car	0.1	0.2	0.2	0.3	0.1	0.2
Mail	0.1	0.1	0.1	0.1	0.2	0.2
Freight	2.0	1.2	5.1	3.4	4.3	4.0
Miscellaneous transportation	0.1	0.3	0.2	0.5	0.6	0.5
From other railway operations	2.9	2.8	3.4	3.1	2.7	2.4
Auxiliary operating revenues	5.9	3.3	15.0	10.1	19.6	15.1

TABLE V—Operating Expenses, by Accounts

ACCOUNT	(3) 1917	(3) 1912	(3) 1907	Per Cent of Increase [1]		
				1907-1917	1912-1917	1907-1912
Number of companies	943	975	939			
Operating expenses, total	$452,595	$332,896	$251,309	80.1	36.0	32.5
Railway operating expenses	421,251	318,700	245,140	71.8	32.2	30.0
Way and structures	55,470	44,271	28,521	94.5	25.3	55.2
Equipment	48,981	38,717	31,486	55.6	26.5	23.0
Power	76,958	53,599	43,973	75.0	43.6	21.9
Conducting transportation	174,973	[2]129,204	[2]97,122	80.2	35.4	33.0
Traffic	2,302	2,606	1,731	33.0	—11.7	50.6
General and miscellaneous	62,738	50,303	42,307	48.3	24.7	18.9
Transportation for investment—credit	*172*					
Auxiliary operations—expenses	31,344	14,196	6,169	408.1	120.8	130.1

[1] A minus sign (—) denotes decrease. [2] Includes superintendence of power.

[3] All totals in thousands of dollars—last 000's omitted.

TABLE VI—Per Cent Distribution of Operating Expenses, by Accounts (Based on Table V

ACCOUNT	1917	1912	1907
Operating expenses, total	100.0	100.0	100.0
Railway operating expenses	93.1	95.7	97.5
Way and structures	12.2	13.3	11.3
Equipment	10.8	11.6	12.5
Power	17.0	16.1	17.5
Conducting transportation	38.7	38.8	38.7
Traffic	0.5	0.8	0.7
General and miscellaneous	13.9	15.1	16.8
Transportation for investment—credit	(1)		
Auxiliary operations—expenses	6.9	4.3	2.5

[1] Less than one-tenth of 1 per cent.

TABLE VII—Operating Expenses, by Accounts—Companies Classified According to Income From Railway Operations: 1917.

ACCOUNT	Total	Class A—Over $1,000,000	Class B—Over $250,000 to $1,000,000	Class C—$250,000 and Less
Number of companies	943	114	179	650
Operating expenses, total	$452,594,654	$340,055,035	$70,304,757	$42,234,862
Railway operating expenses	421,250,838	322,769,195	62,528,547	35,953,096
Way and structures	55,470,419	41,882,192	8,619,811	4,968,416
Equipment	48,981,554	37,894,165	6,836,922	4,250,467
Power	76,958,461	56,201,555	12,652,775	8,104,131
Conducting transportation	174,972,645	139,964,660	23,046,724	11,961,261
Traffic	2,301,817	1,265,290	725,877	310,650
General and miscellaneous	62,738,265	45,727,954	10,650,757	6,359,554
Transportation for investment—credit	*172,323*	*166,621*	*4,319*	*1,383*
Auxiliary operations—expenses	31,343,816	17,285,840	7,776,210	6,281,766

TABLE VIII—Per Cent Distribution of Operating Expenses of Companies Classified According to Income from Railway Operations: 1917 (Based on Table VII)

ACCOUNT	By Classes			By Accounts			
	Class A	Class B	Class C	All Companies	Class A	Class B	Class C
Operating expenses, total	75.1	15.5	9.4	100.0	100.0	100.0	100.0
Railway operating expenses	76.6	14.9	8.5	93.1	94.9	88.9	85.1
Way and structures	75.5	15.5	9.0	12.2	12.3	12.3	11.8
Equipment	77.4	13.9	8.7	10.8	11.1	9.7	10.1
Power	73.0	16.5	10.5	17.0	16.5	18.0	19.2
Conducting transportation	80.0	13.2	6.8	38.7	41.2	32.8	28.3
Traffic	55.0	31.5	13.5	0.5	0.4	1.0	0.7
General and miscellaneous	72.9	17.0	10.1	13.9	13.4	15.1	15.0
Transportation for investment—credit	*96.7*	2.5	0.8	(1)	(1)	(1)	(1)
Auxiliary operations—expenses	55.1	24.8	20.1	6.9	5.1	11.1	14.9

[1] Less than one-tenth of 1 per cent.

TABLE IX—Taxes and Other Deductions-Operating Companies

	(³) 1917	(³) 1912	(³) 1907	Per Cent of Increase 1907-1917	1912-1917	1907-1912
Taxes assignable to railway operations	$45,757	(¹)$35,028	$19,756	131.8	30.6	77.0
On real and personal property	21,805					
On earnings, capital and other	23,952					
Deductions from gross income	$175,306	149,866	²118,339	48.1	17.0	26.6
Rent for leased roads (lines and terminals)	48,303	44,785	48,023	0.6	7.9	—6.7
Interest on funded debt	110,507	98,025	63,741	86.9	21.5	53.8
Interest on unfunded debt	8,606					
Miscellaneous rents	1,775					
Income transferred to other companies	900	7,056	(²) 6,576			
Miscellaneous debits, not elsewhere specified	5,215					

[1] Includes $603,226 rental of subways and tunnels (Boston Elevated Ry. Co.).
[2] Includes "Charges for sinking fund."
[3] All totals in thousands of dollars—last 000's omitted.

TABLE X—Taxes

	1917	1912	1907	Per Cent of Increase 1907-1917	1912-1917	1907-1912
Total	$45,756,695	¹$34,424,739	$19,755,602	131.6	32.9	74.3
Class A	37,157,324	¹28,098,949	15,524,362	139.3	32.2	81.0
Class B	5,902,953	3,935,021	2,479,106	138.1	50.0	58.7
Class C	2,696,418	2,390,769	1,752,134	53.9	12.8	36.5

[1] Not including $603,226 rental of subways and tunnels (Boston Elevated Railway Co.).

counting in vogue "taxes assignable to railway operations" are a charge against net operating revenue and charges for sinking fund are handled as a profit and loss account.

The ratio of taxes to income from all sources less operating expenses increased from 11.1 per cent in 1907 to 13.6 per cent in 1912 and to 16.5 per cent in 1917. The aggregate of operating expenses and taxes was $498,351,349 in 1917, of which amount taxes form 9.2 per cent, or taking operating revenues as a basis taxes absorbed 6.4 per cent.

Taxes, when classified according to the size of the company, as shown in Table X, indicate the greater increases are for the larger companies.

The interest charges of the 943 operating companies on funded and unfunded debt amounted to $119,113,018 in 1917, an amount 21.5 per cent greater than the interest charges in 1912, the increase for 1907 to 1912 being 53.8 per cent. In the case of the 364 lessor companies the interest on funded debt in 1917 amounted to $16,147,380, as compared with $15,234,132 in 1912. "Deductions from gross income" when classified by companies according to income indicate a 57.1 per cent increase over 1912 for the Class A companies. Class B companies increased but 44.6 per cent, while Class C showed a decrease of 4.9 per cent. The cause for these variations is due entirely to the increased interest charges on funded debt.

TABLE XII—Employees, by Classes of Occupation

CLASS	1917	1912	1907	Per Cent of Increase¹ 1907-1917	1912-1917	1907-1912
Number of companies	943	975	²939			
Persons employed						
Number	294,826	282,461	221,429	33.1	4.4	27.6
Salaries and wages⁴	$267,240	$200,891	$150,991	77.0	33.0	33.0
Salaried employees—						
Number	27,151	23,271	11,700	132.1	16.7	98.9
Salaries⁴	$33,910	$26,129	$12,909	162.7	29.8	102.4
Salaried officers of corporation—						
Number	1,883	1,927	1,518	24.0	—2.3	26.9
Salaries⁴	$6,786	$5,709	$3,852	76.2	18.9	48.2
Managers and superintendents—						
Number	2,889	2,882	2,094	38.0	0.2	37.6
Salaries⁴	$6,205	$5,376	$3,580	73.3	15.4	50.2
Clerks, stenographers, and other salaried employees—						
Number	22,379	18,462	8,088	176.7	21.2	128.3
Salaries⁴	$20,918	$15,044	$5,477	281.9	39.0	174.7
Wage earners—						
Number³	267,675	259,190	209,729	27.6	3.3	23.6
Wages⁴	$233,331	$174,762	$138,082	69.0	33.5	26.6
Conductors and motormen—						
Number	136,184	131,321	115,518	17.9	3.7	13.7
Wages⁴	$127,222	$95,452	$75,705	68.0	33.3	26.1
Conductors—						
Number	68,352	65,726	60,032	13.9	4.0	9.5
Wages⁴	$62,997	$47,102	$38,234	64.8	33.7	23.2
Motormen—						
Number	67,832	65,595	55,486	22.3	3.4	18.2
Wages⁴	$64,230	$48,350	$37,471	71.4	32.8	29.0
All other employees—						
Number	131,491	127,869	94,211	39.6	2.8	35.7
Wages⁴	$106,109	$79,311	$62,377	70.1	33.8	27.1

[1] A minus sign (—) denotes decrease.
[2] Exclusive of 6 companies which failed to furnish this information.
[3] For 1917 as of date Sept. 29; for 1912, Sept. 16; for 1907, average number for the year.
[4] Totals for salaries and wages are in thousands of dollars—last 000's omitted.

GENERAL RESULTS OF OPERATIONS

The report gives tables for the several standard units of comparison and Table XI shows the result of operation of all operating companies classified according to income from railway operation.

The number of persons employed in 1917 was 4.4

TABLE XI—GENERAL RESULTS OF OPERATION OF ALL COMPANIES AND OF COMPANIES CLASSIFIED ACCORDING TO INCOME FROM RAILWAY OPERATIONS

UNIT	All Companies 1917	1912	1907	Class A—Over $1,000,000 1917	1912	1907	Class B—Over $250,000 to $1,000,000 1917	1912	1907	Class C—$250,000 and Less 1917	1912	1907
Number of companies	943	975	939	114	91	76	179	155	130	650	729	733
Operating ratio (per cent)	63.8	58.7	60.1	62.3	56.7	58.4	66.4	61.7	61.9	72.5	68.3	67.4
Per mile of track:												
Operating revenues	$15,832	$13,820	$12,268	$20,940	$19,844	$19,287	$10,314	$8,937	$8,009	$6,839	$5,784	$5,251
Operating expenses	10,095	8,107	7,373	13,046	11,252	11,256	6,853	5,517	4,956	4,962	3,949	3,539
Net operating revenues	5,737	5,713	4,895	7,894	8,592	8,032	3,461	3,420	3,053	1,877	1,835	1,712
Per car-mile:	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Operating revenues	33.17	29.53	25.97	32.80	29.49	26.25	36.04	30.63	25.71	31.99	28.32	24.84
Operating expenses	21.15	17.32	15.61	20.43	16.72	15.32	23.95	18.91	15.91	23.21	19.33	16.74
Net operating revenue	12.02	12.21	10.36	12.37	12.77	10.93	12.09	11.72	9.80	8.78	8.99	8.10
Per revenue passenger:												
Operating revenue	6.28	5.95	5.63	5.84	5.54	5.28	8.51	7.51	6.53	8.22	7.68	6.99
Operating expenses	4.00	3.49	3.39	3.64	3.14	3.08	5.66	4.64	4.04	5.96	5.24	4.71
Net operating revenue	2.28	2.46	2.25	2.20	2.40	2.20	2.85	2.87	2.49	2.26	2.44	2.28

per cent more than in 1912, but the salaries and wages paid increased 33 per cent. The greatest increase in wages was to clerks, stenographers and other salaried employees. This increase was 39 per cent. The 267,675 wage earners in 1917 is an increase of 3.3 per cent compared with 1912, but the amount paid in wages, $233,330,688, is an increase of 33.5 per cent. Expressed in terms of an average unit wage, the conductors and motormen received an annual average wage of $934 in 1917, as compared with $727 in 1912, and all other classes of wage earners an average of $807 in 1917 and but $620 in 1912.

Table XII gives a comparative summary for the last three censuses of employees' salaries and wages for the year by classes of occupation.

Problems of the Super-Power Plant

AT A meeting of the Washington Section of A. I. E. E. held on April 13 Harold Goodwin, Jr., of the General Electric Company gave the principles and procedure followed in the design of a 200,000-kw. power plant to be built in Paris, France. It is intended to supersede all present generating stations in that city. The plant will be near the city on the Seine River and the main generating equipment will consist of seven 35,000-kw. generators. The plant will feed ten 60,000-volt underground lines and two 60,000-volt overhead lines. The turbines driving the generators will operate at 325 lb. pressure and 320 deg. F. superheat.

With such large concentration of power, special attention was given to feeder protection. It was decided that the maximum allowable concentration at any point under the city is 500,000 kva., in case of a "dead" short circuit, as 580,000 kva. is the breakdown capacity of the oil switches. As 200,000 kva. could be supplied to any feeder from a single generator and transformer, special reactors were needed. The necessary flexibility and protection were provided by connecting each generator and transformer to a high-tension bus and connecting each of these buses through reactors to a synchronizing bus.

The boiler plant will contain four boilers of novel construction for each turbine. They are to be equipped with superheater coils set between the lower and upper banks of tubes, in order to produce the high degree of superheat specified.

The plant is intended to operate on a 50-cycle basis, replacing the several frequencies now in use, namely, 16⅔, 40 and 42 cycles. It is estimated that the plant as designed would have cost approximately $45 per kilowatt at pre-war prices, but the exact present cost has not yet been estimated. It will, however, be between two and three times the pre-war cost.

Rail Hardening Experience in England

AMONG items reported to the London County Council by the highways committee at the meeting held on March 30 information was given as to the result of the Sandberg rail-hardening process, which is used to a considerable extent in Great Britain. It was stated that the effect of the treatment is to raise the elastic limit of the surface of the rail from about 25 tons to more than 100 tons per square inch. Measurements which have been made indicate that the life of rails can be extended more than three years by this process. An absence of corrugation on the treated rails has been noted.

Lack of Public Policy Deplored

National Municipal League Committee Presents Report Outlining a Suggested Correct Public Policy Toward Street Railways

AS A supplement to its April issue the *National Municipal Review*, published by the National Municipal League, Concord, N. H., publishes a report of the league's committee on public utilities, in which all previous reports of this committee are summarized and the unsolved elements of the problem analyzed. Dr. Delos F. Wilcox is chairman of the committee, whose membership includes seven other men from different parts of the country.

That there is a recognized crisis in local transportation, due largely to the fact that the policy of private management under partial public control has broken down, is the starting point of the report. The necessity for street railway service is recognized, yet the various cities have not prepared themselves to assume responsibility for it. The present condition is a public menace on account of the financial condition of so large a business, on account of the breakdown of such an essential service, on account of the loosening of control of public authority over the street railway and on account of the danger of an unprecedented series of conflicts between the companies and labor. There are several points of view on these questions and the fact that the public lacks a definite policy merely delays the final solution of the problem. The problem is made more complex by the forty-eight separate jurisdictions, aside from the national one under which railways have to operate.

The report then goes on to review the league's efforts to outline and develop a public policy during the last twenty years and reviews the previous reports made by the committee. Its original program that "every city . . . shall be vested with power to perform and render all public services" is still maintained. In other words, ultimate authority of a municipality to own and operate its street railway system, if the people of the city desire it, is a part of the policy of the league.

The report closes with a listing of the unsolved problems that demand immediate attention, which are outlined as follows:

1. A location of authority between states and local bodies.

2. Formation of definite policy for consummation of municipal or state ownership and successful public operation of utilities. Under this heading several subproblems are outlined, such as (a) preparation of specific constitutional amendments; (b) preparation of condemnation laws with all the various corollary questions; (c) preparation of legislation to enable cities to secure funds on advantageous terms (involving the question of debt limit); (d) preparation of satisfactory plans for public operation; (e) preparation of plans for adjustment of disputes between municipalities and employees; (f) preparation of a policy of extension and of rates.

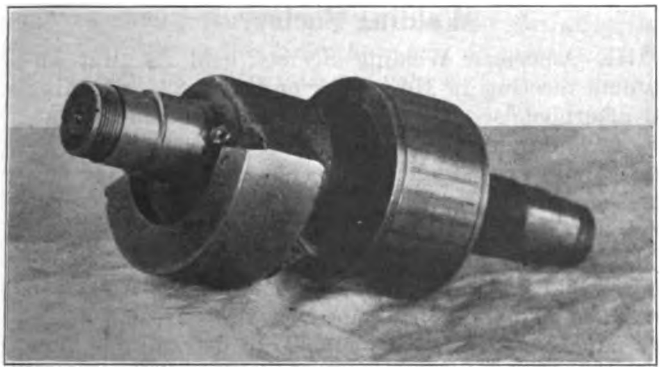
The committee then reaches its conclusions that street railway transportation is a public function and that it cannot be put upon a permanently sound basis until the organized community has prepared itself to perform the function.

As an appendix is given the public utility section of the National Municipal League's model city charter.

Centrifugal-Electric Tie Tampers

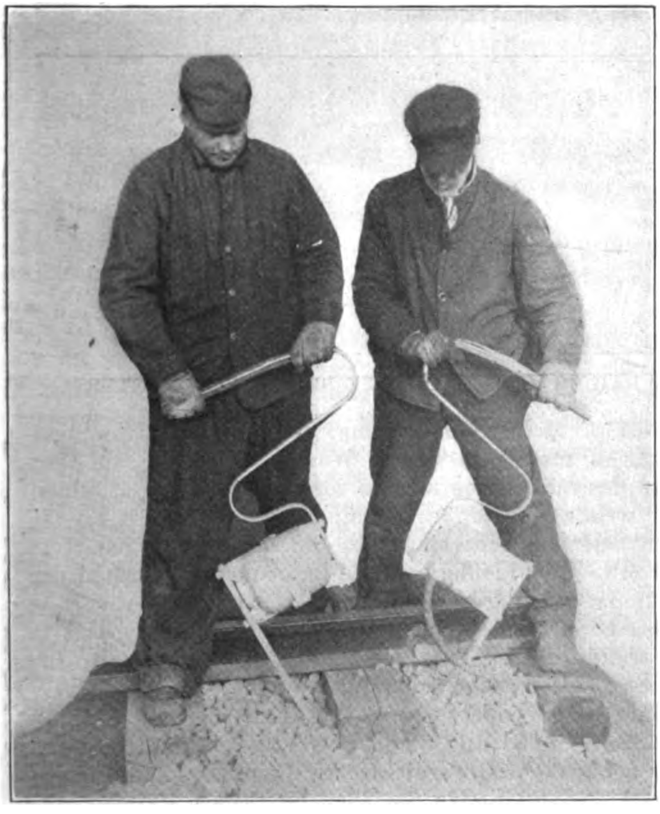
A Three-Phase Motor Operated from a Motor-Generator Set Is Used on Account of Its Rugged Construction

AN exceedingly simple and yet apparently effective electric tie tamper has been brought out by the Kalamazoo Railway Supply Company, Kalamazoo, Mich., under the name of the "Jackson tie tamper." It comprises simply a three-phase, 60-cycle, 110-volt squirrel-cage induction motor with an unbalanced weight mounted on the end of the shaft at which the tamping tool is bolted to the motor housing. By rotation of the motor at a speed of 3,600 r.p.m. the centrifugal force of the unbalanced weight on the shaft produces a tamping impulse of some 400 lb. 3,600 times a minute.



THE ROTOR AND UNBALANCED WEIGHT ON THE TAMPER MOTOR SHAFT

The well-known ruggedness and simplicity of the squirrel-cage motor is taken advantage of by making use of a motor-generator set for supplying the necessary alternating current, the advantages of this type of motor being considered so important as to offset the investment necessary in the motor-generator set, as compared with use of the direct-current motor in the tamping tool. The rotor of the tamping motor is mounted upon a heavy nickel-steel shaft which runs on two heavy ball bearings. The motor housing is made extra heavy and is claimed to be rain, dust and dirt proof. The tamping tool is bolted to this housing at one end and the operator's handle at the other end. This handle is also of unique design since it is constructed of flat spring steel and provided with leather hand strips. This spring handle relieves the operator of vibration and permits the tamping bar to take any working angle without the necessity of the operator bending his back or assuming a cramped, unnatural position. The tamping bar can be quickly attached to the motor and it is supplied in various widths and thicknesses, to conform to the requirements of the ballast.



CENTRIFUGAL-ELECTRIC TIE TAMPER IN OPERATION

Each tamper requires approximately ½ hp. for its operation, it is claimed, and the generator supplying the energy is designed for a capacity of four tampers. No operating switch is provided on the tamping tool, since this is considered to be a source of trouble which the manufacturers have considered could be very largely eliminated by making use simply of a plug and socket-type switch in the power lead. The weight of the tamper, exclusive of the tamping bar, is 40 lb.

Arkansas Association Meets at Hot Springs

A Three-Day Meeting Packed Full of Instructive Discussion, Particularly with Relation to Managerial Problems

THE Arkansas Utilities Association met at Hot Springs, April 26 to 28 inclusive. At the opening of the convention the Hon. Charles H. Brough, Governor of the State, said that the 200 leading utilities in the State represent an investment of $150,000,000, and that the tax commission reports show them to be reporting their investments fairly. J. S. Wharton, president of the association, in responding, said that the records show that the utilities are paying, on a basis of assessment, double the average of the other industries of the State.

Next a paper on "Lightning Protection" was read by J. L. Buchanan, president Wesco Supply Company, St. Louis, Mo., followed by one on "Underfeed Stokers," by O. P. Barnell, Westinghouse Electric & Manufacturing Company, St. Louis. P. W. Thomas, mechanical superintendent Arkansas Light & Power Company, discussed the three fuels readily available in the State, namely, coal, oil and natural gas, with special reference to labor supply, first cost, reliability, economy and overload requirements. The discussion was merged with that of an address by W. G. Schmauder, Texas Power & Light Company, Dallas, on "Present Operating Problems," the important points in which were the cost of money, the open shop and power-plant efficiencies.

Mr. Schmauder advocated firing so as to produce a gray haze at the stack rather than black smoke or no smoke at all, and banking by intermediate firing. He also urged investigation of turbine performance and condenser conditions.

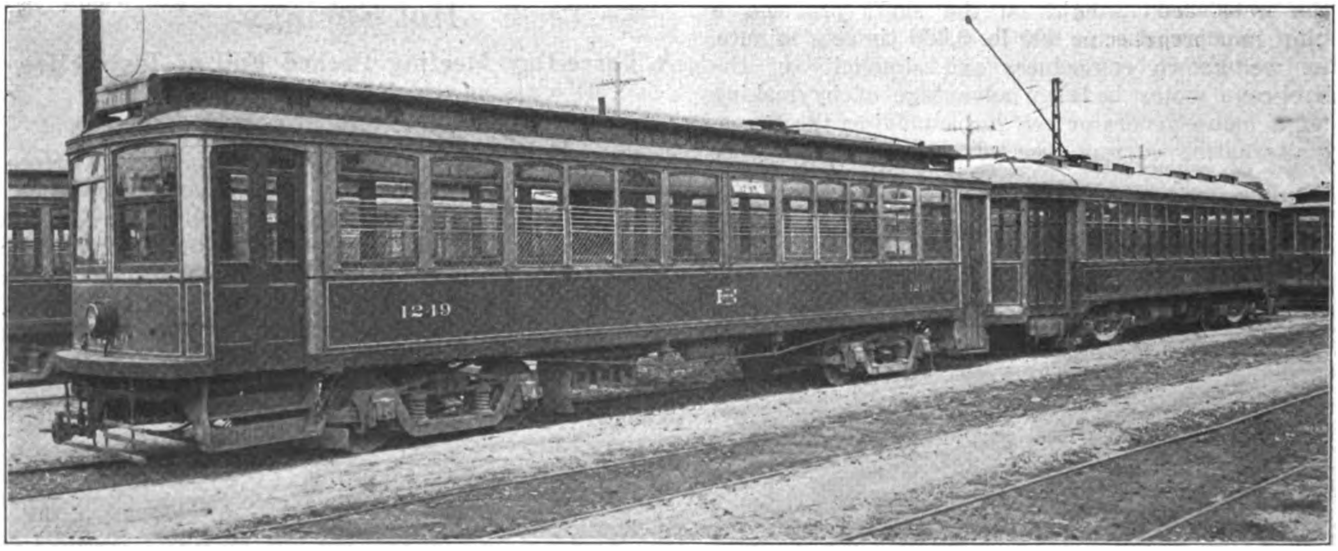
The association voted to affiliate with the Southwestern Geographic Section of the N. E. L. A. and to meet again at Hot Springs next year. The result of the election was as follows: President, C. J. Griffith, Little Rock; first vice-president, J. F. Christy, Jonesboro; second vice-president, J. A. Whitlow, Pine Bluff; third vice-president, Judge R. M. Foster, Helena; secretary-treasurer, S. E. Dillon, Hot Springs.

On the closing day Judge Thomas E. Wood, member Arkansas Corporation Commission, discussed primarily the indeterminate franchise feature of the corporation commission act. He commented on the commission's responsibility in preserving service for the public and avoiding receiverships at this time. He decried the bitter hostility of some cities that had depended upon paid propagandists instead of the orderly processes of law.

Sample Car Tried in Milwaukee

Use of New Cars, Together With Remodeling of Old Rolling Stock, Planned to Help Out General Shortage

THE sample car after which the 100 new cars which the Milwaukee Electric Railway & Light Company is about to purchase are to be patterned has been completed in the shops of the company and is being operated in regular schedule for trial purposes. This car embodies several new ideas in design. It is 45 ft. long, seats forty-eight people in winter and fifty in summer within the car body, with a few additional seats on the platforms, and weighs only 31,480 lb. It is equipped with double trucks designed by the company, which are of very light construction with no springs except the long elliptics in the bolster. The trucks are equipped with 26-in. wheels and four baby motors. The car is also equipped with complete safety devices.


MILWAUKEE TWO-CAR TRAIN, UTILIZING INTERURBAN T RAILER (LEFT) IN CITY SERVICE IN WINTER

During the past winter the Milwaukee company has developed a plan for providing additional equipment to help out against the general shortage, without making new purchases, and at the same time to put into use equipment which ordinarily stands idle in the winter. This has been accomplished by equipping a number of interurban trailer cars with control equipment on one end, through power cables and one trolley, and coupling these permanently to some of the larger four-motor city cars. These trailers weigh 39,000 lb. and seat about fifty-three passengers. In addition to the control at one end, the trailers were equipped with air-operated doors and safety devices. The two cars, having control equipment on opposite ends, are thus operated as a single unit and consequently they may be run anywhere in the same manner as a single-car unit. As these two-car trains are used only in the rush hour, the rather heavy weight of the trailer is not considered of importance and the scheme provides the dual advantage to the company mentioned above.

First Annual Meeting of American Welding Society

THE American Welding Society held its first annual meeting in New York on April 22. Morning and afternoon sessions were devoted to business matters, including the election of J. H. Deppeler as president, J. W. Owens as vice-president to serve for two years and D. B. Rushmore as vice-president to serve for one year.

The retiring president, Comfort A. Adams, spoke briefly regarding the work being done by the American Bureau of Welding. He said that the bureau's activities had been devoted principally to determining how a good weld can be assured. Methods will be sought for testing the quality of a weld after it is made and for determining the best way to eliminate "locked-up" stresses in long welds.

The evening session was devoted to the presentation and discussion of three papers. The first was on "The Speed of Metal Arc Welding," read by William Spraragen of the University of Washington. He said that it is desirable to be able to compute the rate at which arc welding could be accomplished, but there are so many elements entering into the calculation that it is difficult. For inside work 1.8 lb. of metal deposited per hour is considered a reasonable rate, but when the work is performed out of doors the average appears to be about 1.2 lb. This decrease is no doubt due to the cooling action of air currents.

The other papers were: "Automatic Arc Welding Machines" by H. L. Unland, power and mining engineering department General Electric Company, and "Recent Developments in Gas Cutting" by Stuart Plumley, the Davis-Bournonville Company.

When Appraisals Were Forgotten

SANDERSON & PORTER of New York have just issued in pamphlet form an address entitled "Appraisals and Rate Making," by Cecil F. Elmes of the engineering staff of the firm, which was presented before the fifteenth annual convention of the Illinois Gas Association, March 20, 1919, at Chicago, Ill. The paper is an able argument for the appreciation of the public utility business as based economically upon the same laws as privately conducted business.

Mr. Elmes opens his address by calling attention to the automatic rate regulation of commodities by public opinion during the war and immediately therafter, but says that during this time there was no mention of the word "appraisal" of a milk company's plant even though public sentiment, assisted by newspaper advertisement, forced the price of milk in a given community to 22 cents for grade "A" and 17 cents for grade "B." He notes that when we, the American people, started to drop non-essentials one of the first to go overboard was the appraisal, and it was dropped while we were making rates on commodities vital to the national life. And in general the work was well done and done with justice.

The rest of the address is devoted to an analysis of rate making, the worth of service and the determination of value and rate of return. The general purpose of the address seems to be to show the similarity of the public utility business to private business, and conversely the similarity of so-called private business or commercial ventures to public utilities. Basic commission and court decisions are called upon to substantiate this analysis, and at the end Mr. Elmes indicates that there is real progress in the comprehension of the economics of public utility business.

To support some of his statements and arguments with reference to questions of value Mr. Elmes gives some very interesting data on the average cost of wheat, iron, lead, cattle and sheep and the wages of carpenters and masons, all in England, between the years 1260 and 1918 inclusive.

Engineers to Hold Organizing Conference

THE joint conference committee of the national societies of civil, mining and metallurgical, mechanical and electrical engineers has issued a call for a conference to be held in Washington June 3 and 4 for the purpose of forming an organization of engineering and allied technical associations. The purpose of such organization will be to further the public welfare wherever technical knowledge and engineering training are involved and to consider matters of common concern to the professions represented.

The plan of organization has been formulated by the joint conference committee upon the following principles: (1) Non-interference with the inter-relations with respect to technical matters, and the maintenance of the autonomy, functions and operations of individual organizations; (2) local affiliations of existing groups of engineers in order to facilitate united action in local questions of public welfare and other matters of common interest; (3) national association of engineering organizations by means of a national council composed of representatives widely chosen by local affiliations or organizations and by national organizations, meeting annually and acting through an executive board; (4) financial support of such association by contributions from all participating organizations on the basis of membership; (5) a form of organization which will permit expansion and development.

A large number of societies have indicated their willingness to co-operate with the "founder societies" in this movement.

Purchasing Coal on Specification

THE Western Society of Engineers devoted a recent meeting to the subject of coal purchase by specification, with particular reference to the objections which are made to this practice. Among many interesting things brought out, the following are of particular interest:

In preparing specifications for coal to be purchased on the B.t.u. test basis a maximum limit of the percentage of ash should be named on account of the deleterious effects of the ash on the coal. A penalty for the ash content in the coal over the maximum should be provided, heavy enough so that very little such coal would be furnished. The penalty should be on a scale that increases rapidly as the percentage of ash increases. If the ash content is lower than the limit named in the specifications the contractor should obtain an increased price per ton, corresponding to the increased value of the coal.

In writing proposals for coal to be purchased on a B.t.u. basis, limits for the B.t.u. per pound should be named far enough apart so there will be plenty of opportunity for competitive bidding and yet the coal will still be limited to the general quality desired.

Operators in general are not in favor of selling their coal on the B.t.u. basis on account of their fear of the terious effects of the ash on the coal. A penalty for the samples for analysis is the most difficult part of the entire operation. The fundamental principle governing in this matter is that samples shall be so taken as to be fairly representative of the entire lot of coal. The latest bulletin on this subject is technical paper No. 133 published by the United States Bureau of Mines, Washington, D. C.

Taking up in more detail the objections of the coal operators to the purchase of coal on a B.t.u. basis, the following objections were noted:

1. That the contracts as drawn are not mutual.
2. That the terms of settlement are based on the assumption that all samples taken are truly representative of the quality of the coal delivered, while the operators do not consider this to be true.
3. That the contract so operates that the deductions made for the delivery of coal below contract grade is greater than the loss actually sustained, making such deductions, therefore, a penalty instead of liquidated damages.
4. That the plan offers an opportunity for graft and "shake-downs" on the part of the buyer's representative, and the same opportunity for bribery and trickery on the part of the contractor.
5. That the plan promotes and fosters unfair competition, which works to the detriment of both the buyer and the contractor.

The above objections were taken up in detail and discussed at the meeting, but space limitation prevents more than the listing of the objections here.

Association News

Hearing Before I. C. C.

Mr. Henry Urges That Status of Electric Railways Under Transportation Act Be Determined—Questionnaire to Be Sent Out

BEFORE attempting to interpret Section 422 of the transportation act the Interstate Commerce Commission feels that it must have more data with regard to the freight carried by interurban electric lines. In order to secure those data a questionnaire will be sent to all companies. The committee on national relations of the American Electric Railway Association has been asked to prepare a draft of a questionnaire which will give the commission full information on the subject.

The interpretation of the transportation act so far as it applies to electric railways is a matter to which the American Electric Railway Association, through its Washington office, has been giving a great deal of attention. On March 22 Charles L. Henry, chairman of the committee on national affairs of the association, requested an interpretation of the clause in the bill which excludes from the operation of the law such interurban electric railways as are "not engaged in the general transportation of freight." A report of the first hearing on this question was published on page 659 of the issue of this paper for March 27. On May 6 another hearing was granted to the committee by the commission. At this hearing the committee's views, as expressed by Mr. Henry, may be summarized as follows:

"The clause 'engaged in the general transportation of freight' includes only such roads as have either direct or indirect physical connection, interchange arrangements and joint rates with connecting steam railroads and are actually handling general freight traffic.

"It is to be understood, of course, that this definition will not only include those that now are thus situated but also those that may hereafter be thus situated and qualified.

"This committee respectfully suggests that if the commission will promulgate such a definition of the clause 'engaged in the general transportation of freight' as above outlined, or in such other words as the commission deems best, the whole situation will be so clarified that most of the interurban electric railways of the country will be able to determine for themselves whether or not they are amenable to the provisions of amended Section 15 of the interstate commerce act.

"If there are a few companies that cannot so determine, they can make application to the commission for a definition as covering their status, or the commission may call upon them for facts that will enable the commission to determine their specific case."

The commission did not feel justified in accepting the interpretation suggested by the committee, and after Mr. Henry had been questioned nearly an hour, it was decided that it would be best to send out the questionnaire. The suggestion of the committee for the questionnaire will be drafted at once and submitted to the commission.

In addition to Mr. Henry, Edwin C. Faber of the Aurora, Elgin & Chicago Railway and C. D. Cass of the Waterloo, Cedar Falls & Northern Railway, members of Mr. Henry's committee, assisted on May 6 in the presentation of the electric railway companies' case.

Experience with Equipment During the Severe Winter

SECRETARY E. B. Burritt, on behalf of the committee on equipment of the Engineering Association, has sent out a questionnaire to electric railway companies in the Northern States asking for information regarding their experience during the recent severe winter. It is desired especially to collect data for the purpose of recommending improvements. The topics covered by the questions include snow conditions and removal, tracks and roadway, equipment for snow removal, and equipment troubles with motors, armatures, fields, gears, pinions, gear cases, axles and wheels. There are also two questions on equipment tests.

Letter to the Editors

Infringement of Contactor Patents

NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KY., April 24, 1920.

To the Editors:

IN A recent issue of your paper you published an article describing an overhead trolley contactor made by an electric railway for its own use in connection with the operation of a highway crossing signal. The contactor described is substantially like the contactor made by the Nachod Signal Company and covered by United States patents, dated May 18, 1909, and May 9, 1911.

Electric railway managers should know that the manufacture of a patented article by the railway itself, even for its own use, is illegal and constitutes infringement. In some cases manufacturers hesitate to institute suits on account of the good will of the customer and because the amounts involved are not large, but the duplication of patented articles is manifestly unfair to those who put their time, energy and resources into the development of such devices, and it will retard their design and manufacture. CARL P. NACHOD, President.

Auto Traffic Increases

THE number of privately owned automobiles in Kansas City, Mo., has increased from 10,000 in 1915 to over 30,000 in 1919. Approximately 75 per cent of these are passenger cars, all of which at some time or other during the day carry people about the city at the expense of the street cars. In a check made by the Committee of One Hundred of the Chamber of Commerce on ten different heavily traveled streets leading to the business section 4,677 private cars, carrying 9,336 passengers, were counted coming in between the hours of 7 and 9 a.m. and 6,231 carrying 13,265 passengers were counted outbound between 4:30 and 7 p.m. The estimated loss from such competition during the rush hours on these streets alone is estimated at $1,700 per day. The total loss due to all the private automobiles for twenty-four hours per day would exceed this figure by more than 300 per day.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Employees Reaffirm Plan

Kansas City Men Heartily in Favor of Representative Plan of Co-operation Installed a Year Ago

The "representation plan" of co-operation by employees in the operation of the Kansas City (Mo.) Railways was readopted, with slight modifications, by the employees, on April 5. This plan had been put into effect April 1, 1919. It provides for committees of employees in each department, and a central committee of representatives from the department groups, chiefly to handle matters affecting relations of employer and employee. The members of the committees are elected on May 1.

An important element in the operation of the "representation plan" is that the various committees are not arbitrators, but advocates of the employee with a grievance. The committee investigates the case; and if such case has merit, the committee appears before the officials of the company, or before higher committees, to urge the cause of the complainant, and to assist him in gathering his evidence and testimony.

Matters which cannot be adjusted by the division or department committee, or by the central committee, get finally into a board of arbitration, composed as follows: One man selected by the employees' branch of the central committee, one man selected by the employer's branch of the central committee, and three men so far as possible representing the public interest, selected by these two.

In cases of discipline or discharge, the committees function as follows:

1. Employee applies to the employee members of his division committee.
2. Division committee confers with division superintendent or general foreman.
3. Division committee may appeal to superintendent of transportation or department head.
4. Division committee may then appeal to the general manager.
5. An appeal may be taken from the general manager to the president of the company.
6. The case may then be referred to the general committee.
7. The next appeal rests with the central committee.
8. The board of arbitration is the court of last resort.

On all other matters, the functioning is as follows:

1. Division committee takes up case.
2. Appeal taken to general committee.
3. Appeal taken to central committee.
4. Arbitration.

Company Would Terminate Labor Agreement

The employees of the Portland Railway, Light & Power Company, Portland, Ore., have asked an increase to 66 cents an hour, in reply to formal notification of Franklin T. Griffith, president, recently that the company desired that the present wage scale be terminated on April 30. The new pay would mean an increase of 8 cents an hour for motormen and conductors.

According to Mr. Griffith, the company cannot consider any increase in wages. Mr. Griffith states that the present wage scale in Portland is one of the highest in any city of the country. Under it the company is running behind more than $1,000,000 a year.

The existing scale was arrived at last fall, after a prolonged hearing before an arbitration board, the **employees** securing a slight increase at that time. When the agreement was entered into, however, it was provided that either side could negotiate to change the agreement at the end of any six-month period by filing notification of such desire thirty days before such date. About a month ago Mr. Griffith took advantage of this clause, and announced the desire of the company of which he is the operating head to terminate the agreement.

$10,000,000 Expenditures Being Held Up

Inability of City and Company to Get Together Becoming Very Serious at Pittsburgh

A. W. Thompson, president of the Philadelphia Company, the holding company for the Pittsburgh Railways, said in an interview with the resident correspondent of the ELECTRIC RAILWAY JOURNAL in Pittsburgh that all that has been accomplished after more than a year's work and the expenditure of $500,000 in valuing the local railway under the direction of the Public Service Commission bids fair to be lost or of no avail unless good judgment is used now. As far as Pittsburgh itself is concerned Mr. Thompson said it was well to keep before the people, more particularly the business men, the real question in connection with the railway problem and what is to the best interests of the public. Mr. Thompson regards the public as the people who ride on the cars, the employees who operate the cars and every one who invests in traction securities. Mr. Thompson said:

WHAT the "car rider" wants is good service for a reasonable fare; if he gets that he is satisfied. The employee desires and should have a fair rate of wage commensurate with the work he does and the time required to perform that work. The investor desires and should be assured of a reasonable return on the money he has invested.

INVESTORS DRIVEN AWAY

If the security holder, after investing his money, finds that because of mismanagement, unfair legislation and other reasons which reduce the value of his security, he has individually suffered an unfair loss, having suffered that loss he is not likely to invest again in such securities; and if this number is large the result is the destruction of the company's credit.

Much has been said by the city and the traction company in regard to the matter of valuation of the Pittsburgh Railways properties. Valuation means little to the car rider except as it is reflected in the fare he must pay. Valuation means much to the investor because of the recognized amount of property behind his investment. The difficulty of serving the people and at the same time paying a reasonable return to the investor is more imaginary than real, as it is to the advantage of both to have a well-operated and prosperous property of any kind.

$4,200,000 FOR FIXED CHARGES

The present fixed charges are $4,200,000, nearly $1,000,000 more than has been publicly stated by a representative of the city. If the valuation as handed down helps the credit of the railways and makes possible financing estimated to be $10,000,000, to be applied to rehabilitating the railway, then such a decision undoubtedly works to the advantage of Pittsburgh. Based on the value of the nickel today, the 7½-cent fare has less purchasing power than the 5-cent fare had six or seven years ago.

Past experience indicates to every one that only through co-operation and confidence between the various interests, particularly between the city officials and the traction company officials, will the best results be got, and that controversies resulting in hearings, suits, etc., too frequently involving a discussion of technicalities of the law and a demand for each point by both sides, with no spirit of give and take, terminate in long-drawn-out arguments, during which time the public suffers. Is it not reasonable to expect that, having gone through a procedure of valuation and arguments before the Public Service Commission, and that body having come to a decision, it is time to make a start toward bringing about something constructive and not have the situation turn into one of appeals, arguments, etc.?

More than $500,000 has been expended for the purpose of finding out the fair value of the traction properties, and now with the decision of the Public Service Commission at hand, is there to be further delay and discussion, some of which it seems fair to prophesy will be idle? Had it been possible for all interests to have agreed in the beginning, $500,000 spent for hire of engineers and statisticians could have been invested in new cars.

REORGANIZATION IMPERATIVE

If it is possible to bring about a reorganization of the finances, working out a return on investment which will cover a period of years, bringing about improvements which are sadly needed and stabilizing the industry, then and only then can Pittsburgh look forward to a greater development, greater industrial activity, which can only result to the highest degree from efficient and sufficient transportation.

Controversies in court and out have continued to the extent that the people are tired of hearing about the traction problem.

The credit of the traction company is becoming more impaired each day, if it is not already wholly destroyed.

Expenditures are necessary for improvements, and money cannot be borrowed for these improvements until this problem is settled. It seems to me that the broad question of what is best for Pittsburgh should be immediately determined, so that the proper service may be rendered by the traction lines to the best interests of the public, the city and the railway.

Legislative Session Fairly Productive

Some Important New York Measures Failed, but Many Stabilizing Bills Were Enacted

While the New York State Legislature of 1920, recently adjourned, has received its usual annual baptism of criticism for the things it has omitted to do, for its usual and to-be-expected shortcomings and for some spectacular stunts, and while the defeat of the electric railway relief bills was indefensible, much important general legislation of a permanent structural nature was enacted. Sensible and desirable amendments were passed to the insurance, banking and tax laws and measures were put through calculated to relieve existing conditions of stress during the reconstruction period.

IN the matter of legislation affecting electrical interests it was particularly liberal in the consideration of measures reflecting every angle of the situation. The Jenks measures providing relief for street surface lines and the permissible establishment of a service-at-cost-plus plan were defeated, in the opinion of some observers, more on account of the lateness of the time at which they were introduced than on account of the desire of the Legislature not to afford remedial legislation.

OFFICE CREATED, BUT NO APPROPRIATION

The Senate bill providing for the appointment by the Public Service Commission of the First District of at least one and by the Public Service Commission of the Second District of at least two accident inspectors at salaries to be fixed by the commission passed both houses and is in the hands of the Governor. The Legislature, however, failed to provide any appropriation to pay the said accident inspectors, so that in the event of their appointment they will be obliged to work for nothing until another Legislature can appropriate for their salaries.

Senate bill No. 1352 passed the Senate but died in the Assembly. It amended the public service commissions law by providing that if after a hearing on complaint alleging violation of Section 26, relating to safe and adequate service and just and reasonable charges by street railway companies, or upon consideration of facts admitted in writing by a carrier the Public Service Commission shall determine that any party complainant is entitled to reparation the commission shall make an order directing the carrier to pay such sum.

RATE SUSPENSION MEASURE KILLED

The Senate bill which allowed the Public Service Commission to suspend rates of steam, telegraph or telephone corporations for not to exceed 120 days pending a hearing passed the Senate, but died in the Assembly. The effectiveness of this measure was killed by the subtle amendments made at the request of the telephone people against whom the bill was originally directed who against their will dragged in the telegraph and steam corporations. Had the measure prevailed it would have formed an opening wedge to similar amendments to the law in reference to the suspension of street railway rates under similar conditions.

The Legislature passed and the Governor signed Senate Print No. 357 (chapter 275 of the laws of 1920) providing for compulsory arbitration of civil agreements. Much confusion has arisen in reference to the application of this measure, there having also been before the Legislature Assembly Print No. 1662, which provided for compulsory contracts between public service corporations and their employees. This measure, modeled somewhat after the Kansas statute, never had a chance of passage, but the press and many members of the Legislature were of the opinion that the latter was the bill which was passed. The measure which was enacted is of vital interest to corporations and business people in general. It is intended to afford a short cut in the legal procedure necessary to bring about the settlement of all agreements that are in dispute.

Senate Print No. 761 amended the civil code providing that in an action wherein the validity of a rate or charge made by a public service corporation is involved the municipality granting the franchise shall be a necessary party to the action, except where a corporation furnishes service throughout the state or in more than two municipalities. This measure passed the Senate but died in the Assembly.

RAILWAY INVESTIGATION BILL DEAD

Assembly Print No. 303, appropriating $50,000 to investigate the condition of traction companies of the State and determine whether or not the fare now authorized is sufficient, just and reasonable, died in the ways and means committee of the Assembly.

Senate Print No. 434 and Assembly Print No. 458, two different measures introduced by Senator Walker and Assemblyman Donohue, Democratic minority leaders in the Senate and Assembly, respectively, providing for municipal ownership of public utilities, both died in committee. There was no politics in their death, however, as Senate Print No. 1305, the Republican public utilities measure, met with a similar fate.

Senate Print No. 426 (Mayor Hylan's municipal bus line measure) after being given the honor of a public hearing at which the Senate cities committee was subjected to the same stereotyped tirade the Mayor had previously delivered to the Assembly judiciary committee on the Jenks electric railway measures, was never reported for a vote.

A most important measure, Senate Print No. 1019, introduced by George F. Thompson of Niagara County and public service commission investigation fame, was calculated to relieve street railway corporations from keeping in repair any portion of the street except a space 6 in. on each side of each rail instead of the space between the rails and 2 ft. outside as at present. The railways asserted that the present law is a relic of the days of the horse-drawn vehicles; that they were never consulted when a municipality wished to repave a street, and that if relieved from the present burden many new cars could be bought and the service materially improved. The measure was opposed by Corporation Counsel Andrews of the city of Albany and the Mayors' Conference. It was never reported out of committee.

The Legislature has been exceedingly fair in its amendments to existing tax laws clarifying conflicting sections and relieving corporations from the payment of double income and other taxes and passing a measure which is before the Governor repealing the tax on intangible assets.

Council Directs Preparation of Service-at-Cost Grant

The Mayor and the Corporation Counsel of Rochester, N. Y., were directed by a unanimous vote of the Common Council on the evening of May 4 to negotiate and prepare a service-at-cost contract with the New York State Railways. The Council specified that the contract be drawn as outlined by the Mayor in his communication of April 27 and then submitted to the Council and executed by the Mayor when directed by that body to do so. The report of the law committee on which the Council's action was based is particular to call attention to the fact that the cost is to include as one item a fair return on property actually used and useful in giving service. This fair return is to have no reference to the company's capitalization, to the amount of money taken in or to the amount of money spent for other items of the cost of operation. Compensation for the use of the property involved in giving service is to be just as much an item of cost as compensation for the labor used.

Preparing Bill to Create Chicago Transportation District

At a meeting on April 23 of the Chicago Traction Commission, which is considering the Thompson plan for transportation, announcement was made of the synopsis of the proposed bill for establishment of the Chicago Transportation District. This matter will be taken up by the State Legislature next year, and it is intended to ask for the establishment of a special taxing district comprising the city of Chicago and possibly some outlying territory where local transportation is to be furnished for a 5-cent fare. The bill would exempt this district from control of the State Utilities Commission and give the five trustees power to purchase, condemn, build, maintain and operate surface lines, elevated railways, subways and monorail systems.

May Assist in Track Renewal

New Ohio Law Provides That City Can Do Work and Railway Repay in Ten Installments

Through an amendment to the general code known as Senate Bill No. 211, the General Assembly of the State of Ohio has made it possible for a municipality to finance the renewal, repair or reconstruction of the track of an electric railway at the time the street is paved, the cost being subsequently assessed against the company in ten equal annual installments plus 6 per cent interest. It is understood that the Pennsylvania-Ohio Electric Company, Youngstown, will reconstruct about $500,000 of track this year on this plan.

The bill recently signed by Governor Cox provides that a City Council may by ordinance order a railway to renew, replace or reconstruct its track and roadbed at the time the street is torn up for paving or resurfacing. If the company is dissatisfied with the ordinance, provision is made that within ten days after its passage the company may file a complaint or appeal to the Public Utilities Commission. The commission is thereafter charged with the duty of hearing and determining the case within thirty days, either approving, modifying or reversing the action of the local Council. If the railway then fails to notify the local council in writing that it will do the indicated construction work directed by the commission, or if without appeal, by the City Council, then it is provided that the Council may by ordinance authorize the receiving of bids and a contract for furnishing the necessary material and labor to make such renewal or reconstruction of the track and roadbed itself. In this case it is understood the company may bid and get the contract on a competitive basis.

Having done this work, the code provides that the Council shall by ordinance assess the entire cost of the labor and material required for the work against the railway, and upon failure of the latter to pay the assessment in cash it becomes a lien upon all of the property of the company located within the city. This assessing ordinance must provide for the payment of the assessments in ten equal annual installments with interest until paid and not to exceed 6 per cent per annum; provided, however, that the company shall not be liable for any installment of the assessment falling due after the expiration of the company's franchise unless the use of the track is continued.

Detroit Scene Shifted

Court Called Upon to Fix Company's Rights—Trustee Seeks to Prevent Municipal Bond Issue

The City Council of Detroit, Mich., has indicated its willingness to stand back of the Mayor and the Street Railway Commission in their program for street railway extensions, and if the Mayor's policy is carried out, no more lines will be built in the city by the Detroit United Railway. The Council's attitude in the matter became evident when a majority of the Councilmen voted to instruct the Street Railway Commission to construct a line on Harper Avenue, from Gratiot Avenue to Van Dyke Avenue, disregarding the fact that the Detroit United Railway had previously been granted permission to build the same line.

A PRIVATE right-of-way on the north side of Harper Avenue is owned by the Detroit United Railway and about two years ago the company was authorized to construct a double-track line in the center of the street, and the company in turn agreed to pave between the tracks when the city was ready to pave the remainder of the street. The company now claims a right-of-way in the center of the street. The Mayor also proposes to build one of the municipal extensions authorized by the voters on April 5, when the $15,000,000 bond issue was approved, along the Harper Avenue route.

Mayor Would End Company's Privilege

Mayor Couzens will ask the Council to rescind the Council resolutions which give the Detroit United Railway permission to build extensions, except in the case of the Twelfth Street line, where all preparations have been made for laying the tracks. These lines, including the Harper, St. Jean, Shoemaker, West Warren and McGraw extensions, will probably be built by the city.

This present plan was favored by several of the councilmen last year, but at that time did not receive the Mayor's support. The Council wanted to construct the new lines and make replacements on the existing lines with the ultimate result that all lines would belong to the city.

Opposition to the city activities on the Harper and other lines where agreements have been made with the Detroit United Railway will be made by the company. The plan on the part of the city to stop work on extensions where the Detroit United Railway has already started work will probably result in delay from controversy over compensation to be allowed the company for work already done.

Injunction Holding Bond Issue

Bonds for financing the proposed city car lines are being held up by the injunction proceedings in the federal court instituted by the Detroit United Railway and the New York Trust Company, but the Street Railway Commission is proceeding with the plans for the work. Corporation Counsel Clarence E. Wilcox has made a motion before Federal Judge Tuttle to dismiss the company's suit for an injunction, and May 10 has been set as the date for hearing on the motion. Mr. Wilcox maintains that the case should not be heard in the federal court, as no federal question is involved. He also pointed out that the Supreme Court has ruled on similar cases that a municipality had the right to order the railway off the streets upon the expiration of controlling franchises.

The Detroit United Railway and the city are now involved in four suits in the courts. The two cases in the federal court, one by the Detroit United Railway and the other by the New York Trust Company, involve practically the same points. It is asked that the municipal street railway ordinance be declared void and invalid, and that the city be enjoined from proceeding under its authority. The third case filed in the Circuit Court by E. J. Burdick, general manager of the railway, involves the legality of the form of ballots used in the election on the city street car ordinance. The fourth suit was instigated by the Corporation Counsel to commence ouster proceedings against lines on which the franchises have expired.

Staten Island Strike Settled

The strike of trainmen employed by the Richmond Light & Railroad Company on Staten Island was settled on the evening of May 5 and arrangements made to resume service on the morning of May 6. Public Service Commissioner Lewis Nixon drew an order permitting 8 cents to be charged as a single fare, and decreeing that the company shall place on sale tickets in strips of ten to be sold to passengers at 75 cents for ten. Fares for school children were reduced from 4 to 3 cents by the order of Mr. Nixon.

The strike was declared on April 27. Under the settlement the men will get 50, 55 and 60 cents an hour, dependent upon length of service, instead of 40, 42½ and 45 cents. Their original demands were for from 65 to 70 cents. The settlement of the strike came after conferences between representatives of the men and Captain Kuhn, who was appointed receiver by Federal Judge E. L. Garvin, and between Captain Kuhn and Commissioner Nixon. Judge Thomas I. Chatfield concurred in the terms of the settlement, it was stated, and authorized the receiver to resume operation of the road. An order has also been issued by the court permitting the receiver to proceed unmolested in the discharge of his duties and in the operation of the road.

Legislative Session Apparently Disastrous

Opinion Prevails That Rhode Island Company Cannot Be Reorganized Under Legislative Relief Extended

Two of the acts most desired by the underlying traction interests in Rhode Island were strangled by the Senate judiciary committee in the final hours of the legislative session on April 28. The five other measures passed by the General Assembly were signed and became laws May 5. Two acts, one declaring jitneys and buses common carriers after July 1, and placing them under the control and regulation of the Public Utilities Commission, and the other authorizing towns to contribute to the cost of service, passed the House, but were held up by the Senate judiciary committee, which refused to report them after one of the most bitter fights ever waged in the Rhode Island Legislature.

THE traction people and the street car men's union were opposed by the jitney and bus interests, and the latter won their fight on the jitney act. The same fight was made on the act permitting towns to subsidize the electric railways for service rendered, with the additional influence of their respective Senators, who were opposed to allowing this burden to fall upon their constituents.

RAILWAY CHARTER AMENDED

An act passed by the Assembly and signed by the Governor amends the charter of the United Electric Railways which places the government of the corporation in the hands of a board of directors of nine; five elected by the stockholders, one appointed by the trustee under any general or refunding mortgage, two appointed by the Governor with the advice and consent of the Senate, and one appointed by the Mayor of the city of Providence. It also requires that the United Electric Railways shall be required to take over and operate all of the properties of the Rhode Island Company, unless otherwise agreed by the Attorney-General of the State. It is also provided that the company shall first pay in $1,000,000 in cash to be used in rehabilitating the properties. The act limits the indebtedness of the United Electric to $22,000,000 and provides that all stock or bond issues must first be approved by the Public Utilities Commission. Dividends under the act are limited to 6 per cent on the common stock in any one year, but in the case of a lower dividend in one year the deficiency may be paid the following or subsequent years.

COMPANY HAS NOT ACTED

Another act passed and signed places the primary control of the United Electric in the City Councils of the cities and the Town Councils in the towns, but gives the company the right of appeal to the Utilities Commission for modification of any ordinances claimed to be unjust or unreasonable. Other acts relieve the company from franchise taxes and paving obligations, and provide an increased appropriation of $10,000 for the utilities board for clerical assistance to handle the additional work under the jitney act, which did not become a law.

Up to the present time nothing has been done to take advantage of the electric railway legislation passed, and doubts are expressed in some quarters as to whether or not the United Traction and the Rhode Island Suburban stockholders and bondholders will avail themselves of the new laws.

It has been said by men in close touch with the situation that it appeared improbable that the Rhode Island Company could be reorganized under the relief given, and that the lopping off of several of the non-paying lines seemed a certainty. It is known that the receivers of the Rhode Island Company, at the present time, have under serious consideration the cutting off of certain non-paying suburban lines.

Representatives of the stockholders say that it is impossible to keep the present trolley system intact with the jitneys and buses allowed to run unrestricted except for such regulations as the cities and towns are empowered to impose.

Definite action with regard to the future of the traction properties is expected at a meeting to be held in the near future. There is said to be a possibility that the United Electric Railways will not accept its charter as amended because of the provision which requires it to take over all of the properties. If any plan of reorganization is decided upon, it will be only upon the condition that the lines held by the New York, New Haven & Hartford Railroad be left out.

There is talk of a special session of the Legislature to take up again the question of jitney and bus regulation. The realization of such a move is only problematical at the best, in view of the present temperament of the Senate.

There is another hitch that has not yet been discovered, or if it has nothing has been said about it. The Governor is required to appoint two members of the board of directors of the United Electric Railways, under its amended charter, "with the advice and consent of the Senate." This the Governor did not do and the Assembly has ended its session. No provision is made in the act to allow him to appoint these two members when the Senate is not in session. Consequently, he cannot act.

Three New York Cities Tied Up by Strike

Men in Rochester, Syracuse and Utica Return Under Pressure from Union Officers and a Thoroughly Aroused Public

After having repudiated its agreement with the New York State Railways to arbitrate all differences by walking out on a strike which lasted three days, Division 282 of the Amalgamated Association at Rochester, N. Y., finally voted, on Monday evening, May 3, to return to work on the morning of May 4. This ended a strike which had been opposed by the international union and which violated the principle of arbitration, a plank of the international. By their action, the railway employees incurred the disfavor of public opinion and the suspicion of their international officers. The probabilities are they will receive not one cent more than the offer the railway first made to them.

A CLAUSE in the agreement between the employees and the company calls for arbitration of all differences. On this account it was not expected there would be a strike. The new agreement was to go into effect on May 1. The company had offered an advance of 10 cents an hour. This would mean 55 cents an hour, the former scale having been 45 cents. The employees, however, demanded a flat increase amounting to a new scale of 85 cents an hour and an eight-hour day.

At a meeting early Saturday morning, before dawn, the employees not only refused the company's offer, but, despite the pleadings of their local union officers and international officers, refused to arbitrate and voted to walk out immediately.

The meeting, it is said, was dominated by a radical minority; President James F. Hamilton, of the New York State Railways, also expressed that belief, and James Largay, Utica, the international vice-president, believed that that was the cause for the three-day strike. Nevertheless, no employee, nor group of employees, attempted to defeat the attempts of the "radical minority." It was not until William D. Mahon, international president of the Amalgamated Association, told the men, on the night of May 3, that unless they voted to return to work immediately they would have their charter taken away that the employees voted to return to work. David Archbald, president of the local division, also declared that unless the men returned he would resign.

During the three days of the strike, industrial operations were considerably hampered and the public was greatly inconvenienced and had to rely on the "jitney," which reaped a harvest. Nevertheless, it is doubtful if any other labor situation in this city has brought about more bitter public opinion against the employees. Newspapers and individuals are almost unanimous in denouncing the action of the Amalgamated Association in violating the principle of arbitration.

About 1,460 members of the Amalgamated Association, employees of the New York State Railways, in Syracuse and in Utica also declared a strike at meetings on the morning of May 2. Owen Lynch, president, and John Drohan, business agent of the Syracuse local, pleaded with the men to avoid a walkout, but they would not heed their advice. When Business Agent P. T. Noon, Utica, announced before the Utica meeting that the Syracuse men had left their jobs, the Utica employees immediately voted to join them without a dissenting voice.

Offer of Settlement Made

James F. Hamilton, president, and B. E. Tilton, vice-president of the New York State Railways, made an offer to the Syracuse and Utica strikers the same as that made in Rochester. The men had a choice of the following propositions:

Motormen and conductors to receive 5 cents an hour increase, effective May 1, 1920, and arbitrate hours and wages.

Hour clause to read: Working day to be on a basis of nine hours, with leeway of one-half hour to complete schedules, with 5 cents an hour increase, effective May 1, 1920, and arbitrate wages.

Wages of motormen and conductors effective May 1, 1920, to be 51 cents an hour first three months, 53 cents an hour next nine months, and 55 cents thereafter on city lines; 57 cents flat an hour on interurban lines and 60½ cents an hour on the Oneida lines between Syracuse and Utica. Men to accept whatever hours they wish in the different localities (thus an increase of pay of 10 cents an hour or 22 per cent).

The wages of the men previous to the strike were 41 cents for the first three months, 43 cents for the next nine and 45 cents thereafter.

The Utica men insist on an eight-hour day and a six-day week. The Syracuse men met Monday night following the settlement of the Rochester strike, but failed to reach an agreement and adjourned the meeting until the morning of May 5.

Syracuse and Utica Service Restored

Service in Syracuse was resumed on the morning of May 5 and in Utica on May 6. The men there will also abide by arbitration. Mr. Mahon addressed the meeting in Utica on May 5. He warned the strikers that the organization charter would be taken away if they did not live up to their contract with the company made two years ago to arbitrate differences. Mr. Mahon also addressed the Syracuse men the same day, but they contended that arbitration would do no good as the fare in Syracuse must be raised to afford the company sufficient revenue to meet the wage demands. They were inclined to the belief that a strike was perhaps the best means of provoking a boost in fares. Mr. Mahon's second attempt was successful. A board of nine arbitrators will be chosen, three each representing the Amalgamated locals, the company and distinterested parties.

There are 610 men in the Utica local and 850 in the Syracuse branch. No cars were operated by the company in either city during the strike.

Pittsburgh Strike Postponed

Problem Up to City of Making Good on Promises to Employees—Early Statement of City Plan Expected

Acting upon the recommendations of their wage scale committee, the 3,000 trainmen of the Pittsburgh (Pa.) Railways have decided to postpone their contemplated strike action for at least thirty days. Mayor E. V. Babcock and the City Council entered into the negotiations between the trainmen and the receivers for the Pittsburgh Railways on April 27. The Mayor promised the men that if they would postpone their strike action he would evolve a plan which would enable the receivers to give them a material wage increase. The men are demanding a 75 per cent advance, or a maximum hourly pay of 91 cents.

May Discard Previous Studies

The issue that is before the Mayor and the City Council is whether the municipal authorities of Pittsburgh will now discard the results of more than three years of intensive studies of the city's railway transportation system and compromise for the sake of political expediency the issues of increased wages. To do this would result in forfeiting the benefits of the valuation recently concluded, in preventing the building up of credit which is absolutely necessary to rehabilitate the traction companies, and in a repudiation of the reports and findings of the city's own experts.

Following the prosecution of a series of complaints filed by the city of Pittsburgh, the Public Service Commission rendered a decision in March, based upon a report of a valuation board composed of representatives of the city, company and the commission. This report was unanimous with respect to the fixing of an operating budget for the years 1920, 1921, 1922, 1923 and 1924, including a definite rehabilitation program for such period, and an agreement that the value of the property was not less than $48,000,000, on which a 7 per cent return was reasonable.

The receivers of the company thereupon prepared their 1920 budget to conform with the Public Service Commission's findings. This program was such as more than to exhaust any balance remaining after meeting bare operating costs, taxes and the 7 per cent return on the agreed to value of "not less than $48,000,000."

Demands Made Last Month

In April the motormen and conductors presented demands for an eight-hour day, revised working conditions and a wage rate of 91 cents an hour as a maximum, the total increased labor costs from which would agggregate about $7,000,000 a year.

The receivers of the company notified the wage committee of the men and later the municipal authorities that they had granted a 10 per cent increase in wages, effective on April 1, 1920, but that it was impossible to meet the new demands for further increases.

The Mayor and the Councilmen then met with the employees and stated they would endeavor to secure an increase in wages if possible without a fare increase, or, if found necessary, with such an increase.

The problem is thus squarely up to the city. Through its complaint proceedings, it brought forward the budget, the rehabilitation program and the least amount as a fair valuation. Now with that determined and with a lack of funds to carry out the requirements of the same for 1920, the city cannot evade the issue of recommending what it considers an appropriate wage and at the same time approving a rate of fare and the elimination of municipal charges to secure the revenue to meet the budget deficit.

For the purpose of putting into effect its pledge to find a way to increase wages, in return for which pledge the members of Division 85, Amalgamated Association, deferred for thirty days the taking of a strike vote, the city through C. K. Robinson, special city counsel, in charge of traction litigation for the city, asked Receivers C. A. Fagan, W. D. George and S. L. Tone of the Pittsburgh Railways for a detailed financial statement of the company. This, it is expected, will include the annual budget the receivers made up, with detailed explanations of proposed expenditures. The receivers agreed to furnish this. Means of providing the wage increase without increasing street car fares, mentioned May 5, are:

To reduce the volume of track repair and other maintenance provided for in the budget and pay the money to the men.

To abandon the plan of the receivers to purchase 150 new cars (expected to cost between $1,500,000 and $1,750,000), and meaning no increase in fares for Pittsburgh.

To make the entire city a 7½-cent fare zone, and increase the fares to those living outside the city.

After a study of the receivers' statement of the financial condition of the company, the Mayor and the Council are expected, probably early next week, to meet with the receivers and outline the city's plan. In preparation of this plan, the Mayor and the members of the Council were to meet on May 7 in the Mayor's office.

Sidetracked by the crisis over the carmen's wages, plans of the city to work out with the receivers a service-at-cost plan for operating the Pittsburgh Railways will be taken up later. At the same time an effort will be made to reach an agreement on a fair valuation of the railways company, to supersede the valuation placed on the properties by the Public Service Commission.

Following instructions of the Mayor and the Council to protect the city's interests, in case a valuation cannot be agreed upon, counsel for the city on May 5 filed in the Superior Court an appeal from the Public Service Commission's refusal to grant it a rehearing on the valuation decision. The appeal to the Superior Court, even if set ahead, cannot be argued before fall.

The city authorities proved themselves unequal to the occasion last year, when during the rioting attending the railway strike the property of the Pittsburgh Railways suffered damages to the extent of $250,000, not to speak of the great loss in revenue. Mayor Babcock was severely censured by the citizens for his inability to prevent the rioting.

Postponement of the strike for a period of thirty days does not mean that all danger of one is over. There are those who believe a strike on June 1 is probable, because by the scheme that Mayor Babcock contemplates he will be unable to realize sufficient money to give the men more than a 10 per cent wage increase. The men say they will not be satisfied with that.

Good Service Paramount

Mayor Peters of Boston Opposes Increased Wages to Carmen on Elevated System

Mayor Peters has urged the Boston (Mass.) Elevated Railway to refuse the demands of the men for increased wages. His appeal is very unusual. It was made to the general counsel for the company, who is one of the arbiters in the present wage dispute. The Mayor said in part:

> Any deficit in operation must be met by the taxpayers of the cities and towns served The demands of the carmen must be treated as a part of the whole situation. Increases in wages of trainmen now will certainly react most unfavorably on the industrial situation in Boston and on the citizens as a unit. I feel it my duty to impress upon the board the fact that the interest of the public is paramount and if this interest is served, that of the carmen cannot suffer.

In comparing wages and working conditions of city employees with those of the trainmen the Mayor says that to give the trainmen a higher salary than the police and firemen is not only unwarranted but would work an injustice to certain municipal employees. He holds that the men should not receive any additional compensation until they have shown themselves worth more by causing the elevated to show an increased earning capacity. They have it in their power to do this through improved service to the public.

According to the Mayor it is no longer possible to shut our eyes to the fact that public service employees should enforce their rights only as far as they do not conflict with or encroach upon the greater rights of the public.

James H. Vahey, the arbiter of the men on the board, issued on his own account a summons to compel the attendance of Mayor Peters and to submit to cross-examination before the arbitration board. Instead, the Mayor sent his corporation counsel, who questioned the legality of the summons when signed only by a single member. Mr. Doherty, the presiding arbiter, ruled that there was no necessity for summoning the Mayor. If needed later, he could be asked to appear.

Tension Lessened in Cleveland

At a conference between Mayor Fitzgerald of Cleveland, Ohio, and officers of the local branch of the Amalgamated, during a special meeting of the City Council on May 5, an agreement was reached to submit the demand of the employees of the Cleveland Railway for an eight-hour day to a special committee of Council. At the same time the officers stated they would call off the strike, scheduled for the following day, and ask the men to vote again on the offer of J. J. Stanley, president of the company.

Under this offer the wage scale would be as follows: 70 cents an hour for the first three months; 73 cents for the next nine months and 75 cents for all who have been in the service more than one year. This amounts to an increase of 25 per cent over the old scale; 50 per cent over what the men were receiving a year ago and 140 per cent over the figures of five years ago. According to late estimates made by the United States Department of Labor, the cost of living in Cleveland has increased 95.05 per cent during the past five years.

Mr. Stanley said he had probably offered the men more than he had a right to, in view of the fact that the rate of fare under the service-at-cost grant will probably have to be raised in order to cover the additional wage payment. The increase will aggregate $1,500,000 annually.

It was stated that Mr. Stanley at once began to commit to writing the matters he feels that the committee should take into consideration. The special committee will consist of Councilmen Dittrick, Michell, Reynolds, Hichcliffe, Finkle, Damm, Kadlecek and Potter. With the exception of the last three, the committee is composed of members of the Council street railway committee.

News Notes

Successful Municipal Ownership Vote.—An ordinance providing for the purchase by the city of the property of the Ashtabula (Ohio) Rapid Transit Company for $296,000 was carried on referendum vote on April 27 by a majority of twenty-one votes. The property consists of 5.5 miles of line all in Ashtabula.

Men at Trenton Want More.—The employees of the Trenton & Mercer County Traction Corporation, Trenton, N. J., have petitioned the company for an increase in wages. The operators of the two-man cars are now being paid 46, 48 and 50 cents an hour, while the operators of the one-man cars receive 55 cents an hour. The company is asked to grant whatever increase it can afford. Union officials say that many men will probably quit their positions and seek work elsewhere unless wages are advanced.

Preparing for Scranton Arbitration.—T. Frank Penman, Scranton, Pa., and John F. Reynolds, Carbondale, will represent the Scranton Railway as arbitrators in deciding a new agreement with the employees, and Patrick McLane, Scranton, and James H. Vahey, Boston, will represent the men. These four men will endeavor to decide the issue and in event it is necessary to select a fifth man the latter will be selected by W. D. Mahon, international president of the union, and Van Horn Ely, head of the American Railways. The final disposition of the matter is to be handed down within fifteen days from the time the board convenes.

Trenton Suburban Strike Unsettled.—The New Jersey & Pennsylvania Traction Company, Trenton, N. J., has announced that employees who were responsible for the strike will not be reinstated to their former positions when the strike is settled. Deputy sheriffs of Mercer County are guarding the Princeton division, where only one car has been run during the strike. Members of the State Constabulary of Pennsylvania are patroling the lines in that State. The railway has refused the offer of Princeton students to operate cars. Joseph R. Buchanan, of the United State Department of Labor; Sydney L. Wright, president of the railway; Charles J. Fury, a government mediator, and P. J. Shea, representing the strikers, conferred on May 3, but no settlement was reached.

City Ownership Recommended.—The Miami (Fla.) Traction Company is willing to dispose of its holdings, including tracks, etc., to the city of Miami. It is reported that the company has set a price of $150,000 on the property. Some time ago Mayor Smith appointed a committee to decide under what franchise the company would resume operations. The committee held several meetings, and a resolution was passed advising that the city purchase the tracks. At the present time jitneys and buses are the public conveyances that operate in the city. The City Council has so far failed to pass a jitney ordinance that safeguards the people. Two attempts have been made along this line, but the courts decided that the ordinance was unconstitutional, so the jitney business is flourishing. It is reported that the 5-cent jitney will pass out and a 10-cent jitney take its place.

Program of Meeting

Central Electric Railway Association

The summer meeting of the Central Electric Railway Association will be held at the Hotel Ottawa, Ottawa Beach, Mich., on July 7, 8 and 9.

Financial and Corporate

"Watered Stock" Claim False

Vice-President of Brooklyn City Railroad Denies Charge Made by City Accountant

H. Hobart Porter, vice-president and general manager of the Brooklyn (N. Y.) City Railroad, has characterized as "wholly false" the recent statement made at the traction investigation of the Board of Estimate by Deputy Commissioner of Accounts Wood D. Loudoun, which was referred to briefly in the issue of May 1. Mr. Porter also declared that there was not a dollar of "water" in the capitalization of the company. In discussing Mr. Loudoun's testimony, he said:

> Mr. Loudoun's testimony must be mistakenly reported, for the accountants of the city were allowed access to the books of the railroad and had opportunity for a full examination. These books show that the Brooklyn City Company is capitalized at $18,000,000, divided into $6,000,000 of bonds and $12,000,000 of stock. The books show further that all of this except a stock dividend of $750,000 in 1865 was paid for by the bondholders and shareholders, dollar for dollar, at par. In 1894 $6,000,000 was paid in cash.
>
> There is not one dollar "water" in the capitalization of the company. In addition to this property, the company is operating 469 cars which belong to the Brooklyn Rapid Transit Company and which it is claimed cost that company more than $3,000,000 and for which the Brooklyn City Railroad will pay the receiver of the Rapid Transit Company a rental. The receiver of the Brooklyn Rapid Transit Company further claims that the Brooklyn City Company is indebted to the Rapid Transit Company for additions and betterments which cost more than $10,000,000.
>
> #### Loudoun Statement False
>
> Mr. Loudoun swore that the Brooklyn City Railroad has accumulated more than $300,000 for the purpose of paying a dividend for the first quarter of 1920. This is wholly false. The Brooklyn City Railroad earned and paid large dividends prior to 1893 when its properties were leased to the Brooklyn Heights Railroad. From 1893 to July, 1919, dividends were paid by the Brooklyn City Company out of a rental of its properties paid by the Brooklyn Heights Railroad. The lessee surrendered the property and terminated the lease last October. No dividend was paid for the quarter ended Oct. 15, 1919, and no dividend has been paid since and no dividend will be paid during 1920 or for years to come unless the company is relieved of its present situation. The company is not paying interest on its full bonded debt of $6,000,000. A little less than $2,000,000 of its first mortgage bonds are in a guarantee fund claimed by the Brooklyn City Company and on these bonds it is not paying interest. It will pay interest on a little more than $4,000,000 of bonded debt, say $200,000 a year, a fraction over 1 per cent upon the money actually paid into the company by its stockholders and bondholders, less than two-thirds of 1 per cent upon the appraised value of its own property. The stock of the company which a year ago sold at $16 for a share of the par value of $10 sold within the last few days at $4 per share.
>
> The first mortgage bonds which were sold above par are now offered at 60 cents on the dollar. This means that the securities of the Brooklyn City Railroad show a shrinkage of more than $16,000,000 in market values. To a mind of very ordinary intelligence these market values would have disproved earning capacity or the possibility of dividends.

At the hearing Mr. Loudoun testified that the Brooklyn City Railroad had received $35,968,314 in dividends in corporate life and that in 1894 when it increased its capital from $9,000,000 to $12,000,000 it paid dividends at par to all stockholders, although a number of them have not paid in full for the increased shares. If the company had distributed dividends on a 6 per cent basis there would now be a surplus of $14,069,314.

Record Franchise Taxes

Increase in New Jersey Over Last Year Nearly $1,000,000—Largest Collections Ever

The largest amount of money ever collected by the municipalities of New Jersey for franchise taxes of public utility corporations and others for the use of the highways will be paid this year as the result of the assessment just concluded by the State Board of Taxes and Assessments. The tax to be paid by 254 corporations and three individuals using the streets totals $3,925,744, an increase over last year of $934,410 or 31.2 per cent.

The nineteen electric railways of the State are assessed to pay $1,064,303 or 27 per cent of the total tax. Last year the electric railways paid a tax of $960,910, or 32 per cent of the total.

This is the first levy to be made at the maximum rate of 5 per cent of the gross receipts as a result of the passage of the 1917 law. Previous to that year the assessment was at the rate of 2 per cent of the gross receipts, but in 1917 the Legislature enacted a law by which the rate was increased by 1 per cent annually until a maximum of 5 per cent was reached. Utility companies whose gross receipts are less than $50,000 are not affected by this law and still taxed 2 per cent of their gross. Another reason for the increased tax is the fact that in nearly all cases the rates for services have been changed with the result that the gross earnings of the companies have also been materially increased. The tax just levied is based on the gross receipts for the year ended Dec. 31, 1919.

	Number of Companies	1919 Tax	Number of Companies	1920 Tax	Per Cent Increase in Tax Over 1919
Total	254	$3,925,744	294	$2,991,334	31.2
Street railways	19	1,064,303	29	960,910	10.8
Water companies	110	224,924	114	168,974	32.8
Gas and electric companies	75	1,970,813	100	1,416,029	39.0
Telegraph and telephone companies	33	625,572	35	429,249	45.5
District tel. messenger	3	4,632	3	3,495	32.4
Sewer and pipe lines	17	35,500	16	12,674	180.0

California Companies Report

The accompanying table shows the number of companies and taxes paid, together with the percentage increase over the previous year for the classes of public utilities utilizing the streets.

INCOME STATEMENTS OF CALIFORNIA ELECTRIC RAILWAYS YEAR ENDED DEC. 31, 1919.

	Petaluma & Santa Rosa R. R. Co.	San Francisco Napa & Calistoga Ry.	Sacramento Northern R. R.	San Francisco-Oakland Terminal Rys.	Los Angeles Ry. Corp.
Year ended Dec. 31, 1919:					
Miles of line	37.02	41.66	....	144.37	184.50
Miles of single track	43.41	44.52	212.00	262.00	389.00
Operating revenue	$ 369,301	$ 334,020	$1,506,734	$ 5,793,501	$ 7,336,550
Operating expenses	249,573	173,470	1,210,767	4,788,902	6,097,776
Net revenue railway operations	$ 119,728	$ 160,550	$ 295,967	$ 1,004,599	$ 1,238,774
Auxiliary operations (net)	2,657	....	12,244	81,499	....
Net operating revenue	$ 122,385	$ 160,550	$ 308,211	$ 1,086,098	$ 1,238,774
Non-operating income	1,033	4,684	29,980	21,804	67,040
Gross income	$ 123,418	$ 165,234	$ 338,191	$ 1,107,902	$ 1,305,814
Deductions:					
Taxes on railway operations	15,971	32,796	61,531	298,264	373,800
Rentals	....	....	....	4,103	294,066
Interest on funded debt	38,412	63,678	117,610	783,065	992,525
Miscellaneous deductions	1,523	1,745	52,218	334,941	12,253
Total deductions	$ 55,906	$ 98,219	$ 231,359	$ 1,420,373	$ 1,672,644
Net income for year	67,512	67,015	106,832	*312,471	*266,830
Credit balance from previous year	22,561	*3,224	....	*751,127	*368,999
Miscellaneous additions—1919	....	301	2,996	92,839	5,332
Total credits	$ 90,073	$ 63,791	$ 109,828	*$ 970,759	....
Miscellaneous deductions—1919	561	96	109,828	162,332	21,934
Dividends	18,123	....	....	....	....
Appropriations to reserves	13,383	8,861	....	....	185,414
Total debits	$ 32,063	$ 8,957	$ 109,828	$ 162,332	$ 207,348
Surplus at end of year	58,006	55,134	....	*1,133,091	*937,845
Road and equipment account	$1,670,775	$2,016,929	$9,651,320	$46,072 168	$44,812,997
Miscellaneous physical property	77,850	....	154 904	1,592,064	....
Total value of property	$1,548,625	$2,016,929	$9,805,224	$47,664,232	$44,812,997
Capital stock	944,300	731,700	4,469,023	28,175,000	20,000,000
Funded debt	698,400	1,155,100	5,225,360	18,769,500	18,753,000
Total securities outstanding	$1,642,700	$1,886,860	$9,694,383	$46,944,500	$38,753,000

* Deficit.

Conditions in Boston Are Better

Elevated Railway Earns Enough with 10-Cent Fare to Pay Cost of Service and Reduce Part of Accumulated Deficit

The second annual report of the public trustees of the Boston (Mass.) Elevated Railway shows that the deficit for the year ended Dec. 31, 1919, was $978,130. Passenger revenue increased 41.2 per cent and operating expenses 31.8 per cent over the previous year. This was further reflected in a 91.5 per cent increase in net operating revenue, and the net loss for the year was 67.3 per cent, or $2,008,576 less than in 1918. These gains in revenue are due to the several fare changes that have been made since the trustees took over the operation of the property on July 1, 1918.

IN AUGUST, 1918, the unit rate of fare was changed from 5 to 7 cents, which in the following December gave way to an 8-cent flat fare. The receipts from the 8-cent fare, after a trial of seven months, also proved inadequate to meet the cost of service as defined under the statutes, and on July 10, 1919, the unit flat fare was increased to 10 cents. Owing to strikes and other extraordinary conditions, operating losses continued until the middle of September. Since that time the 10-cent fare has produced revenues in excess of expenditures. This surplus on Dec. 31, 1919, had reduced the deficits incurred in July, August and September, aggregating $928,695, to $459,008, including the back pay due to employees on account of an arbitration agreement. The trustees believe that by June 30, 1920, all losses will have been absorbed and no deficit will exist to be assessed upon the cities and towns served. In the previous year a deficit of nearly $4,000,000 had to be met by city and town assessment even after the $1,000,000 reserve fund of the company had been used. As the law now stands there can be no lower fare until the cities and towns have been reimbursed for the amount paid to meet past deficits and this reserve fund has been restored.

The trustees during the year have made a beginning under a program of improvement which can be completed only in a series of years. The changes thus far made are featured in the purchase of modern cars, in the replacement and addition to former equipment, the completion of certain through lines, the lengthening of tunnel trains and with the introduction of two and three-car trains on surface lines.

In the 1920 budget additional improvements have been authorized that will cost $5,700,000. Part of these, however, will be from the depreciation fund, as full provision is now being made for maintenance and depreciation.

The sale of the Cambridge subway makes available for further capital expenditures the sum of $7,868,000. The trustees hold that only a prudent use of this money, which at present affords their only source of capital, would be justified. Such use should secure important improvements, with resulting economies, and tend to re-establish the credit so vital to the development of railway facilities.

The trustees also reiterate their belief that car riders ought not to be subject to a special tax for using public highways, either through payment of subway rentals or assessment for street improvements. The question is between the car rider and the tax payer and is one for legislative decision—determining what is proper service at cost.

The accompanying table gives details as to revenues, expenses and traffic handled for 1919 as compared to 1918, together with the percentage change in each item.

INCOME STATEMENT—BOSTON ELEVATED RAILWAY

Year Ended Dec. 31	1919	1918	Percentage Change + Inc. —Dec.
Revenue from transportation	$28,860,271	$20,462,781	+ 41.2
Revenue from other railway operations	544,320	514,184	+ 5.8
Total railway revenue	$29,404,591	$20,976,965	+ 40.2
Way and structures	$3,783,715	$2,372,932	+ 59.6
Equipment	4,290.040	3,142,369	+ 36.6
Power	2,980,659	2,604,366	+ 14.7
Conducting transportation	10,530,882	7,772,434	+ 35.7
Traffic	4,758	9,167	— 48.2
General miscellaneous	2,110,285	2,094,829	+ 0.7
Total railway operating expenses	$23,700,339	$17,996,097	+ 31.8
Net operating revenue	$5,704,252	$2,980,868	+ 91.5
Taxes assignable to railway operations	1,045,502	917,515	+ 13.9
Operating income	$4,658,750	$2,063,352	+125.5
Non-operating income	93,991	85,728	+ 9.7
Gross income	$4,752,741	$2,149,080	+121.0
Deductions from gross income:			
Rent for leased roads, including rent for Tremont subway	2,775,232	2,752,214	+ 0.7
Miscellaneous rents, including all other subways and tunnels	1,339,502	1,059,072	+ 26.4
Net loss on physical property purchased from W. E. St. Ry	7,986	9,136	— 12.6
Interest on funded debt (B.E.)	1,309,477	1,120,787	+ 16.8
Interest on unfunded debt (B.E.)	246,313	181,370	+ 35.8
Amortization of discount on funded debt	44,291	7,818	....
Miscellaneous debits	8,070	5,389	+ 49.8
Total deductions from gross income	$5,730,871	$5,135,786	+ 11.6
Net income transferred to profit and loss	*$978,130	*$2,986,706	+ 67.3

* Deficit.

STATISTICAL INFORMATION—BOSTON ELEVATED RAILWAY

Year Ended Dec. 31	1919	1918	Per Cent Change + Inc. —Dec.
Mileage—first main track	248.42	248.98	— 0.2
Second main track	214.14	214.32	— 0.1
Total—all track (incl. car-houses, cross-overs, yards, etc.)	535.33	534.86	+ 0.1
Car-miles—In passenger service	53,533,522	52,762,285	+ 1.6
By express and freight cars	175,020	239,283	—26.9
By sprinkler cars	12,707	20,248	—38.2
Total revenue mileage run	53,721,249	53,021,816	+ 1.3
Car-hours—In passenger service	4,749,318	4,641,730	+ 2.3
By express and freight cars	16,765	23,675	—29.2
By sprinkler cars	1,017	1,873	—45.7
Total revenue car-hours run	4,767,100	4,667,278	+ 2.1
Ratio CM to CH (speed m.p.h.)	11.28	11.32	— 0.3
Revenue passengers total	324,758,685	348,664,700	— 6.86
Gross passenger revenue	$28,767,544	$20,352,412	+41.2
Average fare per passenger (cents)	8.85	5.84	+51.5
Passenger rev. per mile of line	$115,700	$81,800	+41.3
Passenger rev. per mile of single track	53,700	38,170	+40.8
Car-mile statistics:			
Operating revenue (cents)	54.70	39.60	+38.2
Operating expenses (cents)	44.10	34.00	+29.8
Net income (cents)	1.82	5.64	+67.8
Passenger traffic (revenue)	6.05	6.57	— 7.9
Car-miles per rev. passenger	0.165	0.152	+ 8.59
Car-hour statistics:			
Operating revenue	$6.18	$4.50	+37.5
Operating expenses	$4.97	$3.86	+28.9
Net income	$0.20	$0.64	+68.7
Passenger traffic (revenue)	68.10	74.90	— 9.1
Operating ratio—per cent	80.6	85.9	— 6.17

New Jersey Valuation Bill Vetoed

Governor Edwards of New Jersey has vetoed the bill of Senator Allen providing for a valuation of the property of the Public Service Railway. The Governor in his veto points out that the Allen bill is much weaker than the bills which the Governor caused to be prepared and which Assemblyman Gaede introduced, but which the Republican Legislature rejected. In his veto the Governor said:

> I am forced to return this bill unapproved, for these reasons:
>
> 1. The bill is limited in its application to the valuation of street railway property. Therefore the properties of the Public Service Gas Company, the Public Service Electric Company, and other similar utilities would escape valuation.
>
> 2. The scope of the investigation and valuation under the bill in question is limited to the physical property. If that is

not so the best that can be said for the language defining the scope of the investigation is that it is vague and indefinite.

3. This bill, instead of creating an independent board, as the Gaede bill does, provides for a commission, consisting of the Governor, the State Treasurer and the State Comptroller.

Contrast the definite, specific direction contained in the Gaede bill with respect to the extent and scope of the inquiry to be made, with litigation-creating language of the bill now returned, and you will understand why I cannot approve this measure. Instead of authorizing an investigation into the issuance or alleged issuance of stocks and bonds without consideration, this bill limits the investigation to the valuation of the utility property. Just what is meant by the phrase, "including every proper and lawful element thereof," I do not know, but it is an invitation to litigation.

St. Louis Valuation Figures by July 1

J. L. Harrop, chief engineer of the Missouri Public Service Commission, who is in charge of the valuation which is being made of the properties of the United Railways, St. Louis, says that two months will be required to complete the engineers' work and prepare the report.

Company engineers are also making a valuation.

The value of the property of the company has been variously estimated between $38,000,000 and $60,000,000. The latter figure was fixed by the city as a basis for determining rates under the compromise franchise settlement ordinance rejected by the company after the measure had been passed by the city.

The Public Service Commission's tentative valuation of the property for the establishment of the 8-cent cash fare and the 7-cent token fare, recently abrogated, was $58,000,000.

The valuation was undertaken by the commission as a basis for the determination of reasonable fares to be charged by the company.

Financial News Notes

New Director for Portland Company.—Harry M. Verrill has been elected a director of the Cumberland County Power & Light Company, Portland, Me. Mr. Verrill was recently chosen president of the company.

Equipment Notes Approved.—The Public Utilities Department of Massachusetts has approved the petition of the Berkshire Street Railway, Pittsfield, Mass., for an issue of notes to the amount of $64,000, to pay for twelve one-man cars.

Annual Tax Paid in Lump Sum.—The Boston (Mass.) Elevated Railway departed from its usual custom of paying annual taxes in installments and presented to the State of Massachusetts a check for $375,000, the amount of tax assessed on the property of the company for the year of 1919.

Hearing on Abandonment.—The Easton (Pa.) Transit Company threatened to abandon the line from the Country Club Junction at Easton to Nazareth, Pa. Judge Stewart has fixed June 7 as the time for a hearing on the application of the company to discontinue the line.

Plans to Reclaim Abilene Road.—The American Public Service Company, Dallas, Tex., has agreed to take over and operate the railway in Abilene, Tex. The Public Service Company has agreed to spend $60,000 in repairs to track and equipment. It will operate the lines under supervision of the city.

Massachusetts Pays for Cambridge Subway.—The State of Massachusetts has obtained title to the Cambridge Subway in paying, by means of a certified check, the amount of $7,868,000 to the Boston Elevated Railway. It is estimated that the rental payments to the State from the subway will amortize the indebtedness in about fifty years.

Long Island Road Suspends Again.—The New York & North Shore Traction Company, Roslyn, Long Island, which operates in Queens and Nassau Counties, has suspended service. In a letter to the Public Service Commission, President George A. Stanley of the company asserted the powerhouse lacks coal. He added that competition by municipal buses has caused heavy losses of revenue.

Plan to Lift Receivership.—Thomas J. Keenan, of Curtis, Keenan, Brink & Harrison, attorney for William G. Phelps, receiver of the Binghamton (N. Y.) Railway, has secured an order from United States Judge George W. Ray, in which full approval is given to the proposed agreement by which the receivership will be relinquished within the next six months and the property returned to the Binghamton Railway.

Ohio Lease Abrogated.—The Dayton & Western Traction Company, Dayton, Ohio, took over its property at 12:01 a.m. on April 25. This comprises the road from Dayton, Ohio, to Richmond, Ind., about 40 miles. For the last fourteen years the property has been leased to the Ohio Electric Railway and operated by it as the Dayton-Richmond division. In the future it will be operated separately under the organization noted elsewhere in this issue.

Weymouth Votes $28,000 to Railway.—At a special town meeting held in Weymouth, Mass., it was voted that the sum of $28,000 be appropriated for aiding the Eastern Massachusetts Street Railway in operating within the town boundaries. At two previous meetings held for the purpose of considering the matter of extending aid the vote had been against any contribution. Lacking the necessary revenue for operation the Eastern Massachusetts Street Railway closed the lines. Under the new arrangement the lines will be opened up shortly.

Natchez Line Offered for Sale.—The 6 miles of single-track electric railway in Natchez, Miss., owned by the Southern Railway & Light Company, are being dismantled as the operation of the railway has recently been discontinued, due to the high cost of operation, and the small earnings, due to the large number of privately owned automobiles. The entire equipment is offered for sale as there seems to be no chance to resume operation of the railway. A modern auto bus has been tried for two months, but the results are not satisfactory. The cost of operation of the bus has been high and the earnings are small, even though the fare is 10 cents. The company will continue to operate its gas and electric plants.

Fort Wayne Property Transferred.—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., which went into the hands of a receiver last year, has ceased to exist and the Indiana Service Corporation became an operating reality when on April 28 the recording of the deeds and the transfers of property was completed in the local courts. The Indiana Service Corporation now controls the interurban lines from Fort Wayne to Bluffton and Lafayette and the city lines in Fort Wayne, in Wabash, Peru, Logansport and Lafayette. The officers of the company are the following who are actively engaged in operating the company's property: President, Robert M. Fuestel; vice-president and general manager, S. W. Greenland, and secretary and treasurer, Harry E. Vordermark.

Notes Offered on 8 Per Cent Basis.—The Guaranty Trust Company, New York, N. Y., and Stone & Webster, Boston, Mass., are offering $1,500,000 Eastern Texas Electric Company five-year 7 per cent convertible gold notes dated May 1, 1920, and maturing May 1, 1925. These notes, which are redeemable as a whole or in part at any time on forty-five days' notice at rates varying from 103 per cent and accrued interest before May 1, 1921, to 100 per cent and interest between May 1, 1924, and maturity, are being offered at 96 and interest to yield about 8 per cent. The notes are direct obligations of the company issued under provisions which secure the holders against any increase in the funded debt unless earnings have equaled at least twice the interest on the entire funded debt for eighteen consecutive months out of the preceding two years. The Eastern Texas Electric Company owns and operates the entire electric light, power and street railway business in Beaumont, Tex., and the entire electric light and power business in Port Arthur, Tex., as well as the interurban electric railway between these two centers. The company has outstanding an issue of $750,000 of three-year 7 per cent notes due Aug. 1, 1921, which are to be called for redemption.

Traffic and Transportation

Buses Start in Milwaukee

Railway Establishes Feeder Bus Route to Learn if Territory Served Will Support Transportation Service

Another electric railway company, namely, the Milwaukee Electric Railway & Light Company, has gone into the bus business to determine if the public will give its support to a route over which there has long been a clamor for service. The line begins at a point about 3½ miles from the terminal building and is virtually a 1¼-mile extension of the Mitchell Street trolley line. As the electric cars are now routed the patrons have had a maximum walk of not more than 1,500 ft.

During the war the Mitchell Street merchants petitioned the Wisconsin Railroad Commission to order a trolley extension over the route now used by the buses. The request was refused on the ground that the costs at that time were excessive and that the possible new traffic did not warrant the extension. The city of Milwaukee appealed the case to the State Supreme Court, but the court upheld the commission.

After the armistice, the so-called Mitchell Street Advancement Association again urged that the company extend transportation facilities through this territory on the grounds that it would greatly benefit trade conditions. The bus line is the result. The line connects at both ends with existing trolley lines. Service was started on April 17, 1920, with three Reo "speed-wagon" chasses mounting home-made bodies which seat sixteen passengers. The buses have the entrance and exit at the front, with door under the control of the operator. They are equipped with pneumatic tires.

TEN-MINUTE HEADWAY ESTABLISHED

The present hours of operation are from 6 a.m. to 11 p.m. Between 6 a.m. and 7 p.m. the buses are run on a ten-minute headway, whereas after 7 p.m. service is cut to a fifteen-minute headway until 11 p.m., when all bus service is withdrawn. Two buses are required to maintain the ten-minute schedule, which leaves one bus in reserve at all times for inspection and repairs. The fare is the same as on the trolleys, and transfers are exchanged between both classes of service. The method of fare collection is according to the pay-enter plan. All fares are deposited in a lock fare box, which is mounted just back of the dashboard. The bus is in charge of a single operator, who also acts in the capacity of fare collector.

In Wisconsin buses operated for the transportation of passengers for hire are classed as common carriers and come under the jurisdiction of the State Railroad Commission. Under the commission's regulation it is necessary for an operator of buses to obtain a permit before he can start operations. These permits, however, are free. Such licenses as are required are issued by the State and cover only the ordinary registration and drivers' licenses.

The Mitchell Street merchants who formed the association are enthusiastic over the company's willingness to try the bus experiment and hope that the earnings will uphold their previous claims that the extension was warranted.

Three Cents a Mile Asked

Indiana Interurbans Apply for Increase from 2¾-Cent Basis—Material and Labor Costs Higher

Petitions were filed with the Public Service Commission of Indiana on April 28 by the Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis & Cincinnati Traction Company, Indianapolis, requesting an increase in basic interurban passenger fare from 2¾ cents a mile to 3 cents a mile. A similar petition will probably be filed by the Union Traction Company of Indiana and by other traction lines operating within the State. Increased cost of operation resulting from a prospective increase of $1 a ton on coal, a 25-per cent increase in coal freight rates, a 25-per cent increase in material and supply costs since Jan. 1, 1920, and increases in labor costs are given as the reason for the advance in fares.

The petition of the Indianapolis & Cincinnati Traction Company states that with the increased fare the company contemplates the continued use of interchangeable penny coupon books whereby $20 worth of transportation is sold for $17.50. Commutation books also would be sold on the present basis of forty trips for twenty-five times the one-way fare with a minimum fare of 10 cents. The Terre Haute, Indianapolis & Eastern Traction Company proposes that commutation fares be on a basis of five-eighths of the regular passenger rate with a minimum of $3.25 for forty trips.

The Indianapolis & Cincinnati Traction Company estimates that operating expenses will increase $81,214 for the twelve months from May 1, 1920, and that the increase in fare would increase the gross receipts $38,496. Substantial increases in passenger receipts for the first three months of this year, if continued for the year beginning May 1, will increase the gross revenue $98,037 over 1919 figures. The net income asked, the petition says, will yield little over one-third of the amount the company is entitled to earn on the value of the property.

Portland Planning Relief

Election Called for May 21 to Vote on Proposal to Rescind Franchise Requirements

The City Council of Portland, Ore., has ordered a special city election on May 21 for the purpose of submitting to the voters three measures, each offering financial relief to the Portland Railway, Light & Power Company, with a view to keeping to a minimum any increase in fares which may be granted by the Public Service Commission.

The first of the three measures to be voted upon provides for relieving the company of license and franchise taxes and a portion of the bridge tolls, and also provides that the company shall not carry city employees without payment of the prevailing fares. This measure further provides that five-tenths of one mill be levied for 1920 to cover the costs of such relief, and that the Council be authorized to levy not in excess of three-tenths of a mill for the same purpose each year thereafter.

The second measure covers the cost of new pavement, relieving the company of payments on work which would have to be done if the tracks were not at present in the streets. All costs for excess work will be charged to the company. A tax levy of three-sixteenths of one mill for 1920 is provided, and three-tenths of one mill for each year thereafter.

RELIEF FROM PAVING CHARGES

The third measure proposes to relieve the company of pavement reconstruction and repair costs when such repairs and reconstruction have not resulted because of the trackage in the street. The plan for relief in this connection is on the same basis as new pavement, and a tax levy of 1½ mills for the first year and 1 mill thereafter is provided. The proposals were worked out by a special transportation committee of the Council, and approved for submission to the voters by unanimous vote of the Council.

It is estimated that even with the relief provided in the plans to be submitted to the people, an increase of 1 cent in fare will be necessary, making a 7-cent fare in Portland. Failure of the passage of the measure will be followed by a 2-cent fare increase, it is believed.

The former plan to float a $5,500,000 bond issue to bring relief to the company was discarded.

Traffic Survey for Memphis

Ross W. Harris, traffic expert, who represented the city of Memphis, Tenn., in the recent appraisal of the property of the Memphis Street Railway, has been engaged by the city and the company to make a survey of traffic conditions in Memphis. The expense of the work will be borne jointly by the city and the company.

Ten-Cent Fare Asked in Toledo

Railway Appeals to Court to Enjoin City from Interfering with Collection of New Rate

The Toledo Railways & Light Company has applied to Federal Judge John M. Killits at Toledo, Ohio, for an order allowing it to collect a 10-cent cash fare and charge 2 cents for transfers. This action was taken on April 30 so as to protect the rights of the company before the ouster ordinance, passed last summer, became effective on May 1, under the terms of an extension by Council which allowed the cars to be brought back from Michigan under the protection of the court. The company also asks that the city be enjoined from interference with the collection of the higher fares. If not granted, the company asks such modification of present orders as to allow it to stop service and remove its property from the city streets.

THE cross-bill seeks to obtain a compensatory return for the company's investment, to establish the rights and status of the company on the streets of Toledo, and also to settle several moot questions which remain unsolved after several weeks of negotiations between the members of a commission drafting a cost-of-service ordinance and Henry L. Doherty, the principal owner of the railway.

The bill first recites the history of the case, beginning with the expiration of franchises from 1906 to to 1914. It bases the rights of the company on the so-called "Three-Cent Fare Ordinance" of Nov. 24, 1914, which resulted in litigation in the federal court establishing the day-to-day privileges of the company, and also upon various paving ordinances.

Under all present orders of the federal court issued since the ouster ordinance a permanent settlement was supposed to have been submitted to the people for ratification at the election on April 27, but due to disagreement between the commission and Mr. Doherty no measures were ready for a vote at that time. Therefore, the company asserts its right to ask for a compensatory return or the privilege of withdrawing service when it desires.

The company now is operating under an order which fixes the fare at 7 cents with 2-cent transfers. Henry L. Doherty claims this does not provide a fair return.

$15,000,000 VALUATION

In the cross-bill the valuation of the property is said to be $15,000,000 and the present fare provides barely 3 per cent on this investment. Eight per cent is cited as a compensatory return. This rate will have the backing of the city and cost-of-service commissioners who have already agreed to this return on the stock of the company formed by the new ordinance. Allowance for amortization of the property is also asked for in the cross-bill.

It is doubtful whether there will be a hearing on the matter before thirty days. Mr. Doherty agreed with the city officials that he would give them that much notice, but filed before May 1 to safeguard the rights of the company. Judge Killits will fix a date for hearing when he returns to Toledo. The City Council will be asked to furnish a fund of $20,000 to secure special counsel and technical advice in the fight against the establishment of 10-cent fares.

It is a question of whether or not Council will ask the Public Utilities Commission of Ohio to order the company to take up its tracks and remove its property. A minority of Council which opposed the return of the cars to the streets during the recent strike may attempt to balk the company by taking advantage of the provisions of the Miller public utilities abandonment law and giving the company thirty days' notice to vacate.

In the latest petition filed by the company, however, the Miller law is claimed to be inapplicable to the Toledo railway case. Judge Killits has held it applicable thus far in the proceedings. The company claims its right to withdraw from the streets is preserved in a decision of the Circuit Court of Appeals in the same case in which the present action is filed.

MILLER LAW ATTACKED

If held applicable, the company declares that the Miller law is unconstitutional in that it would take property "without due process of law," violate contract rights, violate the "home rule" provisions of the Ohio constitution, and also of the city charter of Toledo.

Mr. Doherty seeks by this new cross-bill to clear up all the various looseends of the controversy. The officials believe they can prove a much higher valuation than what Mr. Doherty has said he would accept for the property, and also that they will clear the air of false charges regarding the price charged for current used by the railway department. The initial fare to be charged under a cost-of-service plan could also be obtained after valuation and return were approved by the court.

In negotiations for the approval of the cost-of-service ordinance in process of being completed, Mr. Doherty won several important contentions recently. The maximum rate of fare has been eliminated, the premium for performance clauses have been stricken out, and the provision governing interurbans has been modified. Interurbans using city streets will now contract with the company and points contested by the city will be arbitrated in the usual manner by representatives chosen by the city, company and federal court.

What Mr. Doherty termed "evolutionary rather than revolutionary municipal ownership" has been injected into the plans for the cost-of-service measure. The union of the ideas of cost-of-service and municipal ownership were suggested at a meeting at which both Mr. Doherty and Mayor Cornell Schreiber were present. General plans were formed and will be presented in written form by Mr. Doherty.

Under the new plan the city will begin to acquire an equity in the railway immediately upon the new ordinance going into effect. Mr. Doherty has said that this plan is both legal and feasible as far as he is able to determine.

When the new cost-of-service ordinance becomes effective money will begin to accrue in both the sinking and amortization funds. As these funds grow it would be invested to retire outstanding bonds of the company. Then the bonds would be retired through the issue of common stock which would be held and owned by the city, the company debt being reduced through retirement of the bonds and the city ownership growing through the exchange for the common stock, until ultimately the entire property might become city owned.

It is thought that this new plan will bring the agreed ordinance down to the place where the important differences remaining to be settled will be the one of valuation. And the new court angle may settle this matter.

Transportation News Notes

Rate Reduced in Fall River.—The Eastern Massachusetts Street Railway has installed a reduced ticket rate on its lines in Fall River. A ticket good for sixteen rides is sold for $1.

Asks More on Ohio Interurban.—The Columbus, Delaware & Marion Railway, Columbus, Ohio, has applied to the State Public Utilities Commission for an increase of 5 cents in the rate between Columbus and Worthington. The present fare is 15 cents.

Sunday Cars Authorized.—The Ontario Legislature has amended the railway act so as to permit of the operation of electric cars on Sundays in cities of 15,000 population. The present minimum population is 50,000. St. Thomas, with a population of about 20,000, is expected to be the first municipality to take advantage of the amended act.

Fares Up on Ottawa Line.—The Ottawa (Que.) Electric Railway has been authorized by the Railway Commission to increase the rates charged on its Britannia line. An advance of 5 cents is granted from Holland Avenue to Britannia. A similar increase is allowed on the eastern extension from

Cloverdale Avenue to Rockliffe Rifle Range.

Seven Cents Asked in Rutland.—Application has been made to the Vermont Public Service Commission by the Rutland Railway, Light & Power Company, Rutland, for an increase in cash fare from 6 cents to 7 cents in each zone. The company proposes to install the new rates on May 20. It is planned to sell fifty tickets for $3.15 and fifty school tickets for $1.50.

Seven-Cent Fare Made Permanent.—The Massachusetts Department of Public Utilities has issued an order making permanent the 7-cent zone fare now being charged by the Worcester Consolidated Street Railway. The fare on the company's suburban lines remains at 6 cents for each zone. The 7-cent fare was authorized by the board temporarily on March 7 last.

Asks Six-Cent Fare.—A tariff providing for a 6-cent fare within the cities of Aberdeen and Hoquiam and the town of Cosmopolis and between Cosmopolis and Aberdeen, with a 12-cent fare between Cosmopolis and Hoquiam, has been filed with the Washington Public Service Commission by the Grays Harbor Railway & Light company, Aberdeen. The company recently applied to the commission for a 7-cent local rate.

Fares Raised in Macon.—Fares on the lines of the Macon Railway & Light Company, Macon, Ga., were raised from 6 cents to 7 cents on May 2. The increase was sanctioned by unanimous vote of the City Council. The ordinance passed by the Council provides for a 7-cent fare for a period of two years, after which the grant may be abrogated by the city upon sixty days' notice. Two years ago the company was granted a 6-cent fare.

Seven-Cent Fare in Augusta.—A 7-cent fare will go into effect on May 9 on the lines of the Augusta-Aiken Railway & Electric Corporation of South Carolina, Augusta, Ga. The increase will be made in accordance with the terms of an order issued by the State Railroad Commission on May 1. The company had applied to the commission for a 10-cent fare. The commission granted the company's request for a general readjustment of lighting and power rates.

Would Foster Riding Habit.—Promotion of the riding habit offers the best hope of relieving the financial condition of the Eastern Wisconsin Electric Company, Sheboygan, Wis. This is the conclusion reached by the management of the company, which has asked the Sheboygan municipal authorities to cooperate with it in securing a fare revision from the State Railroad Commission. The company proposes to install a 5-cent fare for the habitual rider through the sale of fifty tickets for $2.50. It is also proposed to sell six tickets for 35 cents. The cash fare is to be 7 cents.

May Raise Rush-Hour Fares.—An increase in fare during morning and evening rush hours was suggested by witnesses for the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., at a recent hearing before the State Board of Conciliation. Representatives of the company declared that, if the demands of the carmen for higher pay were granted, the company would be forced to secure additional revenue. It was intimated that in this event the State Railroad Commission would be asked to allow an increase in fare during the rush-hour period. The carmen are asking a wage advance of 6 cents an hour. They also seek changes in working conditions.

Would Raise Philadelphia Suburban Rates.—The Philadelphia (Pa.) Rapid Transit Company has filed with the State Public Service Commission a revised rate schedule which it proposes to place in effect on its Willow Grove line on May 28. Under the proposed plan there is an increase in the number of fare zones between Philadelphia and Willow Grove, Doylestown, Chester and Media. The 5-cent fare in each zone will be continued. Between Philadelphia and Willow Grove there will be three zones instead of two as at present. The proposed new schedules also call for an extra charge for chartered or special cars.

Eight Cents Asked in Grand Rapids.—An 8-cent cash fare with five tickets for 35 cents is asked in an application filed recently with the City Commission of Grand Rapids, Mich., by the Grand Rapids Railway. The company also requests authority to install a loop system in the downtown section of the city and to make other changes in routing to accommodate the one-man safety cars which will shortly be placed in service. In seeking a fare increase, L. J. De Lamarter, general manager of the railway, stated that during the coming year the system would be called upon to expend $288,950 for replacements and betterments. At the present rate of fare the company's revenue will, it is estimated, fall short by $255,965 of providing for operating expenditures and those already authorized for replacements and improvements.

Six-Cent Fare Extended.—The 6-cent fare on the Chicago (Ill.) Surface Lines will continue in force at least until July 1. This extension of time was allowed by the Illinois Public Utilities Commission on April 26, the date of expiration having been set originally for May 1. Counsel for the city contended that a 5-cent fare should again be made effective, on the ground that even at this rate the March traffic would have produced $150,000 after payment of operating expenses. The commission held that this rate would not be sufficient and that there was no reason for disturbing the present tariff until the conclusion of the valuation hearings. The city has been ordered to close its case by May 20 and the company by June 10. The report of the surface lines showed an increase in revenue of $751,632 for February over the same month for 1919.

Fare Ordinance Modified.—The ordinance to be referred to the voters of Duluth, Minn., in the referendum election on June 21, at the request of the Duluth Street Railway, will make a 6-cent fare mandatory for a period of one year. The ordinance provides that after one year's trial the Council may order a change to any "reasonable rate of fare not higher than 6 cents." The original ordinance submitted by the company to the Council to be referred to the voters was one which provided that the Council should have the power to fix the fare at a figure not to exceed 6 cents. A new angle to the railway's campaign for a higher fare and increase in revenue was furnished when the Federated Trades Labor Assembly wrote to the City Council urging the purchase of the railway without condemnation proceedings, if a "reasonable price can be obtained."

Rejects Fare Ordinance.—A franchise ordinance providing for an increase in fare from 5 cents to 6 cents has been rejected by the Little Rock Railway & Electric Company, Little Rock, Ark. The ordinance was passed by the City Council in March. In declining to accept the grant the company stated that it would be unable to comply with conditions contained therein with regard to the making of improvements and the furnishing of additional service. It stated further that, without a flexible adjustment of fares, it would be unable to make an adequate return on the investment. The railway department of the system was operated at a loss of $85,000 in 1919. Since receiving its present franchise in 1901, the company has expended approximately $1,000,000 on street paving and has paid to the city on account of percentage of its gross receipts about $160,000.

Salt Lake Lines in Need.—A 7-cent fare is required by Utah Light & Traction Company, Salt Lake City, Utah, to enable it to meet operating costs and to make an adequate return on the capital invested in the property. This fact was brought out at recent hearings before the commission on the company's application for an increase in rates. The company some time ago filed a petition for a 7-cent fare with a 1-cent transfer charge and a 4-cent school ticket. For the past five years the system has earned annually not more than a 3.79 per cent return on the valuation of $8,468,000 fixed by the commission. During 1919 each passenger car paid on an average 5.37 cents for a ride which cost the company 6.51 cents. Witnesses for the company contended that $286,000 should be set aside each year for depreciation. The company asks a return of 8 per cent. The commission has taken the application under advisement. In December, 1917, the commission authorized the company to charge a straight 5-cent fare. The company subsequently received permission to raise the cash rate to 6 cents and to sell twenty tickets for $1.

Legal Notes

ILLINOIS—*The Rulings of Public Service Commissions Must Be Reasonable.*

The Public Utilities Commission has received no arbitrary powers by statute, and its orders and decisions are subject to review and must be reasonable and lawful. [State Public Utilities Commission vs. Bartonville Bus Line, 125 Northeastern Rep., 374.]

ILLINOIS—*Paving Assessments Upheld on Street Railway Property.*

Where a city ordinance provided that a street railway company shall at its own expense pave and repair that portion of the street occupied by its tracks, the city is not prevented from assessing for paving improvements, property owned by the street railway company and used as material yards on the theory that the property will be benefited by the proposed improvement, while devoted to street railway purposes. [City of Chicago vs. Chicago Railways, 125 Northwest Rep., 327.]

MASSACHUSETTS—*Reserved Space for Car Tracks in Center of Street Is Not Available for General Public Use.*

In a special reservation in the center of the street where the electric railway company had received a grant to lay tracks and operate cars, the company owed a duty to trespassers that it was liable only for wanton conduct. [Crowell vs. Boston Elevated Railway, 125 Northeast Rep., 607.]

MISSOURI—*Construction of Ordinance Giving Right of Way to Fire Apparatus Going to Fire.*

Under a city ordinance giving fire apparatus right-of-way when going to a fire, a motorman need not know that it is going to a fire and is not excused from colliding therewith, unless he did not know, or did not have any reason to believe, that it was approaching until too late to prevent collision. [Haekelman vs. Kansas City, 217 Southwestern Rep., 618.]

MISSOURI—*Payment of Fare Not Necessary to Make a Person Become a Passenger.*

Where one boards a street car, intending to become a passenger, the conductor making no objection, and thus impliedly accepting him as a passenger, it is immaterial whether he paid his fare. Hence, when he was injured while attempting to alight after being told the car was going to the carhouse it was a question for the jury whether the company was negligent. [Chapman vs. Kansas City Railways, 217 Southwestern Rep., 290.]

MISSOURI—*If Car Exceeds Speed Limit, Person Injured Is Not Necessarily Freed from Consequences of Contributory Negligence.*

An automobilist, who passed behind a street car at an intersection so closely as not to see a car approaching on the other track, was held to be guilty of contributory negligence although the car with which he collided was exceeding the speed limit, and there was a municipal ordinance giving him the right of way, known as the "Vigilant Watch Ordinance." [Zeis vs. United Railways of St. Louis, 217 Southwestern Rep., 324.]

NEW JERSEY—*Student Conductor Is Not an Employee.*

Applicant for position as conductor, who was injured before he had received an appointment and while being instructed in the duties of a conductor under an arrangement whereby he was to receive no compensation during such time except a bonus in case he was ultimately accepted, was not an employee of the railroad at time of injury within the workmen's compensation act. [Fineberg vs. Public Service Railway Co., 108 Atlantic Rep., 311.]

NEW YORK—*Workmen's Compensation Act Protects Employee Waiting Ten Minutes to Take Train From Employer's Premises After Work.*

Ten minutes was not an unreasonable time for a railroad employee to stay on the premises of his employer while waiting to take the next train home, on which train he had a right to ride free of charge, and if injured during such time he was entitled to compensation under the workmen's compensation act. [Kowalek vs. New York Consolidated Railway, 179 New York Supp., 637.]

NEW YORK—*Power to Regulate Fares Includes Power to Increase Them.*

The Milburn Agreement, between city of Buffalo and certain street railways, abolishing transfers but providing it should not prevent the Legislature from regulating fares, etc., does not preclude the Public Service Commission from authorizing increased fares, since the regulating power reserved to the State includes the power to increase inadequate rates as well as reduce excessive fares. [International Ry. *vs* Public Service Commission, Second District, 124 Northeastern Rep., 123.]

UTAH—*Company Not Liable for Injuries Due to Obstruction Caused by Order of the County Road Commission.*

A traction company, which pursuant to an order of county officials removed dirt and rock from its track on a county road and dumped this material at a place designated by the county officials, was held not liable for injuries to a traveler due to the obstruction. [Shepard *vs.* Utah Light & Traction Co., 184 Pacific Rep., 542. See also a similar case, Bagwell *vs* Georgia Ry. & Power Co., 99 Southeastern Rep., 712.]

New Publications

Boiler and Furnace Testing

This is a reprint of Engineering Bulletin No. 1 of the United States Fuel Administration. It is a simple, practical treatise suitable for putting into the hands of the men in the boiler room.

Corona Discharge

By E. H. Warner and Jakob Kunz, Bulletin No. 114, Engineering Experiment Station, University of Illinois, Urbana, Ill.

This bulletin will be of interest to power transmission engineers who are following the progress in high-voltage transmission.

Exhaust Systems

No. 32 in Series of Safe Practices Phamphlets of National Safety Council, Chicago, Ill.

This circular, which is well illustrated, gives details of plans for exhausting the dust, fumes, etc., which are produced by machines.

Report to the President of the United States Bituminous Coal Commission

From Henry M. Robinson, chairman, and John C. White and Rembrandt Peale, commissioners. Government Printing Office, Washington, D. C.

This contains the majority and minority reports of the commission which was appointed to adjust matters of controversy between the bituminous coal miners and the operators of the country. The report covers the history of the controversy and gives valuable data relating to the coal industry.

Reports of Investigations

Bulletin No. 1 of School of Engineering Research, University of Toronto, Toronto, Ont. 243 pages. Published by the University.

The first publication of the University of Toronto's School of Engineering Research contains the results of tests of properties of girderless concrete floors, of a single-stage turbine pump, of the strength of cast iron in bending and of many other investigations. There is also a paper of a mathematical nature on the calculation of transmission line networks.

Modern Practice in the Construction and Maintenance of Rail Joints and Bonds in Electric Railways

Technologic Paper No. 62 of the Bureau of Standards, by E. R. Shepard, associate electrical engineer, Bureau of Standards. Government Printing Office, Washington, D. C., 131 pages.

This is a second edition of the bulletin originally issued in 1915. It includes an appendix describing recent developments and improvements. The publication as a whole constitutes an excellent treatise on the subject and should be in the hands of every electric railway man who has anything to do with bonding directly or indirectly. It is well illustrated and covers practice up to within a few months.

Personal Mention

Mr. Beggs Again Active in Milwaukee

John I. Beggs has assumed control of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. The new position of chairman of the board of directors was created with the understanding that he would accept the place and thereby acquire a controlling direction of the company's affairs, including its relations with the public. No president will be appointed for the time being and no changes in the present personnel of the organization are contemplated.

In speaking on the subject to a representative of the ELECTRIC RAILWAY JOURNAL Mr. Beggs said that he would maintain the company's present organization as it is and would apply himself particularly to the solution of the company's public policy problems and to finding ways and means of raising the $10,000,000 which the company needs this year. He also said that for the present street railway extensions will be built only when the factory or community directly benefited will buy enough of the company's securities to finance the track extension and additional equipment required.

Mr. Beggs has for many years been a dominant figure in traction circles, particularly in Wisconsin. He built most of the interurban lines radiating from Milwaukee and was closely associated with the development of the city lines of the Milwaukee system. He took charge of the Milwaukee lines in 1897. The company had just emerged from bankruptcy, but Mr. Beggs built it up into one of the most prominent and successful combined central station and electric railway properties in the country.

F. L. Francisco, Traction Engineer, Resigns

F. LeRoy Francisco, city member of the Board of Supervising Engineers, Chicago Traction, has tendered his resignation to Mayor William H. Thompson of Chicago. Mr. Francisco was appointed to this position on May 15, 1916, and since that time has been a very constructive force on the board. His service has been characterized by a devotion to engineering principles and an utter disregard of the political aspects of his position.

The Chicago *Daily News* attributed his resignation to the fact that "he could not stand for the tactics of the Lundin political machine and its conduct of city affairs." It is believed that Mr. Francisco was influenced to resign from the board because of the pressure of his consulting engineering practice in this country and in South America. He is a member of the firm of Francisco & Jacobus of Chicago and New York. It is reported that Mr. Francisco will be succeeded by Joseph Strauss, president of the Strauss Bascule Bridge Company.

R. P. Woods at New Post

Will Operate Interurban Line—Resigns from Kansas City Railways Board of Control

Robert P. Woods has resigned as a member of the board of control of the Kansas City (Mo.) Railways to accept the position of vice-president and general manager of the Kansas City, Clay County & St. Joseph Railway. As operating head of the latter road Mr. Woods succeeds the late J. R. Harrigan. A brief announcement of Mr. Woods' election was published in the ELECTRIC RAILWAY JOURNAL for May 1.

R. P. WOODS

Mr. Woods has been the city representative of the Kansas City Railways board of control since 1914. In this capacity he has had supervision over many of the improvements made by the company. Because of his thorough knowledge of these phases of the system's activities, it is understood that he will act temporarily as consulting engineer to the board. He will thus be in a position to direct the carrying out of the extensive traffic improvements which are being made at the direction of John A. Beeler.

For several years Mr. Woods has taken an active part in the civic life of Kansas City. He has also been prominently identified with the movement for the formation of an association of municipal representatives of public utilities. A group of such officials met at Atlantic City during the convention of the American Electric Railway Association last October, and organized the American Association of City Representatives of Electric Railways. Mr. Woods was at that time chosen president of the new body.

Mr. Woods was born in Buffalo, N. Y., on March 4, 1870. At the age of twenty-one years he entered engineering work, and for the following ten years was engaged on a number of bridge, waterworks and sewer projects for various corporations. In 1901 he was made chief engineer in charge of construction of the Wabash River traction line. One year later he was appointed to a similar position with the Indianapolis - Shelbyville interurban. From 1902 to 1904 he served the Indianapolis & Northwestern Traction Company as chief engineer.

In the latter year he became consulting engineer in charge of design and construction of the Lebanon-Thorntown Electric Railway, Lebanon, Ind. Upon the completion of the line Mr. Woods was made vice-president and general manager. He subsequently became president of the company. From 1911 to 1913 he had charge of the building of the 80-mile line of the Kansas City, Clay County & St. Joseph Railway. His connection with the road terminated automatically with the completion of the system.

V. M. Loudon, general manager of the Cleveland, Alliance & Mahoning Valley Railroad, Ravenna, Ohio, has resigned.

H. Albright has been appointed master mechanic of the Cleveland Alliance & Mahoning Valley Railroad, Ravenna, Ohio.

Frank D. True has been elected vice-president of the Cumberland County Power & Light Company, Portland, Me., to succeed A. H. Ford, who resigned several months ago.

Mark A. Williams has been appointed manager of the railroad department of the Cumberland County Power & Light Company, Portland, Me. Mr. Williams has had supervisory charge of the railroad department for some time.

W. E. Riddle, superintendent of transportation of the Cleveland, Alliance & Mahoning Valley Railroad, Ravenna, Ohio, has been made general manager of the company. Mr. Riddle succeeds V. M. Loudon, resigned.

H. M. Verrill, general counsel of the Cumberland County Power & Light Company, Portland, Me., has been elected president of the company. Mr. Verrill succeeds William M. Bradley, who resigned more than a year ago because of ill health.

Percy Priestly has been appointed general manager of the Liverpool Corporation Tramways in succession to C. W. Mallins, resigned. Mr. Priestly, who has had a varied experience as an engineer and a manager, held a double office for Oldham Corporation Tramways before he went to Liverpool in April, 1918. He then took up the position of deputy general manager under Mr. Mallins.

Dayton & Western Personnel Announced

Independent operation of the lines of the Dayton & Western Traction Company, Dayton, Ohio, was resumed on April 25. For fourteen years the road had been operated as the Dayton-Richmond division of the Ohio Electric Railway, Springfield, Ohio. The Dayton & Western connects Dayton and Richmond, Ind., forty miles apart.

The following operating staff has been named:

Valentine Winters, president.
Henry Gebhart, general manager.
W. A. Coleman, superintendent.
P. A. Hommel, general auditor.
F. L. Boyer, general passenger and freight agent.

Valentine Winters, now president of the road, occupied that position up to the time when the system was taken over by the Ohio Electric Railway. He is the second vice-president of the City Railway, Dayton.

Henry Gebhart, appointed general manager, is vice-president and general manager of the Oakwood Street Railway, Dayton. Mr. Gebhart will continue his connection with the latter company. For two years following his graduation from the University of Pennsylvania with the degree of electrical engineer, Mr. Gebhart served as an instructor in engineering at that institution. He then joined the Westinghouse Electric & Manufacturing Company, but resigned in 1907 to become superintendent and purchasing agent of the Oakwood Street Railway. Four years later he was advanced to the position of general manager.

W. A. Coleman, superintendent, was formerly connected with the Dayton & Western. When the system was taken over by the Ohio Electric Railway, he continued with the latter company as assistant superintendent of the Dayton-Richmond division. He resigned his position with the Ohio Electric Railway several months ago.

P. A. Hommel, general auditor, and F. L. Boyer, general passenger and freight agent, were formerly employed by the Ohio Electric Railway.

Edward I. Blair, assistant to the president of the Chicago (Ill.) Elevated Railways, has been selected by President Britton I. Budd to have direct charge of the operation of the lines of the Chicago & Interurban Traction Company.

J. R. Cooper has been appointed assistant superintendent of the lines of the Connecticut Company, New Haven, Conn., formerly known as the Shore Line Electric Railway. These lines recently reverted to the Connecticut Company under court order.

Edward J. Glennon, Deputy Public Service Commissioner for the First District of New York, has been appointed a Justice of the State Supreme Court by Gov. Alfred E. Smith of New York. Mr. Glennon was formerly assistant district attorney of Bronx County.

Edwin H. Reed has been appointed auditor of the Brooklyn (N. Y.) City Railroad. For the past five years Mr. Reed has held the position of general accountant of the American Public Utilities Company, Grand Rapids, Mich., resigning recently to join the Brooklyn City lines. He was formerly special accountant for the Indiana Public Service Commission.

Ralph W. E. Donges, Camden, N. J., former president of the Board of Public Utilities Commissioners of New Jersey, has been appointed a Circuit Court Judge to succeed Howard Carrow. His territory will comprise the southern section of the State. Mr. Donges resigned from the utility body in 1918 to accept a position in one of the military departments of the Federal Government.

Thomas F. Glynn has been made superintendent of the Lynn (Mass.) division of the Eastern Massachusetts Street Railway. Mr. Glynn, who was formerly a car starter, was recently advanced to the position of assistant superintendent of the Lynn division. His promotion to the superintendency followed shortly thereafter. He succeeds Benjamin B. Foss, who has resigned.

L. J. Davis has been appointed engineering assistant to C. E. Morgan, assistant general manager of the Brooklyn (N. Y.) City Railroad. Mr. Davis was formerly sales engineer for the Westinghouse Electric & Manufacturing Company, with headquarters at Detroit, Mich. He was born at Vandalia, Ill., in 1880. Shortly after his graduation from the University of California in 1905, he entered the employ of the Westinghouse Company as an apprentice. He spent several years in the erection department, where he perfected his knowledge of the equipment and maintenance of cars and locomotives. He was later put in charge of the inspection of the railway and central station apparatus turned out at the company's East Pittsburgh plant. He was then transferred to Detroit as sales engineer.

H. T. Ely, who for the past nine years has been in the employ of the Eastern Pennsylvania Railways, Pottsville, Pa., has been promoted from dispatcher to division superintendent of that company, with jurisdiction over that portion of the system between Middleport and Mauch Chunk, Pa. Mr. Ely's headquarters will be at Lansford, Pa. He entered the electric railway field in 1899, with the St. Louis (Mo.) Transit Company, since which date he has been connected at one time or another with the United Railroads of San Francisco, the Interborough Rapid Transit Company, the Boston Elevated Railway, and the Public Service Railway of New Jersey. Prior to his connection with the Eastern Pennsylvania Railways he held the position of superintendent of the Beaumont (Tex.) Traction Company, a subsidiary of the Eastern Texas Electric Company.

Obituary

A. T. Potter, Traction Pioneer

Albert T. Potter, vice-president and formerly general manager of the Rhode Island Company, Providence, R. I., died at his home in Edgewood, R. I., on April 23. Mr. Potter had been ill since July, 1917. He retired from active connection with the Rhode Island Company two years ago.

Mr. Potter's name has been identified with the Providence traction system for more than half a century. Starting as a switch boy and hostler shortly after the opening of the first Providence horse-car line, he literally grew up with the system. He superintended its development from small beginnings into one of the most important electric railways in the East. Respected and loved both by the company's employees and by the public at large, Mr. Potter did much to promote a feeling of co-operation between the railway and its patrons. The title, "A. T.," by which he was generally known, illustrates the universal good will with which he was regarded.

Mr. Potter was born on Jan. 20, 1851. At fifteen years of age he entered the employ of the old Union Railroad. Soon thereafter he was promoted to foreman of the Cranston carhouse. In 1875 he was transferred to Providence as assistant to the superintendent. He became general manager of the company in 1888. Four years later, when the Union Traction & Electric Company took over the lines of the Union Railroad, Mr. Potter was made general manager of the entire system. In 1902 he was elected general manager of the Rhode Island Company, and in the following year he became its vice-president. He was subsequently succeeded as general manager by his son, Albert E. Potter, now president of the company.

David T. Davis, first vice-president of the Havana Electric Railway, Light & Power Company, Havana, Cuba, died at his home in New York City on April 25. Mr. Davis was a member of the New York law firm of Davis, Symmes & Schriber.

Oliver P. Covell, aged seventy-three, known as "Old Dad Covell" by hundreds of Toledo people, and the oldest motorman in the service of the Toledo Railways & Light Company, died at his home in Toledo recently. Mr. Covell had been in the employ of the Rail-Light and its predecessors for more than forty-five years. At one time he drove a horsecar in Toledo. Except for short vacations, "Dad" Covell had worked as a platform employee since Sept. 5, 1875. He held badge No. 1 and had the distinction of operating the first electric car in Toledo.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Paulista Railway Contracts

Westinghouse International Electric Company Receives Orders for Locomotives and Equipment

Since the announcement of the Paulista Railway electrification in Brazil was made in the April 24 issue of the ELECTRIC RAILWAY JOURNAL it has been learned that the Westinghouse Electric International Company has obtained contracts for a portion of the equipment therefor. Two of the four locomotives to be built by this company are for passenger service and two are for freight service.

The passenger locomotives have a one-hour rating of 2,000 hp. and weigh 121 tons. They will be operated from a 3,000-volt direct-current overhead trolley system and will be complete with regenerative control. They are designed for a maximum speed of 65 miles per hour and have a track gage of 5 ft. 3 in. The freight locomotives have a one-hour rating of 1,500 hp. and will weigh 87 tons. They also are operated from a 3,000-volt, direct-current overhead trolley system and will be complete with regenerative control. The maximum speed will be 40 miles per hour and the gage 5 ft. 3 in.

Metal Market Situation

Copper Market Quiet, with Deliveries Held Up—Lead Stocks Low

There has been virtually no change in the copper market within the past few weeks. Prices in the producers' market during the past month have increased one-quarter cent and have held almost the entire month at 19.25 cents. That price still holds for May and second-quarter delivery. Third quarter is marked at 19.50 cents. In the outside market, on the other hand, 18.50 cents is being asked for nearby deliveries, which is three-quarters of a cent below prices asked a month ago. This market is even a little less strong, as a rather large sale was reported this week at 18.37½ cents New York.

Demand in both markets is light. A few sales for near delivery are going through, but sales for futures are quiet. Unrest in four brass mills in New York State and in New England is helping to put a damper on buying for futures as the course of labor is so uncertain. Traffic, too, is still hindering deliveries to refineries, and walkouts in Buffalo railroad yards add uncertainty to the future. Sheet copper is in heavy demand.

Lead stocks in the East are low. Labor shortage and poor transportation are serious adverse conditions which make production of the metal unsatisfactory. Nearby demand is better at from 8.75 to 9 cents in the outside market in New York. The leading producer's price is still 9.25 cents. Zinc shows little change over last week. There are sufficient stocks available for the small volume of sales going through.

Electrical Materials Booked at New High Record

Heavy Ordering of Cars and Equipment Indicate Railway Field Is Contributing Its Share

From the looks of things, manufacturers of electrical apparatus and supplies are moving on to new high records for the year 1920. According to last week's issue of the ELECTRIC RAILWAY JOURNAL, orders placed for rolling stock alone will total more than $4,000,000, and for the previous week, April 24, orders reported will total $1,500,000 for rolling stock, in addition to $2,000,000 for an electrification, which is the amount of the contract of one manufacturer. In this issue orders which will amount to more than $1,000,000 are noted. Hardly a week passes but that contracts are placed in the electric railway field for equipment that calls for a large expenditure in electrical apparatus.

Bookings for the first four months are at an unprecedented rate and are well in excess of the amount that manufacturing capacity can turn out. Several manufacturers have admitted this to be the case. The one great drawback, besides that of the inability to get sufficient labor to man the machines and handle raw materials, in the manufacturing problem today is the shortage of rolling stock and poor transportation conditions, which are holding up the movement of both raw and finished materials. This condition is backing up shipping schedules in the plants and making it increasingly more difficult to close up the gap between booking and billing.

Noticeable increases in orders taken are found in generating apparatus and supplies. Orders on General Electric during the first quarter of 1920 were at the rate of $375,000,000 for the year, and during the month of April even this rate was increased. This brings bookings at a rate of $1,250,000 a day. Orders on Westinghouse during this first three months were at a rate of $180,000,000 for the calendar year, which is $600,000 a day. Shipping dates on a large part of the big apparatus will not be consummated during the present year.

Pole-Line Stocks Low

Deliveries Lengthened By Transportation Delays—Difficulty in Getting Lumber Out of Woods

Supplies of virtually all pole-line equipment are short in the market. It has been almost impossible to secure delivery on poles, cross-arms and wood pins for some time, and stocks in the East and in the Middle West are swept clean. In the South conditions are better. Inquiries and orders in the Mid-West are off a bit, possibly because buyers feel it useless to place orders with deliveries as uncertain as they are. Cross-arms are reported in plentiful supply at the mills, but they cannot be moved to jobbers' yards. In some cases producers have been compelled to curtail operations because of congested shipping docks. Several carloads of arms are enroute to Eastern markets but are held up by embargoes.

Wood poles, too, are short, especially in the 30-ft. and 35-ft. lengths. The 40-ft. and 45-ft. poles are in slightly better supply. Red cedar is reported particularly hard to get and is said to be sold up for the year. Lack of snow in certain parts of the Northwest was responsible for fewer poles getting out of the woods last winter because of difficult sledding conditions.

Wood pins are so short in some East and Mid-West markets that Western Union steel pins are being substituted in places. Chicago and New York stocks are virtually exhausted, but several cars are in transit. In New York territory wood-pin prices are very uncertain, while in the Chicago market a recent advance has set lots of 2,000 to 3,000 at $52.94 per 1,000.

Line hardware is in better condition and stocks are in fair shape. Buying is good, in fact better than heretofore.

Foreign Trade Convention on Pacific Coast

During the past few years the relation of the United States to foreign trade has undergone a marked change, leaving this country in the creditor class of nations, and it is the effect of such a situation that has been taken as the theme of the seventh national foreign trade convention, to be held next week, May 12-15, in San Francisco.

The general sessions, which will be held each morning and Wednesday afternoon, will take up in order the following topics: Fundamentals of Our Foreign Trade; Exports and Imports; Foreign Trade Policies; The Merchant Marine; National Program of Foreign Trade. Group sessions will also be held at which many topics will be discussed.

Heavy Demand for Power-Saving Devices

One Manufacturer Advances Prices 10 Per Cent—Good Deliveries Being Made

Pressure upon electric railways to reduce operating costs is reflected in the present healthy market for devices designed to facilitate the saving of energy by motormen. After much pioneer work, manufacturers have succeeded in developing equipment which not only stimulates the car operator to make a good showing in negotiating stated schedules, but which stands up faithfully under the arduous conditions of railway service. The natural result is a growing demand for this class of apparatus, particularly under present conditions of coal cost and in view of the price levels of energy even when purchased by electric railways from central stations and hydro-electric companies.

Power-saving devices for car service have not suffered in general from adverse conditions surrounding the manufacturer as much as apparatus of heavier types, according to the statement of one of the makers of this type of equipment whose manufacturing conditions are discussed in the following paragraphs. While it has not been possible to build up large factory stocks and maintain them against orders for extremely prompt shipment, deliveries are in fairly good shape. In one line, shipments can be made in from six to eight weeks after receipt of order, notwithstanding increased sales compared with last year and rapidly growing foreign inquiries.

Raw material stocks are in pretty fair shape, so that in a representative factory work is under way to build up a stock of 5,000 equipments. Owing to protracted labor troubles in the wire mills, a serious shortage of small sizes of wire used in instrument coils is being sustained by purchasers. The outlook for improved conditions is better, however, for in one notable case involving one of the largest wire-drawing plants in the country, a strike of unskilled labor for a wage of 75 cents per hour has completely failed after four weeks of idleness, and work has been resumed on nearly a normal scale.

No serious difficulty is reported in the securing of castings for car types of instruments designed to save power, and while some uncertainty exists as to the continuance of tool makers in steady production the outlook is for an excellent business year in this line.

Express shipments have been utilized, even on some large orders.

Prices trend upward, but no immediate advance is expected in one representative product, which was obliged recently to be marked up about 10 per cent.

The spreading acceptance of efficiency equipment as a legitimate investment for the operating company is unquestionably a factor making for stability in costs.

Recording Meter Business Good

A fair demand for recording voltmeters and other chart-using instruments exists at present in the electric railway field. Factory stocks are low, the lighter sizes of wire are hard to obtain, but deliveries can be made in about four weeks in a representative case. Efforts are being made to hold prices against further advancement. One well-known line went up in January—the first increase for three years—but no immediate prospect of higher quotations exists, it is believed. Shipments by express have solved the problem of transportation reasonably well. Development work interrupted by the war is going forward acceptably.

Gear Association Meets in Detroit

At a meeting of the executive committee of the American Gear Manufacturers' Association, held at the close of the Detroit convention May 1, the present officers were re-elected. The incumbents are as follows: President, F. W. Sinram; vice-president, H. E. Eberhardt, and secretary-treasurer, Frank D. Hamlin.

Messrs. Sinram and Hamlin have served the A. G. M. A. as president and secretary, respectively, since its organization three years ago. During this time the association has grown from eight to eighty member companies and during this period not one company has withdrawn.

One of the chief features of the convention just closed was the devoting of an entire day to the discussion of standardization as it affects gears.

Air Brake Association at Chicago

The Air Brake Association held its annual meeting May 4-7 at the Hotel Sherman, Chicago, with a good attendance. The most important change in officers at the convention was the advancement of L. P. Streeter, of the Illinois Central, formerly first vice-president, to the presidency, succeeding T. F. Lyons, of the New York Central, as the post of secretary and treasurer is permanently filled. Frank Purcell, of the Northern Pacific, was elected first vice-president, and George H. Woods, of the Santa Fé, second vice-president. These changes automatically upward have made a place for C. M. Kidd, of the Norfolk & Western as third vice-president after having headed the executive board.

F. M. Nellis, of the Westinghouse Traction Brake Company, is secretary of the association.

Batteries on Deferred Payments

Rather a new departure in the method of payment for storage batteries has been inaugurated by the Edison Storage Battery Company. Edison batteries for all services can now be bought on the deferred-payment plan, which divides payments over a period of twenty months. It is understood that a trade acceptance is taken with the original payment when the sale is made.

Rolling Stock

New York Municipal Railway, New York, N. Y., is expected to close a contract this week for 100 steel subway cars similar to the ones now in operation. The cars are being ordered for the new extensions which are expected to be placed in operation during the year.

Pennsylvania-Ohio Electric Company, Youngstown, Ohio, formerly the Mahoning & Shenango Railway & Light Company, through the Republic Engineers, Inc., of 60 Broadway, New York City, has placed an order for ten double-truck cars with the G. C. Kuhlman Car Company. Delivery is expected to commence in October.

New York Central Railroad, New York N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 28 as being in the market for thirty steel passenger cars fully equipped with multiple-unit control for its electric division, has placed an order with the Standard Steel Car Company for fifteen cars of this type. The cars will be similar to those purchased several years ago for the electric division and will be two-motor cars equipped with General Electric B. C. control and B 260 motors. Owing to the increased price of the cars, which has about tripled since the last order, only one-half of the intended order was placed. Delivery is expected to be made in about six months.

Tacoma Railway & Power Company, Tacoma, Wash., noted in the Feb. 21 issue of the ELECTRIC RAILWAY JOURNAL as having placed an order for six safety cars, has specified the following details on this equipment:

Builders	The J. G. Brill Co.
Type	Birney safety
Total capacity	70
Length over all	28 ft. ½ in.
Truck wheelbase	8 ft.
Rail to trolley base	12 ft. 6 in.
Width over all	8 ft.
Body	Semi-steel
Interior trim	Mahogany, light
Roof	Arch
Air brakes	Safety Car Devices Co.
Armature bearings	Ball
Axles, diameter	3⅝ in.
Car signal system	Faraday
Car trimmings	Bronze
Conduits and junction boxes	National code
Control	K-63, double end
Compressor	West D H 16
Couplers	1½ in. x 36 in. flat end for 1½ in. rim
Curtain fixtures	Side windows and vestibule
Material	Fabrikoid or Pantasote
Designation signs	Hunter
Door operating mechanism	Safety Car Service Co.
Fare boxes	Center platform
Wheelguards	Six bar, H B. lifeguard
Gears and pinions	Pressed steel
Governor hand brakes	West S 6 A Norway iron
Heater equipment, not specified	
Headlight	Golden Glow S. M-95
Motors	2-West, 506-AM-2
Paint	Varnish, light mahogany
Registers	Stone & Webster standard
Sanders	Air, furnished by builder
Sash fixtures, not specified	
Seats	Heywood Bros., 57-SF steel mahogany
Seating material	Rattan, 16 in. x 32 in. cushions
Slack adjuster, not specified	
Step treads	½ in. x 10 in.
Trolley catchers or retrievers	Ideal
Trolley base	1¼ in. x 16 in. x 16 in.
*Trolley wheels or shoes	
Trucks	Brill 29-E-1
Ventilators	Utility standard
Wheels	Southern Wheel Co., standard

Franchises

Northern Light Railways, Elk Lake, Ont.—The Northern Light Railways has been granted a charter to build a narrow-gage line between Elk Lake and Gowganda.

Los Angeles (Cal.) Railway.—The Los Angeles Railway has applied to the Los Angeles City Council for a franchise to extend its Western Avenue line from Melrose Avenue to Santa Monica Boulevard.

Recent Incorporations

Oneida-Sherrill Railway, Oneida, N. Y., has been organized to build an electric railway line between Oneida and Sherrill, N. Y., a distance of 3 miles. Preliminary surveys have already been completed. It is planned eventually to extend the line to Durhamville. The names of the promoters of the enterprise have not yet been announced.

Track and Roadway

Public Service Railway, Newark, N. J.—The Public Service Railway plans to build connecting tracks in South Warren Street, Trenton.

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway is laying new rails on its line in East Colorado Street, Pasadena.

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway proposes to construct a spur track at Fourteenth Street and Daisy Avenue, Long Beach.

North Carolina Public Service Company, Greensboro, N. C.—The North Carolina Public Service Company plans to double-track its line in Elm Street, Greensboro.

British Columbia Electric Railway, Vancouver, B. C.—The British Columbia Electric Railway will double-track a part of its Victoria Road line. The cost of this work is estimated at $25,000.

San Diego (Cal.) Electric Railway.—The San Diego Electric Railway has under way a comprehensive program of track repair on its San Diego city lines. The work is being done in accordance with the terms of an agreement between the company and the city.

Philadelphia (Pa.) Rapid Transit Company.—An ordinance has been introduced in the Philadelphia City Council to permit the Philadelphia Rapid Transit Company to build an electric railway line in Adams Avenue, Roosevelt Boulevard and Wyoming Avenue.

Interborough Rapid Transit Company, New York, N. Y.—Detail studies have been completed for the construction of the proposed rapid transit extension in Queens Borough from the present terminus at Roosevelt and Alburtis Avenues, Corona, to Main and Amity Streets, Corona. The line will be a little more than one mile in length.

Springfield (Mass.) Street Railway.—The Springfield Street Railway proposes to build a double-track extension in St. James Avenue and a single-track extension through Carew Street and Page Boulevard to connect with the Indian Orchard line in Berkshire Avenue. The rights-of-way are now being surveyed. The improvements, which will be financed through the issuance of 6 per cent bonds, will cost $300,000.

Professional Note

Edward B. Richardson, formerly of Richardson & Hale, consulting engineers, and Harry Gay, who for the past nine years has been in the construction and engineering division of the Boston office of Stone & Webster, have formed the partnership of Richardson and Gay, consulting engineers. The firm will be located at 220 Devonshire Street, Boston, Mass., and will specialize on steam, hydraulic and electrical power plants, mechanical equipment and handling, heating and ventilation, appraisals, purchasing and industrial developments.

Trade Notes

Boston Woven Wire Brush Company, Lynn, Mass., has moved its offices and works to Reading, Mass.

Brooklyn (N. Y.) Rapid Transit Company, is reported as inquiring for a 7½-ton overhead traveling crane.

Railway Audit & Inspection Company, Inc., Philadelphia, Pa., has opened an office in the Perry-Payne Building, Cleveland, Ohio.

Phillips Insulated Wire Company, Pawtucket, R. I., has awarded a contract for the erection of an addition, 45 ft. x 81 ft., to its plant.

American Bridge Company, Trenton, N. J., is planning to make two additions to its works on Federal Street, estimated to cost $500,000.

Prest-O-Lite Company, Indianapolis, Ind., will build a number of reinforced concrete buildings at Baltimore, Md., to cost approximately $100,000.

American Steel & Wire Company, New York, N. Y., has planned an addition and improvements to its works at Bessemer, Mich., to cost about $500,000.

American Car & Foundry Company, Buffalo, N. Y., is planning the erection of a one-story brick and steel car shop at a cost of about $200,000, including equipment.

Ingersoll-Rand Company, 11 Broadway, New York, N. Y., will construct a three-story brick addition to its plant at Painted Post, N. Y., to be used as a foundry. With equipment it is estimated to cost about $500,000.

Page Steel & Wire Company, New York, N. Y., has appointed Charles L. Bennett special representative in charge of the combined offices of its Cleveland and Detroit territories, with headquarters at 818 Guardian Building, Cleveland, Ohio.

American Brake Shoe & Foundry Company, New York, N. Y., will construct a foundry at Newark, N. J. The cost of the plant will amount to about $400,000, with equipment, and will consist of a one-story main building 120 x 240 ft. with two wings approximately 116 x 200 ft. each.

General Electric Company, Schenectady, N. Y., is reported to have purchased a plant from the Bartlett-Hayward Company at Baltimore, Md., formerly used for the manufacture of munitions. No announcement has been made as to what products will be manufactured in the new plant.

R. & W. Construction Company, Chicago, Ill., has been formed by E. C. Rutz and P. E. Widsteen, formerly of the Woodmansee-Engineering Company. The new concern will specialize in power plant and transmission line work. Offices have been opened at 35 South Desplaines St., Chicago, Ill.

Bound Brook Oil-Less Bearing Company, Bound Brook, N. J., through its general manager and treasurer, George O. Smalley, announces the appointment of George A. Shoemaker as works manager of the company. Mr. Shoemaker was formerly connected in a similar position with David Lupton & Sons Companies, Philadelphia, Pa.

New Advertising Literature

Delta-Star Electric Company, Chicago, Ill.: Publication No. 92, describing a few forms of its unit-type high-tension outdoor substations.

Heald Machine Company, Worcester, Mass.: Bulletin No. 20-22A, describing the Heald grinding machines and magnetic chucks, and a booklet entitled "Heald Machines in Operation."

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.: Circular 1,608, in which it describes and illustrates the control of electric motors in industrial applications.

American Steam Conveyor Corporation, New York, N. Y.: A twenty-four page booklet, "The American Trolley Carrier," describing a one-man method of handling fuel by this company's apparatus.

Automatic Reclosing Circuit Breaker Company, Columbus, Ohio: Bulletin No. 300 and 301 on Automatic Reclosing Circuit Breakers, giving theory of operation, adjustments, general descriptions and applications.

Sprague Electric Works of the General Electric Company, New York, N. Y.: Booklet B-3552, giving price lists on its direct-current and alternating-current oscillating and non-oscillating fans and ventilating outfits.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 55 New York, Saturday, May 15, 1920 Number 20

"Don't Shoot the Organist"

IN PREVIOUS winters the cars of the Berkshire Street Railway have climbed the hills in Massachusetts with a fair degree of regularity. Last winter, however, the line succumbed in the battle with the elements. This was one reason the legislative investigating committee sought on its recent visit to Pittsfield to borrow the ear of C. Q. Richmond, the manager of the line. The committee was critical. Mr. Richmond was courteous. So far as the delivery of car wheels was concerned, Pittsfield was fifty-three days from Pittsburgh. In the matter of other supplies Pittsfield was nine days from Holyoke. In the matter of still other supplies Pittsfield was three weeks from Philadelphia. These were just a few of the winter's difficulties. Mr. Richmond said his road was like a man who had been on a three months' spree trying to sober up in twenty-four hours. It couldn't be done. The manager of the road also likened himself to the organist of a church in Leadville in the wild western days, who was protected by a sign reading, "Don't shoot the organist; he's doing the best he can." Mr. Richmond proved that considering the instrument with which he was working he certainly did the best he could. In short, an organist can't play "The Storm" on the great organ and sustain the fugue movement if the bellows lack air. This was Mr. Richmond's doxology. With it he rested his case. The committee came to criticise. It went away to praise. Mr. Richmond's parallel was unusual. Still, it was efficacious. And therein lies the value of any parallel.

Is the Master Mechanic Becoming More Ingenious?

BY THE nature of his duties the man whose work brings him into the closest contact with the rolling stock has the best opportunity to display ingenuity. During and since the war period he has had to get along without many things that he would like to have in the shop and on the cars. As a result there has been an unusual amount of inventiveness displayed. Much of this is quite commendable, although in commending it a word of caution is in order. The inventive talent should be exercised along the lines of greatest possible productivity and not in duplicating standard devices which can produce the same or better results at lower cost. A case was cited in this paper recently where, to save a trifling sum, a defective part of a signal was replaced with a home-made piece, with a consequent loss of money and time, and damage to the reputation of the signal. However, such cases are the exception, not the rule.

An inspection of any good electric railway shop will convince the visitor that the master mechanic has been using his head lately. Maintenance costs are being kept down by the exercise of brain power. The wonder is that many of the "stunts" that one sees in use were not thought of earlier. The reason is that the incentive to inventiveness was not so great.

In one shop an operation that formerly required about thirty-five or forty man-hours is now being performed in six by the use of very simple apparatus and procedure. This is but an extreme case of what is going on everywhere. In answer to the query: "Is the master mechanic becoming more ingenious?" we say: "He is." We hope to see him get, for himself and his shop, a reasonable share of the increased income that the higher fares are bringing into the railway till.

Another Legislature Fails in a Crisis

RHODE ISLAND'S trolley system may be rejuvenated, but that will hardly be through any help extended by the State of Rhode Island. Most of the electric railways there are operated by the Rhode Island Company, now in the hands of receivers. After much effort a program had been advanced setting down a minimum of legislation regarded as necessary to relieve the company of some of the burdens under which it was staggering. This program had as its keystone an act to create a new company, the United Electric Railways, to succeed the Rhode Island Company, provision being made for participation in the management of the new company by the State and by the city of Providence. This measure was passed.

Of the complementary acts, however, both the bill to authorize the cities and towns to contribute to the cost of service where the receipts of the company are insufficient to pay expenses and the measure to place the jitneys under the control of the Public Service Commission were defeated. On the other hand, a bill was enacted which is intended to relieve the company of some of its paving burdens. But this measure, while it does lift from the company the burden of paying any part of the initial cost where a street is entirely repaved, may have the ultimate effect of imposing greater responsibilities than the company had before with respect to the maintenance of paving.

In an endeavor to effect a reorganization the warring factions of security holders had been won over to consent to a new capitalization far below the present value of the properties. They in turn asked only such relief from the burdens imposed by the State and the cities and towns and such protection from unfair and unregulated competition as would hold out some hope that a return might be realized on the reduced capital. This has apparently been denied. A way out may possibly be found by lopping off some of the outlying lines. In the original plan it had been sought to avoid this. The receivers have not indicated the next steps.

London Says Fare Fixing Implies Responsibility for Results

HAVING recently been treated to the spectacle of a State Public Utilities Commission dolefully deploring the beggared condition of the largest road under its jurisdiction, yet substituting for the company's carefully planned zone-fare system one wholly unproved, untried and unknown, it is as manna from Heaven to read this blunt, common-sense conclusion of the advisory committee on London traffic in its report of March, 1920:

"We do not suggest that the new (proposed) traffic authority should have the power to fix or vary fares, for the obvious reason that these control the methods of operation, and any traffic authority claiming powers to settle the terms on which passengers are to be carried must be prepared to subsidize or, in case of need, to operate."

The advisory committee qualifies this statement only by the proviso that the controlling or regulatory body should have the power to call for the production of all books and the inspection of all methods of operation. But it is crystal clear on the point that the power to fix fares is incompatible with the lack of corresponding responsibility for results. It will not do to say that the British, having had little fare regulation hitherto, aside from the Parliamentary maxima of long ago, will come around to the irresponsible style of regulation that has grown up here. The advisory committee appears to be mightily well informed concerning regulation in the United States and goes so far as to foreshadow the possibility of adapting the Cleveland service-at-cost plan to the far more complex conditions of London. At the same time the common sense of these Britishers has told them that the continuation of good street railway, motor bus and rapid transit service is too important to be trifled with airily by commissions which cannot assume responsibility even if they would. When the state delegates the power of rate making to such bodies it ought to be prepared to make good the mistakes of its agents. If the advisory committee's suggestion is an example of the famed British characteristic of muddling through, we can stand a little muddling of that kind ourselves. Whatever happens in the London case, no one can withhold admiration for the committee's recognition of the fact that subsidization or outright operation by the state are the only livable alternatives to granting the right to charge a fair fare.

In Justice to the Single-Phase Motor

THE alternating-current railway motor has had a commercial career of about fifteen years in this country. The writer confesses to a feeling of skepticism when, in 1905, the announcement was made that the Westinghouse company had entered into a contract with the New Haven Railroad to equip the New York terminal of the latter for single-phase operation. At that time, while the series alternating-current motor was by no means new, the practicability of applying it to such heavy duty was considered by many to be dubious, to say the least.

The designers of the new type of traction motor knew, of course, that they had a difficult problem on their hands, but the advantages of the alternating-current transmission and distribution without intervention of the rotary converter were considered to be a goal well worth striving for and violating precedents to obtain. During the ensuing decade there was much discussion among the experts as to the relative merits of the direct-current and alternating-current systems, with resulting confusion to the lay mind. Now all is serene, and the railway manager who wishes to electrify his lines can have any system that he wants with full assurance that the equipment will produce the expected results.

Of the two types of motor, the alternating-current one is necessarily somewhat more complicated in construction, due to the necessity for providing a compensating winding on the field frame and to the larger number of poles required. It is also heavier for the same reasons. One would naturally expect, then, that the maintenance of the motor would be much more difficult and expensive. As a matter of fact, however, the modern alternating-current motors are not at all difficult to keep in "good shape." A foreman in one shop, where many such motors must be kept up, remarked recently that he sees essentially no great difference in the local shop work from what would be required for direct-current motors. It is a pleasure to record this because it indicates a great accomplishment in a short period of time. If other considerations dictate the advisability of using the single-phase system, fear of excessive maintenance cost need not be a deterrent.

Commissions Must Restore Confidence in Utility Securities

WARNING has been given time and again by electric railway men that the continued inability of the companies generally to pay dividends to those who have invested their surplus capital in the railway properties would prevent them from securing new money for extensions and betterments to keep pace with the needs of the rapidly growing communities served. The accuracy of this prediction is becoming painfully apparent, even though some of the railways are so recovering their earnings as to be able to pay dividends. So much new work was postponed during the war that an immense amount is now urgently needed. This calls for the raising of very large sums of new money, on which, if it could be secured, dividends could probably be paid with the continuing good traffic and the increased fares being enjoyed by many properties.

But electric railway securities are a drug on the market and those of the other utilities are in like condition. The truth and seriousness of this was reflected at the hearing of various Illinois public utilities before the Public Utilities Commission, at which they presented the detailed reasons for their inability to carry out needed improvements ordered by the commission.

What can the commissions do to better the situation? First, they can approve holding extensions of service in abeyance temporarily until the financial conditions can be improved. Second, they can use their good offices in an effort to restore public confidence in public utility securities. For the present security market is purely the result of a loss of confidence. To help restore it may require that the commissions approve rates of fare which will bring a higher rate of return on the outstanding stock. They can also help in new financing by approving higher interest rates for a few years until confidence is restored. But almost no possible interest rate at present would in itself offset this lost confidence. It seems to us that the utility commissions will best serve their constituents by so regulating the utilities as to permit a rate of return of 10 to 12 per cent. It would not take more than two years of such return to bring the necessary money to the utility field, and since there is nothing of more value to the people than well maintained and operated and fully adequate public utilities—these attributes being the direct outgrowth of healthy earnings—and since the commissions have full power to prevent misappropriation of funds, why not make high earnings possible? Then we can all have a place to invest our savings where the earnings will be attractive and the securities sound and enjoy the good service resulting from the money thus invested meanwhile.

How Do You Buy Advice and Equipment?

IN CYNICAL moments we are tempted to doubt whether the majority of humans in this or any other line of work come to decisions as the result of thought rather than mob impulse. Just now we are thinking of a certain something in the electric railway business—never mind what—that is selling like Salvation Army doughnuts. To have bought this article two or three years ago would have meant that originality and courage are rewarded, because, now that success is demonstrated, neither advancing prices nor tardy deliveries can hold back the stampede.

All of which is introductory to our telling about one railway which does do things with a thoroughness and fairness that can be imitated without a penalty of either advancing prices or tardy deliveries. When this company wants engineering advice on some novel development, for example, the specialist is invited to address "a little group of serious thinkers." These men comprise representatives of every department which could possibly be affected by a change in operating practice. They group themselves with seeming casualness about the visitor and then the ordeal opens, beginning with a bit of sniping here and there, but gradually rising to a bombardment of the most searching questions. So far as the teamwork of a dozen earnestly inquisitive men can go, every advantage and disadvantage of the proposal is foreseen and analyzed.

Practically the same procedure is followed with a manufacturer who offers a money-saving or money-making device. He will find that his good-natured inquisitors have studied possibly all of his advertisements, his catalogs and his installations. He notes that the dominant thought of the assembly is: "Will this help us to give more electric railway service for less expense?" To his joy, he finds that the bogey of competitive prices is not invoked; that the famous saying of Fra Elbertus, "Don't mention pay," has taken a new and pleasing meaning. If he has the article that will bring the biggest return on the railway's investment he will get the business. Price-cutting won't help the inferior article. Another appreciated feature of this company's dealings with manufacturers is a just respect for their time. Appointments made are kept with delightful regularity. There is as little waste motion on one side as on the other.

The thoroughness shown by this management in buying advice or equipment is just as evident in its internal affairs. Whether it is labor relations, the skip-stop, destination signs, information booklets, the building of a timetable, etc., the practices of electric railways the world over are painstakingly ferreted out. Originality in many practices has not been found inconsistent with the adoption of good ideas that were born elsewhere, nor with the discarding of local methods that had outlived their usefulness.

Do You Use Your Engineering Manual?

A RECENT conversation with a railway executive showed us that at least one member of the American Electric Railway Association is convinced of the need for wider use of the standards adopted by the association and for initiative on the part of railway managers in connection therewith. If the interest of this executive was more nearly typical of the attitude of the association members as a whole the engineering standards would make more rapid progress. Thousands of dollars and thousands of man-hours of time have been spent in preparing the association standards, and they have had the approval of the association. The association has endeavored to "sell" the standards to the industry and the editorial columns of this paper have urged their more general use, but all of the good work done in preparing the standards and the efforts made to extend their use fall flat without the active co-operation of the member companies themselves and of the manufacturers.

Every electric railway executive who is responsible for the passage of requisitions for materials should familiarize himself with the association standards and recommended specifications in those items used by his department. When a requisition passes through his hands he should examine it to ascertain whether A. E. R. A. standard material cannot be specified, and if such can be used even with slight inconvenience it should be required. Many will be surprised to find how closely the standards correspond to materials which they are now using and which are being purchased regularly without any thought of the A. E. R. A. specifications.

There is also another feature which is very important, and that is active co-operation from the manufacturer. We believe that there is no other class of publicity which could be quite as effective as for the manufacturers in their advertisements to designate various items as A. E. R. A. standards. Thus, in ordering brake shoes, for instance, the Tuneville Trolley Company would write the Goldbrick Company for 1,000 Goldbrick A. E. R. A. standard brake shoes. If the manufacturers make the standard article and the railways specify them, it stands to reason that they will be used.

On the other hand, the manufacturers will make the articles if the railway companies specify them. Thus, the real problem is to get the articles specified. Is it then necessary for the manufacturers not only to make standard articles upon specification, the duty which naturally falls to them, but also to urge that they be specified? This should not be the case. The Manual is available to all member companies. It is arranged in convenient form and carefully indexed. If there is any inherent fault in the Manual which makes its use formidable, why not discuss this without further delay? Otherwise should it not be in more general use, thus capitalizing the work of the association committees?

Maintenance Practice of the Anglo-Argentine Tramway—Part II

The Several Classes for Inspection and Overhauling of Cars Are Described Together with the Duties of the Men and Types of Work Performed

By R. FRANCISCO APESECHE
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TRAMWAY LOOP AT THE STOCK EXCHANGE, BUENOS AIRES

IN A PRECEDING article, published in the ELECTRIC RAILWAY JOURNAL for March 20, 1920, the extent of the Anglo-Argentine Tramway lines was described and an outline was given of the standardization work which had been undertaken. The reorganization of the rolling-stock maintenance forces has been of great assistance in carrying out the standardization program. For this purpose the inspection and overhauling work has been divided into the following classes: nightly inspection, fortnightly inspection, general inspection and overhauling, truck overhauling and special inspection made after rainstorms. The organization necessary to carry on the various classes of work will now be taken up and a general idea will be given as to the work which is carried out in each class.

NIGHTLY INSPECTION

A thorough inspection cannot be made at night, but as more cars are laid up at this time than during the day a slight inspection of the cars is made at this time. Cars with even numbers are inspected one night and those with odd numbers the following one. This inspection comprises the adjustment of loose bolts and nuts, and inspecting brake rigging, lifeguard triggers, sanding mechanism, gongs, bells, lighting circuits, doors, windows and seats. Three workmen under the supervision of the night foreman inspect each car in about twelve to fifteen minutes and cover from thirty-five to forty cars per night. No repairing is done at night. Any car found with a defect is put aside to be repaired the following day by the gang in charge of the supplementary work. A very close watch is kept on the men and very seldom a car "O. K.'d" during the night shows any defect the following day.

An accompanying illustration shows the form used for the report of the night foreman to the chief foreman. Under the heading "Cars left for repairing" he enters the number of all those cars that are found with defects and which should be repaired the following day. Under "Cars detained for the fortnightly inspection" and "Cars detained for the general overhauling" he enters all the cars that are to be withheld from service in the morning for undergoing either one of these inspections. Under "Night inspection news" he gives all of the particulars as to defects found in the inspected cars. This form is examined and signed daily by the rolling-stock inspector.

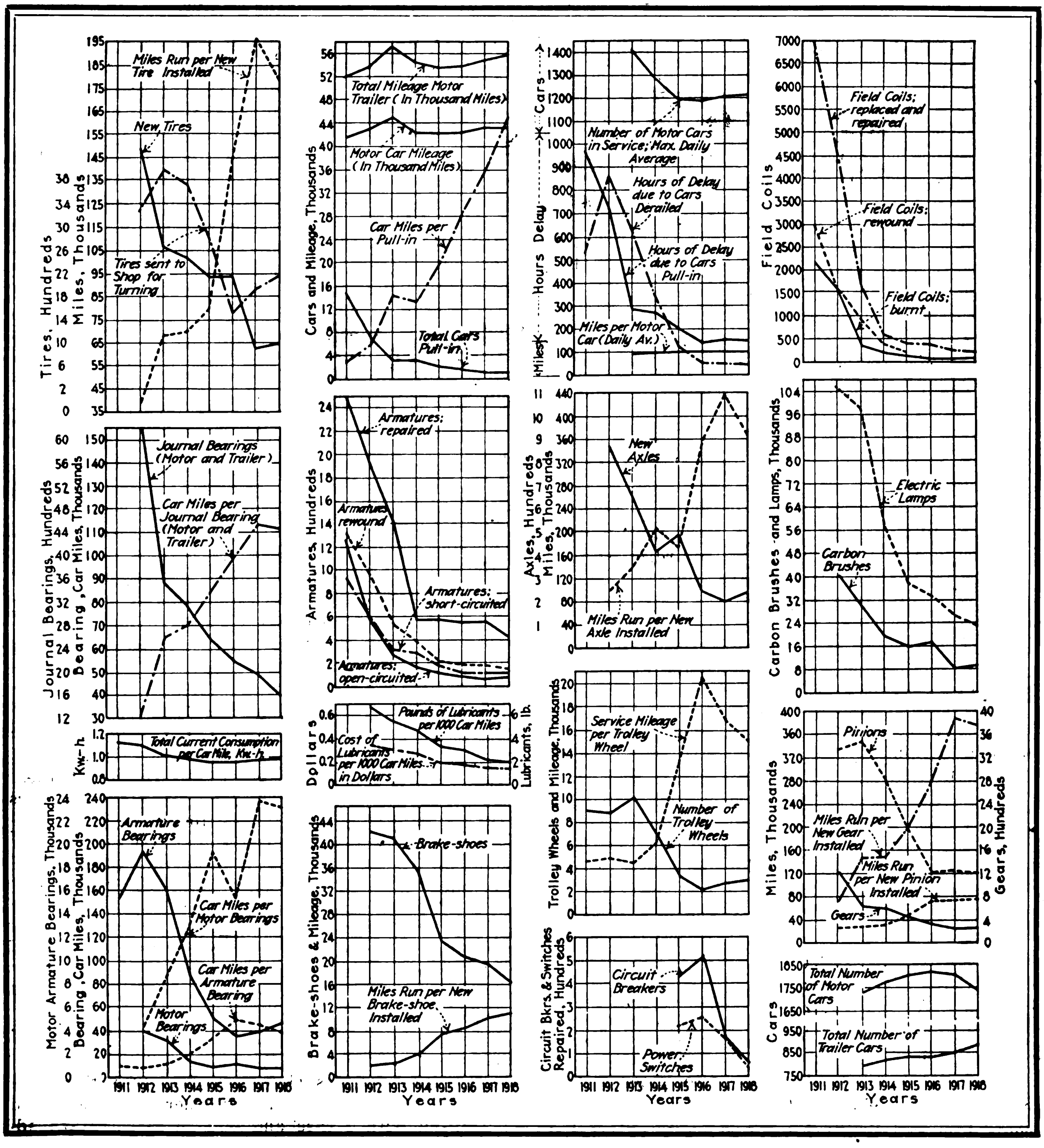
WORK DONE ON FORTNIGHTLY INSPECTION

After the cars are placed over the pits a gang of six men, each one a specialist in the maintenance of a certain part of the equipment, begin the inspection. They are directed by the day foreman, who is in charge of this work. The carpenter looks after doors, windows, seats, curtains, glass, bells and gongs. The truck-and-brake man with an assistant inspects the braking mechanism. One applies the brakes while the other follows the movements of the levers, adjusting where necessary and lubricating with grease and oil. Brakeshoes are adjusted, or replaced if worn out. The inspection of truck parts consists in tightening bolts and examining the condition of springs, adjusting life guards to the required height from the rails and testing their trigger mechanism, emptying the sand box, removing all obstacles such as large stones therefrom, and making sure that everything operates satisfactorily.

The foreman, assisted by the control man, tests the resistance and insulation of the power circuit on each car. Both controllers are inspected to detect loose fingers or burned segments. The control man cleans the segments and fingers, rubs them slightly with vaseline and puts a few drops of oil in the shaft bearings. He examines and cleans switches, circuit breakers, fuses for power and lighting circuits and electric lamps, and makes replacements when necessary.

The motor man inspects the motors and armatures, cleans commutators, adjusts or replaces carbons and brushholders, verifies the armature air gap for given limits, blows out dust and sees that the case closes well. The dust is blown off the resistors once every month.

The trolley man sees that the trolley swivels properly, gages the trolley wheel and replaces it if worn out or takes it to the bench to have it turned if it is wearing out improperly. He puts a few drops of oil in the trolley wheel and in the trolley base.



GRAPHS SHOWING RESULTS OBTAINED FROM STANDARDIZATION OF WORK AND METHODS

The oil man is responsible for the proper lubrication of motors, gears, axles, etc., and he follows strictly the instructions given.

Wheels are inspected by the foreman once a month. He determines with a special gage the degree of wear and sends them to the lathe if necessary.

All light work of repairing found necessary during this inspection is done by the corresponding maintainers. In case the repairing work is of such a kind that it requires the help of other men, the maintainers are assisted by the gang for supplementary work. This force, as explained, takes care of all work not done periodically and assists the maintenance gangs when required. The average time for inspecting a car is about 1½ hour. It is impossible in this short time to inspect each car in the smallest detail and, due to their inaccessibility, many parts are left unexamined. This makes it imperative that, at regular intervals, the electrical and mechanical equipment be thoroughly inspected and overhauled, and this is done to every car once every eight months.

The foreman in charge of the fortnightly inspection fills out Form II, putting down the number of the cars inspected, the air gap measurements, insulation and resistance measurements, and once every month the condition of the wheels. This form is examined daily by the inspectors, who can immediately control any abnormal condition.

At the same time that the fortnightly inspection of the motor cars takes place the foreman in charge supervises the fortnightly inspection of the trailers, for which there is a special trailer maintainer, who inspects the mechanical and electrical equipment and electrical circuits. The carpenter who inspects the motor cars takes care of the inspection of glass and woodwork of the trailers.

GENERAL INSPECTION AND OVERHAULING WORK

A gang of seven men under the supervision of the chief foreman, assisted by the supplementary work gang, overhauls each car every eight months. This gang is composed of the first mechanic, who assists the chief foreman in conducting the work and takes care of motors, cables and resistances; one electrician and assistant for controllers and apparatus of power and lighting circuits; one man for trolley wheels and poles; three men for the mechanical equipment and to assist in overhauling motors and changing gears, and one carpenter for all woodwork.

The inspection done by this gang is carried out as follows: Trolley bases are cleaned and lubricated, and the springs are adjusted so the pull at the trolley harp at the height of 19½ ft. above the rail level is 15½ lb. The trolley harp is cleaned and the trolley wheels gaged. If they are found to be wearing out of shape, they are taken to the lathe to be turned true or are replaced if found at their limit of wear. Connection leads at trolley stand are cleaned and inspected to see if insulation is in good condition. The canvas that covers the cable, on the roof of the car, is examined and painted or changed if worn out. Switches are cleaned and adjusted so that they will make good contact. The circuit breaker is disconnected and cleaned, pits are removed from contacts and the breakers are sent to the general shops, where they are tested and calibrated to open at the required current limit. Fuses and lightning arresters are examined and cleaned, fuse holders and bases are changed if they are burned, and the lighting circuit is tested and all lamp holders and switches adjusted. The controllers are disconnected and completely overhauled, scraped and painted with voltalac. All worn out fingers and segments are replaced; the shaft, bearings and gears are inspected for wear and lubricated; the magnetic blow-out coil and arc shields are examined and cleaned, and the finger contacts are adjusted to the proper tension, after removing worn-out ones. Cutout switches are examined and cleaned in order that they will make good contact, and all contacts are slightly rubbed with vaseline. The entering cables are well aligned and securely connected.

The resistors are then cleaned, dust is blown off with compressed air, and the connections are inspected to make certain that they are tight. The various steps of resistance are verified with an ohmmeter, in accordance with the table of resistance values given for the different types of motor equipment. Cable hose is inspected and its insulation tested. Small brass bands are put around each cable that leaves the hose, indicating its use. The position of the cable hose in the car frame has been standardized, and advantage is taken of the opportunity to place it in the middle of the frame in those cars that have it running along the sides. The hose is then painted.

The armatures are taken to the bench, commutators are turned, the mica is undercut and the armatures are painted with voltalac and tested. In case of defects, they are sent to the general shop for repairs. The field coils are disconnected, tested with the "field tester," insulated if necessary and painted with voltalac. The armature and motor axle bearing housings are emptied, cleaned, repacked and bearings are replaced if worn out. The motor case is cleaned inside with kerosene and the motor leads and their rubber bushings are inspected for badly chafed insulation. They are kept securely connected and well spaced with a wooden block. Brushholders are cleaned and adjusted to the required height above the commutator and the springs are adjusted to give the proper tension on the carbons. The gear case is cleaned, and the gears and pinions are lubricated and gaged for maximum wear and adjusted if loose.

The braking mechanism is completely taken apart, worn out parts are replaced and worn holes are bushed. The rigging is put together and adjusted so the shoes, when the brakes are loose, will have a gap of 2 to 3 millimeters with the wheel tire, which gap should be maintained after the brakes are set from both platforms. The truck is cleaned and its alignment verified. All bolts and nuts are gone over and tightened, all spring washers found to be badly worn are replaced and springs are examined and adjusted. The life guard and sanding mechanisms are cleaned, tested and adjusted.

Bells and gongs are examined, door mechanisms cleaned and lubricated and gears or chains are replaced if worn out. All windows, curtains and seats are thoroughly inspected. It usually takes about one day to complete the general inspection on each car.

The overhauling of the trailers is carried out at the same time, for which work only two men are needed; a carpenter for all woodwork and glass, and a mechanic for brakes, trucks, etc.

Each motor and trailer has its index cards (Forms III and IV in the accompanying illustrations). The dates are entered for the general reconstruction, general inspection and overhauling, full paint, varnishing and half-paint, change of axle and motor bearings, of wheels, brakeshoes, trolley wheels, pinions, gears, etc. On the back of the motor card are written the numbers of the motor and armature, the dates when the armatures were removed to be sent to the general shops, dates when they were put in again, reasons for sending, etc.

The lower part of the card is devoted to axle statistics. All other work done to the cars during this inspection, or at other times is entered in a special book, which is examined daily by the inspector. He also examines the cards of the cars that undergo the inspection and overhauling. All the cars that are inspected or overhauled are examined by the inspector and after he "O. K.'s" them they are returned to service.

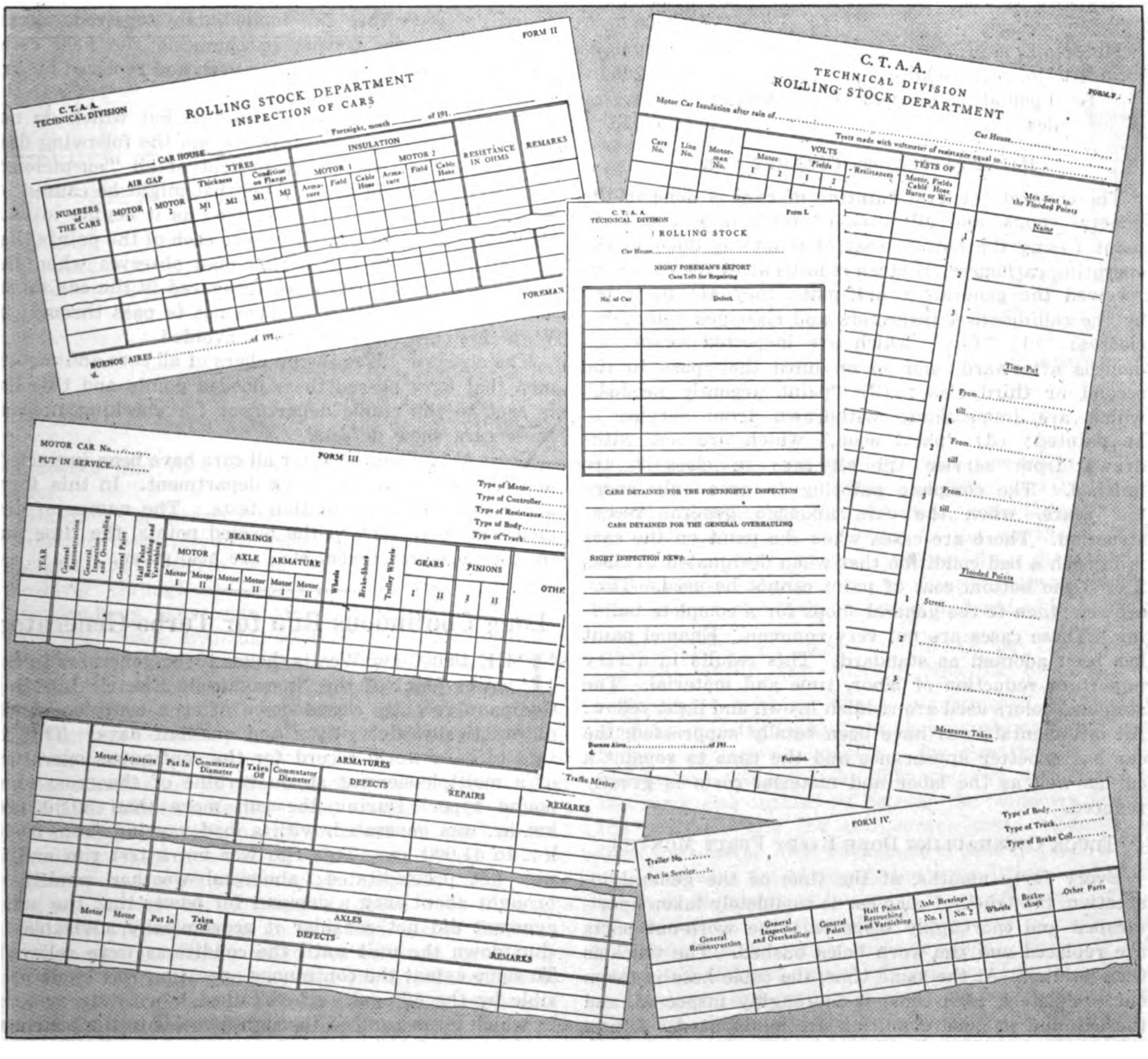
WHEELS AND AXLES ARE CHANGED WHEN WORN OUT

During the general inspection just described the body is not raised off the truck, but if it is found during this inspection or the fortnightly one that either the wheels or gears need repairs, then the body is raised, the wheels and axles taken off, the gears replaced or the wheels and axle changed if they are worn out, or have loose tires. Any axle found with a crack of half an inch or more is replaced immediately.

Work such as changing tires or axles is done at the general shops, since at the operating carhouses the necessary tools for any of these operations are not available. The wheels are inspected once a month by the day foreman, assisted by the gang of supplementary works.

AMOUNT OF LUBRICANT USED

The lubrication of the different parts of the car is done at regular intervals as already explained. When a car has undergone the general inspection it is lubricated completely anew. The amount of lubricant used for each part is as follows: the motor axle and armature bearing pockets are filled with 1 lb. each of common oil. The grease box of the motor axle bearings is filled with yellow grease, which is used as reserve lubricant. The oil is fed to the shaft and axle by means of wicks. In the interpole motors the bearing pockets of armature and



FORM II

C. T. A. A.
TECHNICAL DIVISION

ROLLING STOCK DEPARTMENT
INSPECTION OF CARS

Fortnight, month ______ of 191.. ______

CAR HOUSE ______

NUMBERS of THE CARS	AIR GAP		TYRES				INSULATION						RESISTANCE IN OHMS	REMARKS
			Thickness		Condition on Flange		MOTOR 1			MOTOR 2				
	MOTOR 1	MOTOR 2	M1	M2	M1	M2	Armature	Field	Cable Hose	Armature	Field	Cable Hose		

FOREMAN

BUENOS AIRES................of 191..
d.

C. T. A. A.
TECHNICAL DIVISION
ROLLING STOCK DEPARTMENT

FORM V.

Motor Car Insulation after rain of..........

Car House..........

Tests made with voltmeter of resistance equal to..........

Cars No.	Line No.	Motorman No.	VOLTS				Resistances	TESTS OF	
			Motor		Fields				
			1	2	1	2		Motor, Fields Cable Hose Burnt or Wet	

Men Sent to the Flooded Points

Name

1

2

3

Time Put

1 From..........
till..........

2 From..........
till..........

3 From..........
till..........

Flooded Points

1 Street..........

2 ....

3 ....

Measures Taken

Traffic Master

C. T. A. A.
TECHNICAL DIVISION

Form I.

ROLLING STOCK

Car House..........

NIGHT FOREMAN'S REPORT
Cars Left for Repairing

No. of Car	Defect

CARS DETAINED FOR THE FORTNIGHTLY INSPECTION

CARS DETAINED FOR THE GENERAL OVERHAULING

NIGHT INSPECTION NEWS:

Buenos Aires..........of 191...
d.

Foreman.

MOTOR CAR No..........
PUT IN SERVICE..........

FORM III

Type of Motor..........
Type of Controller..........
Type of Resistance..........
Type of Body..........
Type of Truck..........

YEAR	General Reconstruction	General Inspection and Overhauling	General Paint	Half Paint Retouching and Varnishing	BEARINGS						Wheels	Brake-Shoes	Trolley Wheels	GEARS		PINIONS		OTHE
					MOTOR		AXLE		ARMATURE									
					Motor I	Motor II	Motor I	Motor II	Motor I	Motor II				I	II	I	II	

	ARMATURES								
	Motor	Armature	Put In	Commutator Diameter	Taken Off	Commutator Diameter	DEFECTS	REPAIRS	REMARKS

	AXLES						
	Motor	Motor	Put In	Taken Off		DEFECTS	REMARKS

FORM IV.

Trailer No..........
Put in Service..........

Type of Body..........
Type of Truck..........
Type of Brake Coil..........

General Reconstruction	General Inspection and Overhauling	General Paint	Half Paint Retouching and Varnishing	Axle Bearings		Wheels	Brake-shoes	Other Parts
				No. 1	No. 2			

FORMS USED FOR REPORTING AND FOLLOWING UP INSPECTIONS axle bearings are filled with elastic journal packing and to each one is added 2 lb. of common oil. Two ounces of oil is added to each bearing pocket every fifteen days. The journal box is packed with ½ lb. of cotton waste and 2 lb. of common oil. Every two months thereafter enough oil is added just to keep the waste moist. During the general inspection ⅓ lb. of waste is added to replace that worn out. The gears are lubricated with graphite grease and every two months ½ lb. of grease is added to each gear. Trolley wheels and trolley base bearings are lubricated with grease and oil and the controller shaft bearing with oil every fifteen days.

At the same time the braking mechanism is lubricated with grease and oil. When it is necessary to change the armature or axle bearings, the bearing pockets are emptied and the oil taken to a filter, where, after filtration and decantation, it is used in the journal boxes. Results obtained from the lubrication maintenance standardization has brought the consumption of lubricants down to a very low figure.

The consumption of lubricants per 1,000 car-miles in pounds is as follows:

Common oil (motor and trailer)	0.1605 lb.
Graphite grease	0.0666 lb.
Yellow grease	0.2400 lb.
Motor oil	1.4750 lb.
Elastic journal packing	0.0112 lb.
Total pounds of lubricant per 1,000 car miles	1.9533 lb.

PAINT INSPECTORS CLASSIFY CARS

The complete general painting of cars is done in the general shops, and all work of retouching and half-paint (using the bottom coat of paint) is done in the operating carhouses. Sixteen months after the cars have received the general or half-paint they are inspected by the rolling-stock inspectors and classified into three classes: (1) "fair," which are inspected again two months afterward, and so on until they pass to the second or third class; (2) "paint urgently needed," which are immediately withdrawn from service to be painted; (3) "paint soon," which are not withdrawn from service till all cars in class 2 are finished. The complete painting is done only every ten years, when the cars undergo general reconstruction. There are cases when the paint on the cars is in such a bad condition that when designated in class 2 or 3 the bottom coat of paint cannot be used. They are sent then to the general shops for a complete painting. These cases are not very common. Enamel paint has been adopted as standard. This results in a very important reduction of labor, time and material. The standard colors used are reddish brown and light yellow. All ornamental lines have been totally suppressed, the car has a better appearance and the time to repaint a car as well as the labor and material costs is greatly reduced.

TRUCK OVERHAULING DONE EVERY FORTY MONTHS

Every forty months, at the time of the general inspection, the truck of each car is completely taken apart, scraped and thoroughly inspected; the worn-out parts are replaced and the worn holes bushed. The truck is then painted. At the same time, the cable hose is taken out completely, each cable is thoroughly inspected, and those found in good condition are again used. A new hose is installed.

Another important work carried on by the operating carhouse organizations is the inspection and testing of the insulation for the power circuits of cars after every rainstorm.

The city of Buenos Aires has not a very up-to-date drainage system, and as a result many streets become flooded with even a light shower. This makes it imperative for good maintenance of the rolling-stock that all cars operating through flooded streets be inspected as soon as they are withdrawn from service. When it rains lightly, only ten cars of each line are inspected, and if 50 per cent or more of the cars inspected show a lower insulation than the given limits, then all the cars on that line are inspected. If the cars inspected show that less than 50 per cent have low insulation, then the inspection of the cars on that line is stopped.

When it rains heavily all cars are inspected as soon as they are withdrawn from service. The night foreman, assisted by two men, start the insulation tests, which are continued during the following day by the day foreman until finished.

All cars inspected at night which have a lower insulation than the limits given are put aside and tested again the following morning by the day foreman, and if found defective they are immediately repaired. Practically all repairs consist in changing the field coils, which are taken out, put in the oven and replaced by dry ones.

All cars that show low insulation but which do not pass the limits given are tested again the following day. In this way a close watch is kept of all "'suspicious" cars, so as to avoid any trouble that might be caused by an increase of humidity. As soon as it begins to rain the chief mechanic sends a man to each of the points that usually become flooded. This man observes when the water rises to a given level, measured in the car itself, and then advises the motormen not to pass through it. With this care much trouble is avoided.

The observer takes the numbers of all cars and motormen that have passed these flooded points and this list is sent to the traffic department for checking in case those cars show defects.

Form V is filled out after all cars have been inspected, and sent to the rolling-stock department. In this form are given all the insulation tests. The names of the men who were sent to the flooded points, the time put in, the measures taken, etc., are also given.

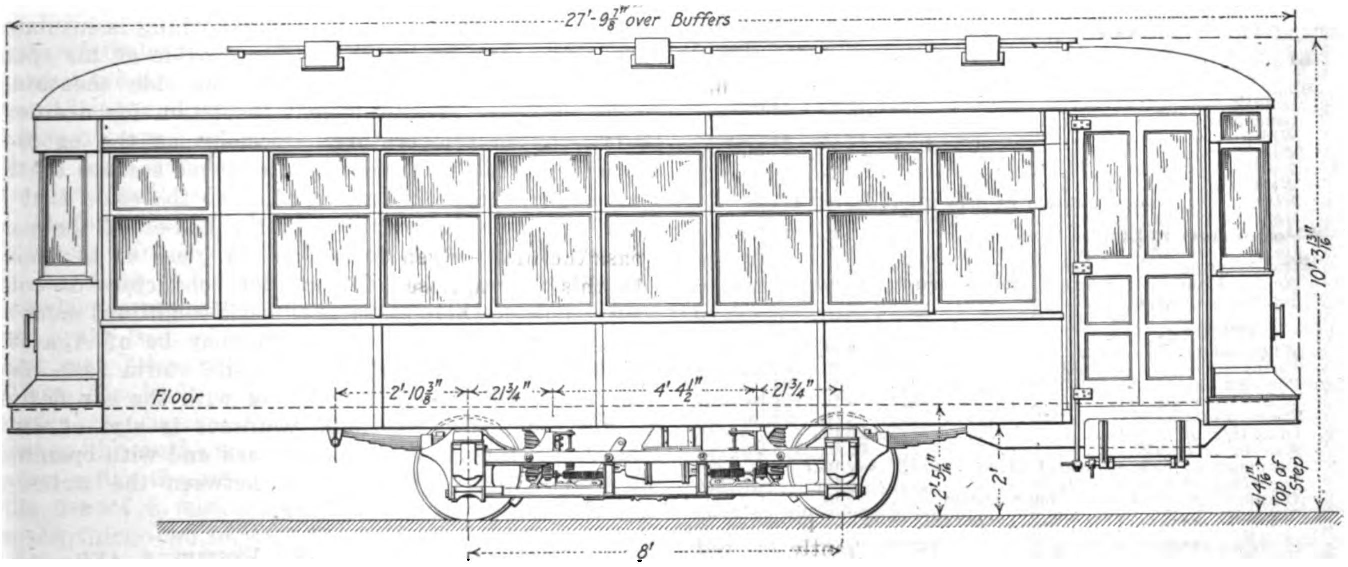
Long Continuous Run for Turbo-Generator

THE 45,000-kw. Westinghouse turbo-generator in the power plant of the Narragansett Electric Lighting Company recently closed down after a continuous run of practically eighty-four and one-half days. This is said to be a world record for the continuous operation of a multiple-element steam turbine of the cross-compound type. During the run more than 50,000,000 kw.-hr. was generated, with a load varying from 6,005 kw. to 41,000 kw. This run was not a test run and it was not premeditated; abnormal weather conditions brought about such a demand for power that the management did not consider it economically advisable to shut down the unit until the conditions were relieved. To some extent the continuous operation was made possible by the 800-gal. self-contained lubricating system, in which oil is pumped through a cooler to the bearings at the rate of 600 gal. per hour.

A New Safety Car Produced En Masse

Particulars Are Furnished of the Osgood-Bradley Safety Car, Which, Though of the Usual Dimensions and with the Customary Operating Equipment, Differs in Certain Features Intended to Secure Greater Strength and Handsomer Appearance

UNTIL the sensational success of the standard safety car the electric railway car builder had no opportunity to produce city rolling stock on a quantity basis. No two orders that came to him were ever exactly alike, even from the same customer. Consequently, there were both extra cost and extra time to be considered by the car builder in doing business on that basis in comparison with turning out a stock product. Today several car builders are actually producing safety cars in quantity and, when necessary, financing the purchase of such cars in the oft-proved assurance that they will pay for themselves in short order.



SIDE ELEVATION OF SAFETY CAR WITH SOME DETAIL OF TRUCK CONSTRUCTION

Despite the great interest in the safety car, no extended description of any of these standardized designs has hitherto been put before the industry. However, through the courtesy of the Osgood-Bradley Car Company, Worcester, Mass., some interesting facts have been made available on the design of this manufacturer. Several hundred cars of this design have already been completed on a quantity-production basis and scores are in actual operation on the lines of the Connecticut Company, and at Elmira, N. Y.; Reading, Pa., and other places.

An examination of the Osgood-Bradley design is of particular interest because the company has adopted certain changes within the standard dimensions and operating equipment that it believes will insure longer life and lesser maintenance as compared with other designs, as will be explained in detail. At the same time the car represents an extended use of American Association standards, as in the adoption of the E-2 axle. It will be understood that the equipment hereinafter mentioned is that which goes on the stock cars, but other devices can be substituted.

In laying out the framing for this car the builder adopted the standpoint that while the car should be light it ought to be strong enough to carry reasonable overloads without distortion and to withstand ordinary service collisions without crumpling. For this reason it may be best designated by the statement that it is of the builder's large-car construction standard, cut down to safety-car size, plus modern refinements which permit the desired strength without going over 16,000 lb. for the double-end and about 15,500 lb. for the single-end design. It is fully intended that this car should be used as strenuously as any other and for as long a life.

A second point was to secure handsome outlines. The illustrations will show better than detail description the success obtained in this direction, especially through the addition of a 6-in. crown to the vestibule. This forestage in the vestibule also permits a good setting of the control equipment and affords a good view to the car operator through the right-hand side window.

EQUAL-WIDTH WINDOWS, AVOIDANCE OF CONTINUOUS POST-CARLINE AND USE OF HEAVIER SHEATHING

Generally speaking, the construction of this car is steel to steel throughout, no wooden shims being used between any steel members. An essential feature in the design is that all the side windows were made of the same size instead of having the windows nearest the vestibule and the end corner posts made wider than the others. One advantage of this is that all side sash can make use of exactly the same fittings and glass. Much more important is the great longitudinal stiffness of the frame, made possible by the use of wide-plate girder-type body corner posts or piers. The body side posts and carlines consist of 1½-in. x 1½-in. rolled tees.

The posts and carlines are not formed as continuous tees because the builder believes that the difficulty of forming such a combination to secure a satisfactory degree of symmetry and accuracy is too great to justify its use. For this reason the posts and rolled tee carlines are installed as separate pieces, the side framing and roof framing being assembled separately on jigs to insure absolute squareness and perfect interchangeability. The vestibule carlines are of ash, steamed and bent to shape.

The side sheathing consists of 3/32-in. in preference to 1/16-in. steel, which has generally been used in the past. Strictly speaking, this sheathing is not just a covering, but is the web plate of a vertical girder which is riveted together to form the main carrying member on each side of the car. The same 3/32-in. stock is used for the letter panels over the side windows and for the wide end post coverings in place of the customary No. 20 gage steel. The side sheathing plates are put on in sections, covering two windows with the joints, which come at the posts. These are covered with a batten and splice plate thoroughly riveted together. The belt rails consist of 1¾ in. x ¼ in. steel bars, the window sills of 3/32-in. plates and the dashers of 1/16-in. plates. Wood is used for the vestibule posts, plates, window sills and end pieces.

STANDARD DIMENSIONS OF OSGOOD-BRADLEY SAFETY CAR AND TRUCK FOR DOUBLE-END OPERATION

Carbody		
Length over all	27 ft.	9⅞ in.
Length over dashers	26 ft.	8 in.
Width over side sills	17 ft.	9½ in.
Width over belt rails	7 ft.	8 in.
Width over eaves	8 ft.	8⅞ in.
Width of aisle	7 ft.	9 3/16 in.
Height from rail to bottom of side sills	1 ft.	10 in.
Height from rail to bottom of truck sills	2 ft.	
Height from rail to top of steps	2 ft.	1¼ in.
Height from rail to top of floor	1 ft.	2 in.
Height from rail to top of roof	2 ft.	5 1/16 in.
Height from rail to top of trolley board	10 ft.	3 13/16 in.
Seating capacity	32	
Truck		
Wheelbase	8 ft.	
Spring base	13 ft.	8⅞ in.
Center to center of journals	5 ft.	9½ in.
Width over all	6 ft.	11¼ in.
Track gage	4 ft.	8½ in.
Diameter of wheels	26 in.	
Size of journals	3¾ in	x 6 in.
Diameter of axle at wheel fit	4 3/16 in.	
Diameter of axle at gear fit	4½ in.	
Diameter of axle at motor bearings	4 in.	
Capacity	25,000 lb.	

EXTRA STRONG BUFFER CONSTRUCTION TO WITHSTAND SERVICE COLLISIONS

The side sills consist of 3-in. x 3-in. x ¼-in. rolled angles. To these are fastened, by means of angles and gusset plates, the 3-in., 5.5-lb. I-beams which serve both as cross framing and truck sills. The floor supports are 3-in., 4-lb. channels at the body corner posts and 3-in., 5.5-lb. I-beams at the center, extending from side sill to side sill.

The ends of this car have received particular attention to assure a construction which will not crumple up under severe service. The buffer member is a 6-in. channel with flanges extending outward, reinforced with a ⅛-in. anti-telescoping plate about 18 in. deep and 1½-in. x 1½-in. x 3/16-in. angles, all riveted together and to the usual 3-in., 4-lb. diagonal channel platform center sills and to 6-in., 8-lb. channel side sills. Thus is provided a structure of sufficient strength to withstand ordinary service impacts without distortion and of a design capable of transmitting such shocks directly to the main framing. The diagonal members are not called into play, serving merely to keep the car in square. It is obvious, in view of the frequency of minor collisions, that this reinforced construction will save many an hour in the shop that could be better devoted to the manufacture of revenue miles.

After being built up on a jig the roof is secured to the side frames with riveted connection plates. The ⅛-in. body end plate is about 18 in. deep and is riveted to the side frames at the body corner posts, giving great lateral stiffness and so assisting materially in preventing the weaving of the superstructure. While the roof covering is of the customary tongued and grooved whitewood, covered with No. 8 duck, the boards are fully 7/16 in. thick, to insure that a platform or maintenance man who happens to step from the body-length trolley board will not crash through the roof.

As usually furnished, this car has no interior headlining, the carlines and lower side of the roof boards being exposed. The standard interior finish is in birch, while all sash and doors are cherry.

Up to about 11 in. along the side of the car the side sheathing is insulated by a wooden heater panel or truss plank ¾ in. thick. From the top of this truss plank to the window sill the side sheathing is insulated by a steel plate so installed as to provide an air space between this steel wainscot and the side sheathing. This air space gives sufficient insulation for ordinary variations in temperature, especially as the exposed steel is a small proportion of the inner surface of the car and is located in such relation to the seats that it does not come in contact with the bodies of the passengers to any such degree as the glass of the sash, which, of course, are far greater conductors of cold. Nevertheless, where extreme climatic conditions must be met the wainscot and headlining may be of Agasote, Nevasplit or similar material, while storm sash may also be added without interfering with the car design in any way. The vestibule wainscot is also of steel plate, with pockets for the drop sash and with openings at the bottom of each pocket between the wainscot and the floor to permit cleaning.

CURTAINLESS WINDOWS; VESTIBULE AND DOOR FEATURES

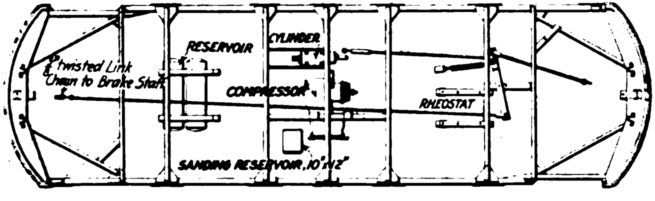
As previously noted, all side sash are of uniform width. There are seven windows on each side and one window on the left-hand side of each vestibule. In all side windows the top sash is stationary, while the lower sash is arranged to raise 25 in. in the clear. Although brackets and pockets are provided for curtain rollers and guides, curtains and fixtures of any desired type will be supplied only as special equipment. The builder believes that for the short-line service in built-up territory, for which safety cars are most commonly used, there is no more need for curtains than in a bus and that their omission will tend to reduce maintenance costs. The public does not complain about their absence from buses and is not likely to miss them in districts where there are plenty of shadows from buildings or trees. In any event, the saving in curtain and fixture cost has been used to strengthen the construction so as to reduce upkeep costs in still other directions.

The standard side window guards are ½-in. pipe spaced 2½-in. centers and six per window. Hinged guards are optional and extra.

The vestibule platforms are flush with the body floors. The vestibules are of the usual fully inclosed type with two-part doors arranged to fold outwardly. These doors are hung on a steel shaft with ball bearings, and the hinges which join the doors are also of ball-bearing type. Normal operation, of course, is by means of pneumatic door and step control, but a flush handle permits hand closing when necessary. The inter-operating step has a 3-in. flush-inserted Mason carborundum safety tread.

BOTH THE MOTORMAN AND ALL THE SEATED PASSENGERS FACE FORWARD

Each car is furnished with sixteen reversible, light-weight double cross seats and one double folding seat per vestibule of the manufacturer's make. The cross seats have slat cushions and backs. The cushions are non-tilting and easily removable. They are made of birch, but are finished in imitation mahogany. The seat backs have malleable iron corner grab handles finished in aluminum.

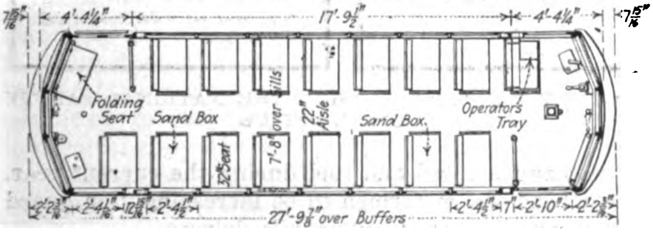


GENERAL PLAN OF UNDERFRAME WITH LOCATION OF PRINCIPAL APPARATUS ATTACHED THERETO

The arrangement for the car operator is of particular interest. For his convenience in operating the car and in handling tickets, punch and other accessories the standard cross-seat cushion nearest the controller and air brake is overlaid with a patented combination seat and tray (the tray on the inner side, as illustrated). When the back is reversed this combination swings under the cushion to which it is attached and thus leaves the cushion itself available for passenger use exactly like the other cross-seat cushions. In this way the use of a motorman's stool is obviated. Furthermore, thirty-two forward-facing seats are always available to passengers instead of having the users of the motorman's rear seat and the front vestibule seat ride backward.

A TRUCK MADE FOR HARD SERVICE AND EASY RIDING

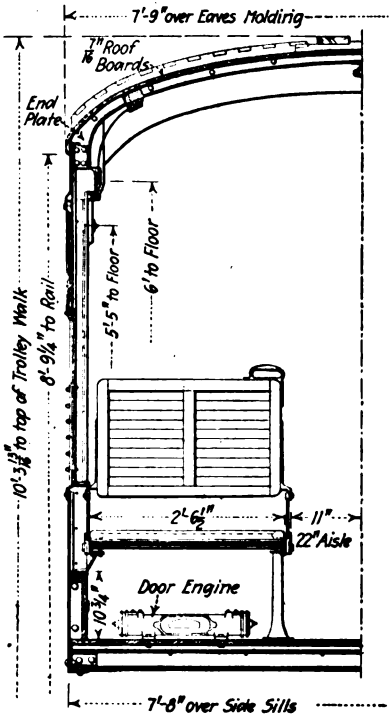
Examination of the design of the truck will show that while its design differs materially from other single trucks for safety cars, the parts in themselves are all standard. The side frame is of the built-up type and a total depth of some 12 in. is secured in this bar-type construction to obtain sufficient increase in strength for the carriage of loads up to a total capacity of 25,000 lb. without deflection or fracture. The truck frame throughout is made up of commercial bars, shapes and steel castings. The frame is tied together and braced transversely by channels at the top, secured to the top members of the frame by combination steel gusset castings. At all essential points the truck parts are fitted with turned bolts drive-fitted in reamed holes. The pedestals are of cast steel with replaceable wearing pieces at the journal-box guides. The journal boxes are of Symington A. E. R. A. standard type for 3¼-in. x 6-in. journals, with top-hung spring lids and fitted with lead-lined journal bearings. The pedestals, however, will take anti-friction ball or roller bearings should the purchaser desire them. Either chilled steel or forged steel wheels of 26-in. diameter may be used in connection with the A. E. R. A. standard E-2 axle. This axle, as noted, is provided with 3¼-in. x 6-in. journals and a 4-in. motor bearing.



PLAN GIVING PRINCIPAL HORIZONTAL DIMENSIONS

Wheels and axles can be removed readily without dismantling the truck. The brakeheads are also made for A. E. R. A. standard brakeshoes. The brake-hangers are of the link type, with compression springs on the pins to eliminate rattle.

It may be surmised that much thought was given to develop a spring suspension which would give the least possible teetering or oscillation. The spring system on which the body is carried includes a quarter elliptic spring at each end or corner of the truck and a set of springs on each side of the truck adjacent to the pedestal. From the reports already forwarded by users, this truck is doing all that was expected in the way of easy riding. Examination of this truck in its entirety, even after the installation of the motive and braking apparatus, indicates that the designers realized the part that accessibility plays in encouraging shopmen to make inspections regularly. The regular motor equipment of this car consists of either Westinghouse or General Electric motors, the former being the No. 506 ball-bearing or No. 508 sleeve-bearing type and the latter the corresponding GE-258 or GE-264 type, as desired. The usual controller is the K-63B. The trolley poles are installed to interlock with the control circuit, whereby the operator, when changing ends, must pull the front pole down and secure it under the hook before it is possible for him to start the car again. This protection eliminates pole, overhead and roof damage due to the operator's forgetfulness.



HALF VERTICAL SECTION, TO SHOW GENERAL MAKE-UP OF BODY

The safety equipment is of the standard type supplied by the Safety Car Devices Company with 8-in. x 8-in. air-brake cylinder and either General Electric CP-25 or CP-27 compressor or Westinghouse DH-10 or DH-16 compressor. About 50 ft. of 1-in. pipe is furnished for radiation. As much of the piping as practicable is carried inside the car alongside the truss-plank or heater panels. For extremely cold climates the piping outside the car can be provided with covering as protection against freezing, but such insulation is not considered necessary for ordinary conditions. In all cases every Safety Devices equipment valve is located inside the car as a protection against freezing, and the pneumatic door engine at each end is placed directly under the motorman's seat, where it is open to both inspection and repair without removing the seat.

The sandboxes, located two at each end of the car under the seats, are arranged with Osgood-Bradley pneumatic traps. These traps are designed to prevent the entrance of water from any source, whether from wheelwash, from snow melted off of a passenger's feet or from car washing. Each trap is fitted with a pipe leading directly to the rail without bends or offsets.

The brake rigging is extremely simple. The brake cylinder is mounted on the car body and is connected to the truck live levers without the intervention of intermediate levers, links and clevices. The only brake lever attached to the car body is that used with the builder's ratchet brake handle of drop type. From this handbrake lever direct connection is made to the handbrake rigging and to the cylinder *via* rods, simplifying the under-car equipment by avoiding the use of sheaves and cables. All holes in the truck levers, brake levers, hangers, etc., are furnished with hardened steel bushings.

WIRING, LIGHTING, HEATING AND OTHER DETAILS

Trolley cables are usually carried in Duraduct flexible conduit, cleated and bolted in place, while the wires inside the car for heaters and lights are in grooved wooden moldings. Metal conduit normally is installed only between the circuit breaker and the controller.

The lighting system comprises three circuits of five 23-watt Mazda lamps, placed as follows: Four on each side of the car body in the upper advertising standard (11-in.) card moldings; two in each vestibule at the side doors to illuminate the steps when the doors are open, but provided with shades to protect the motorman against glare; one in each Hunter destination sign (twenty-five destinations in 4-in. letters), and one in each Crouse-Hinds Type Z headlight of plain glass and enameled reflector type.

The car operator's protection against interior illumination is afforded by a denim curtain hung by rings from a curved rod and usually made to inclose about half of the vestibule. When not in use this curtain is drawn into a side pocket located behind the operator. This arrangement is similar to that in effective use on many city cars for years.

Marker or route lights are not regularly installed. When wanted they are placed over the center vestibule window and provided with 4-in. semaphore lenses with colored glass slides interposed to get desired color combinations.

While the builder is prepared to furnish any kind of heaters desired, that is, electric, stove or forced draft, the standard arrangement embodies the use of ten double-coil 800-watt cross-seat heaters with the coils arranged for three points of heat, as the company believes that the greater effectiveness over truss-plank heaters justifies the additional cost. Thermostats are optional with the purchaser; also extra heaters, as for the vestibules.

Either Consolidated or Faraday buzzers are supplied. These are placed one push-button per side post and one per vestibule at a height which calls for rising from the seat to permit operation.

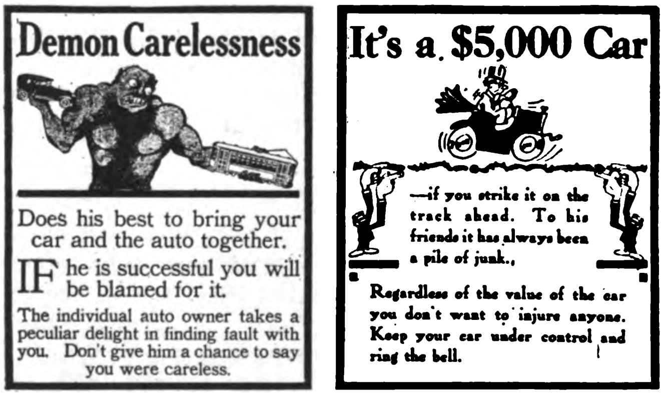
Ventilation is furnished through six Osgood-Bradley patented exhaust ventilators with adjustable grills or registers set in the ceiling and operated from the aisle of the car. The ventilators are located three on each side of the car.

Registration of fares on standard registers is provided for ordinarily by means of the standard square shaft extending the full length of the car along the center line and operated by cord pull. Should the purchaser so desire, he can arrange for pedal mechanism, pneumatic operation or electric push-button control. The pedal mechanism is not favored because of its greater complexity and the fact that its under-platform location subjects it to neglect, dirt and rust. Foot gongs are of the car builder's make. The trolley catchers are of Keystone or Ohio Brass Company's make, and that pioneer safety device, the life-guard, is either H-B or Osgood-Bradley.

Such items as straps, registers, fare boxes, scrapers, track-switch bars and brackets are left completely to the discretion of the customer.

Careless Auto Drivers and High-Priced Junk

THE accompanying illustrations are reproductions of current bulletins being issued by the National Safety Council. The circular letter which the council sends out with this bulletin states that the rapidly increasing number of automobiles presents one of the most serious problems of the safety departments of electric railway companies today. In 1910 there were 400,000 automobiles in the United States; in 1917, 3,000,000, and in 1919, 7,000,000. And now it is predicted by the manufacturers that 2,500,000 machines will be manufactured and sold during the current year. Thus it behooves motormen to be increasingly on guard against carelessness of automobile drivers.



Demon Carelessness

Does his best to bring your car and the auto together.

IF he is successful you will be blamed for it.

The individual auto owner takes a peculiar delight in finding fault with you. Don't give him a chance to say you were careless.

It's a $5,000 Car

—if you strike it on the track ahead. To his friends it has always been a pile of junk.,

Regardless of the value of the car you don't want to injure anyone. Keep your car under control and ring the bell.

TWO TIMELY BULLETINS FROM THE NATIONAL SAFETY COUNCIL OFFICE

The other bulletin depicts the common tendency of human nature to magnify the value of property after it has been damaged, as the electric railway claim agent well knows. Accompanying the bulletih a memorandum from the council says: "Every motorman has it in his power to prevent accidents that lead to at least 75 per cent of the damage claims that come into the offices of electric railway companies. What is more important, he is responsible for the safety of the passengers of his car, and to some extent for the safety of pedestrians and passengers in automobiles."

Why Do Mechanical Rail Joints Become Loose?

Frictional Losses That Develop Between Visits of the Track Walker Should Be Taken Up by the Nut Lock — Specifications Insure a Product Best Adapted for the Service

BY HOWARD H. GEORGE
Assistant Engineer Public Service Railway of New Jersey

ONE of the causes of mechanical joints is breakage of the nut lock or, as it is sometimes called, the lock washer. Another is the failure of the nut lock to develop sufficient reaction to prevent turning of the nut or, as will be later brought out, its failure to compensate for losses in tightness developed by bolts in service. The latter type of failure is not so pronounced when the nut locks are first installed, but there ultimately develops such a decrease in the initial tension as to render the nut lock ineffective. Breakages can generally be traced to either flaws in the metal or to too great brittleness in the metal, caused by improper heat treatment at the time of hardening and tempering. This is also the cause of failure to develop or to retain the full amount of reaction.

The nut lock itself is very small and for that reason, perhaps, track men have not given it the consideration it deserves. Its value, however, if a satisfactory nut lock can be obtained, is large. Comparatively few bolts become loose due to turning of the nuts. Observations in a number of cases have proved conclusively that in most instances looseness occurs either because of the wear of the contact surfaces or on account of actual stretching of the bolts. It should therefore be the aim to secure a nut lock that will compensate as far as possible for this.

The process of manufacture of the nut locks must be as scientifically accurate as possible in order that the steel may assume its proper molecular structure in annealing, and in order to secure the desired degree of hardness and uniformity of temper in the heat treatments. Comparatively slight variations in the degree of heat to which they are subjected in the process of annealing before the stock is shaped into nut locks or of the subsequent heat treatment may be sufficient to render the entire lot defective.

In the manufacture of nut locks the stock is first placed in annealing ovens, where it is brought up to a specified uniform temperature and is kept at such temperature a certain time. It is then removed and permitted to cool very gradually. It is next wound into spiral coils and each individual helix is cut away by passing the coil through a special machine. The nut lock is now formed and is ready for the hardening process. In the latter it is again heated in special revolving drums, the movement of which is so regulated that it requires a certain definite time for a given number of nut locks of a given size to pass through it. The amounts of heat to which all are subjected are therefore uniform. Upon the completion of their passage through the heat chamber they are dropped into a circulating oil quenching bath, and here again the control of the temperature of the oil itself is a very important item in the process.

The next step is the tempering process. This is generally done by again heating them in air until a certain designated color test indicates to the operator that the proper temperature has been reached, when they are removed from the oven and cooled. By this method the determination of the extent of the heat treatment is entirely a matter of judgment on the part of the operator. There has recently been perfected, however, a process for tempering in an oil bath, where the control of the temperature and duration of treatment at such temperature in each bath is absolute and where the human element is entirely eliminated, thus practically assuring uniformity of temper in the finished product. The advantages of this over the first-named process are so many that it is probably only a question of a comparatively short time when all manufacturers of springs of any kind will be forced to adopt it. The above outline of the processes through which the steel goes before it becomes a nut lock should aid the engineer in understanding the needs of some of the requirements in his specifications, and emphasize to him the fact that no other article used in track construction requires any greater refinements or more scientific accuracy in its manufacture than the nut lock.

Why do mechanical joints become loose? To learn what takes place we must study the result and try to analyze what happens. There are many different types of plate joints now in use, but the theory is practically the same in all cases, the principle involved in all being that two wedge-shaped plates are forced against the head and base of the rail by bolts, their function being to hold the ends of the rail together. H. B. Nichols, then chief engineer of the Philadelphia Rapid Transit Company, very clearly explained the action of this type of joint in actual use in a paper read before the American Street Railway Association in 1905, and his statements are as true today as then. Outlined as briefly as possible, his explanation was that the solidity and permanence of the joint depend upon the thorough, continuous and tight contact of the two plates against the rails. In any form of rolled steel, however, the sections are never uniform and, consequently, in the case of rails, the two ends are never of exactly the same section, variations of as much as $\frac{1}{16}$ in. sometimes occurring. This is also true of the plates. But even if it is assumed that the sections are exactly the same and that the plates "fish" perfectly, rolled-steel surfaces are not perfectly smooth, but consist of very small elevations and depressions, and consequently, instead of having a continuous contact between the rails and the plates, only an intermittent or point contact is obtained. Under car loading only, the plates have to resist only vertical and lateral movements, but in addition to these movements there is also a bodily or longitudinal movement of the rail itself, due largely to temperature changes. There is also the wave motion in the rail as the wheel loads pass over it. All these motions act as does a file on the small irregularities of the surfaces in contact. While this movement is only ¼ to ⅜ in., even in severe changes of temperature, yet the point contacts are so small as compared with the extent of rail movement that the action is the same as that of a file, and the result is that no matter how tightly the plates may have been adjusted originally, they get loose very quickly and the ends of the rails soon begin to hammer under the wheel loads. If the joints are put together in the best possible manner with the material in most common use, and the ties are properly tamped and kept tamped, and the general surface of the track is maintained in good shape and the bolts are tightened at intervals (all of which represents the best practice in railroad maintenance), it will be found that when the man with the wrench makes his occasional or periodical visits the bolts at the ends of the splice bars are often found to be tight, while the next or intermediate bolts are somewhat loose and the bolts at the center of the splice, or at the ends of the rails, are much looser.

To follow up the investigation a little further: In my previous article on the subject of bolts, it was shown to have been proved that ordinary steel track bolts may easily be drawn up so tightly when originally installed as to load them beyond their elastic limit. But whatever may be the cause, as soon as the slightest looseness develops, the rail ends do vibrate vertically between the splice bars. This vertical movement, if continued, causes deformation of the splice bars and cupping of the receiving rail end, resulting in both the joints and rail becoming unfit for main line service long before the rest of the rail has worn perceptibly. It is a fact that splice bars do wear hollow at their centers and that the fishing spaces on each side of the rail grow wider at the ends due to play in loose joints, and once worn, they can never be satisfactorily tightened so as to leave a smooth riding surface.

So much for the causes, but how are we to remedy the trouble? It is my belief that these frictional losses should be taken up by the nut lock, at least such losses as may occur between visits of the track walker. To accomplish this, it is necessary to develop some type of nut lock that will be capable of developing and indefinitely retaining a reaction approximately equal to the elastic limit of the bolt, and that will consequently be capable of taking up such constantly occurring but almost imperceptible losses as they occur and will thus hold the plates firmly in place. Failure of joint bars has been largely reduced by the design of bars whose neutral axis corresponds with the neutral axis of the rail. Practical elimination of bolt failure be-

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Nut Locks

1. Material:

The steel from which the nut locks are made must be of open-hearth steel, or other approved process, and shall conform to the following chemical analysis:

Phosphorus—not over 0.05 per cent.
Sulphur—not over 0.05 per cent.

2. Physical Properties and Tests:

After the finished nut lock has been subjected to pressure sufficient to compress it flat for a period of one hour, its reaction shall not be less than two-thirds (⅔) its height or thickness of section, providing such thickness is less than the width of section. If the section is square, the reaction must not be less than one-half (½) its thickness. If the height of thickness of section is more than its width, the reaction shall not be less than the width of the section. These specifications apply to nut locks having internal diameters of 13/16 in., 15/16 in. and 1 1/16 in. as used with bolts having diameters of ¾ in., ⅞ in. and 1 in. respectively.

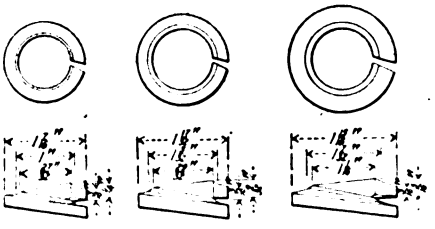
With one end of the finished nut lock secured in a vise and the opposite end twisted to forty-five degrees there must be no sign of fracture. When further twisted until broken, the fracture must show a good quality of steel.

A sufficient number of tests will be made to satisfy the railway company's inspector that the material meets the specifications in every respect, and he shall have the privilege of selecting the specimens to be tested.

3. Workmanship and Finish:

The dimensions and form of the nut lock shall conform to the drawings submitted to the manufacturer.

The nut locks shall be clean and without burrs or rough edges. The coil and cross-section shall be uniform throughout.



DIMENSIONS OF NUT LOCKS

The manufacturer is required to guarantee:

"A" That the steel was thoroughly annealed and permitted to assume its proper molecular structure before being made into nut locks.

"B" That the subsequent heat treatment was scientifically accurate according to the best methods known, to secure uniformity of temper and the highest efficiency obtainable.

4. Inspection:

When required, the manufacturer shall furnish samples of nut locks from a preliminary lot before proceeding with the filling of the order, and shall give sufficient notice in advance of the date when they will be ready for inspection.

The railway company's inspector shall have free entry at all times, while the work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered.

The inspection shall be made at the mill, and the manufacturer shall afford the railway company's inspector, free of cost, all reasonable facilities to satisfy himself that the nut locks are being furnished in accordance with these specifications. The tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

The tests shall be made of samples of the finished product selected by the railway company's inspector from each separate heat treatment. Two pieces shall be selected for each test and if both meet the requirements of the specifications the lot will be accepted, but if both fail the lot will be rejected. If one of the test pieces fails, a third test piece shall be selected and tested; if it meets the requirements of the specifications the lot will be accepted, but if it fails the lot will be rejected.

If, after shipment, any nut locks are found to be defective, due to material or manufacture, they may be rejected.

5. Marking and Shipping:

When the nut locks are shipped they shall be packed in good serviceable boxes. All boxes must be plainly marked as to material, size and number contained therein. They must bear the name of the manufacturer and name and shipping address of the consignee.

cause of stretching has been made possible, due to the manufacture of heat treated alloy steels, and the only remaining element in the joint to improve upon is the nut lock. The recent development and perfection of a new type of nut lock has very largely accomplished the desired results by introducing a radically different design, involving the use of a double curve (concave-convex) instead of a plain spiral. Tests have shown that the heaviest spiral spring nut lock develops a pressure of but a little more than 3,000 lb. when coiled for a 1-in. bolt, while nut locks of the new design have developed a pressure of from 12,000 to 13,000 lb. When it is considered that the elastic strength of an ordinary 1-in. steel bolt is only about 18,000 lb. it will be realized that the desired result has been at least partly attained. The matter is, however, worthy of still further effort in order to secure a still more powerful permanent reaction.

As to the cost of inspection, this of course will vary with the total number of nut locks to be inspected. Where there are over 50,000 the cost is about 25 cents per thousand, but where smaller numbers are inspected the charge is at the rate of $15 per day and expenses. Where the cost of the washers is $20 per thousand this is but a small added expense, and the ratio is still smaller when the cost is $30 per thousand, as is the case with the improved type of nut lock previously referred to. Even where the cost is as low as $15 per thousand, the inspection adds only 1⅓ per cent to the purchase price.

Old Type Motors Arranged for Oil and Waste Lubrication

MANY different designs of oil cups and several methods of using felt in the oil boxes of the old type motors, such as the Westinghouse 12-A, 49 and 68, and the General Electric 52, 54, 57 and 67, originally for grease lubrication, have been tried. C. R. McMahon, master mechanic, Des Moines (Iowa) City Railway, has obtained very good results by cutting out the bottom of the grease chamber in the top half of the motor case to the full size of the chamber. This is done by the use of an acetylene torch after the bottom half of the motor case and the armature have been lowered out of the way. It is not necessary to take the top half of the motor case off the truck to do this cutting out of the bottom of the grease chamber.

The oil slot in the armature bearing should be made at least as large as the hole in the bottom of the oil box, or even a little larger. It has been found that a slot measuring about 1½ in. x 3¾ in. for G.E. 67 motors and 1½ in. x 4¾ in. for G.E. 57 motors is of about the right dimensions to insure proper lubrication for the service on this road.

With the grease boxes cut out as noted above, and making use of the proper grade of wool yarn and oil that is not materially influenced by heat or cold, these old type motors can be lubricated on the 1,000-mile basis both winter and summer with much saving of oil and labor and few hot armature bearings. It is very important that the yarn be kept down close to the shaft and turned over or new yarn put next to the shaft every two or three months in order to prevent glazing, with a consequent stopping of lubrication and a resulting hot bearing.

Interborough Tests Fare Collection and Registration Device

Electro-Mechanical Control Device Has Been Installed at the Ninety-sixth Street-Lexington Avenue Subway Station for Test Purposes

THE Interborough Rapid Transit Company, New York City, is testing what is called a "fare-receiving electro-mechanical control device" at the Ninety-sixth Street-Lexington Avenue subway station. Approximately 4,000 persons pass through this station in the morning rush hour, and six of these new fare devices have been installed to take care of the requirements. In principle the device is somewhat similar to a form of passimeter. The fare, which in this case is a nickel, is deposited in a fare box and this unlocks a pair of arms, permitting the passenger to pass inside a pipe framework. As soon as the first pair of arms return to their normal position a second pair of arms immediately behind these are unlocked, so that the passenger can pass out.

The fare box has an illuminated sign which reads "Drop Nickel Here," with an arrow pointing to the coin receptacle. There is also a dial register which shows the number of passengers that have passed through. The arms which control and operate the mechanism are about 36 in. above the floor level and are arranged in pairs, with one on either side of the pipe framework which admits the passengers. The unlocking of the first pair of arms and the registering of the number of persons that pass through are done electrically, so that there is no mechanical connection between the fare box and the operating arms. The device as at present constructed is arranged so that several 5-cent pieces may be deposited in the coin receptacle and then a corresponding number of persons can pass through the arms of the device. This should prove a convenience where one person wishes to pay several fares.

Some of the advantages claimed for the device are that it will speed up passenger movement through the station, as passengers can deposit their nickels and then pass through without interference, and no time is lost in buying tickets, which is necessary with the present chopping box system. The objectionable features hitherto presented by turnstiles are said to be eliminated, that is, that the device occupies no unnecessary room and there is no idle space. As the pressure that it is necessary to exert against the arms is but 6 to 7 oz. there is no inconvenience to persons passing through.

This installation is for trial and changes will be made as they appear advisable in order to perfect the mechanism to a higher state. The Interborough officials believe that at many of the subway stations such a scheme will reduce greatly the inconvenience the passengers are subjected to by the present ticket system. This device could be installed in numerous places along railings where a passenger with a 5-cent piece could deposit the coin and pass through without further delay. Of course, it would be necessary to have change booths, with attendants, adjacent to all such devices, and probably during rush hours at heavy traffic centers it would also be necessary to have an additional attendant to direct passengers not familiar with the operation. The device is the invention of Frank Hedley, president and general manager, and J. S. Doyle, superintendent of car equipment, of the Interborough Rapid Transit Company.

Maintaining Electric Railway Motors—Part II

Detail Practices for Babbitting Bearings and Dipping and Baking Armatures Are Discussed, with Suggestions for Proper Equipment Necessary in This Work

By JOHN S. DEAN
Industrial and Railway Motor Engineering Department
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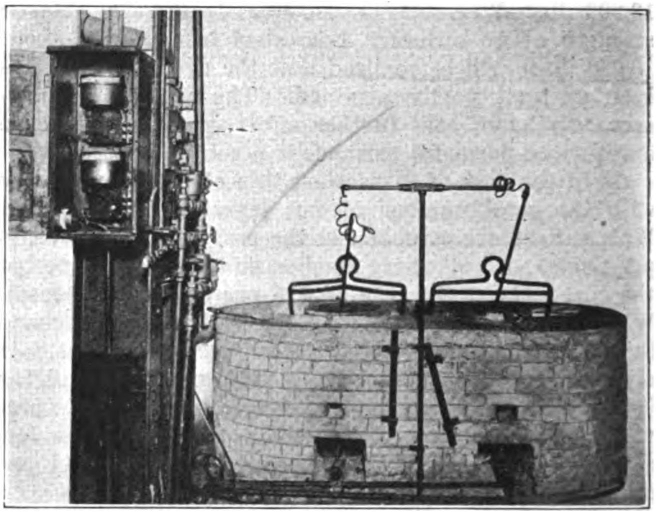
IN A PRECEDING article published in the ELECTRIC RAILWAY JOURNAL for April 17, 1920, the care and methods necessary in rewinding armatures, smoothing and slotting commutators and correct methods for brush maintenance were discussed in detail. The babbitting of cast iron, malleable iron or cast steel bearing shells is an important work which it is necessary to carry out carefully in connection with railway motor maintenance. In rehabilitating bearings all of the old lining should be removed from the shell. This may be done by heating the shell sufficiently to melt out the lining. All oil, dirt or other foreign matter may be removed by dipping the shell in a solution of caustic potash or by burning. If the burning method is used this should continue until all smoke ceases, showing that all oil and dirt have been burned off. The surface can then be scraped with a file and rubbed down with coarse sandpaper in order to remove all scale and oxide.

Bronze, pipe or steel shells which are tinned should have the old lining removed by heating, preferably in a pot of scrap babbitt, care being taken not to heat them above 375 deg. C. Just as soon as the old lining is melted out the tinned surface should be swabbed with zinc chloride (a saturated solution of zinc in hydrochloric acid) and dipped into a pot of "half-and-half" solder, which should be kept at a temperature of not less than 340 deg. C. and not more than 375 deg. C. If shells are to be babbitted immediately the tinned surface should not be touched after removal from the solder pot. If the shells are to be allowed to cool the tinned surfaces can be brushed off with a piece of clean waste.

In tinning bronze or steel shells the part not to be tinned should be painted with a thin mixture of graphite and water. When dry the part to be tinned should be treated in the manner just described. The shell should be left in the solder until it is just hot enough for the solder to run off, leaving a thin coating. After the shell is removed from the pot the surface to be coated should be rubbed thoroughly with a swab saturated with zinc chloride and then dipped in solder again to wash off all traces of zinc chloride. If any untinned spots can be detected on the surface to be babbitted the operation should be repeated. Steel shells must be pickled to remove the scale before tinning.

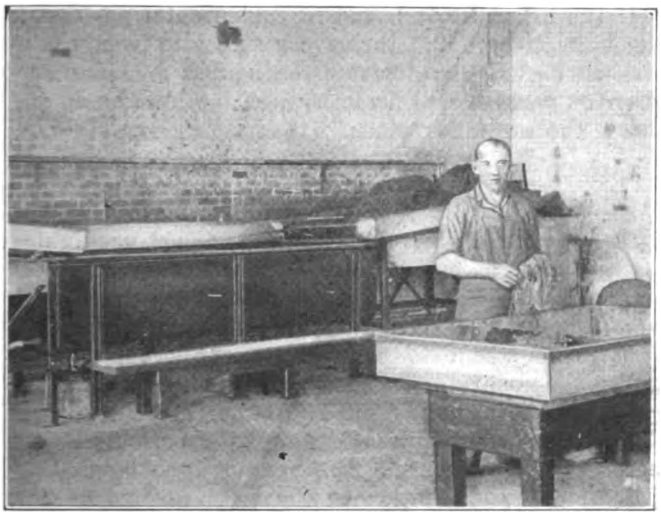
CORRECT METHOD OF HOLDING AND STEADYING THE LADLE WHILE POURING BABBITT INTO BEARINGS



BABBITT IN FURNACE AUTOMATICALLY HELD AT CORRECT TEMPERATURE BY MEANS OF THERMO-COUPLES

Iron or steel shells (untinned) should have the mandrel heated to a temperature of approximately 150 deg. and the shell to 100 deg. C. If the shell becomes too hot the time for cooling may be so prolonged as to permit the heavier metals in the babbitt to have time to settle to the bottom end of the bearing. In a case of this kind the metal in the one end of the bearing will be soft and in the other end brittle. Then, again, if the shell should be too cold it will cool the babbitt too suddenly, causing the babbitt to shrink away from the shell. After each bearing is poured the mandrel should be swabbed off with a piece of waste which has been dampened with clay wash. This leaves a thin layer of fine clay dust on the surface of the mandrel, which has been found to be of great assistance in producing smooth, clean bearings free from pinholes and other defects.

For bronze or steel shells (tinned) the mandrel is heated to about 100 deg. C. After each bearing is poured it may be found necessary to cool the mandrel. This is done by dipping it in a clay wash, which leaves on it a layer of fine clay dust, the same as the swabbing for iron and steel shells. When the mandrel is at the proper temperature the water of the clay wash will



THE NEW AND OLD METHODS OF SATURATING OLD WASTE WITH OIL

evaporate very quickly from the surface of the mandrel without any vicious spattering. The bronze shell should be babbitted immediately after it has been tinned, before it loses the heat given to it by the tinning operation.

Babbitt is melted in an iron pot or kettle and maintained at a temperature between 460 and 482 deg. C. It is very necessary that this temperature be maintained when bearings are being poured and that the upper temperature of 482 deg. C. be not exceeded at any time, as in certain grades of babbitt the metal is irreparably damaged if overheated. The use of an automatic regulator is necessary to hold the temperature within these limits. The metal should be stirred thoroughly at frequet intervals, otherwise the heavy metals will settle to the bottom of the pot. The babbitt metal should be kept covered with charcoal or graphite to prevent oxidation.

Babbitt is poured from a ladle in a steady stream directly down along the mandrel to avoid splashing or pocketing of air. The lip of the ladle should be kept free from burrs or other surface irregularities in order to pour a smooth, round stream. If the metal is splashed up against the mandrel it will cause blowholes and give a mushy bearing.

The pouring temperature for babbitt is from 460 to 482 deg. C. and the temperature of "half-and-half" solder for tinning is 340 to 375 deg. C. Iron and steel shells should be preheated to a temperature of 100 to 150 deg. C. and the mandrel for iron and steel shells from 100 to 150 deg. C.

LUBRICATION OF BEARINGS

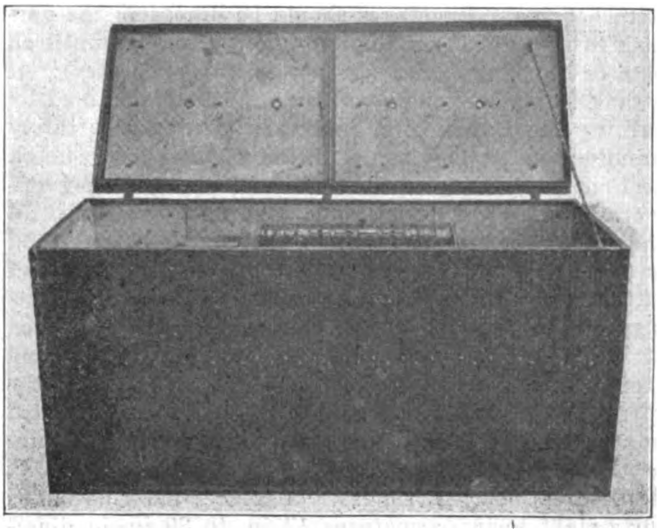
To insure a cool-running bearing it is important that a steady supply of lubricant be fed into it. The supply chamber must be part of the motor and of sufficient capacity to last between inspection periods and so protected as to keep the supply free from dirt and grit. The lubricant should consist of a good grade of mineral oil, light oil in winter and heavy oil for summer use. Very good results have been obtained with special brands of prepared lubricants which are highly recommended by some operators.

For best results a long-fiber wool waste should be used. It should first be saturated in oil for at least twenty-four hours and left on a screen or grating to drain for several hours. Oil wells should be of ample capacity to hold sufficient oil to last between inspection periods. The opening for inspection and refilling should be accessible and be provided with a tight-fitting lid, held in place by a strong spring or bolts to keep out water, dirt and grit. Provision should be made for proper drainage of the spent oil and means provided to gage the depth of oil at regular inspection periods.

Before the bearings are packed all water, dirt and small particles of metal should be removed from the oil well. Saturated waste should be loosely packed in the oil chamber and forced into place by means of a pronged rod of brass or some other soft metal, that it will not injure the journal. In this manner the waste is forced up over the bearing window and its springy action tends to hold it against the journal.

Well-designed bearings when in good condition, properly packed with a long-fiber wool waste and filled with a good grade of oil, should run from one to three weeks between oilings. The time for inspection largely depends upon the system of inspection for other apparatus on the cars, which makes it advisable for each operator to decide from actual conditions the most suitable oiling schedule to fit his equipment. When bearings are inspected all dirt should be carefully wiped from the oil box lid before it is opened, after which the proper measure of oil should be poured into the oil-well opening and not on top of the waste. One to two gills of oil per bearing is required at each oiling period. This varies with the size of motor and the location of the bearings, *i.e.*, pinion-end bearings, commutator-end bearings, armature bearings or axle bearings. The quantity of oil also depends largely upon the length of time between oilings and the service conditions. If too much oil is poured into the oil well the level will rise above the bearing window and the oil will overflow into the motor. This usually injures the insulation and wastes oil. On the average the maximum height of oil in armature bearings for a 50-hp. motor should be about 3.5 in., while the minimum should be 1 in. For axle bearings the maximum should be 2.5 in. and the minimum ½ in. These heights can be checked by means of a rod placed in the oil well.

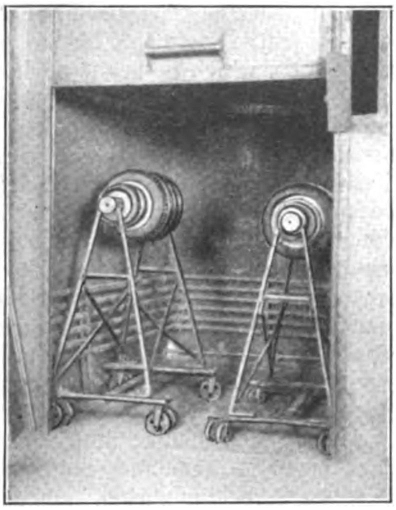
It is considered good practice to repack the bearings every three months. At this time all the waste is removed and that which is glazed and charred is discarded. The bearings are then refilled with good, clean, old waste, to which sufficient new waste has been added.



ELECTRICALLY HEATED OVEN USED IN SHOP WHICH TAKES CARE OF 150 MOTORS

About once a month it is advisable to "tease up" the waste in the bearings to make the flow of oil more effective.

Dipping in varnish and then baking thoroughly fills all cracks and pores in the insulation. This greatly reduces the possibility of breakdowns, which might be caused by filling of these cracks with moisture or other conducting materials. Further, varnish acts as an effective bond to prevent vibration of motor parts. Dipping and baking of comparatively new motors is an insurance against maintenance charges for rewinding. It improves the insulation, fills up the pores, keeps a smooth surface on the coils and prevents vibration. The equipment necessary for dipping and baking comprises a tank to contain the dipping solution, an oven in which to bake and also a means of handling the apparatus. Oil and dirt should be removed thoroughly with clean, compressed air, or a cloth dampened with benzine may be used where the quantity of oil is excessive. To protect the polished surfaces, such as the journal and commutator face, these may be covered with friction tape. It is good practice to rub the journal after the dipping process with a cloth wet with benzine. In drying the part to be treated is heated in an oven to 100 deg. C., so that, with the delay involved in getting it to the dipping tank, it will be at a temperature of 40 to 60 deg. C. at the time of dipping.



BAKING RAILWAY ARMATURES IN STEAM-HEATED OVEN

An oil-proof and moisture-proof baking and insulating varnish should be used at a specific gravity of 0.850 at 15 deg. C. temperature of solution, or 0.846 at 20 deg. C., 0.0843 at 25 deg. C. and 0.840 at 30 deg. C.

If the varnish is too heavy it should be thinned with benzine. Armatures should be dipped in the varnish in a vertical position and allowed to soak until all sign of bubbling ceases (twenty to thirty minutes). If a tank is not available good results can be obtained by turning the armature at intervals of twenty to thirty minutes in a shallow pan with the varnish deep enough so that the bottom of the slots will be completely immersed. The armature should then be turned until all the coils have been thoroughly soaked. If this method is employed the insulation creepage surface at the end of the commutator should be treated by repeated paintings of the varnish. The armature should be drained at room temperature until all dripping ceases and should be kept in such a position that pocketing of the varnish will not occur. Armatures should be supported in a vertical position while baking and the temperature of the oven should be from 95 deg. C. to 105 deg. C. Armatures below 12 in. in diameter should be baked forty-eight hours, armatures 12 in. to 30 in. in diameter sixty hours and armatures over 30 in. in diameter seventy-two hours.

If the armature is baked in a horizontal position it should be given a half turn every fifteen to twenty minutes during the first half of the baking period, otherwise the varnish will drain toward the lower side and throw the armature out of balance.

SOME DON'TS AND PRECAUTIONS TO BE OBSERVED IN THE DIPPING PLANT

Do not use matches; do not smoke; do not use lighted torches, electric hoists or any other device that may produce sparks around the dripping tank, as the varnish is inflammable. If steam is used for heating, do not permit the steam to escape into the oven, thereby giving the apparatus a vapor bath. This is worse than no dipping. Do not permit the temperature to exceed 130 deg. C. and do not rush the baking period. A wet motor is worse than one that has not been treated.

Provide for ventilation of the oven, no matter how small it is made; provide for a complete change of air in the oven once every hour; holes near the top and bottom will usually provide natural ventilation.

Provide uniform temperature of the air in the oven. Place thermometers at various heights in the oven to determine the temperature.

Turn armatures frequently, if they are baked horizontally, to prevent unbalancing due to pocketing of the varnish.

PUTTING ON PINIONS

When pinions are installed on railway motor shafts with taper fit, the shaft should be clean and free from burrs or swellings, the pinion bore should be clean and free from burrs and the fit of the pinion bore should be in contact with at least three-quarters of the surface of the taper fit on the shaft. This can be checked by rubbing Prussian blue, thin red lead and oil or thin lamp black and oil on the pinion bore and fitting it on the shaft.

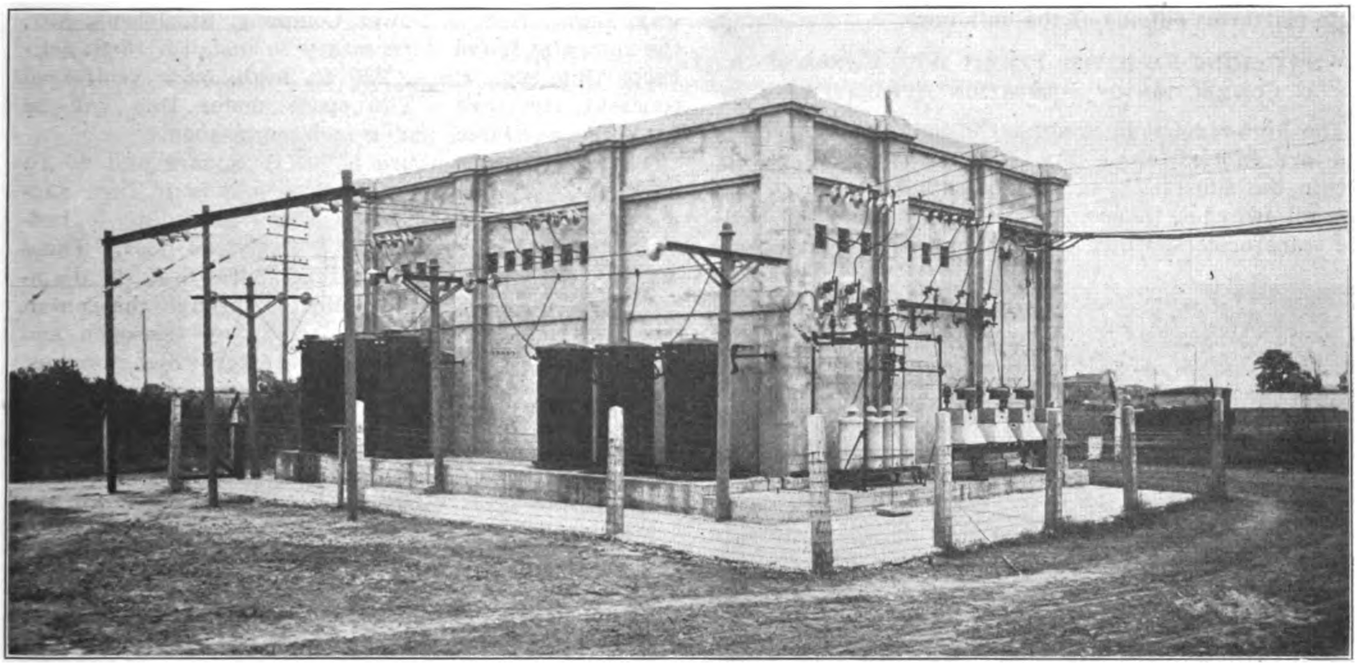
After the above points have been taken care of the pinion should be put on the shaft cold to make sure that the keyway in the pinion is the proper size for the key mounted on the shaft and that the pinion does not ride or bind on the top and sides of the key and will not ride the key when pressed further on.

The keyway on the pinion can be 0.002 in. larger, but not less than, the key. There should be at least $\frac{1}{32}$ in. clearance between the top of the key and the bottom of the keyway in the pinion. The corners of the key should not cut into the fillet of the keyway. To prevent this the corners of the key should be rounded.

Pinions up to 3-in. bore should be heated in boiling water for thirty minutes, and those with 3-in. or larger bore for sixty minutes. To prevent rusting and to insure a clean surface at the fit washing soda should be added to the water in the proportion of ¼ lb. of soda to 5 gal. of water. When the pinion has attained the temperature of the boiling water, namely, 100 deg. C. (212 deg. F.), it should be taken out of the water and the bore quickly wiped clean. Without allowing the pinion time to cool it should be tapped on the shaft with a 6 or 8 lb. sledge hammer, using a heavy piece of wood or copper between the pinion and the hammer. This sledging is not to get a driving fit, but to make sure that the pinion is home and well seated. Three or four taps evenly distributed around the pinion end should be enough. The pinion nut with lock washer can then be screwed home tight with a wrench having a purchase or lever arm of 3 or 4 ft.

Energy Supply System Doubly Safeguarded

Two Principal Substations Are Tied Together on Both the Alternating-Current and Direct-Current Sides for Emergency—New Substation a Neat Layout



TRANSFORMERS AND LIGHTNING ARRESTERS INSTALLED OUTSIDE FIVE MILE SUBSTATION, CHARLESTON, S. C.

THE Charleston Consolidated Railway & Lighting Company, Charleston, S. C., has safeguarded the continuity of energy supply to its street railways by a double interconnection of its old and new power houses, which are also the two main substations for the railway system. Under normal operation all energy for both railway and lighting purposes is generated at the 10,000-kw. Charlotte Street power plant, located very close to the center of the city. In this station are located two 500-kw. motor-generator sets and one 300-kw. rotary converter in addition to the generating equipment.

About 2 miles distant from this power plant is the old Meeting Street power station, which is maintained as a reserve generating station and operated only under emergency conditions. It is equipped with two 200-kw. Ball & Wood horizontal tandem-compound generating units and one 525-kw. vertical cross-compound unit. These are all direct-current units and maintained in operating condition. When active use of this generating equipment was discontinued some years ago a 500-kw. motor-generator set was installed in the station to take care of the railway load in that vicinity, making use of the feeder cables which had formerly supplied the entire system. For the operation of this motor-generator set two parallel 13,200-volt alternating-current lines were erected between the two power plants. The two plants were also tied together by two 750,000-circ.mil overhead cables which were connected between the 625-volt buses. This double tie was made to provide for emergency conditions, which may be outlined as follows:

With the construction of the new Charlotte Street station and the installation of 1,300-kw. capacity of converter and motor-generator equipment this became the center of the direct-current distribution system. If anything happens to take either the big generators or the railway machines at the Charlotte Street power station off the line the direct-current reciprocating units at the Meeting Street plant can be started up. They are able through the direct-current tie lines to supply nearly 1,000 kw. to the 625-volt buses in the Charlotte Street plant for distribution there over the outgoing feeders. Except for the peak load period, which requires about 1,500 kw., this is adequate to carry the entire railway load, and while under such an emergency the lighting and power business of the city might be interrupted, at least the railway service could be continued. Also, if the high-tension lines between the two stations should be blown down or the alternating-current energy supply to the Meeting Street station otherwise interrupted it is possible to supply direct-current energy from the Charlotte Street station to the direct-current buses at the Meeting Street station for distribution over the outgoing feeders there, up to the limit of capacity of the railway machines in the Charlotte Street plant.

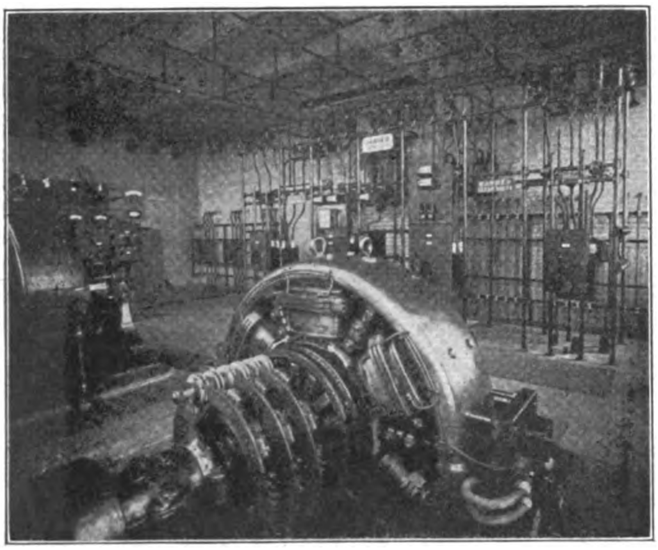
NEW SUBSTATION FIVE MILES OUT

The distribution system for the railways in Charleston was recently amplified by the addition of a new substation located about 5 miles out on the long suburban line which extends out to the Charleston Navy Yard, a distance of about 7 miles. This is pictured inside and out herewith. One of the 13,200-volt lines connecting the Charlotte Street power house to the

Meeting Street station was extended out the navy yard line to supply Five Mile Substation. The continuity of the alternating current supply to this station is also safeguarded by a second high-tension line from the Charlotte Street station, constructed along a different and more direct route to the new substation. Each of these lines is connected into the substation through a separate bank of 13,200/440-volt transformers which are installed along with the lightning arresters on concrete platforms outside of the building.

SWITCHING FACILITIES PERMIT WIDE RANGE OF CONNECTION OF SUBSTATION APPARATUS

The high-tension lines enter the building at one end and are carried on a pipe frame across the ceiling within the substation and down through the high-tension oil switches, thence out to the high-tension side of the transformers, which are just outside the rear wall.



ROOMY ARRANGEMENT OF EQUIPMENT WITHIN THE NEW SUBSTATION

The low-tension lines from the transformers are brought directly through the rear wall at a level about even with the tops of the transformers, thence down the inside wall and under the floor to the machine switches. Any possible combination of connection between the two high-tension lines, the two banks of transformers and the two converters may be secured by a proper setting of the knife switches, twelve of which are located along the top of the high-tension frame work seen along the back wall inside the substation.

The station is equipped with two 500-kw. rotary converters, which are controlled through two main line and two machine switch panels. The high-tension equipment is all installed along the back wall, except for the alternating current starting switches for the two machines, which are located with the feeder panels along one end. The building itself was constructed with brick walls covered with stucco and with a concrete floor and roof.

An effort has been made to minimize electrolysis in the vicinity of the Charlotte Street power plant by installing a negative return system on all railway lines. No circuits whatever in the station are grounded, so that practically no path is possible for the return of the current to the negative buses except that which enters by way of the rails and negative cables leading into the station.

Unique Chimney Mounting at St. Joe

Steel Stack Installed on Reinforced Concrete Structure Supported on Caissons Extending to Bedrock, Nearly 75 Ft. Below

On account of the lack of floor space on the site of the steam power plant of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., the company found it necessary to install a 16-ft. self-supporting steel stack, 225 ft. high, on a reinforced concrete structure. The space under this will be utilized for heater, meter and pump rooms.

The concrete structure is 30 ft. square and 40 ft. high above the boiler room floor and is in turn supported at each corner on a caisson extending to bedrock, nearly 75 ft. below the boiler room floor. These caissons are reinforced concrete shafts 6 ft. in diameter, with a hole 3 ft. in diameter through the center. They were sunk to bedrock partly by the open and partly by the pneumatic method, after which the hole through the center was filled with a lean concrete.

The caissons are connected above the basement floor by heavy reinforced concrete arches and girders. Above the boiler room floor the structure has eight columns around the perimeter and one through the center, with three floor levels. The entire structure is reinforced to carry the weight of the chimney and equipment and also to take care of the pressure set up by the action of the wind on the stack, the velocity of which was assumed at 100 m.p.h.

The boiler room level of the structure will serve as a pump room and will contain two Manistee and two Cameron steam-driven centrifugal boiler feed pumps. On the next level will be two 2,000-hp. Hoppes and two 4,000-hp. Cochrane open-type feed-water heaters and a 1,000-cu.ft. hot water storage tank.

The third level will be almost entirely occupied by a 2,000-cu.ft. storage tank for the condensate returned from the various surface condensers. On the top level will be the chimney, with a base diameter of 29 ft., and eight Hammond water meters.

The chimney was designed and fabricated by the Kansas City Structural Steel Company and will be lined with Vitrebestos stack lining, manufactured by the Johns-Manville Company. This lining will be 2 in. thick in the bottom third and 1½ in. thick for the upper two-thirds of the chimney. The lining will not only protect the chimney against corrosion but will also tend to maintain the temperature of the gases.

The caissons and substructure required 660 cu.yd. of concrete and 50 tons of reinforcing steel. The chimney and substructure without the equipment weigh approximately 1,450 tons, or about 13 tons per square foot on the rock.

New Boiler Room Recording Device

A boiler room recorder which measures and indicates both carbon dioxide and carbon monoxide has been perfected by the Mono Corporation of America, Buffalo, N. Y. The purpose is to provide a check upon the fireman so that in producing a high percentage of CO, he shall not produce any considerable quantity of CO. The makers of the instrument have also devised a premium system to be used in connection with it in encouraging economical firing.

Construction and Maintenance of Grade Crossings on Pacific Electric

Where Soil Will Not Produce Natural Crossing on Interurban Lines Graded and Oiled and Oil Macadam Crossings Are Standard—Central Plant Erected for Heating Oil and Mixing Macadam

BY CLIFFORD A. ELLIOTT
Cost Engineer Pacific Electric Railway Company, Los Angeles

STANDARD TYPE OF OIL MACADAM ROAD CROSSING CONSTRUCTED BY PACIFIC ELECTRIC RAILWAY

THE Pacific Electric Railway Company, which operates 1,094 miles of interurban lines in southern California, faces the problem of maintaining approximately one thousand road crossings which intersect its lines. This gives about one crossing per mile of single track. The existence of so many crossings is due to the large mileage of good roads maintained by the counties through which the railway lines are operated. Ninety-five per cent of these highways, main ones as well as numerous branch and cross roads, are improved either with a permanent type of pavement, with light oiled screenings, or are graded, rolled and oiled. Due to the great local oil production with a resulting low cost, it has in past years been common practice for counties and municipalities to give considerable attention to the oiling of public thoroughfares.

In many of the municipalities permanent types of paving have always been laid. When those streets which intersect the railway lines undergo improvement legal or franchise requirements obligate the railway company to make similar improvements for the width of its franchise strip at the street intersection. Usually the same type of pavement as placed by the municipality on the balance of street is laid, but there are instances where the street paving specifications governing the municipality's improvements do not prove satisfactory for placement in and about the rails of the interurban railway tracks. This is especially true where such improvements call for a solid concrete type of pavement, as due to its rigidity this is an unsatisfactory type for road crossings. It is difficult and expensive to maintain around rails at a street intersection, where the elevation of the rails in some cases is slightly above the grade of the street and necessitates a paving run-off to produce accessible approaches in order to provide a reasonably smooth and improved road crossing.

The municipal or county officials are generally in accord with the company in modifying the specifications to meet this situation, and in most instances they grant permission to the company to pave its tracks at such road crossings with the company's standard type of oil macadam pavement. This class of paving also is commonly used in other road crossings where the company sees fit to render such improvement without solicitation, thereby complying with the requirements of the State, that where railway or railroad tracks cross public streets or highways, whether or not the thoroughfares are improved, the railway company is obliged to maintain safe and passable crossings at intersections with its tracks.

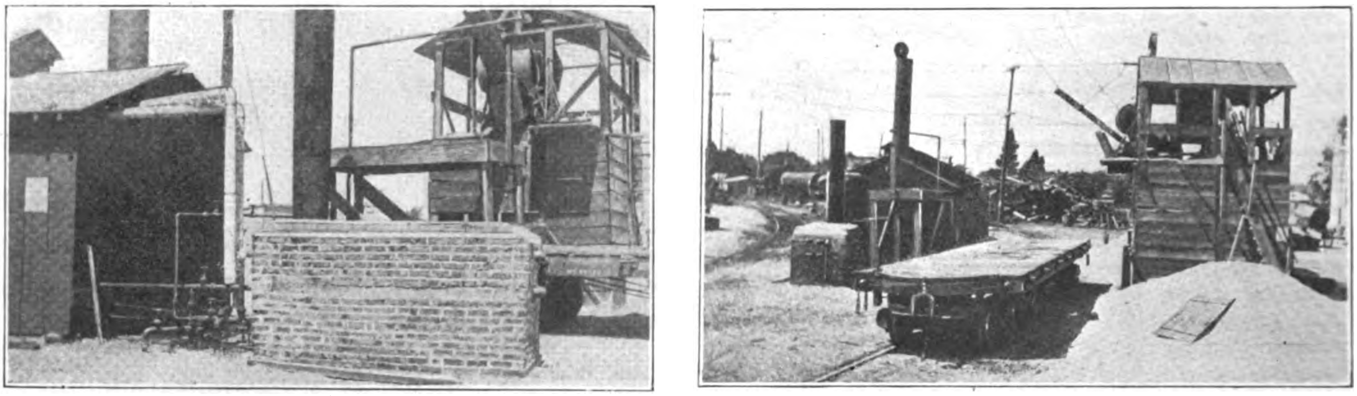
Approximately 75 per cent of the one thousand crossings on the Pacific Electric lines are permanently improved, while the balance are either the graded or oiled type of road crossing. In the foothills and mountainous districts, where durability and hardness of soil in time produce a natural road crossing, a little oiling and refilling with gravel or screenings considerably lessens the maintenance expense. Where the lines penetrate valley districts the soil is usually soft and loamy and an oil macadam crossing is essential. In the territory contiguous to the Pacific Ocean, where the soil is of a sandy nature, an exceptionally rigid type of oil macadam road crossing is demanded, as with the soft yielding subsoil it requires much effort to construct and maintain a lasting crossing. At the time of placing the oil macadam it is difficult to obtain the desired subgrade, and the steam roller is obliged to give two or three times the number of rollings when the crossing is being constructed or repaired in order to obtain the desired results.

Prior to the year 1911 our organization for handling the oiling of road crossings and paving with oil macadam was incomplete, as this class of construction and maintenance work was in its infancy. The paving organization was obliged to heat the oil with the steam rollers and this method consumed 50 per cent of the time the rollers were in service. Where work of this nature required attention of any magnitude it was necessary to go to the trouble and expense of constructing an oil pit to heat the oil shipped to each of the various jobs. In addition, expense and loss of time were incurred while pumping the oil into the pit, as well as in pumping it again into the oil tank sprinkling wagons for distribution on the job.

As the number of road crossings and miles of paved streets in the maintenance program was constantly being increased, it was deemed expedient more efficiently to organize the paving department and to set up an oil heating and oil macadam mixing plant. This was located approximately three miles from the central portion of the city of Los Angeles and is accessible for handling the work with dispatch. In the erection of this oil macadam mixing plant strict economy was practiced. Second hand engines and boilers were utilized where they were of no further service in the power plants or car shops. Buildings for housing boilers and engines also were provided from second-hand material reclaimed from other structures on the lines. When this plant was first established a second-hand 30-hp. boiler was transferred from the car shops to be utilized in heating the oil and a suitable boiler room was erected. This boiler is operated by burning distilled oil, but is also equipped with a fire box for burning wood. Scrap bridge piling and building material is accumulated for this purpose.

The boiler room is located between the underground concrete oil storage pit and the super-heater. The oil storage pit has combination wooden covered doors, so that the pit can be easily entered for reaching the 1,400 lineal feet of 1-in. pipe maintained in the pit for surface heating of the oil. Steam from the boiler room at a maximum steam pressure of 80 lb. is forced through a connecting pipe into the 1-in. surface pipe heating system. The capacity of the oil storage pit is approximately 25,000 gal. and it will accommodate the contents of two standard railroad tank cars, or four of the company's small size standard tank cars. A small steam-operated pump, with a steam line from the main boiler room, is located 12 ft. below the ground level on the same plane with the bottom of the oil heating pit. This conveys the oil by pipe line into the super-heater for the purpose of increasing the first heat of 150 deg. to 350 deg. before the oil is conveyed to the oil macadam mixing machine.

All crude oil used must have a grading of 90 per cent asphaltum. The degree of heat obtained is 350 to 400, and when ready to apply to the rock the average existing degree must not be less than 250 deg. Twelve hours is required to heat one tank of crude oil, during which period 100 gal. of distillate oil is consumed by the boiler and 1,200 gal. of water is used. Three-fourths inch rock is used in this type of oil macadam for road crossings and 10 gal. of oil is applied to one cubic yard of rock.



OIL MACADAM MIXING PLANT OF PACIFIC ELECTRIC RAILWAY. AT LEFT—MAIN BOILER ROOM, SUPER-HEATER OUTFIT AND EQUIPMENT FOR STEAMING OUT OIL TANK CARS. AT RIGHT—OIL MACADAM MIXING PLANT

Two men are used in heating the oil, one a licensed stationary engineer and the other a laborer to operate the pipes. In mixing oil macadam four additional laborers are used. An average of four to five cars of oil macadam can be mixed during a twelve-hour period. This is loaded on flat cars averaging 16 cubic yards per car ready to ship to the job.

The oil macadam mixing drum is located in the tower of the mixing plant. The hoppers and mixer are operated by a small steam pump connected with the main boiler room and a shut-off lifting door regulates the quantity of rock it is desired for the hoppers to gather up. Check valves also regulate the quantity of oil entering the mixing drum when the material is being made up. As rapidly as the oil macadam is mixed it is conveyed by a drop chute onto flat cars set on a working track located between the oil heating plant and the oil macadam mixing plant. The piping system through which the oil is conveyed is, after work is suspended, thoroughly and immediately steamed out with connecting steam pipes in order to avoid stoppage of the piping system when the oil cools.

When oil is being heated, either for shipment to some job where it is to be applied directly upon rock already in the track or for use immediately at the plant in mixing road crossing oil macadam, after being conveyed from the main-heating pit to the super-heater and the desired heat obtained, it is conveyed either into the tank car for shipment or to the mixing machine. When these sources of use are cut off a by-pass pipe carries the oil from the super-heater back into the main heating pit.

At this plant facilities are maintained also for handling the steaming out of oil cars set out by the transportation department. An efficient working rack for pipe line and pipe fitting apparatus used to steam out the cars is provided adjacent to the two tracks allotted to this work. A large underground pit, with a storage capacity of two standard railroad line tank cars, is used to accumulate the waste oil, which is at first drained from the tank car into a seepage drainway and thence into the pit. A steam line is connected with the main boiler room of the oil macadam plant and a separate pump is used in thoroughly steaming out the remaining waste oil in the tank cars. It requires two days to steam out one tank car, employing one stationary engineer and one laborer.

As many as twelve barrels of waste oil are accumulated at times from steaming out two standard tank cars. Due to the many classes of oil handled in these tank cars the waste is useful only for the ordinary oiling of the roadway to suppress dust and weeds. If the oil is of proper grade it is barreled and stored for this use as it is collected from time to time. Several municipalities have effective ordinances requiring the railway company during the hot and dry weather to re-oil its roadbed upon order of the Street Superintendent. The company ships the oil to the job and sprinkles the oil about the tracks with tank sprinkling wagons.

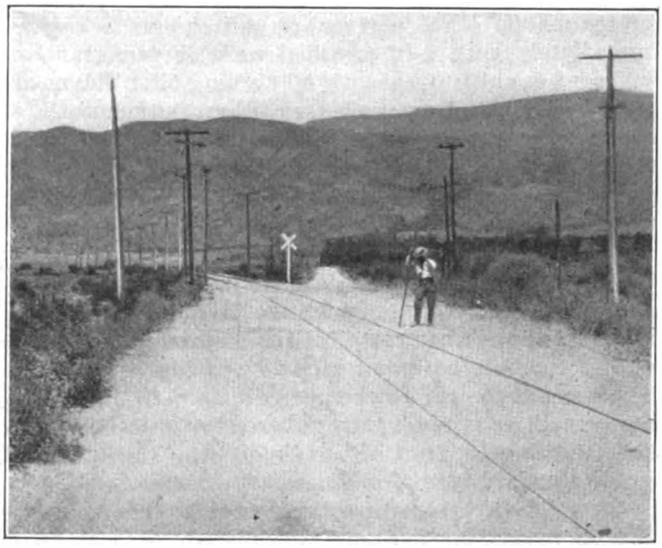
When an oil macadam road crossing is to be constructed or repaired the responsibility for the work does not necessarily rest with the paving organization, as frequently in the interest of economy the material after being mixed at the plant is shipped to one of the roadmasters on the system. The track gangs in handling track repairs at the road crossings can satisfactorily unload, apply and tamp in the oil macadam to good advantage. Usually 8 to 10 cu.yd. of oil macadam provides a first-class road crossing, or one car of 16 cu.yd. will take care of two locations.

STANDARD TYPE OF GRADED AND OILED ROAD CROSSING BUILT BY PACIFIC ELECTRIC RAILWAY

In addition to the mixing of oil macadam for road crossing repairs or new construction, a special type of oil macadam, using pea size rock, is mixed at frequent intervals when needed to patch up temporary depressions in asphalt paved streets in the cities, or for temporary paving repair work around joints excavated for bonding repairs or for tightening and shimming up. This special class of oil macadam is frequently used as temporary paving around special trackwork layouts where minor parts have been excavated for repair or renewal. When such work is to be undertaken the foreman of the plant is notified to mix up the required batch of this type of oil macadam which, when prepared, is moved with dispatch to the job and if necessary handled by one of the engineering department's auto trucks. A one-ton dump truck is usually delegated to perform this task, as the larger type of dump truck moves with less speed and is cumbersome to operate in congested traffic districts.

The Pacific Electric Railway Company also uses oil macadam quite extensively on straight-away stretches of track, but the type of oil macadam used for this class of work is of a different specification from the mixture used for road crossing work. This type of paving ranges in depth from 2 in. to 5 in. The 2-in. depth of paving is laid only where it is the intention to provide a light type of paving, while the 5-in. depth is for a permanent job for the full depth of rail. This pavement is not used around girder rail, but usually around 50 lb., 60 lb., 70 lb. and 75 lb. T-rail. Three sizes of rock are used, *e.g.*, ¾-in., 1½-in. and 3-in. sharp and angular crushed rock, while the final dressing is pea size screenings of ¼-in. crushed rock and granite dust. The rock used must be of such quality as to pass the abrasion test of the city of Los Angeles.

Asphaltic oil is used and applied at a temperature of not less than 250 deg. F., nor more than 410 deg. F. It is required that an asphaltic oil be furnished with no admixture of any artificial or refined products and that it shall contain not les than 92 per cent of asphaltum at 80 deg. penetration, District of Columbia standard, when 20 gr. are heated to a temperature of 400 deg. F. in an uncovered cylindrical dish 2¼-in. in diameter. The residium at 80 deg. penetration must not contain more than 2½ per cent of sulphur and must be soluble in carbon tetrachloride to the extent of at least 99.8 per cent and the oil must not contain more than 2 per cent water and sediment.



STANDARD TYPE OF GRAVELED ROAD CROSSING PRODUCED BY NATURAL SOIL CONDITIONS

The pavement is laid on the roadbed in three courses, as follows: The first course consists of the lower two-thirds of the entire pavement and is placed on top of the ties laid with crushed rock that will pass a 3-in. ring and be retained on a 2½-in. screen. The mass is rolled

TABLE I—MATERIAL USED WITH 2-IN. OIL MACADAM

Amount of pavement laid	10,444	sq.yd
Oil used per square yard	0.5578	gals.
1½-in. crushed rock used per square yard	112.3	lb.
¾-in. crushed rock used per square yard	48.3	lb.
¼-in. crushed rock used per square yard	28.6	lb.
Total amount of crushed rock used per square yard	189.2	lb.
Average men days per square yard pavement	0.04	
Total oil used	257.79	bbl.
Total men days	434	
Total time trucks used	2¼	days
Total time teams used	24	days
Total time work motor used	24.5	hrs.
Total time coal used on roller	22.5	days
Total coal consumed by roller	8.65	net tons
Total crushed rock used size 1½ in	586.9	tons
Total crushed rock used size ¾ in	252.45	tons
Total crushed rock used size ¼ in	149.8	tons

dry with a 12-ton, three-wheel Monarch steam roller. Six inches each side of the rail and down to the top of the tie is slotted up with ¾-in. crushed rock, after which it is wet down and again rolled until all slack is removed and it ceases to creep. Such portions as cannot be reached with the roller are tamped to grade by hand.

The second course, consisting of 1½-in. rock, is laid and rolled dry into the base course with the same type of roller and as the rolling progresses sufficient 1½-in. rock is spread over the surface from time to time to thoroughly bind the broken stone foundation and form a true surface. It is then wet and rolled until all creeping ceases.

All depressions and low spots are brought to an even grade and the entire mass is again rolled. The first coat of oil is then applied at the rate of approximately ¾ gal. to the square yard. The oil is covered immediately with the third and last course of ¾-in. crushed rock, rolled and all depressions brought to an even grade. The rolling is continued until the rock ceases to crawl and the surface is smooth and to grade, when the second coat of oil is applied at the rate of approximately ½ gal. per square yard. This is covered immediately with ¼-in. crushed rock or pea gravel of sufficient quantity to absorb all surplus oil. The entire mass is dampened and rolled until hard and smooth, all depressions being brought to an even grade. After the elapse of a week or ten days all surplus ¼-in. rock is swept up, care being exercised that the slotway is left clear of all dust and rock.

This class of oil macadam has given excellent results, is favorable in appearance and meets with hearty approval by all the municipalities in which it has been laid. At times when certain cities improve their streets with a concrete base and asphalt wearing surface type of pavement the railway company upon petition to these municipalities is frequently favored with permission to substitute on its franchise right of way strip its high grade standard type of oil macadam pavement.

On a job of this nature performed in October, 1918, the oil macadam pavement was placed for a depth of 2 in. in and about 4½ in.—60 lb. A. S. C. E. rail. The rail was not renewed and the ballast was highly crowned to consume the balance of the depth of rail. This was a double track line paralleling the Pacific Ocean in one of the nearby beach towns. The results shown in Table I were obtained.

TABLE II—MATERIAL USED WITH 5-IN. OIL MACADAM

Amount of pavement laid	15,693	sq.yd.
Oil used per square yard of pavement	1.58	gal.
3-in. crushed rock used per square yard of pavement	351.4	lb.
1½-in. crushed rock used per square yard of pavement	115.0	lb.
¾-in. crushed rock used per square yard of pavement	111.0	lb.
¼-in. crushed rock used per square yard of pavement	23.0	lb.
Total amount of crushed rock used per square yard of pavement	600.4	lb.
Average men days per square yard pavement	0.079	
Total men days	1253.2	
Total amount of 3-in. crushed rock used	2757.45	tons
Total amount of 1½-in. crushed rock used	902.67	tons
Total amount of ¾-in. crushed rock used	871.53	tons
Total amount of ¼-in. crushed rock used	185.95	tons
Total	4717.60	tons
Total oil used	24,795	gals.
Teams used	70	days
Work motor used	9.43	days
Coal used in 642 days on steam roller	225	tons

A further comparison is afforded by a job performed in March, 1918, at an inland town where the full 5-in. depth standard type of oil macadam was placed in and about 5-in., 75-lb. T-rail. This also was double-track construction. The results shown in Table II were obtained.

Where a very light temporary type of gravel and oil pavement is placed upon the surface of the tracks after they have been graded and the back fill accomplished until the grade material is flush with top of rail it has been found that the following materials and labor are required: 1 cu.yd. screenings will cover approximately 500 sq.ft. of roadbed. One laborer can spread approximately 25 cu.yd. screenings per ten-hour day. Three-fourths to 1½ gal. of oil approximately covers 1 sq.yd. of screenings.

Coal Situation Really Serious

THE acute shortage of coal is growing worse in several sections of the country. New England is particularly hard hit. It would occasion no surprise if several railway companies in the country would be compelled to curtail service materially if not to shut down entirely in the next week or so. One New England community is already reported to have been without light, either gas or electric, for a period of three days, due to coal shortage. One electric railway, at least, has entirely stopped service on two lines, on account of coal shortage. Other companies are known to have only a few days' supply on hand.

The demand for what coal can be shipped has forced prices to unheard-of figures and still higher figures are quoted as bid by industries which are almost at the end of their rope. It is reported that $12 and $13 per ton for tidewater bituminous coal is being paid, and double that or more offered for resale.

The causes are apparently (1) the almost absolute lack of movement over the railroads, either to supply empty cars to the mines or to move loaded cars now on the systems and (2) the Atlantic seaboard labor conditions in connection with the movement of coal in barges. No particular relief is in sight.

Historical Investment Basis Used

THE Consolidated Gas Company, which is a historic company before commissions and courts, has been supported in its valuation contentions by Special Master A. S. Gilbert before the U. S. District Court. The principal points were basis of valuation and rate of return. On the latter point the master proposes an 8 per cent return. On valuation he says: "Although I have no doubt that the present reproduction cost would be at least as much as the sum arrived at, for reasons elsewhere indicated, I feel on sounder and fairer ground in basing my conclusions upon the actual investment in the property, proof of which was offered in the first instance by the defendants and by the complainants in rebuttal."

If this report is approved by the court the company's request for an injunction against the enforcement of the 80-cent gas law will probably be granted.

General Dawes Blames Chicago Politics

Present Price of Securities Forced Below Intrinsic Value by Politics—Public Ownership, with Increased Taxes, Probable Result

IN THE statement that, as a tremendous penalty on the public for the continual attacks of politicians, public ownership of utilities was practically the only way out, Gen. Charles G. Dawes, president Central Trust Company of Illinois, summed up his cross-examination by city representatives before the Public Utilities Commission of Illinois May 12. He had appeared before the commission in the continuation from April 29 of the hearings being held to investigate the general financial difficulties of the utilities, particularly their inability to finance new extensions and betterments ordered by the commission. After testifying at the previous hearing, the General took a week off, he said, to investigate what the dragging of transportation matters into politics had really meant in the Chicago situation. At the conclusion of the cross-examination he presented a statement in which he said in part: "The plutocrats in the Chicago street car situation, as they are usually referred to, are the unfortunate scattered holders of the secondary obligations of the surface lines which represent an agreed-upon valuation arrived at after long negotiations between the roads and the city in 1907. The market value of these secondary obligations, before the city administration put the blight of politics upon them, was $65,900,000, and even this figure represented a large loss upon the securities of the old street car systems. But now that the great business question of transportation has been dragged into politics the market value of the secondary securities is $24,500,000, representing a fall in the market of $41,400,000. The annual income now paid the holders of these secondary securities is about $3,200,000. Under these political attacks, the first mortgage bonds of the surface lines, which are the only source of new money supply for rehabilitation purposes, are selling on about a 14 to 15 per cent basis. In these times of credit stringency the railroads and other public utilities not subject to attack by the demagogues are having to pay as high as 7 and 8 per cent for their money and much of it is not as well secured actually as are the first mortgage bonds of the Chicago Surface Lines. The difference between a 7 per cent interest rate and about a 14 per cent interest rate, to wit, 7 per cent, is the financial measure of the effect of the fight of the political demagogues upon the street car company.

CONFISCATION WON'T SOLVE PROBLEM

"The testimony of Mr. Blair and the experts at the last hearing was that the Chicago Surface Lines need $10,000,000 to $15,000,000 immediately and probably $10,000,000 per year for the next ten years. In other words, even if the income of the secondary security holders, amounting to $3,200,000 annually, were confiscated, an extra charge of $700,000 to $1,000,000 in addition to the ordinary rates for money would have to be imposed upon the people to get the means immediately necessary for the roads, and $700,000 additional each year thereafter to provide the money necessary to keep them up. Within about four years the entire annual income forced away from the secondary security holders would have been dissipated in the extra cost of capital alone to the roads. This would be done in the name of the interests of the people.

"Let no one deceive himself as to this. The old property of the Surface Lines might be confiscated, but old property will not rehabilitate the lines. New money must be invited into the enterprise, and in a city where political attacks have brought the market price of first mortgage bonds from 98 down to 60 in a few years new capital will not consent to put its neck into the noose a second time without charging heavily for it, if at all.

"I do not believe that even a 15 per cent rate would secure this money based upon conditions which have existed for the last two years in the city of Chicago. The question is immediately raised whether the politicians have not already made it impossible for the Chicago public ever to have a satisfactory street car service that will operate under a reasonable expense to it. The political slogan of a 5-cent fare is too popular to be readily abandoned. Having made the operation by private companies under reasonable rates impossible, it would seem to be the policy of the city government to take over the property at confiscatory prices if possible and then to conceal the inevitable increase in the cost of transportation to the public in the shape of heavier general or special taxes. The total confiscation of the interest of the secondary security holders, with the moral injury to the community ignored, would not, in my judgment, save the public one-half what these politicians and their methods will lose it.

"The proper solution of the question, of course, would be the restoration of the general credit of public utilities under the State Commission, which would enable capital to be secured for the roads upon a reasonable basis so that under the control of the commission they would be operated at the least possible cost to the public with the best possible service. But the restoration of credit, even with as strong a commission as this one, can never occur until the attacks of the city demagogues cease, and I for one see little hope for such an occurrence in the city of Chicago. The demagogues who have brought into politics this great question of city transportation are the real enemies of the people. They would place under heavy sacrifice the interests of their city and the public for their own petty and temporary political advantage."

AMORTIZE PRESENT EXCESSIVE COSTS

Other witnesses heard before the commission were James B. Forgan, president of the First National Bank and of the First Trust and Savings Bank; Harry A. Wheeler, vice-president Union Trust Company of Chicago and formerly president of the United States Chamber of Commerce; Charles Piez, president the Link Belt Company and the Electric Steel Company; Charles W. Folds, a Chicago investment banker, and Donald Richberg, special counsel for the city in gas matters. Mr. Forgan testified along much the same lines presented by the bankers at the previous hearing, attributing the inability of the utilities to finance new work primarily to the loss of confidence of the public and a feeling on its part that under the restraint of public regulation they were unable readily to absorb large fluctuations in operating costs. Mr. Wheeler advocated that there should be no extensions made during these abnormal times except those absolutely essential. He said that a rate of fare should be granted high enough not only to provide a rate of return that would attract the necessary new capital but also to make possible the payment of a part of the abnormal expenditures involved in new work out of surplus earnings, so that this would not continue to be an undue burden upon the future car riders. He attributed the antipathy of the public to utility securities to loss of confidence and to the great increase in the number of industrial securities now offered on the market in competition with them which are free from regulation, are sound and in general offer a higher rate of return. He declared that any rate of return to be satisfactory must be such as will meet this competition and permit the payment out of operating expenses of improvements in order to keep down the capitalization of abnormal costs now prevailing. Mr. Piez presented the viewpoint of a manufacturer, testifying that industrial progress of the community is being seriously hampered by the inability of the utilities to keep pace with the requirements. He said they should be permitted to be prosperous so that they could keep ahead of requirements rather than lag behind them. He expressed the view that the popular prejudice against utility securities was a reflection in large measure of the attitude for years back of the Interstate Commerce Commission in considering its regulatory function in the nature of restraint.

It was brought out in his further testimony and in subsequent questioning of Samuel Insull that the present low value of existing securities was not at all a question of their underlying value. Referring to the Chicago Elevated System, Mr. Insull said there was a tremendous margin of property in excess of the prior lien securities. It was simply a question of the earnings being inadequate to carry these securities. B. E. Sunny and Henry A. Blair were also cross-examined by Chester E. Cleveland, representing the city, but the cross-examination during the entire hearing was largely irrelevant and brought out little of value to the commission or to the city in solving the immediate problem of providing for extension of facilities.

The original hearing of April 29 was reported at length on pages 939-941 of this paper in the issue of May 8.

On May 3 the so-called down-state public utilities were heard at Springfield, Ill., by the Public Utilities Commission, the inquiry into their financial needs being along the same lines as that held in Chicago.

An Incentive for Good Management

Outline of a Reward-for-Management, Service-at-Cost Plan with Reward Based on Volume of Traffic

By T. Fitzgerald

Consulting Electric Railway Engineer, Pittsburgh, Pa.

WE HEAR some talk these days of the necessity for unselfish devotion to the interest of the community on the part of men engaged in public utility management. It has been found, however, that human nature is such that an adequate reward must be paid to secure the mental or physical labor of men.

If a community wants good street railway service it must pay an adequate price for it. When the company and the community work harmoniously along sound economic lines there will result both the quality and the quantity of service demanded by the car riders at a price as low as possible for that service.

The law of supply and demand controls today just as it has always. The necessary precedent to the supply of any product is a demand for that product at a price which will pay for its cost, which cost includes a reward sufficient to attract capital and brains for the production of the product. If the cost of production requires a price too high for the demand, the supply cannot be continued. The price is sometimes paid in an indirect manner, as in the case of practically all municipal waterworks.

It is believed that there is sufficient demand for street railway service in large communities to provide for a supply at a price which will pay the cost of production including the necessary reward for management.

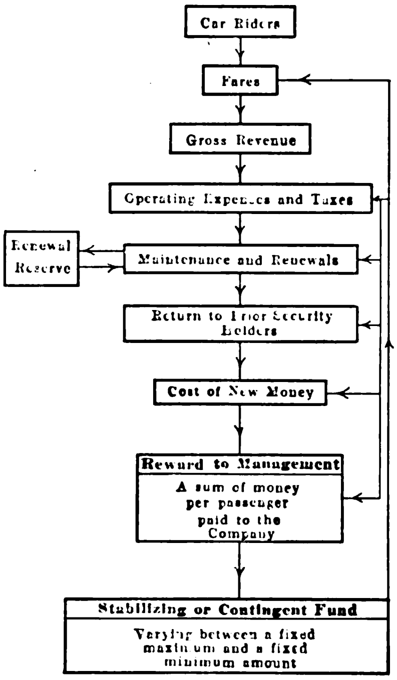

Car Riders
Fares
Gross Revenue
Operating Expenses and Taxes
Renewal Reserve
Maintenance and Renewals
Return to Prior Security Holders
Cost of New Money
Reward to Management
A sum of money per passenger paid to the Company
Stabilizing or Contingent Fund
Varying between a fixed maximum and a fixed minimum amount

DIAGRAM SHOWING DISPOSITION OF ITEMS UNDER PROPOSED PLAN

It is also believed that, with an agreement based on sound economic laws, private ownership and operation of street railways will bring about the best results for the capital and the community interested. In most agreements between cities and street railways the Cleveland "Tayler" plan with modifications has been worked out. The Cincinnati plan has been referred to frequently as the most satisfactory solution of the problem yet devised. Regarding the Cleveland agreement, the remarks of Mr. Squire, of counsel for the Cleveland Railway, quoted in *Aera* for August, 1918, show that in his opinion the Tayler plan is fundamentally unsound. He says: "The Tayler plan, it may be remarked, . . . is in some respects more dangerous than the Johnson 3-cent-fare plan. It is more specious. . . . The company today has sustained a diminution in capital value . . . and is still running behind, although the maximum rate is now in effect."

Turning to Cincinnati, we find that a recent attempt to sell $6,000,000 worth of securities for very necessary capital expenditures resulted in securing a small fraction of that sum through short term notes, just enough to pay maturing obligations and an indebtedness to the city. The defect in the Cincinnati plan is pointed out in the 1919 annual report of the Cleveland Railway, page 16. Referring to a suggested provision similar to the Cincinnati provision of a reward for management increasing with a decreasing fare, the report says: " . . . There would be a great temptation to let the property deteriorate . . . thus impairing the security of the investment of the stockholders . . . permitting service to become unsatisfactory because of poor track and equipment."

An absolutely essential part of a sound financial plan is a reward-for-management feature necessary to attract capital and its hired man-and-agent management. This reward must be based definitely and logically on results, and not, as in most cases, on compliance with some arbitrary pseudo-scientific standard through which it is hoped that the desired results will be obtained.

It is hopeless to attempt to take into account in any standard of measurement all of the variables which enter into the determination of the efficiency of an operating management. It is, however, possible to establish a reward for management which can only be achieved in its maximum amount through the most intelligent and effective effort.

All present arrangements between cities and street railways seem to ignore the possibility of agreeing on a plan which will allow the company and the city to proceed in accordance with fundamental principles on which the best interests of the city and of the street railways depend. The best interest of the city and car rider requires that quality of service and that price which will be attractive to the largest number of car riders. When the largest possible number of car riders has been carried it means that the quality of the service and the price have been most nearly properly adjusted to the demand for service. If the reward to the company is proportioned to the number of passengers carried, its interest in turn will be identical with the car rider's and will furnish the necessary incentive to it to adjust as nearly as possible the quality and price of service to the demand. This leads up to the real basis of my plan to provide the reward for management.

FORECAST OF ANNUAL RESULTS

From Operation of Reward-for-Management Feature
Cost-of-Service Plan

Based on: (1) A reward for management of one-tenth cent per passenger; (2) a reduction in reward per passenger of one per cent for each two per cent increase in passengers above the highest number carried in any preceding year.

Year	Passengers	Reward per Passenger, Cent	Gross Reward
1920	260,000,000	0.1	$260,000
1921	267,000,000	0.0986	263,262
1922	275,000,000	0.0972	267,300
1923	283,000,000	0.0958	271,114
1924	291,000,000	0.0944	274,704
1925	300,000,000	0.093	279,000
1926	309,000,000	0.0916	284,044
1927	318,000,000	0.0902	286,836
1928	328,000,000	0.0888	291,26
1929	338,000,000	0.0874	295,41

The best method of making this reward effective is to fix the rate of fare so as to provide, in addition to reimbursement for all other expenditures on account of furnishing service, an allowance to the company of a sum of money for each and every passenger carried. This allowance or reward should be a charge against the cost of service and considered as a necessary part of the total cost of capital.

With this reward in view the company will make every effort to provide service which will bring the largest number of car riders. The company's incentive to economy in financial as well as operating management is vital because any additional expense will increase fare, and increased fare will decrease riding.

The effect of such an arrangement on the morale of the operating personnel should be powerful, inasmuch as this plan brings out positively and prominently the fact that the street railway industry is a selling business and that the success of the company depends primarily upon its ability to sell its product—car rides.

The investment of capital to produce more or better service is in the interest of both the company and the car riders only if the cost of such investment will bring a commensurate return in improved service or in operating economy.

Under such an arrangement there should be no objection on the part of the company to allowing the fullest investigation and the control of investment, operations and service.

Some modifications may be advisable in this fundamental plan due to local conditions, although the broader and simpler the arrangement the greater will be the chance of its successful adoption and operation.

Among other modifications it might be advisable for the company to accept a nominal reward per passenger for the ordinary increase in passengers carried due to the growth of the community, and a substantial reward for any traffic in excess of this. There must, however, be some reward for management which keeps abreast of the community in its development.

Allowance to the company per passenger could be proportioned to its success in completing capital investment required by the city. A modification of this kind might be used to harmonize the views of the community and the street railway company if the problem of inadequate facilities is acute.

The allowance to the company per passenger should be reduced (not of course in direct proportion) with an increased volume of business, certainly if the number of passengers carried per dollar invested increases. The allowance could be based on passengers carried per dollar invested, but this seems to introduce unnecessary complications.

An additional incentive to the management to reduce capital costs to a minimum could be provided by increasing the allowance for decreased capital cost per dollar per annum and decreasing the allowance for increased capital cost.

The foregoing provisions are simply possible additions to the plan, and would not affect its operation adversely, but it is not believed that they are necessary to augment the effect of the incentive to the company to improve service and decrease costs in order to sell more rides and increase the gross reward.

A modification of this plan providing a reward large enough to permit a division of the allowance between capital and labor presents attractive features. Such a division of the reward would give a direct incentive to the employee to increase the sale of his product—car rides—and could be regarded as a wage to the employee for his interested effort over and above the amount paid him to cover his bare living expenses. From a similar viewpoint the cost of capital other than the reward for management may be regarded as the bare living expenses of the capital invested, and the additional reward as its wage for its interested effort.

In this connection it may be noted that within reasonable limits the greater the reward for management the higher will be the efficiency of the management possible to secure and the lower the cost of fare due to the greater efficiency.

A diagram showing the disposition of items under this plan is presented herewith, also a statement showing results from its operation based on definite assumptions as to details.

Although this plan of reward for management seems to adapt itself more readily to street railway operations than to other kinds of business, other industries engaged in the production of standardized measurable units can be operated in accordance with the idea.

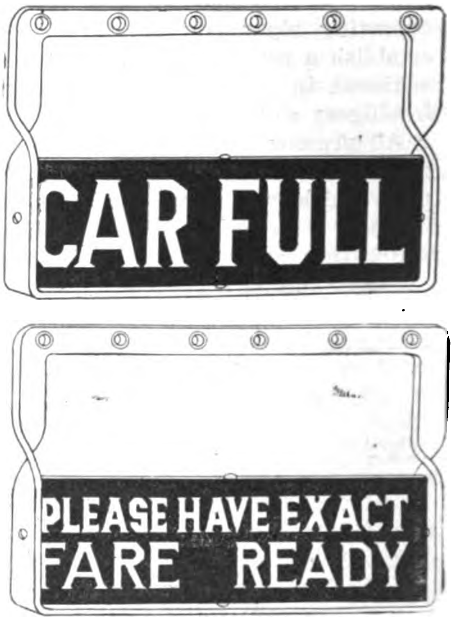
Car Signs and Motorman's Adjustable Mirror Used in Richmond

THE Virginia Railway & Power Company, Richmond, Va., has, with its first installation of one-man safety cars, adopted the practice of using a "car full" sign when the number of passengers on the car reaches fifty. This gives a standing load of eighteen passengers, which the management thinks is all that can be handled without defeating one of the principal attributes of the car from the public's point of view; namely, high schedule speed.

The sign which was developed for this purpose is made reversible, carrying the words "car full" on one side and "please have exact fare ready" on the opposite side. The sign is mounted in a frame made of ¼-in. x 1-in. strap iron which is fastened to the window sill in the right-hand front window. This frame is made in a complete rectangle to give added strength, and the two ends are spot-welded together. The two side pieces of the rectangle are given a one-quarter twist so that the flat side comes against the window sill and is also parallel to the ends of the signboard. The rectangle measures 9 in. x 21¾ in. inside, and the signboard, 5¼ in. x 21½ in., with letters 3½ in. high on the "car full" side and 1¼ in. high on the reverse side. The sign in this position on the dash is conveniently within the reach of the operator, so that he can quickly change the sign without leaving the car, and with only a step from his operating position. The sign is held in either position about its horizontal axis by a friction catch between the top of the frame and either edge.

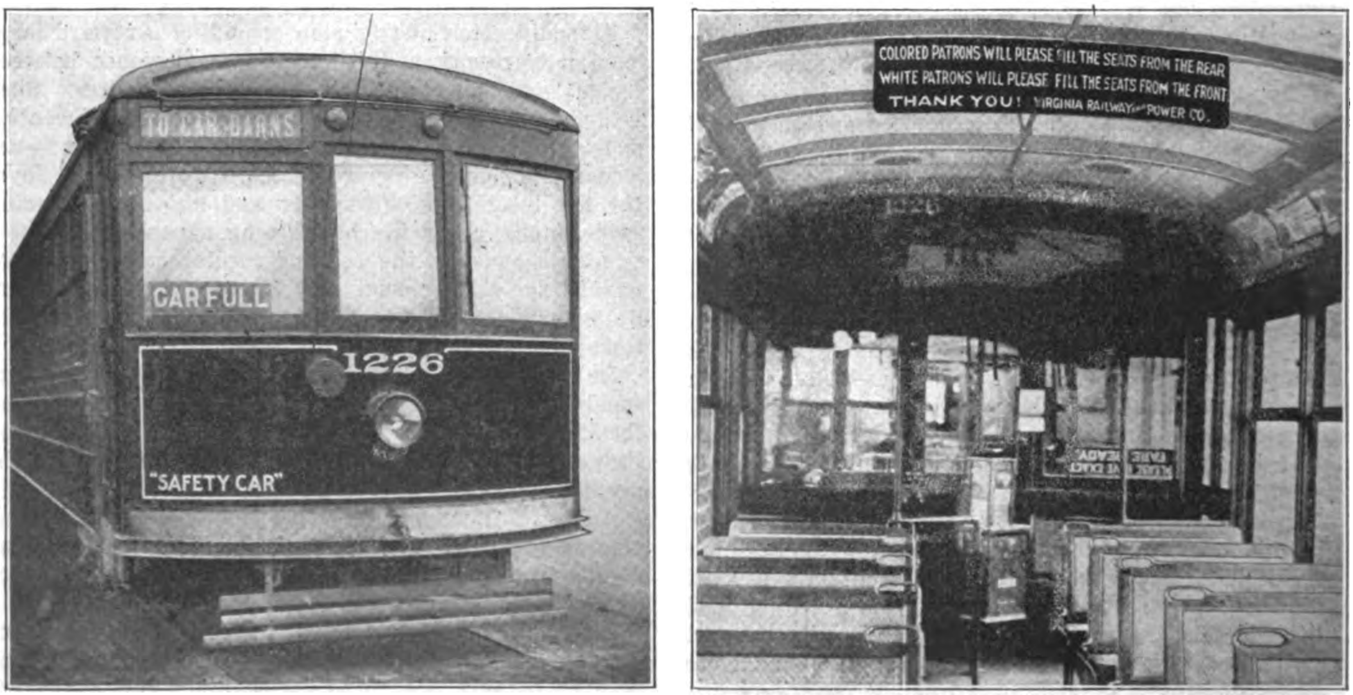
Sign Directing Segregation of Passengers

In the picture below showing the interior of the safety car the sign which the Virginia Railway & Power Company uses in directing colored passengers to the proper position in the car is also seen. This is fastened to one of the carlines at about the center of the car, and it reads: "Colored passengers will please fill the seats from the rear. White passengers will please fill the seats from the front. Thank you. Virginia Railway & Power Company."



CONSTRUCTION DETAILS OF "CAR FULL" SIGN

In this same picture can be seen one of the mirrors which the company has installed on all of its cars. A recent improvement made in this connection has been the mounting of the mirrors to make them adjustable for any motorman, regardless of his height. The mirrors were formerly screwed solidly to the end posts, and this feature brought some complaint from some of the shorter and taller men. To overcome the objections, W. J. Hicks, master mechanic, arranged to mount the mirrors on a ½-in. rod bent in a U-shape with the ends hammered out to take two wood screws for fastening the rods to the posts. This rod is 13 in. long between bends and the mirror is attached to it by two pipe clamps having ¾-in. x 1-in. high loops. A ⅝-in. sash-spring is fastened on the back of the mirror to bear against the rod and hold it in any position in which it is set. A motorman can thus adjust the mirror to suit his height.

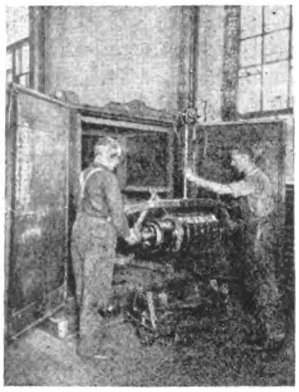

TO CAR BARNS
CAR FULL
1226
"SAFETY CAR"
COLORED PATRONS WILL PLEASE FILL THE SEATS FROM THE REAR
WHITE PATRONS WILL PLEASE FILL THE SEATS FROM THE FRONT
THANK YOU! VIRGINIA RAILWAY & POWER CO.

AT LEFT, "CAR FULL" SIGN USED ON RICHMOND (VA.) SAFETY CARS. AT RIGHT, THE REVERSE SIDE OF THE "CAR FULL" SIGN MAY BE SEEN IN THE RIGHT-HAND VESTIBULE WINDOW

The sign directing the segregation of passengers and the adjustable motorman's mirror are also shown.

Shop, Track, Power and Line

These Articles and Ideas Are From Men on the Job Who Find Special Applications and New Methods an Incentive for Greater Effort — If You Have Something Good Pass It Along



Testing Motors After Repair

The Pittsburgh Railways, After a Few Months' Trial of Testing All Motors After Repair and Before Installing, Finds Itself Repaid

SOME form of check upon the work done by the repair department on motor armatures and fields has always been recognized as desirable. It is doubtful, however, if any other road has gone so far in this direction as has the Pittsburgh Railways recently.

This company commenced to test all motors coming from the repair shop about the first of December, 1919. During the month of December 23 per cent of the motors tested were rejected and returned to the repair department for further attention. The month of January showed only 19 per cent returned, while the month of February showed only 15 per cent returned. This three months' record gives a striking indication of the apparent effect upon the quality of work done by the repair shop. Another measure of the effectiveness of this test is indicated by the fact that for the month of February, 1919, thirty-one motors of a particular type had to be changed after they had come from the repair shop and been installed upon cars. This was before the period of testing these motors. In February, 1920, after testing of these motors had started, not more than twelve motor changes were necessary.

For some time the company has had a testing stand so arranged that certain small motors could be dropped into place and run, through gearing, in opposition to a permanently installed interuban motor acting as a generator. Certain intermittent testing was then done upon them. The same or a similar principle has been utilized, but a much improved stand has been erected, as shown in the accompanying illustration. In this case an interurban motor has been mounted upon a sliding base and an easily disconnected coupling has been arranged so that when the motor to be tested is dropped by the crane onto its three-point suspension rack the interurban motor can be moved toward it and the two aligned so that they may work upon the same shaft, thus eliminating the noise and difficulty of gear connection. In addition to this rack the old rack will be replaced with another like the new one, thus giving a two-rack capacity.

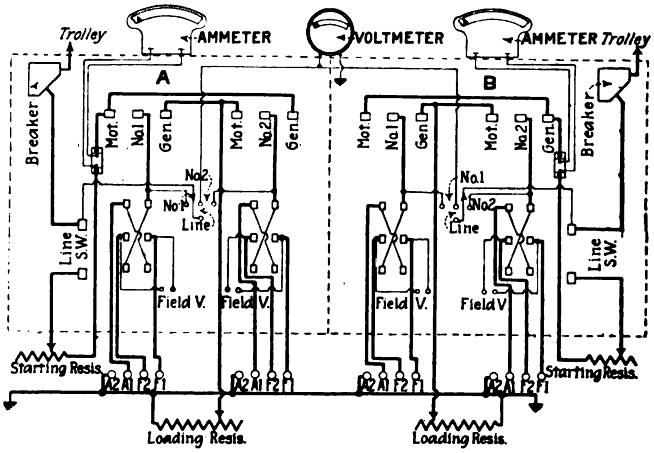
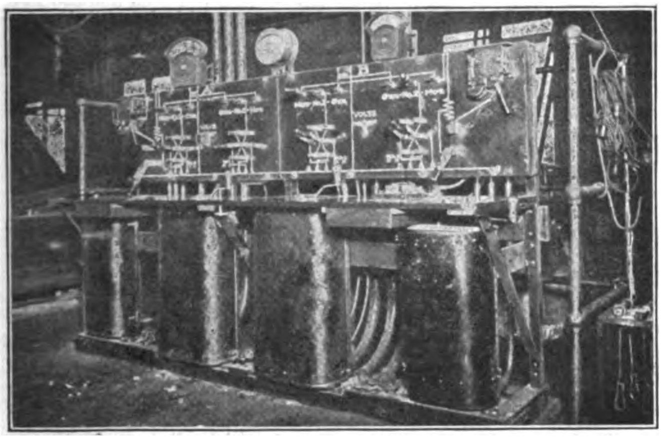
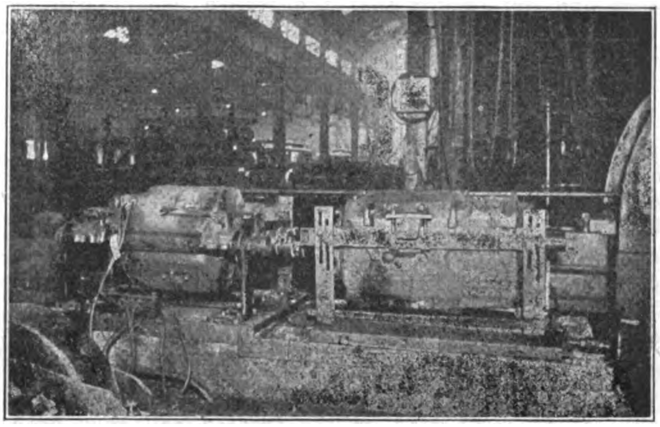


DIAGRAM OF CONNECTIONS OF CONTROL SWITCHBOARD FOR MOTOR TEST

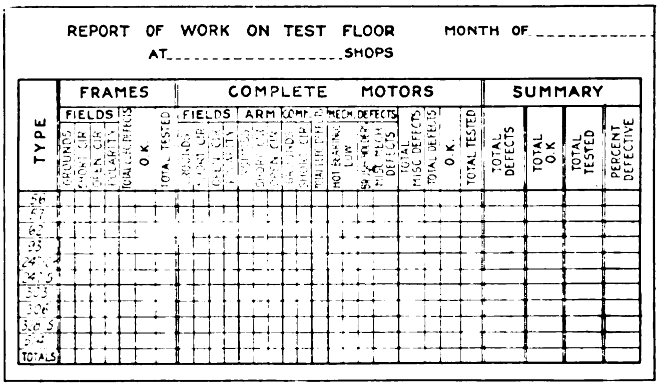
A very complete switchboard and control system has been arranged to take care of this testing. A photograph of the switchboard is shown in an accompanying illustration. A diagram of the circuit on this board is



CONTROL SWITCHBOARD FOR MOTOR TEST



ADJUSTABLE STAND FOR TESTING RAILWAY MOTORS also reproduced. As indicated, this board is arranged to take care of two racks and gives complete control over both the motor and the generator ends of the combination. The copy of the report form shown herewith indicates the type of test which is made upon the motor. This test might be described as a complete factory test upon the motor with the exception of a heat run. With reference to the heating of the motor, as it takes too long to wait for the motor to come to its maximum temperature so long as it is possible to keep the hand upon the motor without discomfort no heat run is made. In case, however, the bearings seem to get hot, or any other part of the motor seems to heat too rapidly, then a heat run is carefully made until the trouble is discovered. The motor is first tested for general defects, tests being made for grounds in both field and armature by applying 2,500 volts for a short period. A 15-minute opposition test is run in both directions under full load. A speed variation of 4 per cent plus and minus is allowed. Another run is made with 150 per cent load for five minutes.


REPORT OF WORK ON TEST FLOOR MONTH OF ____________
AT ________________ SHOPS

TYPE	FRAMES							COMPLETE MOTORS																		SUMMARY			
	FIELDS							FIELDS				ARM			COMM.			MECH. DEFECTS											
	GROUNDS	SHORT CIR	OPEN CIR	POLARITY	TOTAL ELEC DEFECTS	O.K.	TOTAL TESTED	GROUNDS	SHORT CIR	OPEN CIR	POLARITY	GROUNDS	SHORT CIR	OPEN CIR	GROUNDS	SHORT CIR	TOTAL ELEC DEFECTS	HOT BEARING	LOW	[illegible]	MISC MECH DEFECTS	TOTAL MISC DEFECTS	TOTAL DEFECTS	O.K.	TOTAL TESTED	TOTAL DEFECTS	TOTAL O.K.	TOTAL TESTED	PERCENT DEFECTIVE
56																													
57																													
62																													
[illegible]																													
[illegible]																													
[illegible]																													
303																													
306																													
[illegible]																													
[illegible]																													
TOTALS																													

MONTHLY REPORT OF TEST-FLOOR WORK

This system of testing has been installed under the direction of F. R. Phillips, superintendent of equipment, and R. F. Bull, engineer of equipment, at the Homewood shop of the company. The Pittsburgh Railways is among the local industries co-operating with the University of Pittsburgh in its co-operative engineering course. Men who are with the company on three months' assignment from this co-operative course are used for the motor testing. These students, who are usually juniors in the course of electrical or mechanical engineering, are very keen to catch any defective motors as they come from the repair shop. The Pittsburgh railways is very well satisfied with the arrangement and anticipates that the future benefit will be even greater than those realized so far.

Rail Hardening Experience in England

AMONG items reported to the London County Council by the highways committee at the meeting held on March 30 information was given as to the result of the Sandberg rail-hardening process, which is used to a considerable extent in Great Britain. It was stated that the effect of the treatment is to raise the elastic limit of the surface of the rail from about 25 tons to more than 100 tons per square inch. Measurements which have been made indicate that the life of rails can be extended more than three years by this process. An absence of corrugation on the treated rails has been noted.

Material Used in Splicing Cables

A List of the Most General Types of Line Cable with Material Used

THE accompanying table gives data on the material required for making either a straight splice, a branch splice or an end bell in each of the different cables listed. This list includes rubber insulated and braided cables, varnished cambric and braided cables, lead and paper, lead and rubber, weatherproof and multi-conductor cables, and the various combinations found in the actual practice are provided for.

A—Straight splice in 500,000 circ. mil rubber insulated and braided cable.
B—Straight splice in 1,000,000 circ.mil rubber insulated and braided copper cable.
C—Straight splice in 2,000,000 circ.mil rubber insulated and braided cable.
D—Straight splice in No. 6 Duplex rubber insulated and braided cable.
E—Straight splice in 500,000 circ. mil varnished cambric and braided cable.
F—Straight splice in 1,000,000 circ.mil varnished cambric and braided cable.
G—Straight splice in 2,000,000 circ mil varnished cambric and braided cable.
H—Straight splice of No. 0000 lead and paper to lead and rubber cable.
I—Straight splice of 500,000 circ. mil lead and paper to 500 000 circ.mil rubber insulated and braided cable.
J—Straight splice of 500,000 circ. mil lead and paper to lead and rubber cable.
K—Straight splice of 1,000,000 circ mil lead and paper to lead and rubber cable.
L—Straight splice of 2,000,000 circ.mil lead and paper to lead and rubber cable.
M—Straight splice of 1,000,000 circ.mil lead and paper cable to 1,000,000 circ mil rubber insulated and braided cable.
N—End bell for No. 2 three-conductor high-tension lead and paper cable.
O—End bell for No. 6 three-conductor, high-tension lead and paper cable.
P—End bell for No. 000 three-conductor, paper insulated, high-tension, lead-encased copper cable.
Q—End bell for 250,000 circ.mil three-conductor, high-tension cable.
R—End bell for 350,000 circ mil three-conductor, high-tension cable.
S—Straight splice in No. 0 triple braided weatherproof insulation.
T—Straight splice in No. 00 triple braided, weatherproof insulation.
U—Straight splice in No. 000 triple braided, weatherproof insulation.
V—Straight splice in No. 0000 triple braided, weatherproof insulation.
W—Straight splice in 250,000 circ. mil triple braided weatherproof insulation.
X—Straight splice in 500,000 circ. mil triple braided, weatherproof insulation.
Y—Straight splice in 1,000,000 circ mil triple braided, weatherproof insulation.
Z—Straight splice in 2,000,000 circ.mil triple braided, weatherproof insulation.
AA—Straight splice in 500,000 circ.mil lead and paper.
BB—Straight splice in 1,000,000 circ.mil lead and paper cable.
CC—Straight splice in 2,000,000 circ. mil. lead and paper cable.
DD—Straight splice in No. 6 three-conductor lead and paper cable.
EE—Straight splice in 350,000 circ mil three-conductor, high-tension, paper insulated, lead-encased sector cable.
FF—Straight splice in 250,000 circ.mil three-conductor, high-tension lead and paper cable.
GG—Straight splice in No. 000 conductor, high-tension, paper insulated, lead-encased copper cable.
HH—Straight splice in 2,000,000 circ mil lead paper and rubber covered cables.
II—Straight splice in No. 2 three-conductor lead and paper cable.
JJ—Straight splice in 500,000 circ. mil submarine cable.
KK—Straight splice in No. 0000 lead and rubber cable.
LL—Straight splice in 500,000 circ.mil lead and rubber cable.
MM—Straight splice in 2,000,000 circ.mil lead and rubber cable.
NN—Straight splice in 1,000,000 circ.mil lead and rubber cable.
OO—Straight splice in No. 6 duplex lead and rubber cable.
PP—Straight splice in 2,500,000 circ mil cable, one braid.
QQ—Straight splice in 5,000,000 circ.mil cable, one braid.
RR—Straight splice in No. 0 lead and rubber cable.
SS—Straight splice in No. 0000 lead and rubber cable.
TT—Straight splice in No. 1 lead and rubber cable.
UU—Straight splice in No. 4 lead and rubber cable.
VV—Straight splice in No. 0000 rubber, lead and braid cable.
A1—Branch splice on No. 0 rubber and lead cable.
B1—Branch splice on No. 0000 rubber and lead cable.
C1—Branch splice on No. 1 rubber and lead cable.
D1—Branch splice on No. 4 rubber and lead cable.
E1—Branch splice on 250,000 circ. mil rubber and lead cable.
F1—Branch splice on 500,000 circ. mil. rubber and lead cable.
G1—Branch splice on 1,000,000 circ mil rubber and lead cable.
H1—Branch splice on 2,000,000 circ.mil rubber and lead cable.
I1—Branch splice on No. 2 three-conductor lead and paper cable.
J1—Branch splice on No. 6 three-conductor lead and paper cable.
K1—Branch splice on No. 000, three conductor, high-tension lead and paper cable.
L1—Branch splice on No. 0000, three-conductor, high-tension lead and paper cable.
M1—Branch splice on 350,000 circ. mil three-conductor, high-tension lead and paper cable.
N1—Branch splice on 250,000 circ mil rubber insulated and braided cable.
O1—Branch splice on 500,000 circ. mil rubber insulated and braided cable.
P1—Branch splice on 1 000,000 circ.mil rubber insulated and braided cable.
Q1—Branch splice on 2,000,000 circ mil rubber insulated and braided cable.
R1—Branch splice on 500,000 circ mil varnished cambric and braided cable.
S1—Branch splice on 1,000,000 circ mil varnished cambric and braided cable.
T1—Branch splice on 2,000,000 circ.mil varnished cambric and braided cable.
U1—Branch splice on 250,000 circ. mil three-conductor, high-tension, paper insulated, lead-encased copper cable.
V1—Branch splice on 1,000,000 circ.mil paper insulated, lead-encased copper cable for trolley side-feed.
W1—Branch splice on 2,000,000 circ.mil paper insulated, lead-encased copper cable.
X1—Branch splice on 250,000 circ. mil varnish cambric and lead cable.
Y1—Branch splice on 500,000 circ mil varnished cambric and lead cable.
Z1—Branch splice on 1,000,000 circ.mil varnished cambric and lead cable.
A2—Branch splice on 2 000,000 circ.mil varnished cambric and lead cable.

Material Required for Making One Splice in Each of the Cables Listed

				Copper Connectors												Lead Pipe					Tape, Lbs.					Solder, Lbs.				Rubber Insulated, Cable, Ft.			Rubber Covered Wire		
Kind of Cable	Compound No. 227, Pints	Muriatic Acid, Gills	Cheese Cloth, Yds.	No. 2	No. 6	No. 1-0	No. 2-0	No. 3-0	No. 4-0	250,000 Cm.	350,000 Cm.	500,000 Cm.	2,000,000 Cm.	Copper Wire No. 10 B. & S. Tinned, Lb.	Kerosene, Qts.	Dia., In.	Lgth., In.	Paint, P. & B., Insulating, Pints	Pasters	Sterine Sticks	Paper, Small	Paper, Large	¾-in. Rubber	1¼-in. Friction	Lino. Var. Cambric	Wiping	½x½	End Bell	Insulators for End Bell	350,000 Cm., 11,000 V.	250,000 Cm., 11,000 V.	3-0/11,000 V.	No. 2 H.T.	No. 6 H.T.	Insulating Joint
A	½	..	1	..	..	..	..	..	..	..	..	..	..	½	2	..	..	1	...	¼	..	..	2	1	..	1	..	..	..	..	..	..	..	..	..
B	½	..	1	..	..	..	..	..	..	..	..	..	..	½	2	..	..	1	...	¼	..	..	3	2	..	2	..	..	..	..	..	..	..	..	..
C	...	..	1	..	..	..	..	..	..	..	..	..	..	1	2	..	..	1	...	¼	..	..	4	2	..	3	..	..	..	..	..	..	..	..	..
D	...	..	¼	..	2	..	..	..	..	..	..	..	..	..	2	..	..	1	...	..	..	..	1½	1	..	½	..	..	..	..	..	..	..	..	..
E	...	..	¼	..	..	..	..	..	..	..	..	..	..	½	2	..	..	2	...	¼	..	..	2	1	..	1	..	..	..	..	..	..	..	..	..
F	...	..	1	..	..	..	..	..	..	..	..	..	..	½	2	..	..	1	...	¼	..	..	2	1	1½	2	..	..	..	..	..	..	..	..	..
G	...	..	1	..	..	..	..	..	..	..	..	..	..	1	4	..	..	1	...	¼	..	..	4	2	..	3	..	..	..	..	..	..	..	..	..
H	½	..	¼	..	..	..	..	..	..	1	..	..	..	..	1	1½	10	..	4	..	..	1	..	..	..	2	½	..	..	..	..	..	..	..	..
I	2	½	1	..	..	..	..	..	..	..	..	..	..	½	2	1½-2½	8-12	1	6	¼	..	..	2	½	..	2	½	..	..	..	..	..	..	..	..
J	½	..	¼	..	..	..	..	..	..	..	..	..	..	½	1	2	12	..	6	¼	..	2	..	..	..	2½	½	..	..	..	..	..	..	..	..
K	1	..	¼	..	..	..	..	..	..	..	..	..	..	½	2	2½	12	..	6	¼	..	2	..	..	..	3	½	..	..	..	..	..	..	..	..
L	2	..	¼	..	..	..	..	..	..	..	..	..	..	1	2	3	14	..	8	¼	..	3	..	..	..	4	½	..	..	..	..	..	..	..	..
M	...	..	¼	..	..	..	..	..	..	..	..	..	..	1	1	2-2½	8-12	1	...	¼	..	2	½	½	..	2	½	..	..	..	..	..	..	..	..
N	4	..	1	3	..	..	..	..	..	..	..	..	..	..	4	..	..	1	5	¼	9	1	1	1	..	2½	..	1	3	..	..	..	15	..	..
O	4	..	1	..	3	..	..	..	..	..	..	..	..	..	4	..	..	1	5	¼	9	1	1	1	..	2½	..	1	3	..	..	..	..	15	..
P	12	..	..	..	..	..	..	3	..	..	..	..	..	..	4	..	..	1	3	¼	9	1	1	½	..	2½	..	1	3	..	..	15	..	..	..
Q	12	..	1	..	..	..	..	..	..	3	..	..	..	..	4	..	..	1	5	¼	9	1	1	½	..	2½	..	1	3	..	15	..	..	..	..
R	6	..	1	..	..	..	..	..	..	..	3	..	..	..	4	..	..	1	10	1	12	2	1	½	..	2½	..	1	3	15	..	..	..	..	..
S	...	1	¼	..	..	1	..	..	..	..	..	..	..	..	1	..	..	¼	...	¼	..	..	..	½	..	½	..	..	..	..	..	..	..	..	..
T	...	1	¼	..	..	..	1	..	..	..	..	..	..	..	1	..	..	¼	...	¼	..	..	..	½	..	½	..	..	..	..	..	..	..	..	..
U	...	1	¼	..	..	..	..	1	..	..	..	..	..	..	1	..	..	¼	...	¼	..	..	..	½	..	½	..	..	..	..	..	..	..	..	..
V	...	1	¼	..	..	..	..	..	1	..	..	..	..	..	1	..	..	¼	...	¼	..	..	..	½	..	½	..	..	..	..	..	..	..	..	..
W	...	1	¼	..	..	..	..	..	..	1	..	..	..	..	1	..	..	¼	...	¼	..	..	1	½	..	1	..	..	..	..	..	..	..	..	..
X	...	1	¼	..	..	..	..	..	..	..	..	..	..	½	1	..	..	½	...	¼	..	..	2	1	..	1	..	..	..	..	..	..	..	..	..
Y	...	1	¼	..	..	..	..	..	..	..	..	..	..	½	1	..	..	1	...	½	..	..	4	1½	..	1½	..	..	..	..	..	..	..	..	..
Z	...	2	¼	..	..	..	..	..	..	..	..	..	..	1	2	..	..	1	...	1	..	..	6	2	..	4	..	..	..	..	..	..	..	..	..
AA	2	..	¼	..	..	..	..	..	..	..	..	..	..	½	2	2	12	..	6	½	..	2	..	..	..	3	½	..	..	..	..	..	..	..	..
BB	2	..	1	..	..	..	..	..	..	..	..	..	..	½	2	2½	12	..	6	½	..	2	..	..	..	3	½	..	..	..	..	..	..	..	..
CC	2	..	1	..	..	..	..	..	..	..	..	..	..	..	2	3	14	..	10	½	..	3	..	..	..	3½	½	..	..	..	..	..	..	..	..
DD	4	..	1	..	3	..	..	..	..	..	..	..	..	..	2	3	20	..	8	..	9	2	..	..	..	4	½	..	..	..	..	..	..	..	..
EE	8	..	1	..	..	..	..	..	..	..	3	..	..	..	4	4	20	..	10	½	12	3	..	..	..	5	½	..	..	..	..	..	..	..	..
FF	8	..	1	..	..	..	..	..	..	3	..	..	..	..	4	4	20	..	10	½	10	3	..	..	..	5	½	..	..	..	..	..	..	..	..
GG	8	..	1	..	..	..	..	3	..	..	..	..	..	..	4	4	20	..	10	½	9	3	..	..	..	5	½	..	..	..	..	..	..	..	..
HH	2	..	1	..	..	..	..	..	..	..	..	..	..	..	2	3-2½	8-14	1	10	½	..	3	2	1	..	4	½	..	..	..	..	..	..	..	..
II	4	..	1	3	..	..	..	..	..	..	..	..	..	..	2	3	20	..	8	..	9	2	..	..	..	4	½	..	..	..	..	..	..	..	..
JJ	1	..	¼	..	..	..	..	..	..	..	..	..	..	½	2	2	12	..	6	..	..	..	1½	1	..	3	..	..	..	..	..	..	..	..	..
KK	...	..	..	..	..	..	..	..	1	..	..	..	..	..	2	2	10	2	5	½	..	..	1	..	..	2½	½	..	..	..	..	..	..	..	..
LL	2	..	1	..	..	..	..	..	..	..	..	..	..	½	2	2½	12	..	10	½	..	..	1	..	..	3	½	..	..	..	..	..	..	..	..
MM	2	..	1	..	..	..	..	..	..	..	..	..	..	..	4	3	14	..	10	½	..	..	2	½	..	4	½	..	..	..	..	..	..	..	..
NN	2	..	1	..	..	..	..	..	..	..	..	..	..	½	2	2½	12	..	10	½	..	..	1	½	..	3	½	..	..	..	..	..	..	..	..
OO	...	..	¼	..	2	..	..	..	..	..	..	..	..	..	2	2½	12	1	6	..	..	..	1	½	..	2	..	..	..	..	..	..	..	..	..
PP	...	2	1	..	..	..	..	..	..	..	..	..	..	1	4	..	..	1	...	1	..	..	..	1	..	5	..	..	..	..	..	..	..	..	..
QQ	...	4	1	..	..	..	..	..	..	..	..	..	1	2	4	..	..	1	...	1	..	..	..	1	..	10	..	..	..	..	..	..	..	..	..
RR	¼	..	¼	..	..	..	..	..	..	..	..	..	..	..	1	1½	10	..	4	¼	..	..	½	¼	..	2	..	..	..	..	..	..	..	..	..
SS	¼	..	¼	..	..	..	..	..	..	1	..	..	..	..	1	1½	10	..	4	¼	..	..	½	¼	..	2	..	..	..	..	..	..	..	..	..
TT	¼	..	¼	..	..	..	..	..	..	..	..	..	..	..	1	1½	10	..	4	¼	..	..	½	¼	..	2	..	..	..	..	..	..	..	..	..
UU	¼	..	¼	..	..	..	..	..	..	..	..	..	..	..	1	1½	10	..	4	¼	..	..	½	¼	..	2	..	..	..	..	..	..	..	..	..
VV	1	..	¼	..	..	..	..	..	1	..	..	..	..	..	1	2	12	..	6	..	..	..	½	½	..	2	..	..	..	..	..	..	..	..	..
A1	¼	..	¼	..	..	..	..	1	..	..	..	..	..	..	1	2	12	..	6	¼	..	..	½	¼	..	3	..	..	..	..	..	..	..	..	..
B1	¼	..	¼	..	..	..	..	..	1	..	..	..	..	..	1	2	12	..	6	¼	..	..	¼	½	..	3	..	..	..	..	..	..	..	..	..
C1	¼	..	¼	..	..	..	..	1	..	..	..	..	..	..	1	1½	12	..	6	¼	..	..	½	¼	..	2½	..	..	..	..	..	..	..	..	..
D1	¼	..	¼	1	..	..	..	..	..	..	..	..	..	..	1	1½	12	..	6	¼	..	..	½	¼	..	2½	..	..	..	..	..	..	..	..	..
E1	2	2	1	..	..	..	..	..	..	..	1	..	..	..	4	1¼-3	14-16	1	10	½	..	..	2	1	..	4	½	..	..	..	..	..	..	..	..
F1	2	2	1	..	..	..	..	..	..	..	..	..	..	1	4	1¼-3½	24-14	1	10	½	..	..	2	1	..	5	½	..	..	..	..	..	..	..	..
G1	4	..	1	..	..	..	..	..	..	..	..	..	..	1½	4	1½-4	16-16	1	10	1	..	2	2	1	..	6	½	..	..	..	..	..	..	..	..
H1	4	..	1	..	..	..	..	..	..	..	..	..	..	1½	4	2-4½	16-16	1	10	1	..	3	2	1	..	7	½	..	..	..	..	..	..	..	..
I1	10	..	1½	..	..	..	..	3	..	..	..	..	..	..	6	4½	22	..	10	1	9	4	..	..	1	6	½	..	..	..	..	..	..	..	..
J1	8	..	1½	3	..	..	..	..	..	..	..	..	..	..	6	4½	22	..	10	½	9	4	..	..	1	6	½	..	..	..	..	..	..	..	..
K1	10	..	1½	..	..	..	..	..	..	..	3	..	..	..	6	5	22	..	10	1	12	5	..	..	1	8	½	..	..	..	..	..	..	..	..
L1	10	..	1½	..	..	..	..	..	..	..	3	..	..	..	6	5	22	..	10	1	12	5	..	..	1	8	½	..	..	..	..	..	..	..	..
M1	20	..	2	..	..	..	..	..	..	..	..	3	..	..	8	6	24	..	15	1	15	6	1	..	1	10	½	..	..	..	..	..	..	..	..
N1	...	..	¼	..	..	..	..	..	..	..	..	..	..	½	1	..	..	½	...	¼	..	..	1	½	..	2	..	..	..	..	..	..	..	..	..
O1	...	..	¼	..	..	..	..	..	..	..	..	..	..	¼	1	..	..	½	...	¼	..	..	1½	1	..	2½	..	..	..	..	..	..	..	..	..
P1	...	..	¼	..	..	..	..	..	..	..	..	..	..	1	1	..	..	1	...	¼	..	..	3	½	..	3½	..	..	..	..	..	..	..	..	..
Q1	...	..	½	..	..	..	..	..	..	..	..	..	..	1½	1½	..	..	1	...	¼	..	..	4	2	..	4	..	..	..	..	..	..	..	..	..
R1	...	..	1	..	..	..	..	..	..	..	..	..	..	1	4	..	..	1	...	½	..	..	4	2	..	2	..	..	..	..	..	..	..	..	..
S1	...	..	1	..	..	..	..	..	..	..	..	..	..	1½	4	..	..	1	...	1	..	..	4	2	..	2	..	..	..	..	..	..	..	..	..
T1	...	..	1½	..	..	..	..	..	..	..	..	..	..	1½	4	..	..	2	...	1	..	..	6	3	..	3	..	..	..	..	..	..	..	..	..
U1	16	..	2	..	..	..	..	..	..	..	..	3	..	..	8	5	24	..	15	1	12	6	1	..	1	10	½	..	..	..	..	..	..	..	..
V1	2	..	1	..	..	..	..	..	..	..	..	..	..	1	4	3½	14	..	7	½	..	3	..	..	..	5	..	..	..	..	..	..	..	..	1
W1	6	..	1	..	..	..	..	..	..	..	..	..	..	1½	4	4½	16	..	10	1	..	4	..	..	1	8	½	..	..	..	..	..	..	..	..
X1	2	..	1	..	..	..	..	..	..	..	1	..	..	..	4	1½-3	16-14	1	10	½	..	..	2	1	..	4	½	..	..	..	..	..	..	..	..
Y1	2	..	1	..	..	..	..	..	..	..	..	..	..	1	4	1¼-3½	24-14	1	10	½	..	..	..	1	½	5	½	..	..	..	..	..	..	..	..
Z1	4	..	1	..	..	..	..	..	..	..	..	..	..	1½	4	1½-4	16-16	1	10	1	..	2	..	1	½	6	½	..	..	..	..	..	..	..	..
A2	4	..	1	..	..	..	..	..	..	..	..	..	..	1½	4	2-4½	16-16	1	10	1	..	3	2	1	½	7	½	..	..	..	..	..	..	..	..

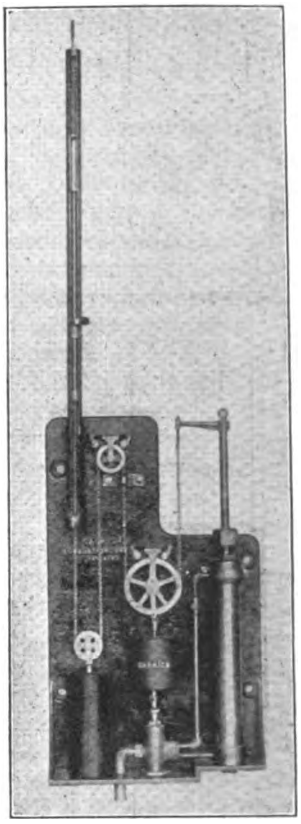
Automatic Control of Furnaces

An Automatic Regulating System for the Graduated Control of Fuel Feed, Damper Position and Air

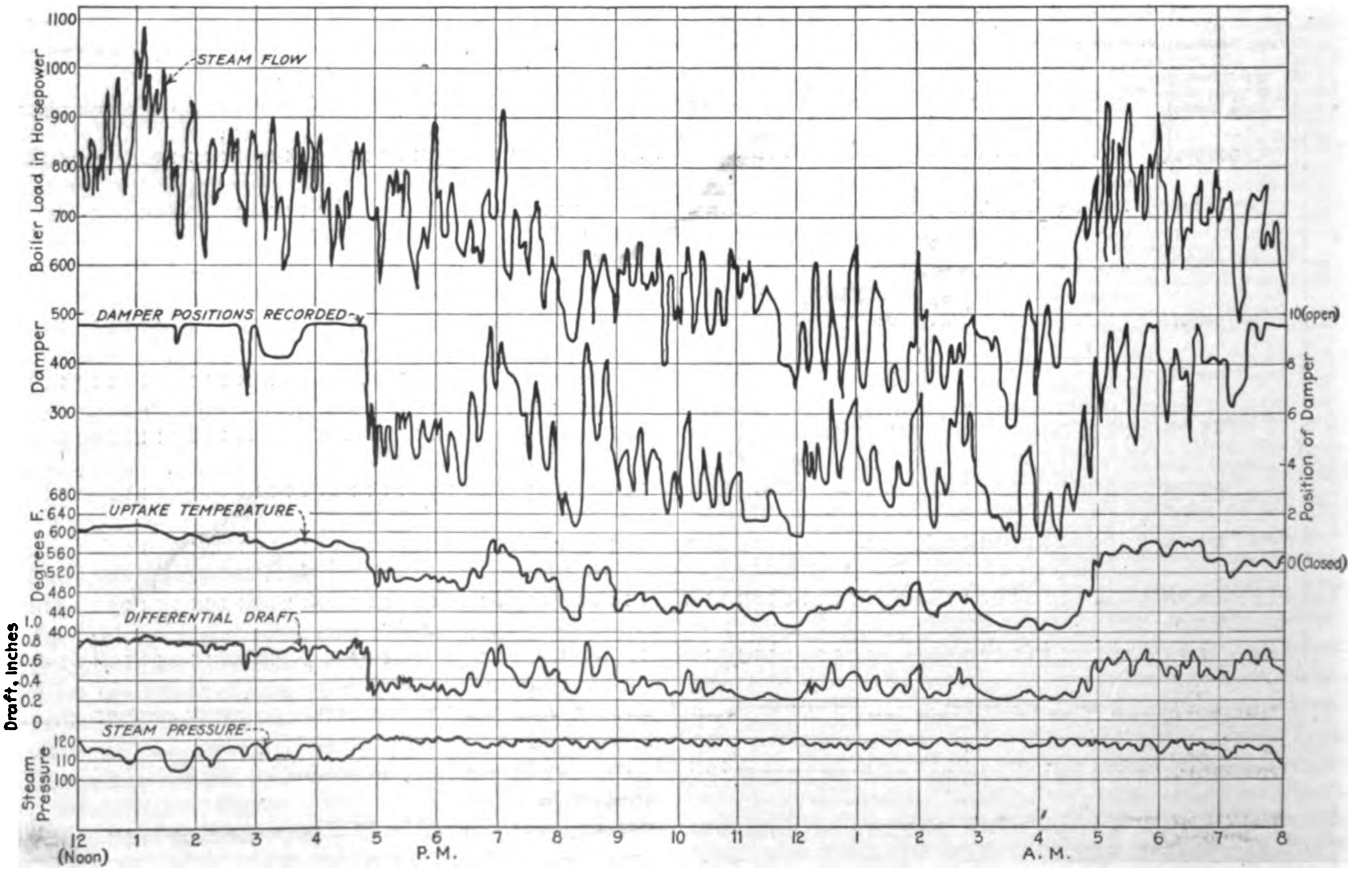
AN AUTOMATIC system of controlling the combustion in a furnace which is so designed as to make possible the maintenance of the most efficient operation under the varying conditions of load and fuel has been developed by the Carrick Engineering Company, Chicago. This system has been developed to overcome some of the weakness of hand control, which, as is commonly known, cannot be adjusted frequently or accurately enough to provide the proper setting for slightly varying conditions. Changes in the damper position and rate of fuel feed and speed of motors in forced or induced draft systems, as made by hand, take into account only the rather large variations, so that there are periods between the changes in settings when conditions may be rather widely different from those which would secure most efficient combustion. The automatic system which the Carrick company has developed is so designed, it is claimed, that the changes in setting of damper, speed of fuel feed, etc., take place gradually and simultaneously with slight changes in steam pressure in the boiler, which may be due to variation of the load or condition of the furnace or coal.

This new automatic regulating system consists of a master control having a barometric column of mercury which is actuated by the steam pressure in the boiler. The height of the mercury column varies 2 in. for every pound of steam pressure changes. A mercury reservoir, shown in the left-hand corner of the diagrammatic drawing of the Carrick system, on page 1007, is connected with an upper mercury cylinder or well by a pipe line. A free-moving piston in this upper well is connected by a cable to the arm of the hydraulic cylinder, shown at the right of the control panel. The chain connection between the floating plunger yoke and the hydraulic piston passes around the floating wheel or valve gear, shown at the center of the panel. Just below this wheel is a four-way pilot valve which controls the flow of water from the city pressure either to the top or bottom of the hydraulic cylinder, depending upon whether the steam pressure rises or falls, thus raising or lowering the piston of the valve. This hydraulic piston cannot move until the four-way pilot valve is opened.

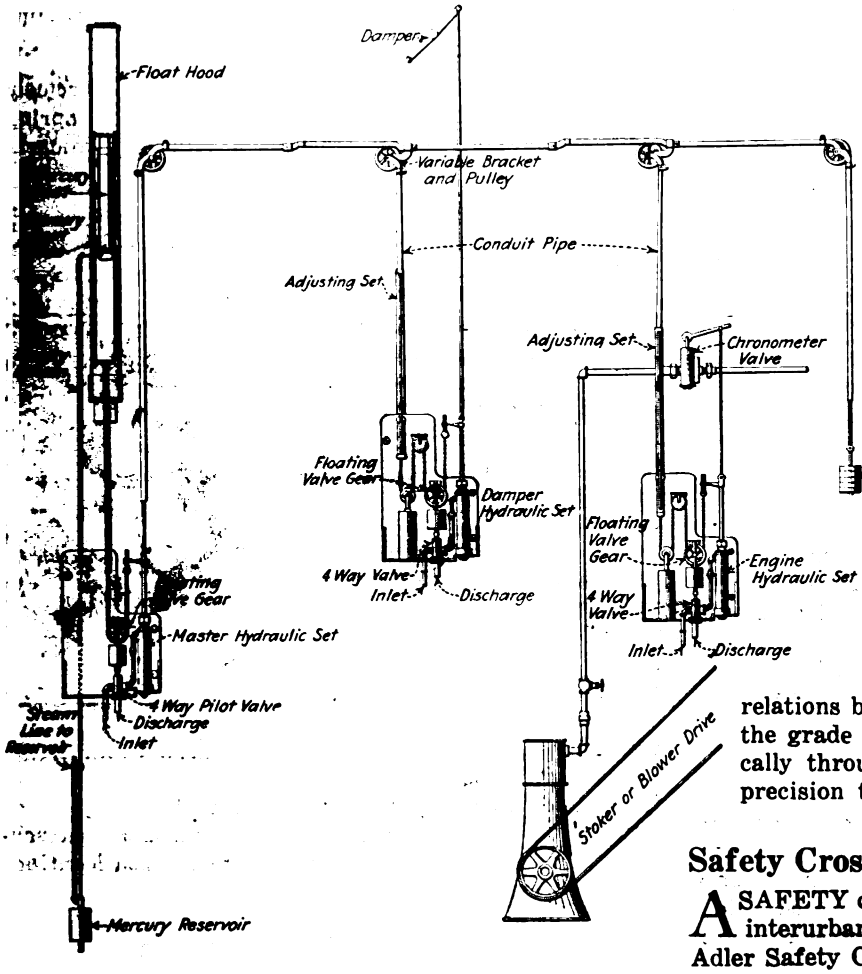
When a change in the steam pressure takes place there is a corresponding change in the mercury level in the upper well and the plunger therein travels accordingly. This causes the wheel lever to raise or lower and at the same time



A TYPICAL AUXILIARY CONTROL PANEL



A RECORD OF THE OPERATING RESULTS PRODUCED BY THE AUTOMATIC CONTROL WITH A 500-HP. WATER-TUBE BOILER turn slightly, whereupon the valve gear and the pilot valve piston are raised or lowered, since the hydraulic balancing pressure must remain constant until the above changes have taken place. As soon as the piston of the pilot valve is raised or lowered water from the city mains is admitted to the top or bottom of the hydraulic cylinder, causing the piston to move upward or downward, restoring the position of the wheel lever and automatically returning the piston of the pilot valve to a neutral or closed position. The neutral position is attained as soon as the hydraulic piston travels downward or upward as far as the mercury plunger traveled upward or downward, or in other words as soon as the hydraulic pressure is balanced against the steam pressure on the mercury. When this balance takes place the master control holds that position until there is another change in pressure.



DIAGRAMMATIC DRAWING OF AUTOMATIC CONTROL SYSTEM SHOWING MASTER AND AUXILIARY CONTROLS

The operation of the master control is transmitted to the individual auxiliaries, there being one auxiliary control for each damper, stoker engine or motor, forced-draft fan, etc. The auxiliaries are all connected to the master control by a strong tiller cable or chain, and the connections are run through conduit pipes with special pulleys so constructed as to make possible a turn through any angle. An interesting feature of the graduated control is that each auxiliary may be so adjusted one boiler may be set ahead or back of the others and the load carried on a certain number of boilers up to a predetermined rating, when the others can be cut into service automatically and at any rate desired.

Where engines or turbines are used for driving stokers or fans a special chronometer valve is employed. This is designed to supply steam under graduated control. In general, the valve is of the vertical piston type with a rectangular opening through the piston and a corresponding rectangular port in the body of the valve. The length of stroke of the piston is determined by the auxiliary control, so that the flow of steam to the stoker or fan engine is varied to correspond with the requirements. There is also provision for micrometer hand adjustments which permit of turning the piston of the valve to vary the width of the port to suit the requirements of any particular machine. An accompanying illustration on page 1006 shows the comparative record taken on a 500-hp. water-tube boiler during consecutive hours of the operation as controlled by the automatic system. The load chart is shown at the top and the damper position just below. The other simultaneous readings plotted on the chart are the uptake temperature, differential draft and steam pressure. It will be noted that at 7 p.m. with a load of 900 hp. the damper was nearly wide open. From then until 8:30 p.m. the load diminished and the damper position changed correspondingly. Also, between 4 and 5 o'clock the next morning the load gradually increased, and again the damper changed its position, gradually opening up until the peak was reached, showing how the damper is maintained in the correct position to supply the proper draft and produce the rate of combustion necessary to carry the load efficiently. The feed of the stoker had been increased in the same proportion, so that the efficient relations between draft and fuel bed established for the grade of coal burned was maintained automatically throughout the period and with much closer precision than is possible with hand regulation.

Safety Crossing Signal for Interurban Lines

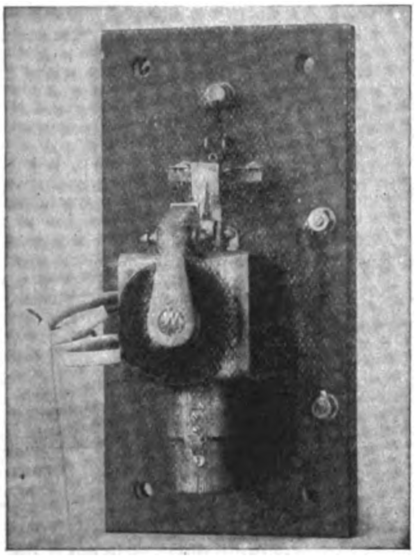
A SAFETY crossing signal adapted for use on electric interurban lines is being marketed by the Charles Adler Safety Crossing Signal Company, Baltimore, Md. This signal system is a combination of an audible alarm placed at the crossing to warn vehicles of the approach of a car and a visual side signal to indicate to the motorman of an approaching car whether or not the bell at the crossing is operating. If the signal system is out of order the bell does not ring, but its failure is signaled to the motorman, so that he will be aware that he is approaching an unprotected crossing and can regulate his speed to safe limits. The signal operates in conjunction with an open-track circuit from the trolley in conjunction with a relay. This relay is designed to give positive action with a very small current, and current is used only while the trolley wheels pass the trolley contact. The relay is so designed that the armatures when once moved will remain in position without the necessity of an energizing magnet to hold them.

Among the advantages claimed are that when out of order it causes no inconvenience to nearby residents by continued ringing and its maintenance cost is low.

New Relay for Direct-Current Circuit

A NEW relay, known as type KN, is now being manufactured by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. It may be used either as a signal relay or as a trip-free relay.

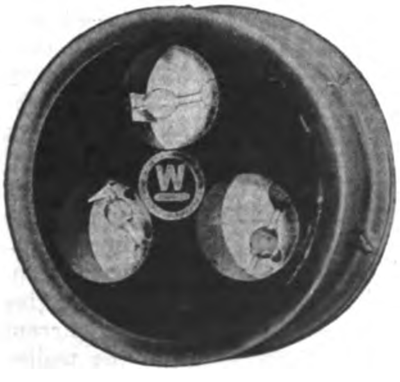
When used as a signal relay it operates an audible or visible signal to notify the attendants that a circuit breaker has been tripped automatically. The contacts of the relay are normally held latched in the open position. In operating, this latch is released by a coil in series with the circuit breaker trip coil and is reset by a coil connected across the control circuit. The contacts will remain closed until the circuit of the reset coil is energized by means of a push button. The signal is actuated only when the tripping is done by automatic devices and does not operate when a circuit breaker is opened manually.


NEW DIRECT-CURRENT RELAY

When used as a trip-free relay it prevents the holding in of an electrically operated device, such as a circuit breaker, while an abnormal condition exists on the circuit. When the circuit breaker is opened automatically the circuit breaker closing circuit is also opened. When the trouble has been removed from the lines the controller is moved to the trip position, thus resetting the trip-free relay and closing the circuit breaker closing circuit.

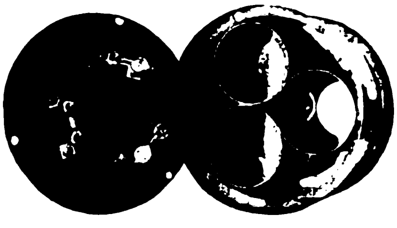
Vacuum Tube Type Electrostatic Glow Meter

INDICATION of potential, ground detection and synchronism are the three uses to which a recently developed electrostatic glow meter can be placed. This device is manufactured by the Westinghouse Electric & Manufacturing Company and consists essentially of three vacuum tubes. When used as a ground detector or potential indicator the device is connected so that one of the bulbs is in parallel with the bottom section of each of the three insulator columns. When used for synchronizing between a bus and a line or between two lines or two buses the glow meter is connected as follows: The phase connections through one of the bulbs are made such that it will not glow at synchronism. The phases of the two lower bulbs are crossed so that they will glow a half brilliancy at synchronism. When out of synchronism there will be an apparent rotation, which will be an indication as to whether the incoming line is fast or slow.


ELECTROSTATIC GLOW METER

For switching these instruments small oil switches may be used so that it is possible to use one glow meter for a number of purposes; that is, if enough oil switches are provided.

The base on which the apparatus is mounted is of micarta insulation. The small bulbs are filled with a rare gas which has the property of giving forth a vivid orange-red glow on an extremely small static discharge. They are mounted on spring clips and are separated from each other by micarta tubing.


ELECTROSTATIC GLOW METER WITH COVER REMOVED

Two-Way Pull Plug for Shop and Other Uses

THE Benjamin Electric Manufacturing Company of Chicago, Ill., has just brought out a pull plug which is a development of its No. 92 two-way plug. This has been on the market for several years. In addition to providing the convenience of two outlets, the pull-chain mechanism controls one of the outlets so that this lamp can be turned off independently. This should prove a convenient fixture in shops where it is necessary to have a drop light close to the work in addition to another light for general lighting purposes. The pull chain attachment also enables this plug to be used in such locations where different intensities of light are necessary.

TWO-WAY PLUG FOR SHOP USES

Fatty Acids in Lubricants

AT THE meeting of the National Petroleum Association, held at Pittsburgh, Pa., on April 22, a paper was read by H. M. Wells and James E. Southcombe on "The Theory and Practice of Lubrication." This paper was designed to explain the principles involved in the "germ" process of lubricating oils, which is said to have been tried out on a considerable scale in Great Britain. "Germ process" oil is made by a patented process, and it is intended for use in small proportion in mineral oil to give the quality of "slipperiness," which the authors of the paper attribute to low-surface tension.

In the paper experiments are described which demonstrate that the frictional resistance shown by any mineral oil can be definitely reduced by the addition of about 1 per cent of commercial fatty acids. The frictional coefficient of a pure mineral oil is said to be lowered by at least 25 per cent by such mixture without danger of serious corrosion of lubricated surfaces.

Association News

Claims Work Well Under Way

On May 11 S. B. Hare, president of the Claims Association, held a conference at association headquarters with several committee chairmen and outlined the work to be covered prior to the convention. The result of the conference was briefly as follows:

The committee on constitution and by-laws is to harmonize the constitution of the Claims Association with respect to the changes that have been made in the past in the rules of the American Association, especially the provisions regarding membership.

The committee on interchange of claims statistics is to prepare for issuance by Secretary Burritt a questionnaire covering claims department costs. The working up of this information, when collected for comparative purposes, so that it will be available for member companies will also fall to this committee. The detailed tabulating work, however, will be done at the association office.

The committee on membership plans a campaign to increase enthusiasm among claims officials in the work of the association. The lack of this at present is reflected in the small number of individual members. The committee hopes that by waging a vigorous campaign for a larger attendance at convention meetings, together with personal effort on the part of all present members to reflect the benefits derived in the past from association work, a greater association interest can be aroused. This should develop new ideas not heretofore brought out that should prove of material advantage to all members.

Claims Association Committees

The complete list of Claims Association committees appointed to report at the 1920 convention in October is as follows:

Safety Committee: R. E. McDougall, New York & Harlem Traction Lines, chairman; C. G. Rice, Pittsburg (Pa.) Railways; W. F. Weh, Cleveland (Ohio) Railway; H. V. Drown, Public Service Railway, Newark, N. J.; H. K. Bennett, Eastern Massachusetts Street Railway, Boston.

Committee on Resolutions: A. G. Jack, Wilmington & Philadelphia Traction Company, Chester, Pa., chairman; C. A. Glawson, Macon (Ga.) Railway & Light Company; H. O. Allison, Beaver Valley Traction Company, New Brighton, Pa.

Committee on Ways and Means: J. S. Harrison, Jacksonville (Fla.) Traction Company, chairman; S. J. Herrell, Knoxville (Tenn.) Railway & Light Company; H. L. Arden, Northern Ohio Traction & Light Company, Akron, Ohio.

Committee on Subjects: J. S. Kubu, New York State Railways, Utica, N. Y., chairman; Claude D. Davis, Columbia (S. C.) Railway, Gas & Light Company; W. G. Fitzpatrick, Detroit (Mich.) United Railways; L. F. Wynne, George Railway & Power Company, Atlanta.

Committee on Interchange of Claims Statistics: H. D. Briggs, Public Service Railway, chairman; W. F. Weh, Cleveland Railway; J. S. Kubu, New York State Railways, Utica, N. Y.

Committee on Constitution and By-Laws: H. K. Bennett, Eastern Massachusetts Street Railway, chairman; W. F. Weh, Cleveland Railway.

Committee on Membership: C. G. Rice, Pittsburgh Railways, chairman; Wallace Muir, Kentucky Traction & Terminal Company, Lexington, Ky.; W. A. Tichenor, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

Equipment Committee Meets

The equipment committee of the Engineering Association held a general meeting at association headquarters on May 7. Several of the sub-committees met May 6 to prepare material for presentation at the general meeting. Those in attendance were: Daniel Durie, West Penn Railways, chairman; R. H. Dalgleish, Capital Traction Company; James C. C. Holding, Midvale Steel & Ordnance Company; E. D. Priest, General Electric Company; F. W. Sargent, American Brake Shoe & Foundry Company; K. A. Simmon, Westinghouse Electric & Manufacturing Company; C. W. Squier, Electric Railway Journal, and J. W. Welsh, special engineer of the association.

There was considerable discussion in regard to motor failures which occurred on roads operating in New England during the recent severe winter. Several definite suggestions were outlined for reducing troubles under these conditions and for producing more reliable equipment. The replies which have been received to the questionnaires regarding the life of wearing parts and equipment failures due to severe weather conditions were gone over at considerable length, and plans for summarizing these so that definite conclusions could be drawn were decided upon.

The sub-committee having charge of the standardization of railway motor parts decided to have a meeting at the works of the General Electric Company, Schenectady, N. Y., on May 18. It was considered particularly important that all the railway members of the committee make a special effort to attend. An earnest endeavor will be made on the part of all the various sub-committees to finish their work this month, so that final reports and recommendations can be made at the next meeting of the committee on equipment, which will be held June 3 and 4 at association headquarters.

Simon Lake of Submarine Boat Fame Addresses Company Section

The principal speaker at the dinner meeting of the Connecticut Company Section held on May 6, at Bridgeport, was Simon Lake, eminent through his inventions in the field of submarine boat design and construction. Mr. Lake's topic was "The Commercial Submarine," but he also discussed briefly the military submarine. In his lecture, as he has done consistently heretofore, Mr. Lake defined the legitimate scope of the military submarine as coast defense. For this purpose, he said, it will be a necessity for a long time to come. The commercial submarine, as he is now actively developing it, is not primarily for the transportation of goods, although he sees a great future for it in this field. For the present the primary purpose is in salvaging wrecked vessels and their cargoes and in gathering the natural treasures to be found on the beds of the oceans and other bodies of water. Mr. Lake also sees an opportunity for the submarine in Arctic exploration, as this type of boat lends itself well to travel under ice, its framework being lightly in contact with the smooth undersurface of the ice. He believed that goods can be transported in this way, also, in a few bodies of water which are closed by ice through a large part of the year.

Other speakers were S. B. Price, secretary of the Chamber of Commerce, who represented the Mayor; Philip A. Atwater, treasurer of the Columbia Lock Nut & Bolt Company and president of the Kiwanis Club, and J. S. Goodwin, local manager, and W. J. Flickinger, assistant to the president, the Connecticut Company. Chairman W. R. Dunham, Jr., turned the meeting over to Mr. Goodwin, who presided while the addresses were being made and a varied entertainment program was being given.

An interesting feature of the meeting was a brief description by Mr. Flickinger of the new zone system, scheduled to be put into effect on May 9. He solicited the co-operation of the members of the section in selling commutation tickets and otherwise making the new system a success.

Letters to the Editors

Automatic Substation Savings

OMAHA & COUNCIL BLUFFS STREET RAILWAY
OMAHA, NEB., April 14, 1920.

To the Editors:

In the article in the March 13, 1920, issue of the ELECTRIC RAILWAY JOURNAL on "Automatic Substations for Heavy City Service," by R. J. Wensley, I note that originally there were two power stations in the example discussed and, according to the proposed plan, one was to be abandoned and sold for scrap.

The power house that is to be abandoned contained 8,000 kw. in direct-current generating machinery for which a credit of $100,000 was taken as scrap value. This 8,000 kw. will have to be replaced by installing 8,000 kw. in alternating-current generating machinery and sufficient boiler capacity in the plant that is to remain. If the old boilers were used from the scrapped plant in the other plant, the additional expense of moving and erecting the boilers, the purchase of new turbines and condensers and the building of an addition to the power-house building would amount to about $100 per kilowatt.

The cost of 8,000 kw. in new power-house equipment would then be in the neighborhood of $800,000, instead of the $100,000 as allowed in Mr. Wensley's Table II. Table II would then read as follows:

GROSS COST OF THE NEW SYSTEM

11,500 kw. of substations at $40		$460,000
25 miles of line at $5,000.		125,000
Reconstruction of feeder system		25,000
Power-house equipment, turbine, generator, foundations, building, etc.		800,000
Total cost of automatic substations		$1,410,000
Credit power plant scrap	$100,000	
Credit for copper removed	205,380	305,380
Net cost of automatic substations		$1,104,620
Fixed charges at 15 per cent on net cost		165,693
Annual operating labor		7,000
Gross annual charges against automatics		$172,693

ANNUAL EXPENDITURE DUE TO NEW EQUIPMENT

Annual saving in copper loss	$66,000
Annual saving in platform labor	14,600
Annual saving in shutting down old plant	50,000
	$130,600
Annual cost of substations	172,693
Annual expenditure due to new equipment	130,600
Deficiency annually	$42,093

This would leave a deficiency of $42,093 annually, instead of $47,970 credit, as shown.

I should like to hear from other engineers on this subject.

W. O. JACOBI,
Superintendent Electric Line.

[The above letter was submitted to Mr. Wensley for his comment. Mr. Wensley has replied as below.—EDS.]

WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY
EAST PITTSBURGH, PA., May 5, 1920.

To the Editors:

I have your letter enclosing a copy of one submitted by W. O. Jacobi for publication in the ELECTRIC RAILWAY JOURNAL, in which Mr. Jacobi comments on the paper which I presented before the American Institute of Electrical Engineers on March 12. In reply to the points raised by Mr. Jacobi, I would state as follows:

If new power-house equipment had to be purchased to take the place of the 8,000 kw. in the old direct-current generating equipment in the case which I cited, then Mr. Jacobi's comments undoubtedly would be correct. The figures that were given in the Institute paper, however, had to do with a specific case and were the figures worked up for use on a particular job. On this particular job it is unnecessary to purchase new generating equipment since, at the time the new power station was built, complete generation was installed to take care of this load. The figures as given, therefore, represent the money which the traction company actually will have to spend at this time in making the change to automatic substation operation.

There is no question at all but that if the proposition was being analyzed as an entirely new one the additional annual charge of the power-plant equipment should be assessed against the operation of the railway. Under the conditions, however, which had to do with an actual case and with real money which must be spent at the present time and not with investment previously made which may be used in the reconstruction, I feel that the figures as given in the Institute paper are correct.

R. J. WENSLEY,
Switchboard Engineering Department.

Two More Large Turbines

THE United Electric Light & Power Company, New York City, one of whose large customers is the New Haven Railroad, will soon install two Westinghouse turbine-generators which will have a capacity of 35,000 kw. or a short-period peak-load capacity of 40,000 kw. These will be of the tandem-compound type, somewhat similar to the units installed in the Northwest Station of the Commonwealth Edison Company, Chicago, Ill. They will operate at 1,200 r.p.m., producing three-phase current at 13,200 volts, 60 cycles. The turbines will be designed for 220 lb. steam pressure, 200 deg. F. superheat and 29 in. vacuum. They will have reaction blading throughout. The high-pressure element will be single-flow and the low-pressure element double-flow.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Franchise Vote Soon

Houston Service-at-Cost Measure Being Prepared for Submission to Voters

The new franchise for the Houston (Tex.) Electric Company, embodying the service-at-cost feature and patterned somewhat after the franchise granted the Dallas Railway in 1917, has finally been completed by city officials and representatives of the company. After submission to the expansion board of the city of Houston for its approval, the proposed franchise will be placed before the voters for their approval at a referendum election to be called for that purpose. The franchise does not in any way affect the Galveston - Houston Interurban, its schedules, fares or method of operation.

City Has Right to Purchase

Under the proposed franchise the city of Houston has the right to purchase the entire plant of the company, but not any part of it, at any time it may desire to exercise such option, at the agreed valuation of $6,000,000 plus amounts credited for betterments and improvements.

A sliding scale of fares is provided. When the fare regulating fund, $40,000, becomes 40 per cent above normal, the fares are to be reduced in accordance with the schedule; if the fund should reach 40 per cent below normal then the company will be allowed to raise fares to the next step indicated.

The valuation of the company's holdings will remain at $6,000,000, the figure set by the federal court on March 13. On this amount the company will be allowed 8 per cent per annum as a fair rate of return.

A board is provided by the proposed franchise, called the board of control, consisting of four members, two representing the city and two the company, the Mayor being one of the city's representatives by virtue of his office and chairman of the board, the other member of the board representing the city to be appointed by the Mayor and approved by the City Council.

Service Regulations with City

In the event the board fails to agree on any problem it then has the power to select a fifth member by a majority vote. In case it cannot make such a selection within five days then the matter will be decided by the district judges in Harris County, they selecting the fifth member by a majority vote.

The power to regulate the quality and quantity of service is to remain with the City Council and the requirement of the extension of lines unless it can be shown by the company that such an extension would interfere with the earning of a fair rate of interest; in that case if the citizens of the community wish the extension and are willing to pay for it by increased fares to that section then it will be made by the company.

$1,000,000 for Improvements

Considering the acceptance of the franchise by the company to be ample compensation for the passage, the city only requires that the company pay it $500 on Jan. 1, 1921, and on the first of the year after that.

In case the company does not render the service to which the public is entitled, the city has the right to enforce the obligation by mandamus or to forfeit the franchise by judicial proceedings.

The franchise states that the company has filed a list of expenditures that is proposed for the improvement of the property estimated at $1,000,000, and says that by the filing of such an article the company has bound itself to carry out such improvements.

Electric Railway Men Not Subject to Eight-Hour Statute

A decision which in effect holds that electric and interurban railroads do not come under the provisions of the Adamson eight-hour act was rendered recently at Sacramento, Cal., by Judge William C. Van Fleet, in the United States District Court.

The case was styled J. E. Williamson vs. Northern Electric Railroad (since changed to the Sacramento Northern) and was a test case, by which Mr. Williamson, as a former employee of the line, sought to compel the payment of wages claimed to be due him as between the ten-hour and the eight-hour basis, and covering the period since Jan. 1, 1917, when the act went into effect.

Judge Van Fleet ruled that Williams in the first place, as an employee of the electric railroad, did not come under the act for the reason he was not engaged in the handling of interstate commerce.

In the second place, the Judge held that since the plaintiff had accepted receipts with the clause "in full settlement of all demands to date" he was barred from again coming back to the corporation and asking for more pay. The court ruled that this would bar the collection of additional wages regardless of any act.

New York Arbitrators Meet

Adjustment of Wages in Rochester, Syracuse and Utica Before Board for Settlement

The first step toward bringing about an adjustment in the matter of wages between the New York State Railways and its organized employees in Rochester, Syracuse and Utica was taken at Syracuse on May 12, when B. E. Tilton, vice-president and general manager of the New York State Railways, named by President James F. Hamilton to represent the company in the arbitration proceedings, met with James H. Vahey, Boston, for the purpose of choosing a third party to take part in the proceeding.

Union Selects Its Counsel

Mr. Vahey was the choice of the men as their representative. He is the general counsel for the Amalgamated Association. The selection of the third man may prove very difficult owing to the fact that it is expected the choice of one side will not correspond to the desires of the other, while those that would be viewed with favor by both parties to the dispute will likely refuse to serve.

The sections of the proposed labor contract on which the company and men do not agree and which the arbitration will finally decide are as follows:

Sec. 2. The hours of labor and weekly working period for motormen and conductors.

Sec. 19. Providing for flagmen and crossing tenders and their wages.

Sec. 22. Providing for Sunday work for motormen and conductors who have no regular Sunday work day and are called back to work on that day.

Sec. 27. Providing for the wages of motormen and conductors.

Sec. 31. Which has been combined with Section 37, which is to provide for motormen and conductors who hold city runs and are asked to do extra work on the third rail; also providing for the hours of labor and wages of men in express and baggage work.

Sec. 39. Providing the minimum pay for express and baggage men when required to report.

Sec. 2 of the Oneida Supplement, which covers wages of motormen and conductors on the Oneida Line.

The hours and wages of the employees as requested in the Oneida Supplement of the agreement, which provides for a differential for motormen and conductors on this line.

Wages and Hours General Subject

It was agreed that the arbitrators should consider the wages and hours and make an award thereon covering all sections in the agreement whether specifically mentioned herein or not.

It was previously stated that there would be nine arbitrators in a Utica report This was erroneous.

Detroit's Extension Program Halted

Plans of City Administration Demand Removal from Detroit United Railway of Authority to Build More Track

Construction activities by workmen employed by the Detroit (Mich.) United Railway on the Harper Avenue extension were stopped only after John Kerwin, superintendent of the company's track department, had been placed under arrest. This action was taken after Corporation Counsel Wilcox had informed members of the Council that the plans of the administration demanded the removal from the company of all authority to build more track. The preventing of further track construction in the city by the Detroit United Railway was declared a part of the Mayor's plan and the Council indefinitely postponed the reconsideration of the vote by which the resolutions were adopted rescinding authority to the company to build extensions.

COUNCILMAN KRONK, the only member to vote against the postponement of the resolution to reconsider revoking the company's right to build extensions, stated that in his opinion the people did not intend to stop railway construction when they approved the Mayor's plan on April 5. He maintained that the people had the impression that the plan approved would double the activities in the matter of railway extensions. He also maintained that the company could put the lines in operation and then if long drawn out litigation proved necessary, the people, in the interim, would have the additional transportation facilities. In the meantime additional lines could be built by the city so that eventually a system would be developed that would serve all the people.

The president of the Council cited that inasmuch as the Corporation Counsel indicated that full responsibility for any action that was part of its street railway plan must be assumed by the administration, it was not the province of the Council to hinder in any way the development of the Mayor's plan by which he had pledged to improve the city's transportation facilities.

POLICE DISPERSE WORKERS

The technical point upon which action of the city officials was based in stopping work on Harper Avenue was the failure on the part of the company to obtain a permit from the Department of Public Works for work in the street. In 1917 a Council resolution was passed instructing the Detroit United Railway to double track Harper Avenue, which was then provided with a single track built on the north side of the street under an old county grant to the Rapid Railway before the territory was included in the city.

When the Mayor's secretary and the Corporation Counsel visited the site and found about fifty men at work excavating in the middle of the street for a double track foundation they reported to the Mayor and were instructed to have the Commissioner of Public Works stop the work if no permit had been issued. With a small squad of policemen it was attempted to stop the workmen, but results were ineffectual, for while part of the construction gang were being ordered out of one end of the trench others would return to work at the other end. After reinforcements had been hurriedly summoned from police headquarters, about forty policemen cleared the trench. After Superintendent Kerwin's arrest and his telephone conference with officials of the railway, the workmen were dispersed and a small detail of police left to prevent the work from being resumed.

After the Council proceedings rescinding the company's authority to build extensions had been signed by the Mayor, a letter was sent to the Detroit United Railway by the Commissioner of Public Works notifying the company that the permit issued last November to build double tracks, switches, etc., on Montclair, Schumacher, St. Jean, Warren Avenue East and Bewick has been canceled and any privileges granted thereby have been revoked. The Mayor expressed his willingness to go to the mat with the Detroit United Railway for a finish fight. He charged that the company started its men on the job on Harper Avenue without a permit on the very day he had named in requesting the company for a conference to determine what procedure was to be taken in regard to that extension. The Department of Public Works has been instructed to pave Harper Avenue and at the same time lay foundations for a street car line to be built by the city.

While the city was stopping work on the Harper line, another crew of track builders had begun work on the St. Jean extension. This work also was stopped by policemen after an experience somewhat similar to that in connection with the Harper line. Work there had also been started without the necessary permit from the Department of Public Works.

Paving Charges Withdrawn

The Janesville (Wis.) Traction Company has been relieved of the cost of street paving along its tracks. The ordinance as passed by the City Council on April 19 follows:

Sec. 1. In all cases where the streets of the city of Janesville upon which the tracks of the Janesville Traction Company are laid, or shall hereafter be laid, shall be paved or macadamized, the macadamizing, as the case may be, occasioned by the side tracks being laid in said street, such extra cost being measured by the difference between the cost per square yard of paving the roadbed of said company, and the cost per square yard of paving outside the roadbed; the term roadbed as herein used shall be understood to mean that portion of the street between the rails of said company and the short space outside the rails occupied by the ties. Said traction company, if dissatisfied with the bid for paving said roadbed, shall have the right to pave the same and collect of said city as compensation therefor a sum equal to the contract price per square yard of paving said street outside the roadbed; in case of such election by the traction company to pave its roadbed, the said company must perform said work in all respects according to the plans and specifications therefor, to the satisfaction of the Board of Public Works, and such work shall be commenced, prosecuted and completed in all respects as directed by the Board of Public Works, and within the time limit set by said board.

Sec. 2. The said Janesville Traction Company shall maintain and keep in repair its right-of-way in all streets, and shall repair any and all damage done to streets, or bridges of said city, or to the macadamizing or paving thereof, in the construction of its railway and the laying and repairing of its tracks, and shall replace any pavement taken up, destroyed or damaged, placing the same in as good condition as theretofore, and said Janesville Traction Company shall also protect and save and keep harmless the said City of Janesville from all claims for damages, costs and expenses arising from the negligent construction, negligent want of repair or operation of its said railway.

Sec. 3. If the said Janesville Traction Company shall fail or neglect to pay the extra cost of any such street improvement, or shall fail to restore any pavement displaced by it, or to keep the tracks, roadbed and right-of-way of said company in repair, as herein provided, or shall fail or neglect to level or remove the snow from its tracks, the Common Council shall have power to cause the same to be done and recover the costs therefor from said company.

Sec. 4. Any and all former ordinances, or parts thereof, so far as the same are inconsistent with this ordinance, are hereby repealed.

Sec. 5. This ordinance shall be published for three successive days following its passage, and shall be in force and take effect from and after its passage and publication.

Lima Talking Franchise

A controversy has arisen in Lima, Ohio, over the matter of a new franchise to the Ohio Electric Railway. Tentative drafts of a new grant were submitted some time ago by the city. These were revised and used as the basis of a proposal from the company. The ordinance proposition from the railway is based on the service-at-cost plan.

John E. Zimmerman, of Day & Zimmerman, operating managers for the Ohio Electric Railway in the interests of Drexel & Company, Philadelphia, Pa., has explained that the ordinance proposed by the company provides for the extension of the tracks in Lima to the Garford auto plant just as soon as viaducts can be built for the railway tracks. New cars for all city lines are specified, the type of rolling stock to be left to an agreement between the company and city officials. Power needs will be met temporarily by securing additional current from Toledo until such time as the Ohio Electric Railway can provide greater power facilities at its local plant.

The ordinance has been approved in joint session by company representatives and Councilmen. Opposed to the measure, however, is a citizens' committee. This committee desires its own franchise adopted and made mandatory on the part of the company. It is the contention of the citizens that improvements may be slow if the measure advanced by the company is adopted. To this objection it is explained that Drexel & Company, representing the holders of the bonds of the railway, are willing to advance funds to meet urgent needs in Lima, but that they could hardly be expected to go to any great expense unless assured that they would in the event of foreclosure be protected by an arrangement which would permit them to operate at a profit.

Sense of Perspective Preserved

The jitney has for some time been a problem at Asbury Park and Bradley Beach, N. J., where the Atlantic Coast Electric Railway operates. The unfairness of the competition is at last coming to be realized, however, as instanced in an editorial in the *Seacoast News* of Bradley Beach. This editorial is so apropos of the general condition which exists in communities where untrammeled jitney operation is permitted that the editorial is reprinted in part:

> There is absolutely no return from the jitney owner, save possibly his automobile tax. Is it fair to encourage these men to ride before the trolley car and pick up its business when we are demanding all sorts of things from the trolley company? But we get the reply that the trolley service is poor. That may be so. There were times this winter when the steam service on the railroads was far from up to the schedule, and only a flying machine could make time. We are told that the equipment is poor. This may be. We do not question a 200 per cent rise in most commodities, but a 10 per cent rise in trolley fares is a crime to be seriously combated. Still these companies are paying the same ratio of increase for their necessities, including labor, that all other business is forced to pay. Is it reasonable to believe that under these circumstances the trolley company can provide the finest of rolling stock and the best of equipment? And yet with all these failings the trolley car is still more dependable than the lauded jitney bus. Because the trolley car is not on time and the jitney just happens along it is a great institution, but suppose we were waiting for a jitney bus and there was no trolley car to happen along? How long would it be before the jitney would be a confirmed nuisance? "Stand by the ship that carries you safely over," is a good maxim and one that should be seriously considered when we talk of discriminating in favor of the jitney bus. This institution is all right, but if posing as a common carrier it should come under the same laws as all common carriers and be subject to the same restrictions.

Trenton Suburban Strike Unsettled

There are still no signs of a settlement of the strike of the employees of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., started three weeks ago. The company is operating few cars during the day and none after dark. Deputies armed with riot guns patrol the New Jersey divisions, while mounted police of the Pennsylvania State Constabulary guard the lines in that State. Farmers in Pennsylvania who patronize the company liberally by shipping milk and produce into Trenton also watch the Pennsylvania divisions.

Company officials, government mediators and employees have conferred, but no settlement could be reached. General Manager Thompson announced that all employees who failed to return to work after May 6 would lose their seniority in case they were reinstated by the company.

Kansas Court's First Railway Case

Assumed Jurisdiction Despite Railway's Plea That It Lacked Authority Under the Circumstances

An electric railway wage dispute has been decided by the new Court of Industrial Relations in Kansas. The order became effective May 1. The case was that of the local division of the Amalgamated Association against the Joplin & Pittsburgh Railway. In the opinion of the court a controversy existed between the employees and the company, and this controversy, if allowed to proceed, would endanger the continuity and efficiency of the service of the railway, would affect the transportation of the necessities of life, would produce industrial strife, disorder and waste, and would thereby endanger the public peace, threaten the public health and injuriously affect the general welfare of the public in the communities served by the railway. The court therefore assumed jurisdiction.

THE court finds that a fair and minimum wage to be paid to the complainants and others similarly situated by the railway is as follows:

Class of Service	Rate per hour Cents
Motormen and conductors:	
First three months	.45
Next nine months	.48
Next twelve months	.51
After two years	.55
Blacksmiths	.55
Blacksmith helpers	.45
Machinists	.60
Machinist helpers	.45
Carpenters—first class	.55
Carpenters—second class	.48
Painters	.55
Painters' helpers	.45
Pitmen	.55
Pitmen helpers	.45
Armature winders	.60
Armature winder helpers	.45
Car cleaners	.45
Headlight, taillight and telephone men	$135 per month

The men contended that the wage paid by the railway was unfair, unreasonably low and not sufficient to provide reasonable living conditions for the employees and their families. The company contended that the court had no jurisdiction to hear and consider the complaint because the company was engaged in interstate commerce and that the company and its employees were subject to the transportation act as approved Feb. 28, 1920.

COURT HAS JURISDICTION

This contention was duly considered, but the court held that it had jurisdiction. Further time, however, was allowed to the company. In the second answer it reiterated its former stand and said that a wage contract, dated Aug. 1, 1914, and expiring Aug. 1, 1920, between the company and its employees was in existence and in full force and effect. The railway challenged the jurisdiction of the court to alter the terms of this contract. It alleged that for the court to do so would be in violation of the Constitution of the United States and also in violation of the Bill of Rights of the Constitution of the State of Kansas. It denied that any controversy had arisen which endangered or was likely to endanger the continuous operation of its electric railway.

On the other hand, the employees claimed the right to reopen the case before the Court of Industrial Relations on the ground that the War Labor Board had ceased to function and that the Industrial Relations Court, having been created since the War Labor Board went out of existence, was the proper body before which the matter should be heard. As stated before, the railway claimed that the contract of Aug. 1, 1914, precluded any such submission to the court. In this controversy the court held with the complainant.

WAGES BEFORE DIVIDENDS

The court said that the most serious difficulty which confronted it was the determination of the ability of the industry to pay the increased wage. Wages of labor should, however, be considered before dividends to the investor and a business which was unable to pay a fair rate of wage to its employees would eventually have to liquidate. The Kansas law imposed upon the court the obligation, so far as it has the power to do so, to assure to labor a fair wage and to capital a fair return.

There are also before the new court other cases involving electric railways, notably those affecting linemen and other employees of the Joplin & Pittsburgh Railway and one involving trainmen of the Topeka Railway.

Short Strike in London, Ont.

The Ontario Railway & Municipal Board, summoned by the City Council of London, Ont., restored service on the railway system of that city on May 5, thus ending a strike begun on May 1. The men had asked for 65 cents an hour. They agreed with the railway board to return for a test of the company's earnings, and to accept in wages a distribution of whatever revenue remained after paying other operating costs and bond interest, but with no allowance made for dividends to shareholders. This arrangement is to continue for a period of three days to two weeks, as required by the Railway Board, as a basis for a report on the necessity or otherwise of fare increases.

An increase in existing rates of seven and nine tickets for 25 cents, with free transfers, was refused by vote of the people on Jan. 1, when the company was prepared to accept six and eight tickets for 25 cents. Now the company has informally indicated that nothing less than 5 cents straight or six tickets for 25 cents can suffice, because of increased operating costs. Before the strike the men were offered a renewal of the existing wage agreement providing a maximum wage of 44 cents an hour.

An Unprecedented Appeal

Boston's Chief Executive Thinks Trainmen Well Paid with a Wage Advance of 150 Per Cent in Ten Years

An unprecedented appeal was made by Mayor Peters on May 4 to the Boston Elevated Railway to refuse the demands of its trainmen for increased wages. The Mayor defended his position on the ground that arbitration boards and certain groups of employees have in the past been prone to lose sight of the general public's welfare in industrial disputes affecting public utilities. He submitted figures to show that the trainmen are now on a wage basis somewhat similar to the Boston policemen and firemen, although the police and fire departments "demand a higher average of competency than is required of motormen and conductors." The protest was addressed to H. Ware Barnum, general counsel of the company.

THE Mayor's letter reviewing the situation as he saw it follows substantially in full:

Since the time that the daily papers carried the announcement of the demands of the motormen and conductors, I have been considering the propriety of writing to the elevated in order to lay before the trustees certain facts which should be considered by any board which might be appointed to pass upon the demands of the employees. The facts that I have in mind have not, I fear, been given proper consideration in the past, and if they are not considered at this time, a grave injustice will again be done the citizens of Boston as a whole.

PUBLIC INTEREST PREDOMINANT

I believe it may be safely said that the public interest is predominant in industrial disputes, especially in the case of public utilities, and it is my duty as Mayor to defend the public interest. This observation is more readily applicable to the case at hand for any deficit in the operation of the elevated must be met by the cities and towns which it serves. The demands of the carmen cannot therefore be considered as an isolated unit; they must rather be treated as only a part of a question in its relation to the whole. Increases in compensation to motormen and conductors in the elevated system at the present time will certainly react most unfavorably, not only on the industrial situation in Boston, but on the citizens as a unit.

I wish it distinctly understood that I am in no way attempting to abrogate the right of the workingman to better his condition when such an endeavor on his part may achieve success without injustice being done to other workingmen. In short, the recognition of a right cannot and must not mean the failure to recognize other equally important rights. Therefore, as the chief executive of the city, I feel it my duty, as well as my responsibility, to impress upon the arbitration board the fact that the interest of the public at large is paramount, and if this interest is served, that of the carmen cannot suffer. I write this letter only after the most deliberate consideration, for I appreciate that my action is not only unusual, but almost without precedent, and for that reason I have made absolutely certain of my ground before proceeding.

COMPARISON WITH POLICEMEN

In the case of thousands of city employees, it would be very difficult to compare their duties and terms of employment with those of the carmen of the elevated. On the other hand, there are certain groups of city employees whose compensation and conditions of public employment are such that the comparison with the work and compensation of the carmen would be justified. I have in mind four groups: policemen, firemen, mechanics and laborers.

Both in the police and fire departments, privates are on the same salary basis. They enter the service at $1,400 a year and progress $100 a year for four years until they reach the maximum of $1,800. The motormen and conductors, on the other hand, need work only one year before the maximum is reached. Therefore, on a daily wage basis we find the salary schedule over a period of four years, as follows:

	Police and Firemen.	Motormen and Conductors.
First year	$3.83	$4-$4.40
Second year	4.11	4.80
Third year	4.38	4.80
Fourth year	4.66	4.80
Fifth year and after	4.93	4.80

The police receive one day off in eight and they receive no overtime. Firemen receive one day off in three, and it should be remembered that practically all of the two days they are on duty must be spent at the station house. Both receive two weeks' vacation without loss of pay.

I believe, and I think it is generally admitted, that the firemen and police are receiving a fair compensation for the work performed. I have no hesitation in stating most emphatically that I believe it is the opinion of the majority of our citizens, and I believe this opinion is sound, that the duties and the responsibilities of the firemen and police are greater than those of the motormen and conductors, and without any reflection on the elevated's carmen, I think it may fairly be admitted that the police and fire departments demand a higher average of competency than is required of the motormen and conductors.

The conclusion is obvious: The firemen and police are receiving a fair compensation for the work performed; their responsibilities are greater than those of the conductors and motormen, the police and fire departments requiring a higher average of competency; therefore any increase in the salary of carmen which would automatically yield them a higher salary than the police and firemen is not only unwarranted, but it would work an injustice to certain municipal employees.

150 PER CENT INCREASE FOR TRAINMEN

The only other two classes in the city employees which are susceptible to comparison are the mechanics and laborers. In the new budget mechanics are receiving $4.50 and $5 a day, the greater portion receiving $4.50. The laborers are now receiving $4 a day. The terms of their employment give them two weeks vacation without loss of pay. No overtime is paid, time off being given to offset overtime.

It would be very difficult to attempt to compare the salaries of teachers with those of motormen and conductors, for there are far too many groups.

I have before me a statement showing the rates of wages for motormen and conductors during the past thirty-two years. In January, 1910, the hourly rate was fixed at 23 cents. This has gradually risen, until in July of last year the hourly rate, after one year of service, was fixed at 60 cents—an increase in ten years of more than 150 per cent. Certainly no corresponding increase has been granted to other public employees.

The Boston Elevated is not in what could be termed a prosperous condition. I believe I voice the sentiments of a great majority of our citizens when I say that it would be most unmoral to grant any increase to the employees of the elevated were such an increase by any possibility to cause a deficit in the elevated's finances. Under such conditions the primary consideration is the great public.

The elevated carmen are at the present time receiving a good wage, and, I say this only after the most mature deliberation, they should not receive any additional compensation until they have shown themselves worth more by causing the elevated to show increased earning capacity. They must not forget that they are part and parcel of the elevated system. They have it in their power to increase or decrease the earning capacity of the company through an improved service to the public. Until they give the public a service which enables the elevated to show a greater earning power, they are not entitled to a higher wage, and not until that time should they be given increased compensation.

This is a doctrine which I believe has been too much disregarded in the past, and it cannot be overestimated at the present time.

I feel so strongly on one point that I hope you will pardon my apparent reiteration. I am convinced that the time has passed when industrial disputes, particularly those affecting public utilities, can be settled without reference to the effect that such settlements may have on the public as a whole. Arbitration boards in the past have been prone to lose sight of the large questions of public policy which may be involved, and certain groups of employees have been inclined to take this same attitude in pressing their demands.

The time has come when we can no longer shut our eyes to the fact that employees of public service corporations should enforce their rights only as far as they do not conflict with or encroach upon the greater rights of the public.

I hope that the arbitration board will have this fact in mind at all times, and will not lose sight of the fact that the motormen and conductors received an exceedingly liberal increase last summer. The members of the arbitration board are invested with a public trust, and I feel certain that no personal prejudice will prevail in their decision, and that they will make their decision purely in the interest of the public, for after all, the best interest of the public as a whole is the only insurance of the welfare of individual groups of employees.

"No Accident Week" June 6-12

A committee has been organized among the safety and employment managers of public utility properties in the States of New York and Pennsylvania to encourage interest and conduct a "No Accident Week" on the days from June 6 to 12. The plan has the backing of a number of prominent public utility interests in the States mentioned and G. R. Rinke, secretary Utilities Mutual Insurance Company, 5 Nassau Street, New York, has been appointed secretary. Success is expected because of a previous safety effort made by a number of public utilities during the week of Nov. 16-22. The influence of this week was found to continue in more marked attention to safety.

The organization in charge has prepared a poster in colors to be issued about a week ahead of the "No Accident Week," and during the week there will be about six bulletins for daily changes. There will also be an attractive button. Among the railway companies which have agreed to carry out the program are the Albany Southern Railroad, Buffalo & Lake Erie Traction Company, New York, Westchester & Boston Railway, Northwestern Pennsylvania Railway and the Buffalo, Lockport & Rochester Railway.

Wages in St. Louis Will Be Arbitrated

The motormen and conductors of the United Railways, St. Louis, Mo., have decided to submit their request for higher pay to arbitration. The proposal is that the men select an arbitrator, the company another and that these two agree upon a third, who will make up the board of three, to whom the whole matter will be submitted. Such a proposal necessarily includes an obligation to abide by the decision of the arbitrators. No provision is made in the arrangement for representation of the interests of the public, which, however, are protected in theory by the State Public Service Commission.

The demands of the men are for 75 cents an hour for the first six months

of employment, 80 cents the second six months, and 85 cents thereafter, together with an actual eight-hour working day. They were rejected by Receiver Rolla Wells. The men now receive 50 cents an hour for the first year, 55 cents the second year and 60 cents thereafter.

Labor for Higher Fares

Wilmington Union Tells Central Labor Body Increases Are Necessary—Unfair Bus Competition Protested

The Wilmington Division of the Amalgamated Association, which is associated with the Wilmington & Philadelphia Traction Company, has addressed a long letter to the Central Labor Union of Wilmington protesting against unfair bus competition and upholding the right of the company to charge higher fares. The letter was in reply to one sent to the local union by the Central union.

In referring to bus competition the railway employees make it plain that they believe the buses should be regulated on the same basis as the electric railways. They say:

> As a labor organization interested in the health and safety of the people of the community, the trolleymen's union is working for fair standards of regulation and safety, which, as the one organization intensely interested in a square deal for its members and the public, feels it is in the right in expressing its views in an open and above-board manner.

On the question of higher fares the letter calls attention to the lower purchasing power of the nickel and the large number of cities in which fares have been increased, in some cases as much as 10 cents. Considerable space is also given to a comparison of the fare and operating conditions in Wilmington and in the neighboring city of Philadelphia to prove that there is nothing in the practice in the latter city to show that a higher fare in Wilmington is not necessary. The local union concludes its letter by saying that in its preparation the union has not consulted the officials of the company, but "the cost of living has affected street railway companies just as much as it has affected workmen."

National Legislation for Utility Disputes

The Royal Commission on the unification of labor laws in the Dominion of Canada has brought in a recommendation that all disputes in public utilities should be dealt with exclusively by federal legislation. This includes public utilities under control of the provinces. If the suggestion should be enacted into law, it would mean that the Hydro-Electric Power Commission and the Hydro-Electric Radial system would come under the federal act in regard to wage disputes, etc., despite the fact that these enterprises are owned and controlled by the municipalities, but with provincial backing for their bonds.

Valuation a Stumbling Block

Toledo Commissions Holding Back Their Reports—City Provides Legal Fund

Emergency legislation was passed by the City Council of Toledo, Ohio, at its meeting on the night of May 10, appropriating a fund of $20,000 as a war budget to meet Henry L. Doherty and the Toledo Railways & Light Company in a legal battle in federal court. The railway interests called the fight when they asked for 10-cent fares with 2-cent transfer charge, with the added purpose of establishing a valuation, settling the fairness of charges for power and determining the status of the whole street railway question. The city has made no reply to the brief filed by the company, but since the Council has authorized the expenditure of $20,000 for expert legal and technical advice it is thought the city will attempt to bring on the case as soon as possible.

IN the meantime the two commissions which have been working for several months framing cost-of-service and municipal ownership ordinances have been putting the final touches on their work. It is expected they will submit the ordinances to Council in time for the meeting on May 17. Many of the Councilmen believe that the federal court case in which the valuation is fixed will have to be completed first before the propositions can be consistently submitted to the people. At the present time the city is insisting on a valuation of $7,110,000. Henry L. Doherty says his property is worth $15,000,000.

Mr. Doherty has won practically all of his contentions in the final sessions of the commission at which time his objections to the original draft of the ordinance have been considered. He has been in conference with the commission recently on the proposed plan for gradual ownership of the lines by the city. The commissioners and Mr. Doherty agreed recently on the main features of a plan by which the city would gain an equity in the property through the retirement of bonds with the proceeds of the sinking funds provided by the ordinance. However, the final question will involve the matter of valuation. There is such a divergency on this point that it is doubtful whether any agreement can be reached without the court action.

One Commission Waits for Other

The municipal ownership division has been prepared to report for some time, but has been awaiting the completion of the cost-of-service report. This commission has also had the valuation for a stumbling block. The members have surveyed many of the lines in the city with a view to rerouting and have also looked over lines in New York and Detroit in quest of the latest plan for public ownership.

When the issue will reach the voters is problematical. Most of the Councilmen are in favor of hasty submission in an effort to remove the railway question from the possibility of another ouster action when snow flies. Many yet feel that the city's final club is to oust. This was evident in the debate over the $20,000 fund for the legal battle.

If the measures are submitted to the Council on May 17 it is certain that the Council will recommend an election immediately. This will bring the vote one month later or perhaps late in June. There is a possibility that neither measure will be adopted. In that event, the matter will then be thrown into the hands of the court.

Case May Be Called in Fall

The federal court calendar is in such shape at the present time that Judge Killits declares it may be early fall before a hearing on the recent petition of the railway may be heard. However, the judge may be able to advance the hearing if it is shown that the valuation must be determined to enable a final settlement this summer.

The judge set a time limit for filing petitions for higher fare or other relief depending upon an investigation into railway issues, of which neither the company nor city took advantage.

In the argument for the passage of the $20,000 fund for legal assistance in the coming federal court fight Mayor Schreiber, Law Director Martin, and some of the Councilmen openly declared they believed there was strong possibility of neither settlement being accepted by the voters. In such a case they said it would pay the city to fight the company's valuation in court so that lower fares might follow if the property were operated on the cost-plus basis by the court.

The company has asked a "10 and 2" rate of fare to supplant its present rate of "7 and 2." It wants 8 per cent return on its investment with allowance for amortization. The company asserts that the present return is less than 3 per cent.

It also recites ordinances which give it a right to the streets without franchise and declares that the Miller public abandonment law does not apply to railway property in cities and if it does apply is unconstitutional.

Socialist for Immediate Action

Three Socialist members of the Council opposed the expenditure of any money to fight the railway in court. One of the radicals came out for immediate enforcement of the ouster ordinance in answer to the company's request to the court for 10-cent fares.

The city's valuation commission was hired with money advanced by the railway. Now the city finds it necessary to provide a large fund to bring these experts back as witnesses in the court hearings which will be held on the matter of valuation.

Sentiment Against Increase

All Pittsburgh Opposed to Wage Advance if Fares Must Be Raised Correspondingly

Trainmen of the Pittsburgh (Pa.) Railways cannot possibly be granted anything like a substantial increase in wages unless the company raises the fare to four checks for 35 cents. This, at least, is said to be the firm opinion of Receivers C. A. Fagan, S. L. Tone and W. D. George. While none of the receivers would affirm this, they would not deny that they will take this stand at future conferences between Mayor E V. Babcock, the City Council and representatives of the trainmen.

Receivers Fagan, Tone and George are strongly opposed to increasing the fare. They hold that increases in fare are invariably followed by disastrous decreases in riders. The net financial result does not justify the action. Their opinion is that their contention on this point is given verisimilitude by the opinions of some of America's foremost traction experts.

It is a fact that the receivers, if forced to grant the trainmen one-half of their demanded 75 per cent wage increase, must abandon their program for rehabilitating the company's properties. They must forego the contemplated purchase of many double-truck cars and extensive city street improvements, as well as track repairs which have been declared essential for more than a year. The trainmen are demanding a maximum wage of 91 cents an hour and material improvements in working conditions.

Mayor Babcock seems to be handling the situation all himself. He is summoning conferences almost daily between representatives of the trainmen, City Council and others, but the receivers have not been invited to participate in these meetings since April 27. It is understood that Mr. Babcock intends to invite the receivers in either late this week or early next week.

On May 10 the Mayor called a meeting of the City Council and representatives of the trainmen. At this meeting talk turned to the possibility of selling three checks for a quarter or four for 35 cents. The Mayor was represented as being opposed to any increase in fare, while the City Council is reported to be divided on the matter. The city officials had before them a special financial report furnished by Receivers Fagan, Tone and George.

It is understood that the Mayor will have some suggestion to make to the receivers when they are called into the conference.

When the proposition of selling three tickets for a quarter was broached at the Mayor's conference it was "pointed out" that this would mean an increased revenue of some $2,080,000 to the car company, "enough to allow of a wage raise of 12 cents an hour to each conductor and motorman." This, it was said, is on the assumption that travel does not fall off in volume. The annual traffic is now 250,000,000 passengers, it was explained, thus making each 1 cent of fare yield $2,500,000 to the company.

To raise the employees' wages 1 cent an hour, it was estimated, would require $167,000.

In the meantime civic organizations all over the Pittsburgh district are holding meetings and passing resolutions opposing an increase in wages for the trainmen, provided a wage raise is accompanied by an advance in fare rates.

Cleveland Wage Plan Accepted

The second vote of the platform men of the Cleveland (Ohio) Railway on the wage proposition made by President J. J. Stanley stood 2,008 for to 238 against. The balloting took place on May 7, after the local officials and Vice-President Fitzgerald of the Amalgamated Association had advised the men of the arrangements made for the submission of the schedules to a special committee of the City Council for readjustment. The first vote, taken several days before, resulted in the defeat of the proposition by 1,806 to 401.

The union thus withdraws its demand for time and one-half above eight hours a day, while the company drops its contention for the open shop and employment of women as conductors. The increase in wages amounts to 15 per cent and the minimum day is raised from five hours to six hours. The new rates will be 70 cents for the first three months of service, 73 cents for the next nine months and 75 cents thereafter.

Hearings on changes in the schedules to improve running conditions must be begun before the special committee by May 20, but no time has been set for a decision. Union officials have expressed the hope that the committee will hurry matters through as soon as possible.

On the evening of May 10 the Council enacted an ordinance making the rate of fare 5 cents, with a 1-cent charge for transfers. The old rate was six tickets for a quarter, with a transfer charge of 1 cent. It is thought that this rate will cover the increase granted the men, but it will depend to some extent upon the changes which the committee makes in the schedules.

Municipal Ownership Vote June 21

Municipal ownership of the Duluth (Minn.) Street Railway will be submitted to the people at the special city election to be held on June 21, at which time the 6-cent fare referendum ordinance will also be voted on, the City Council has decided. Municipal ownership of the railway was voted down a year ago, but upon the suggestion of the Federated Trades Assembly the Council has passed an ordinance which, upon approval at the special election, will permit the city authorities to issue $3,500,000 in bonds to be used for the purchase or condemnation of the lines of the Duluth Street Railway.

News Notes

Wage Increase Refused.—President Rankin Johnson of the Trenton & Mercer County Traction Corporation, Trenton, N. J., has refused to grant any increase in pay to the employees.

Five-Cent Wage Increase.—The Monongahela Valley Traction Company, Parkersburg, W. Va., has increased the wages of its platform men 5 cents an hour, beginning May 1. Other employees received proportionate increases.

Campaign for Saving Started.—A considerable part of the issue of *Here We Are* for May 1 is devoted to an explanation of the building and loan plan for its employees being advocated by the Georgia Railway & Power Company, Atlanta, Ga.

Valuation Before Mechanical Engineers.—Valuation topics will occupy a leading place at the spring meeting of the American Society of Mechanical Engineers to be held in St. Louis, May 24 to 27. Other matters to be discussed are power and combustion and the new elevator code.

Seventy Cents in Des Moines.—The arbitration of wages for employees of the Des Moines (Ia.) City Railway last week resulted in an award of 70 cents an hour. As the road is in the hands of a receiver, the award must be approved by the federal judge before it can become effective.

Trainmen Don Overalls.—The employees of the Monongahela Valley Traction Company, Fairmont, W. Va., have voted unanimously to form an "overall" club and to discontinue the use of uniforms such as have been worn by the trainmen. There are 125 trainmen employed by the company.

Interurban Raises Wages.—The Androscoggin Electric Company, Lewiston, Me., has posted notice of a voluntary increase in wages of its employees. Under the new scale Portland-Lewiston interurban trainmen's wages range from 53 to 55 cents an hour, a flat increase of 10 cents.

Sixty-Cent Scale Suggested.—The International Railway, Buffalo, N. Y., has submitted to the Amalgamated proposed adjustments and procedure which it is understood are to be presented by that association to the employees for consideration. The wage maximum is raised from 48 cents to 60 cents.

Board to Decide Ottawa Demands.—The employees of the Ottawa (Ont.) Street Railway having failed to reach an agreement with the company in regard to a demand for increased wages and better working conditions have decided to apply to the Department of Labor for the appointment of a board of conciliation.

New York May Take Bridge Line.—By a vote of forty-nine to fifteen the Board of Aldermen of New York has passed an ordinance which authorizes the city to take over the electric railway running over the Williamsburg Bridge which has been operated by a private company on a temporary franchise which expires May 31.

Another Carhouse Robbed.—About 1:30 a.m. on April 12 four men, masked and armed, entered the carhouse of the Pan Handle Traction Company, north of Follansbee, W. Va., tied the foreman and his two assistants, blew open the safe containing the company's receipts for the day, took everything valuable in sight and escaped in an automobile.

Portland Wages Being Arbitrated.—The matter of the settlement of the wage demands of the trainmen of the Cumberland County Power & Light Company, Portland, Me., is before a board of arbitration, consisting of G. L. Brooks, representing the men; F. H. Perkins, representing the company, and A. H. Hall as umpire chosen by Mr. Brooks and Mr. Perkins.

Increase in Pay on Lake Shore.—Conductors and motormen on the Lake Shore Electric Railway, Cleveland, Ohio, and Lorain Street Railway have received a 10 per cent increase in wages. The new wage scale is 54 cents an hour for new men, 56 cents an hour for two-year men, 58 cents for third-year men and 60 cents an hour for men serving their fourth year or more.

Interurban Strike Averted. — A threatened strike on the Niagara, St. Catharines & Toronto Railway was averted a few hours before the time set for the walkout on May 1. Four employees who had been dismissed will be reinstated. An agreement has been entered into between the company and its men to settle other grievances by means of a local board of conciliation at St. Catharines.

Council Fixes Railway Pay.—The railway committee of the City Council of Guelph, Ont., has recommended to the Council that the city shall pay its employees on the railway as follows: Carhouse men, 45 cents an hour; foremen, 47½ cents; conductors and motormen, first year, 41 cents; second year, 43 cents, and third year, 45 cents an hour. The maximum for platform men is now 41 cents.

Conciliation at Winnipeg. — Two boards of conciliation have been appointed by the Minister of Labor at Ottawa to settle disputes between the Winnipeg (Man.) Electric Railway and its railway and gashouse employees. The company is to be represented on both boards by W. J. Christie, Winnipeg, and the men by R. S. Ward, also of Winnipeg. The chairman has still to be selected.

Wages and Fares Coupled in Sarnia.—The employees of the Sarnia (Ont.) Street Railway have made a demand on the company for a 35 per cent increase in wages. The company claims it cannot meet the demand unless the present fare of 6 cents is increased to 7 cents. A strike is threatened. The matter is now up to the City Council, which has it in its power to allow the company the increase asked.

Permanent Traffic Body Proposed for London.—The advisory committee on London traffic, appointed by the Ministry of Transport, issued its report on March 25. It recommends the setting up of a permanent statutory body to be called the London Traffic Authority consisting of three members appointed by the Government and paid salaries. The authority is to deal with all questions relating to traffic in the metropolis.

City Ownership Agitated.—The City Council of Chatham, Ont., has presented a resolution to the Ontario Hydro Radial Commission asking the commission to investigate the feasibility of acquiring and extending the Chatham, Wallaceburg & Lake Erie Railway from Wallaceburg to Chatham. Investigation of the proposed electrification of the Pere Marquette Railway between Chatham and Sarnia is also asked.

Canadian Road Offered to City.—The Sudbury-Copper Cliff Suburban Electric Railway has made a formal offer to sell its radial system to the town of Sudbury, Ont., for $222,921. This amount is stated to represent $208,680, the actual cost of the system and its equipment, plus $14,251, representing three years' dividend on preferred stock. The company will accept ten, fifteen and twenty-year municipal debentures in payment.

Wage Question to Arbitration.—On April 29 the platform men of the Northern Ohio Traction & Light Company voted to submit the wage dispute between them and the company to arbitration. The same action had been taken in Canton and by the interurban men. A threatened strike was thus averted. Terms of the present contract provided for arbitration in case of a disagreement on wages and conditions. The company has chosen one man and the employees will select another. If these two fail to agree upon a third the selection will be made by Governor Cox.

Suburban Men Get Increase.—The trainmen of the Syracuse & Suburban Railway, Syracuse, N. Y., have been granted a wage increase of 33⅓ per cent. There are no franchise limitations for this company in Syracuse, Manlius or Fayetteville, through which the line operates, and a boost in the fare is not only possible but probable. The residents of the villages have shown no opposition to such a contingency. C. Loomis Allen, general manager, the Corporation Counsel of Syracuse and the Presidents of the villages through which the suburban cars operate took the matter informally before the Public Service Commission to show the need of increased revenue.

Programs of Meetings

Iowa Electric Railway Association

The program of the sixteenth annual convention of the Iowa Electric Railway Association to be held at the Fontenelle Hotel, Omaha, Neb., May 20 and 21, has been announced as follows:

The Thursday morning session, May 20, will be devoted to the address of President F. J. Hanlon, Mason City, Iowa, and to the reports of the secretary and various committees, including that of the Iowa Committee on Public Utility Information, by H. E. Weeks, Davenport, Iowa. The Thursday afternoon session will be devoted to a discussion of "Street Railway Legislation" and "Service-at-Cost Franchises." Several delegates have been listed on the program to present prepared discussions on each of these subjects.

At the Friday morning session the subjects of "Safety Cars" and "Labor Conditions and Agreements" will be similarly discussed. This discussion will be followed by the final reports of committtees and election of officers. Immediately following adjournment the delegates will proceed to Lake Manawa for luncheon and the afternoon, as the guests of R. A. Leussler, general manager of the Omaha & Council Bluffs Street Railway.

Pennsylvania Street Railway Association

The Pennsylvania Street Railway Association will meet at the Penn-Harris Hotel, Harrisburg, Pa., on May 27 and 28. The session on the morning of May 27, starting at 11 o'clock, will be devoted to the address of President Gordon Campbell, the reports of committees, the report of the secretary and treasurer and the appointment of the nominating committees. In the afternoon these papers will be presented:

"Hazards in the Electric Railway Field," by Edward C. Spring, Lehigh Valley Transit Company.

"Mutual Safeguards," by Miss Laura M. Roadifer, Philadelphia Rapid Transit Company.

"Public Policy Talk," by J. G. Gredler, Harrisburg Railways.

There will also be a discussion on the value of uniform system of making reports to the different departments of the commonwealth, under the direction of Carl N. Martin of the Trenton, Bristol & Philadelphia Street Railway.

On the morning of May 28 the following papers will be presented:

"Modern Methods of Prolonging Track Life," by E. A. Hoffman, Wilkes-Barre Railways.

"Reasonable Rate of Return on Investment," by C. L. S. Tingley, Altoona & Logan Valley Electric Railway.

"The Library as a Business Asset," by H. B. Megargee, American Railways.

"Pulverized Fuel for Peak Load Service at Railway Power Houses," by O. M. Rau, Philadelphia Rapid Transit Company.

Financial and Corporate

Reorganization Planned

Details Arranged for Successor to Jackson Light & Traction Company, to Be Sold Under Foreclosure

About 14 miles of electric railway, the electric light plant and the gas works, also certain parcels of real estate belonging to the Jackson Light & Traction Company, Jackson, Miss., will be sold under foreclosure at Jackson on May 26, as a result of proceedings instituted by the Chicago Trust Company, trustee, representing the holders of first mortgage bonds, due April 1, 1922, interest and sinking fund payments on which are in default.

REVIEW OF BONDHOLDERS' PLAN

A bondholders' protective committee, of which William T. Bacon is chairman, has drawn up a plan for the reorganization of the company. This plan provides that a new corporation, to be known as the Jackson Public Service Company, shall acquire the new franchise and all the assets of the Jackson Light & Traction Company and issue immediately $1,055,000 of first mortgage sinking fund gold bonds, of which $930,000 are to be delivered, bond for bond, to the holders of certificates of deposit for the Jackson Light & Traction Company first mortgage 5 per cent bonds.

It is explained that under the Mississippi statutes priority over the old Jackson Light & Traction Company bonds was urged by general creditors whose claims amounted to more than $100,000. It was thought that this claim could be defeated, but in order to avoid possible litigation an agreement with the general creditors was reached whereby they are to accept bonds of the new issue and dismiss their claim to priority. Accordingly $125,000 of bonds of the new issue are to be certified at once, out of which the satisfaction of all general creditors and of all the expenses of attorneys, engineers and members of the protective committee are to be accomplished. This will make the total amount of bonds which are to be issued $1,055,000.

FIFTEEN-YEAR BONDS PROPOSED

The new bonds are to be dated Oct. 1, 1919, and are to mature Oct. 1, 1934. They are to bear interest at 5 per cent to April 1, 1922, the maturity date of the Jackson Light & Traction Company bonds, and 6 per cent thereafter until maturity. They will be protected by a contract with the American Public Utilities Company, under which the latter guarantees the priority of the new issue over all liabilities incurred by the new company. The interest which was due and unpaid on April 1 and Oct. 1, 1919, on the old issue of bonds is to be paid by scrip maturing in four annual installments on Jan. 1, 1921, to Jan. 1, 1924, inclusive.

The properties are now being operated under increased rates and have been showing sufficient earnings to protect the bondholders under the plan of reorganization which has just been outlined. A municipal election was held in Jackson on Jan. 17, 1920, at which a new twenty-five-year franchise was voted for the operation of the properties. The sale of the properties in bankruptcy was effected last year.

City Not Keen About Taking Road

The New York & North Shore Traction Company, operating from Flushing to the city line at Little Neck, Long Island, and into Nassau County, shut down recently on account of inability to obtain coal at reasonable prices. The cause for the shut-down has been investigated by the Public Service Commission for the First District. At the hearing at which the investigation was made George A. Stanley, president of the company, stated that so far as he personally was concerned he favored an agreement which would permit the road to be leased to the city and be operated by the latter for a period of several years, until business conditions have resumed a normal character.

The representative of the city of New York who was present at the hearing, however, stated that the city would not be bound by any such proposal. President Stanley stated that as soon as the company could get coal operation would be resumed, but pointed out that the operation of the road during 1919 had cost the stockholders and bondholders some $50,000 more than had been received for fares and that the stockholders and bondholders had recently been subjected to an assessment of $17,000 in addition to assure the continued operation of the road.

Long Island Trolleys Lose

Five Feeders of Long Island Railroad Fail to Meet Combined Costs of Operation

The thirty-seventh annual report of the Long Island Railroad, which covers operations for the year ended Dec. 31, 1918, gives information concerning the operation of the several electric lines owned and operated by that company. The accompanying table shows that for the year the trolley operations were conducted at a loss of nearly $10,000. Only two of the lines proved self-supporting. They were the Ocean Electric Railway and the Nassau County Railway. They earned 40.5 and 3.92 per cent respectively on their outstanding capital stock.

Year Ended Dec. 31, 1918	Ocean Electric Railway	Huntington Railroad	Northport Traction	Nassau County Railway	Glen Cove Railroad	Total
Operating revenues	$156,929	$41,850	$10,425	$14,949	$24,882	$249,035
Operating expenses, taxes and uncollected railway revenue	101,204	61,863	12,041	12,994	24,015	212,117
Operating income	$55,725	*$20,012	*$1,617	$1,955	$867	$36,918
Non-operating income	303	212	213	212	212	1,152
Gross income	$56,028	*$19,800	*$1,404	$2,167	$1,079	$38,070
Deductions from gross income	41,879	3,044	837	793	1,237	47,790
Net income	$14,149	*$22,844	*$2,241	$1,374	*$158	*$9,720
Dividends	None	None	None	None	None	None
Balance to profit and loss	$14,149	*$22,844	*$2,241	$1,374	* $158	*$9,720
Outstanding capital stock	35,000	30,000	45,000	35,000	10,000	155,000
Outstanding bonds	20,000	26,000	None	None	None	46,000
Miles of single track	15.59	19.97	2.74	1.60	3.50	43.40

* Deficit.

Valuation Bill Passed Over Veto

The so-called Allen bill providing for the valuation of the property of the Public Service Railway of New Jersey has been passed over the veto of Governor Edwards. The Governor considered the measure too indefinite. He regarded it as an invitation to litigation. Under the new law the Governor was designated as a member of the valuation commission. He has now announced that he will not serve on the commission. It is his opinion that even if he were disposed to serve he could not do so because the State Constitution prohibits him from accepting any other office while serving as Governor.

State Treasurer William T. Read and State Comptroller Newton A. K. Bugbee will be in control of the valuation. An appropriation of $100,000 becomes available at once to proceed with the work. Mr. Bugbee is reported to have said that his personal view on the subject was that the State House Commission should retain the services of an expert firm of engineers of unquestioned standing to make the appraisal of the physical property of the electric railway corporations. It was his view, however, that the commission should exercise supervision in the fixing of valuations, and that these should not be based upon either present values or the values obtaining nine or ten years ago. He believed that valuation should fall somewhere between these figures, and that the commission should adopt the proper rule.

Baltimore Is Optimistic

Seven-Cent Fare, Recently Established, Should Benefit Public and Restore Confidence of Investors

There is a strong optimistic tone in the annual report of the United Railways & Electric Company, Baltimore, Md., recently issued for the year ended Dec. 31, 1919, notwithstanding a decrease of 26 per cent in net income and failure to meet all dividends during the year.

During the year there were two fare changes. On Oct. 1, 1918, the unit rate of fare was increased from 5 cents to 6 cents. This rate prevailed until Oct. 1, 1919, when the unit cash fare was again changed to 7 cents cash or 6.5 cents by tickets. The large reduction in fare gained by the use of tickets caused approximately 90 per cent of the passengers to use the 6.5 cent ticket rate, so that in effect the average rate paid was only slightly more than 6.5 cents. These fares produced a gain in railway operating revenue of 24 per cent.

On Jan. 1, 1920, a straight 7-cent fare was made effective due to the fact that the 6.5 cent fare failed to produce sufficient revenue and allow the company the surplus recommended by the Maryland Commissioners in their prior decision due to the 33.6 per cent increase in operating expenses. The company hopes, however, that with the 7-cent fare in effect it will be able to get its roadbed and equipment in good operating condition, establish credit for new cars and capital expenditures and meet every reasonable demand for adequate service.

Already thirty-three safety and 100 center-entrance trailer cars have been ordered. They are expected to produce material economies in both platform labor and power consumption as well as wear and tear on the track and special work. Sixty double-truck cars designed for train service were also purchased through agreement with a United States governmental agency.

Considerable work was done also during 1919 in rebuilding and improving the rolling stock then in service. New motors of modern design were installed under 110 cars. Power saving recorders and new type thermostats were also installed in all cars for the purpose of reducing the consumption of power. The work of vestibuling the open-end cars was continued, with the result that at the end of the year a total of 370 cars had been completely vestibuled. At the company's shops twenty-seven single-truck cars were remodeled for use as trailers. Nine cars were likewise remodeled to adapt them to the one-man plan of operation.

The accompanying table shows the financial status as compared with the previous year, together with the percentage change in each case.

INCOME STATEMENT—UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

Year Ended Dec. 31	1919	1918	Percentage change +Inc. — Dec.
Revenue from transportation	$14,711,455	$11,672,229	+26.04
Revenue from other railway operations	82,779	257,473	—67.85
Total railway operating revenue	$14,794,234	$11,929,701	+24.01
Railway operating expenses:			
Way and structures maintenance	$915,289	$551,755	+65.89
Equipment — maintenance	919,863	716,237	+28.43
Power maintenance	64,080	32,887	+94.85
Depreciation	739,712	596,485	+24.01
Power service	1,027,846	1,040,158	— 1.18
Conducting transportation	4,898,515	3,518,311	+39.23
Traffic	5,262	16,561	—68.23
General and miscellaneous	1,361,383	963,913	+41.24
Total railway operating expenses	$9,931,950	$7,436,307	+33.60
Net operating revenue	$4,862,284	$4,493,394	+ 8.20
Taxes assignable to railway operation	1,409,262	1,160,452	+21.40
Operating income	$3,453,022	$3,332,942	+ 3.60
Non-operating income	40,117	83,061	—51.70
Gross income	$3,493,139	$3,416,003	+ 2.30
Deductions:			
Rents	$477,793	$442,080	+ 8.10
Interest on funded debt	1,998,600	1,971,351	+ 1.40
Interest on unfunded debt	93,200	32,512	+186.90
Interest on income bonds (4%)	559,080	559,080	......
Amortization of discount unfunded debt	48,785	39,411	+23.80
Other amortization items	30,000	....	......
Miscellaneous	39,257	38,917	+ 0.90
Total deductions from gross income	$3,246,715	$3,083,351	+ 5.30
Net income transferred to profit and loss	$246,424	$332,652	—26.00
Profit and loss surplus at beginning of year	362,370	1,066,988	—66.00
Profit and loss credits:			
Miscellaneous	19,958	26,825	—25.60
Account of released equipment by Md. Electric Railways	322,569	....	......
Gross profit and loss surplus	$951,322	$1,426,465	—33.40
Profit and loss debits:			
Dividends on common stock (a)	204,612	818,448	—75.00
Dividends on preferred stock (b)	920	920	......
Contributions incident to war	23,176	35,575	—34.90
Adjustment of reserve for inquiries and damages	225,000	61,649	+265.50
Provision for uncollectible accounts receivable	30,586	17,000	+79.80
Income and excess profits taxes	86,221	105,035	—17.90
Welfare department deficit	31,004	....	......
Other miscellaneous debits	4,746	25,468	—81.30
Total profit and loss debits	$606,265	$1,064,095	—42.90
Profit and loss surplus at end of year	345,057	362,370	— 4.80

(a) $20,461,200 outstanding ($50 per share). (b) $23,000 outstanding ($50 per share).

STATISTICAL INFORMATION — UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

	1919	1918	Percentage change + Inc. —Dec.
Total mileage—all track (including car house, etc.)	418	415	+ 0.72
Average—total miles operated (revenue track)	402	......	......
Car-miles operated	35,522,354	32,569,906	+ 9.08
Car-hours operated	4,115,068	3,778,054	+ 8.94
Ratio CM/CH (speed m.p.h.)	8.62	8.62	......
Passenger traffic:			
Revenue passengers @ 5c	....	159,091,243	......
Revenue passengers @ 6c	168,304,855	51,397,867	......
Revenue passengers @ 7c	7,566,154	....	......
Revenue passengers @ 6.5c. ticket	50,234,549	....	......
Commutation and special ticket	8,607,267	7,698,509	+11.82
Children and half fare	9,178,141	8,646,909	+ 6.15
Total revenue passengers	243,890,966	266,834,528	+ 7.14
Transfer passengers	86,756,575	81,879,968	+ 5.96
Other free passengers	5,348,708	3,174,014	+68.60
Total passengers	335,996,249	311,888,510	+ 7.70
Operating ratio (per cent)	67.20	62.40	+ 7.70
Car-mile statistics:			
Operating revenue (cents)	41.70	36.65	+13.78
Operating expenses (cents)	28.00	22.84	+22.59
Net income (cents)	0.69	1.02	—32.35
Passenger traffic (total)	9.47	9.59	— 1.25
Car-miles per revenue passenger	0.1458	0.1434	+ 1.67
Car-hour statistics:			
Operating revenue	$3.60	$3.16	+13.90
Operating expenses	$2.41	$1.97	+22.40
Net income	$0.06	$0.088	—31.85
Passenger traffic (total)	81.70	82.50	— 0.97
Taxes—Per cent of gross revenue	9.50	9.65	— 1.55
Per cent of net operating revenue	29.00	25.80	+12.40
Return earned on common stock	1.207	1.622	— 3.44
Depreciation reserve:			
Per cent of road and equipment value	0.972	0.793	+22.60
Per cent of operating revenue	5.00	5.80	......

City Seeks Ruling on Valuation

Judge A. G. Rutherford of the Davidson County Circuit Court at Nashville has granted the petition of the city of Memphis for a writ of certiorari to determine whether the Public Utilities Commission of Tennessee was warranted in including certain property items in the amount of investment upon which the Memphis Street Railway is entitled to earn a return.

The petition was filed by Walter Armstrong, city attorney of Memphis. The granting of this petition makes certain Mr. Armstrong's declaration of several weeks ago that the courts would be asked to interpret what property could be included in the rate base. The Utilities Commission allowed about $2,000,000 for superseded property, making the total $11,800,000, and then decided that the company was entitled to earn a minimum of 6½ per cent and a maximum of 7½ per cent on the whole.

Binghamton Debts Being Paid Off

An agreement is reported under which the debts of the Binghamton (N. Y.) Railway, now in receiver's hands, are being paid. It is said that provision has been made for the return of the property to the owners within six months. From unofficial sources it is reported that the money for making these payments has been produced largely through the assistance of the bondholders of the Scranton Railway and the Scranton, Binghamton & Montrose Railway, which also control the Binghamton Railway. A statement says:

Richard W. Day, Scranton, with four others, also from Scranton, whose names could not be learned, heads the list of directors. The others include William H. Hecox, Addison J. Parsons, cashier of the First National Bank, Walter H. Morse, cashier of the City National Bank; Fred W. Ogden, of the Crocker-Ogden Company; Frank L. Fuller, Scranton and Binghamton; Thomas J. Keenan, attorney for Receiver Phelps.

The directors have elected these officers: President, Frank L. Fuller, re-elected; first vice-president, Richard W. Day, Scrantion; second vice-president, Addison J. Parsons; secretary, William H. Hecox; treasurer, Elmer M. White.

It is said that G. Tracy Rogers, long identified with the affairs of the company, will no longer serve as a director. Mr. Rogers has many interests other than the railway. Moreover, he spends much of his time in New York City.

Municipal Bonds to Yield 6 Per Cent

Bonds that are an obligation of the city of Seattle, Wash., and a lien on the earnings of the Seattle Municipal Railway are being offered by R. M. Grant & Company, New York, N. Y., to yield 6 per cent. The interest rate is 5 per cent. The purchase of the bonds by investors is recommended by the bankers for the following reasons:

1. These bonds are an obligation of the city of Seattle and have been issued to provide funds for the purpose of making additions and betterments to and extensions of the existing Municipal Street Railway system.
2. The combined gross earnings of the Municipal Street Railway system and the traction lines acquired from the Puget Sound Traction, Light & Power Company average $3,854,720 for the five-year period 1915 to 1919, inclusive, equivalent to about four and one-quarter times annual interest requirements on all outstanding street railway bonds.
3. The lien of the interest and principal on the gross revenues before any deduction is made for operating, maintenance and depreciation has been confirmed by the Supreme Court of the State of Washington.
4. It is estimated that the total value of the street railway properties now owned by the city is in excess of $25,000,000.

Albany Road May Be Saved

A plan is being worked out to preserve the Albany (Ga.) Transit Company to the city. Dismantlement had been threatened. The Chamber of Commerce regarded this as out of the question. In consequence a proposal will be placed before the community in the interest of the city under which, summarized briefly, it is proposed:

1. To bond the property for not less than $50,000 and ask the people of Albany to take these bonds, the proceeds of the bonds to be used to defray the expense of rebuilding cars, making certain changes in the lines, discharging all obligations and leaving the property entirely debt free except for such bonded indebtedness as previously existed.
2. To make a belt-line system by joining the Tift Park line with the Hilsman Heights line and taking into the loop one of the two lines now running into the southwestern section of the city.

A New Form of Relief

Councilman A. H. Palmer of Akron, Ohio, has prepared an ordinance which provides for a bond issue of $1,000,000, with which he proposes that extensions to the city railway lines shall be built, since the Northern Ohio Traction & Light Company, owner of the local road, has announced that it is not in position to build extensions at the present time.

Under the Palmer plan the city would build the tracks and rent them to the company for a return large enough to cover the bond interest and create a sinking fund for the redemption of the securities. The company would be obligated to keep the tracks in repair and when its franchise is renewed four years hence it would be required to take over the extensions by purchase.

Mr. Palmer stated that his investigations show that the extensions would cost about $75,000 a mile and that the bond issue would thus provide for 13 miles of new track. In view of the fact that the company has stated that no extensions can be built unless a higher rate of fare is granted, he says he sees no other way out of the dilemma, as he feels that the people will not stand an increase in the fare. The question would have to be submitted to a referendum vote if approved by the City Council.

Financial News Notes

Electric Branch Abandoned.—The Boston & Maine Railroad has abandoned the 3 miles of electric railway known as the Northampton Branch. The tracks will be torn up, according to report.

$225,000 of New Stock Planned.—The Fitchburg & Leominster Street Railway, Fitchburg, Mass., has applied to the Department of Public Utilities of Massachusetts for permission to issue new preferred stock to the amount of $225,000.

Note Issue of $970,000.—Notice of new financing has been given to the holders of notes, bonds and stock of the Washington-Virginia Railway, Washington, D. C., in a circular advertising an issue of 6 per cent bond secured gold notes by the company to be known as series A, $850,000 notes, and series B, $120,000, the proceeds to be used to refund capital expenditures since 1910, and for the completion of the Camp Humphreys extension.

Keeps Up Fight on Dividend Increase.—Edward D. Barry filed a petition in Common Pleas Court on April 29 asking for an injunction to prevent the ordinance increasing the dividend of the Cleveland (Ohio) Railway from 6 to 7 per cent from going to a referendum vote. Mr. Barry won a victory in his first suit to prevent a referendum vote on the question. On April 19 Council again approved the dividend increase and adopted a resolution to submit the ordinance to a vote of the electors. This is the second time Mr. Barry has intervened.

Bond Extension Not Arranged.—The $185,000 of Gardner, Westminster & Fitchburg Railway first mortgage 5 per cent bonds due on Feb. 1, 1920, are now in default as to principal. The Feb. 1 interest was paid and the bondholders were notified that thereafter interest would accrue at 6 per cent, but no definite agreement as to the extension has been made. A meeting was held with a substantial portion of the bondholders, largely savings banks in the State of Maine, and acting upon the result of that meeting the matter is being carried along in an informal way. The road is included in the system of the Northern Massachusetts Street Railway.

Economies Being Suggested.—D. W. Henderson, general superintendent of the Seattle (Wash.) Municipal Railways, proposes changes in the municipal railway which he states will effect a total annual saving of $89,226. Mr. Henderson proposes to discontinue the operation of the Alki and Fauntleroy cars north of the Columbia Street loop on First Avenue and of the South Seattle cars north of Fourth Avenue and Jackson Street. He states that by turning the first two-named cars back at the Columbia Street loop he will save daily 72.50 car-hours. The cost of operating a car an hour is $2.70, and the shortening of the two lines would effect a daily saving of $196.50.

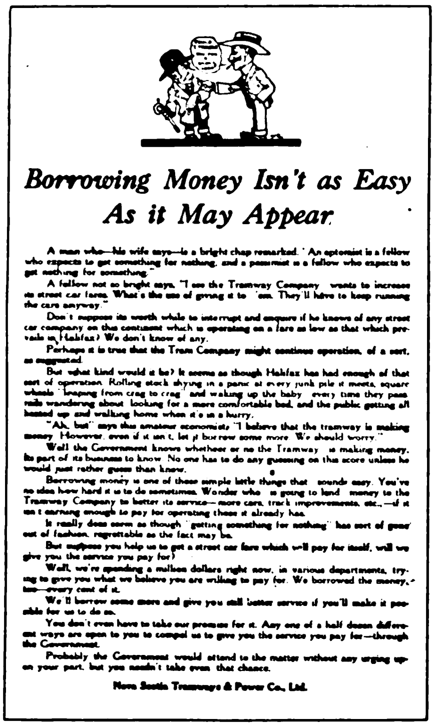
Serious Outlook for Westchester Line.—The Westchester Street Railway, White Plains, N. Y., may be forced to go out of business, according to a statement made on May 5 by Leveritt S. Miller, receiver. The company operates a line connecting White Plains, Tarrytown, Mount Vernon, New Rochelle and Mamaroneck. Mr. Miller was appointed receiver by Justice Morschauser, following an appeal to the court by the Farmers Loan & Trust Company, New York, trustee for the holders of $125,000 of bonds. The company has a power house and carhouse in White Plains on the Bronx Parkway. The land was condemned, but the commissioners extended the lease of the property where the power house and carhouse were situated. The lease has now expired and a renewal has been refused. The city authorities also refuse to allow another power house or carhouse to be built in White Plains. Unless they can be put up, Mr. Miller said, there would be nothing to do but abandon the line.

Traffic and Transportation

Publicity Plays a Part

Halifax Company Conducts Advertising Campaign in Behalf of Higher Fare

"Tell it to the people." This is the motto of the Nova Scotia Tramways & Power Company, Halifax, N. S. It's some motto, too. Just now the company looks to it to win something dear to the heart and near to the pocket of almost every electric railway—an increase in revenue.



Borrowing Money Isn't as Easy As it May Appear

A man who—his wife says—is a bright chap remarked, "An optomist is a fellow who expects to get something for nothing, and a pessimist is a fellow who expects to get nothing for something."

A fellow not so bright says, "I see the Tramway Company wants to increase its street car fares. What's the use of giving it to 'em. They'll have to keep running the cars anyway."

Don't suppose its worth while to interrupt and enquire if he knows of any street car company on this continent which is operating on a fare as low as that which prevails in Halifax? We don't know of any.

Perhaps it is true that the Tram Company might continue operation, of a sort, as suggested.

But what kind would it be? It seems as though Halifax has had enough of that sort of operation. Rolling stock shying in a panic at every junk pile it meets, square wheels "leaping from crag to crag" and waking up the baby every time they pass, rails wandering about looking for a more comfortable bed, and the public getting all heated up and walking home when it's in a hurry.

"Ah, but" says the amateur economists "I believe that the tramway is making money. However, even if it isn't, let it borrow some more. We should worry."

Well the Government knows whether or no the Tramway is making money. Its part of its business to know. No one has to do any guessing on this score unless he would just rather guess than know.

Borrowing money is one of those simple little things that sounds easy. You've no idea how hard it is to do sometimes. Wonder who is going to lend money to the Tramway Company to better its service—more cars, track improvements, etc.,—if it isn't earning enough to pay for operating those it already has.

It really does seem as though "getting something for nothing" has sort of gone out of fashion, regrettable as the fact may be.

But suppose you help us to get a street car fare which will pay for itself, will we give you the service you pay for?

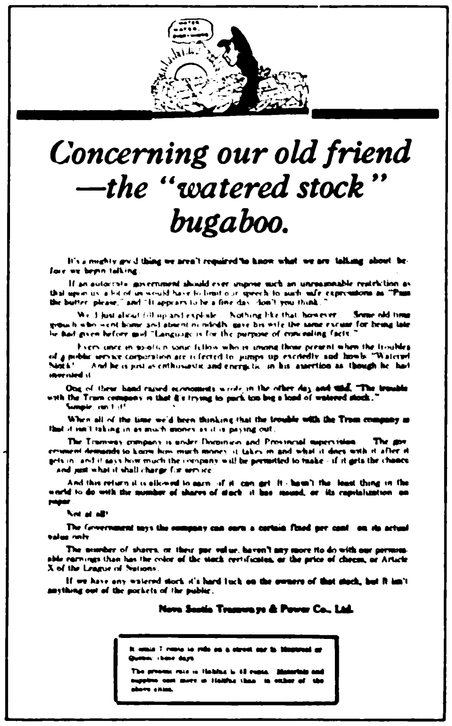
Well, we're spending a million dollars right now, in various departments, trying to give you what we believe you are willing to pay for. We borrowed the money, too—every cent of it.

We'll borrow some more and give you still better service if you'll make it possible for us to do so.

You don't even have to take our promise for it. Any one of a half dozen different ways are open to you to compel us to give you the service you pay for—through the Government.

Probably the Government would attend to the matter without any urging upon your part, but you needn't take even that chance.

Nova Scotia Tramways & Power Co., Ltd.



Concerning our old friend —the "watered stock" bugaboo.

It's a mighty good thing we aren't required to know what we are talking about before we begin talking.

If an autocratic government should ever impose such an unreasonable restriction as that upon us a lot of us would have to limit our speech to such safe expressions as "Pass the butter please," and "It appears to be a fine day, don't you think."

We'd just about fill up and explode. Nothing like that, however. Some old time grouch who went home and absent mindedly gave his wife the same excuse for being late he had given before said "Language is for the purpose of concealing facts."

Every once in so-often some fellow who is among those present when the troubles of a public service corporation are referred to jumps up excitedly and howls "Watered Stock!" And he is just as enthusiastic and energetic in his assertion as though he had invented it.

One of these hand raised economists wrote in the other day and said, "The trouble with the Tram company is that it's trying to pack too big a load of watered stock."

Simple, isn't it?

When all of the time we'd been thinking that the trouble with the Tram company is that it isn't taking in as much money as it is paying out.

The Tramway company is under Dominion and Provincial supervision. The government demands to know how much money it takes in and what it does with it after it gets in, and it says how much the company will be permitted to make—if it gets the chance—and just what it shall charge for service.

And this return it is allowed to earn—if it can get it—hasn't the least thing in the world to do with the number of shares of stock it has issued, or its capitalization on paper.

Not at all!

The Government says the company can earn a certain fixed per cent on its actual value only.

The number of shares, or their par value, haven't any more to do with our permissible earnings than has the color of the stock certificates, or the price of cheese, or Article X of the League of Nations.

If we have any watered stock it's hard luck on the owners of that stock, but it isn't anything out of the pockets of the public.

Nova Scotia Tramways & Power Co., Ltd.

It costs 7 cents to ride on a street car in Montreal or Quebec these days.

The present rate in Halifax is 6 cents. Materials and supplies cost more in Halifax than in either of the above cities.

FARE ADVERTISEMENTS OF HALIFAX COMPANY

The Nova Scotia system needs more money. There is nothing very remarkable or very original in that. The company has applied to the powers that be—in this case the Nova Scotia Legislature—for higher fares. But it has not rested its case with the Legislature and let it go at that. It realizes the force that lies in public opinion. It knows that to obtain a higher fare and to enjoy it to the full after obtaining it, it must have the support of its patrons. It knows, moreover, that legislators like their jobs and, therefore, are anxious to "stand in" with the folks back home. So the tramways officials are laying the facts before the Halifax public. They are "telling it to the people."

Large advertisements outlining the company's situation are appearing in the Halifax dailies, the *Chronicle* and the *Echo*. The man who writes the ads believes in using short words and sentences with a "punch." He does not consider it necessary to call calculus, Greek or Einstein's theory to his aid. In simple and understandable fashion the ads lay the facts before the public. Incidentally, said public is learning a lot it never knew before about economics, and is being set right regarding watered stock and other bugaboos. The best of it is that the instruction is free. If the people decide to come across with a 2-cent fare increase, so much the better.

Says the company in one of these talks on economics:

> Suppose a dozen years ago you had invested all you owned in an office building in Halifax. You had determined that the rentals would pay the expense of caring for it and give you something over for your time and something for the use of your money.
>
> The building was in fine condition and was called "modern" then. Your tenants were contented with the rates, and the steam heat and lighting arrangements and the elevator service.
>
> Then suddenly the times began to change. Your taxes doubled, the price of coal doubled, and your tenants began to complain of the slow old elevator which seemed to have a way of getting out of order at the most inconvenient time.
>
> The roof leaked and a new one was needed. Many of the rooms required replastering. The stores downstairs demanded up-to-date show windows in place of the dinky little ones which were in vogue twelve years ago.
>
> Of course you anticipated some of these things when you bought the building, but your estimates showed you could pay for them out of rentals.
>
> Then all at once you find that your dollar—just like every one else's dollar—will buy only about half as much as it did then, and that so great is this shrinkage that you don't take in quite enough money to pay running expenses and taxes to say nothing of those repairs and the profit which you counted on for your old age.
>
> How are you going to keep up that building, put in that new elevator and make those changes? Where is the money coming from? All that you have is what your tenants pay you, and that isn't enough.
>
> No, you can't raise the rent. A law, made to meet conditions when you purchased that building—when a dollar was worth 100 cents—says you can't.
>
> Wouldn't you get your tenants together some day and say: "Boys, I'm up against it. I'm paying out more on this building than you are giving me for the use of it. The only money I have to spend is what I get from you. I know just as well as you do that we have long needed a new elevator, and a new roof, and new show windows, and new plaster, and a lot of new things. Because I think I know you all to be fair I've taken a chance. I've borrowed the money with which to do some of these things and they are already under way. I hope we can turn this old building inside out and make it a credit to the street. I know you will be perfectly willing to pay me what it costs me to house you. When you have done that I can borrow more money and finish the job, and. I will finish it. More than that, I am depending upon you to help me get that old law—perhaps just and reasonable in its time—amended to fit the scrambled conditions of today. And I don't think you are going to prove my judgment wrong."
>
> Isn't that about what you would do?
>
> It's what the tram company is doing anyway.

A bill has been introduced in the Provincial House of Assembly which proposes to allow the company to raise its cash fare from 5 cents to 7 cents. The measure calls for the sale of four tickets for 25 cents and sixteen for 90 cents. It also provides that the company shall not be required to use a paving material more expensive than that used by the city. Under the terms of the measure the Board of Public Utilities would have jurisdiction over the rates to be charged by the company. At present rate regulation is the prerogative of the Legislature.

Suit to Restrain City in Fare Case

The Galveston (Tex.) Electric Company has filed a bill in equity in the United States District Court for the Southern District of Texas at Houston seeking to enjoin the 5-cent fare ordinance promulgated by the city of Galveston on June 1, 1919. Relief is sought through the same channel as that employed by the Houston Electric Company, which recently won its fight for an equitable valuation and fair return thereon when Special Master Otis Hamblen fixed $6,000,000 as a just valuation of the company's properties and held that it should be allowed to earn 8 per cent on this value.

The bill filed by the Galveston Electric Company sets forth that for the months of January, February and March of 1920, the latest figures available, the company earned at the rate of less than 1 per cent per annum on its invested capital, and that for the year 1919, during which a 6-cent fare was in effect for a period of five months, the company earned only 2 per cent on the value of its railway property. It is alleged that the present fare is confiscatory. The company seeks to enjoin the city from enforcing the 5-cent fare ordinance.

The Galveston City Commission in 1918 passed an ordinance authorizing the company to charge 6-cent fares and requiring it to pay to the city a tax of 1 per cent of its gross receipts. The measure was later repealed.

Fare Measure Passed

Sliding Fare with Seven-Cent Maximum Approved by Voters of St. Paul —Control by Council

Voters of St. Paul, Minn., have approved the ordinance to permit a sliding scale of fares upon the St. Paul City Railway, included in the Twin City Rapid Transit System, if the City Council determines the situation requires it. In short, the ordinance brings the franchise measurably under the regulations of the city charter and the service and fare under the control of the City Council.

While the measure just passed provides that the Council shall have the right to fix fares, still its right in this respect is limited to the granting of a rate of not more than 7 cents per passenger. In no event is the company to receive a rate in excess of the present 5-cent fare until it has built and put in operation sufficient cars to furnish the service prescribed by the ordinance.

The St. Paul *Dispatch* considers the result of the vote surprising in view of what had seemed to be the public temper toward the company and all of its work. That paper says that the vote is interesting if it is to be interpreted as a decision to demand the kind of service everybody wants and to sanction a higher fare to pay for the service.

SOCIALIST DEFEATED

Commissioner F. L. Powers, who drew the ordinance, was defeated for reelection. Socialism was the issue, and the rampant candidate of the Socialists for Mayor was defeated by the present Mayor, L. C. Hodgson, who will have the deciding vote in the Council.

The committee for better street railway service explained in the advertisements which it carried to influence the voters in favor of the new measure that the franchise amendment meant that the city would be empowered to compel the railway immediately to supply the full and proper service required by the citizens of St. Paul and make any additions and extensions to present trackage that might be necessary to complete such service. It was further explained that the city was also empowered to regulate the fare charge when such improved service was completed. The proposed amendment follows:

Sec. 1. That Section 13 of Ordinance No. 1227, entitled "An ordinance authorizing the St. Paul City Railway Company to construct, equip, maintain and operate street railway lines in the city of St. Paul," approved Sept. 20, 1889, be and the same is hereby amended to read as follows:

"Sec. 13. The Council of the city shall have the right, power and authority to regulate, fix and control reasonable rates of fare to be charged by said grantee for carrying passengers on any of its lines within said city, provided that the Council shall not have the right to fix, nor the said St. Paul City Railway Company the right to receive, a rate of fare in excess of 7 cents for each passenger, with his ordinary baggage, traveling on any of said lines, and upon the payment of his fare such passenger shall be entitled to a transfer as provided in Section 14 hereof; and provided, further, that in no event shall the said grantee be entitled to receive a rate of fare in excess of the present 5-cent fare until said grantee has built and put in service sufficient cars to furnish, and is actually furnishing, the service prescribed by the ordinances of said city; and provided further that no fare shall be required for a child under five years of age while traveling in the care of an older person, and that when the same car travels over two or more streets or lines there shall be but one fare for the whole distance so traveled."

Sec. 2. This ordinance shall not be effective for any purpose unless the said grantee shall accept the same, in writing, within thirty days from the passage and publication thereof, nor unless within said time said grantee shall also agree in writing, that the franchise and privileges conferred by said Ordinance No. 1227, together with any modifications thereof, including the foregoing amendment, shall be held and used subject to all the conditions and limitations in the city charter prescribed. In view of the fact, however, that said grantee does not now pay any gross earnings tax, and because such gross earnings tax tends to increase fares, and therefore must be paid by persons using the lines of said grantee, the grantee, its successors and assigns are hereby specifically relieved from the payment of 5 per cent of the gross earnings of said grantee.

Sec. 3. This ordinance shall take effect and be in force from and after its passage and publication, and the acceptance thereof by the grantee and the filing by said grantee in the office of the city clerk of the agreement aforesaid, in a form to be approved by the Corporation Counsel of said city, and after the same shall have been approved at a general or special election by an affirmative majority of the qualified electors of said city of St. Paul voting thereon.

Aid of Courts Invoked

Developments have followed fast in the Staten Island fare fight. As noted in the ELECTRIC RAILWAY JOURNAL for May 8, page 959, the strike of the trainmen employed by the Richmond Light & Railroad Company was settled on May 5 and service resumed on May 6 under an order from Public Service Commissioner Nixon permitting an 8-cent fare with strips of tickets at ten for 75 cents.

The city has been prohibited from interfering with the service by an order from Judge Thomas R. Chatfield, Federal District Court. This aroused the ire of the representatives of the city of New York. Mayor Hylan attacked Commissioner Nixon for permitting the increase in fare. F. H. La Guardia, president of the Board of Aldermen, suggested that Mr. Nixon be removed from office by Governor Smith. He urged the Corporation Counsel to obtain a writ of prohibition applying to other lines in the city.

The city did obtain an order restraining Mr. Nixon from considering any application from the Staten Island Midland Railway for permission to increase its fares. This company suspended operation some months ago on the ground that it was losing money at a 5-cent fare. When this case came before the court, on May 11, Terrence Farley, counsel for Mr. Nixon, asked a postponement until May 17 so as to prepare an adequate defense. Mr. O'Brien, for the city, said that Mr. Nixon never should have granted permission to the Staten Island company to increase the fare unless he had previously studied the situation thoroughly. This writ of prohibition and a plea to prevent the Richmond Light & Railroad from charging an 8-cent fare will accordingly come before the court on May 17.

New Zones Work Well

Connecticut Company Installs Modified Zone System Ordered by Utilities Commission

New zone fares were introduced on the lines of the Connecticut Company on May 9 in accordance with the recent order of the Public Utilities Commission of Connecticut modifying the system as adopted originally by the company itself. Employees of the company had been coached for some time to answer all questions about the new conditions, and zone markers were put up at all new limits along the line to help the public to understand the change. In consequence, there was a minimum of delay and confusion.

Under the new arrangement it costs 3 cents a mile to ride if payment is made in cash. With the zone ticket the passenger can travel for 2 cents a mile with a minimum collection of three zones punched on his ticket. The commuter rides for 1⅔ cents a mile on a commutation ticket, which is a new form of payment under the Utilities Commission order. All zones approximate a mile in length.

TICKET SALES ARRANGED

The company has ruled that if the end of any line is ½ of a mile or more beyond the last zone point, this distance will be called an additional zone, and will cost the passenger 2 cents more if he has a ticket or 3 cents if he pays cash. If the distance is less than ½ of a mile from the end of the line to the last zone point no extra fare is charged. Tickets are sold at a reduction of 33⅓ per cent from the cash rate.

The monthly commutation ticket sold at the rate of 1⅔ cents per zone is good only between the traffic centers of cities having a population of 25,000 or over and points more than five zones distant on lines radiating therefrom. These tickets are good for two rides daily except Sundays and legal holidays for the person for whom they are issued.

The order of the commission in connection with this fare change was reviewed at length previously in the ELECTRIC RAILWAY JOURNAL for April 10, page 777.

Upholds Paving Exemption

The Massachusetts Department of Public Utilities has dismissed the petition of the city of Melrose which sought to require the Eastern Massachusetts Street Railway to change the grade of its tracks and install new paving in that city. Under the old street railway law, the street railway companies were obliged to pave between the tracks and 18 inches outside the outer rails. The public control act relieved the company from this burden until two years after peace was declared. There was a provision, however, that the Public Utilities Commission might be appealed to to compel the railway to pay a part of the cost of such work.

Baseball Scores, Cincinnati Fans —and Trolley Fares

All Cincinnati is boosting for the Reds—the Cincinnati Reds, of course. That of itself isn't so remarkable, perhaps, in view of the record Pat Moran's ball-tossers made against the White Sox in last year's World's Series. But Cincinnati, at least that part of it that "trollies," now has a particular reason for wanting the home team to score on all comers. That reason is this: If the Reds play championship ball between now and the beginning of June, car fares will stay down. If they fail to live up to their reputation as scorers, fares will probably go to 7½ cents on June 1.

The Cincinnati Traction Company must have more revenue. It has two ways of getting it: an increase in fare or—more riders. Cincinnati prefers the latter way. If the Reds play like champions, large crowds will attend the games and incidentally will swell car receipts. In that case there will be no need of a fare increase. From the way Hod Eller is twirling 'em these days it looks as if the fare would stay put.

W. C. Culkins, city street railway director, is watchfully waiting. Meanwhile he is turning over in his mind the fact that the traction system lost $17,000 in March and that April saw a further increase in operating costs. In a report submitted to Mr. Culkins by the company the gross earnings in April are given at $706,053 as against $713,915 in March. The decrease was largely the result of the inclement weather and the coal situation.

As a means of economy Mr. Culkins advised the company that he would investigate the feasibility of using gas in place of coal during the summer months. He advised the company also to make better arrangements with the Union Gas & Electric Company for power. Mr. Culkins said that the power supplied at present was inadequate.

Of course, the great majority of the car riders do not care a whoop about these figures. What they do care about is how much it costs them to ride in the cars. They don't want to have to hand over half a cent more every time they pass the conductor. So, naturally, they want the Reds to win. If they failed to back the home team they wouldn't be loyal Cincinnatians—or street-car riders.

Decision Against City Buses

The Appellate Division in Brooklyn, N. Y., on May 10 handed down a decision sustaining the ruling of Justice Cropsey that the municipal buses had no legal right to run in the streets of Brooklyn in competition with the lines of the Brooklyn City Railroad.

The opinion was written by Justice Blackmar, all the other Justices concurring. The court maintains that the city of New York has no power or authority to operate bus lines or stage lines in the streets except by legislative grant. The opinion states, however, that the city can grant franchises to privately owned corporations.

The opinion also holds that no emergency to continue the operation of the bus lines is shown at present.

Subsequently the Appellate Division authorized the Corporation Counsel to appeal to the Court of Appeals from its decision sustaining Justice Cropsey in issuing an injunction restraining the operation of three lines of municipal buses in Brooklyn. The Appellate Division then granted to the city a stay which allows the buses to continue in operation at least until the Court of Appeals hands down its decision. In issuing the stay the court directed that the appeal be taken as soon as practicable.

Modification of Transfers Sought

The Dallas (Tex.) Railway has asked John W. Everman, Supervisor of Public Utilities, for authority to change the transfer system with a view to correcting some of the abuses now evident in Dallas. The company desires to institute a transfer showing only the line of origin and good for passage within fifteen minutes from time of issue on any lines going in the same general direction as the line from which the transfer was issued. Under the system now in force transfers of different color are used for different cars. The transfers indicate the line of origin and also the line on which they will be honored. Present transfers are good for one continuous passage on next car leaving point of transfer, but transfer tickets are frequently used hours after their issue. Under the proposed system the date punch would be eliminated. The time stamp would, however, be placed on the front of the transfer in bold lettering and the transfer would become void if not used within fifteen minutes from time stamped.

Rhode Island Accepts the One-Man Car

The petition of the Newport & Providence Railway, Newport, R. I., to operate one-man safety cars in Newport, Middletown and Portsmouth to Bristol Ferry was granted in a decision rendered by the Rhode Island Public Utilities Commission on May 12. An order was entered by the commission empowering the company to put the cars in operation at once.

The commission takes cognizance of the bus lines in Providence and says that its observation of the operation of these buses leads it to believe that one-man safety cars can be operated with full protection and safety of the passengers and without undue hardship to the persons operating such cars.

The Newport & Providence Railway is the only electric railway in the State not in the hands of a receiver and the first company to operate one-man cars in the State. This company made an attempt to operate one-man cars about five years ago, but the town of Middletown blocked the move by passing an ordinance preventing the operation of cars in the town unless manned by two men. On an appeal to the Utilities Commission, the petition was subsequently dismissed.

The petition upon which the decision is made was filed more than a year ago. It was opposed by the city of Newport and the town of Middletown. The Providence division of the Amalgamated Association also appeared and opposed it, declaring that the cars were not safe.

The decision of the commission, reviewing the petition, discusses particularly the safety features which have been introduced in the operation of such cars during their development.

Transportation News Notes

Five Cents Straight in Cleveland.—A straight 5-cent fare is now in effect in Cleveland, Ohio. The City Council on May 10 passed an ordinance authorizing the Cleveland Railway to charge the flat 5-cent rate. This action was taken following the settlement of the differences between the company and its employees. The fare was formerly 5 cents cash or six tickets for 25 cents.

Service Restored in Weymouth.—Service was recently restored on the Weymouth line of the Eastern Massachusetts Street Railway, Boston, Mass. The Weymouth voters have appropriated the sum of $28,000 to enable the company to resume operation. One-man cars will be operated up to June 1, 1921. Motor buses will replace the electric cars on the Pleasant Street line. The Weymouth division will be in charge of a "home rule" committee appointed by the selectmen.

One-Man Cars for Brantford.—The Brantford (Ont.) Municipal Railway has decided to equip the system with one-man cars. The decision was hastened by a demand for more money from the employees. The city proposes to reduce the number of men employed so as to be able to pay the new scale of wages. The employees at present receive from $23 to $35 a week. In January last the city voluntarily increased the pay 2 cents an hour.

More Trailers for St. Louis.—The United Railways, St. Louis, Mo., will add six trailer cars to its service for each of eight weeks, beginning Nov. 1 of this year, under the terms of an order issued on May 5 by the State Public Service Commission. The order provides for the addition of fifty trailers. Some time ago the commission issued a similar order obligating the company to add two trailers a week from May 1 until fifty had been added. The company asked for an extension, contending that it would be impossible to add the requisite number of cars in the allotted time. After a hearing upon the matter the commission entered its new order.

Safety Cars for La Crosse.—One-man safety cars will soon be operating in La Crosse, Wis., as the result of an agreement between the La Crosse City Council and the Wisconsin Railway, Light & Power Company, which owns the local trolley system. The company recently informed the municipal authorities that it needed an increase in revenue and that it might have to raise fares above the present 6-cent level. It proposed to cut down expenses by introducing one-man cars on the local lines. To this proposal the City Council objected. Later, however, the Council met in special session and withdrew its objection to the use of "safeties." Eight of the cars will be placed in service in the course of the next few months.

Asks Eight Cents on B. R. T.—Lindley M. Garrison, receiver of the New York Consolidated Railroad (Brooklyn Rapid Transit System), has applied to Public Service Commissioner Lewis Nixon of the First District of New York for permission to charge an 8-cent fare on the company's lines. Mr. Garrison proposes to put the higher rate into effect on thirty days' notice. The New York Consolidated Railroad operates certain of the Brooklyn subway and elevated lines under lease from the New York Municipal Railway, which made the dual system contract No. 4 with the city. In this contract the fare is fixed at 5 cents. In notifying Mayor Hylan of the fare application, Commissioner Nixon stated that, since the company is operating the subways under the terms of a municipal lease, the commission would take no other action at present than to receive the application and place it on file.

Dan Fisher's New "Texas Siftings."—Dan Fisher is in action again. That isn't so unusual, of course, because he is doing something or other pretty much all the time. But he generally has time to tackle just one more job, especially if it is on speaking terms with the writing game. That is his nature. First it was *O. K.'d Copy*. Now it's *Partners*. *Partners* is Dan's particular hobby these days, which means that it has more kick to the square inch than anything else in the State of Texas, except Dan himself. Dan lives in Dallas. He works for the Dallas Railway. Wherefore *Partners*. *Partners* is of and for the Dallas Railway and it is by Dan. So far three issues have been received. One might go on and describe those issues—"Cotton Patch," "Chimney Corner" and all. That would convey no more idea of how good *Partners* is than it would be if one said that each issue is 9 in. x 6 in. You must read *Partners* to appreciate it. Write to Dan for your copy. You'll be well repaid. A half hour with *Partners* is the next best thing to a talk with Dan in person.

Personal Mention

T. B. MacRae has been appointed auditor of the Chicago & Interurban Traction Company, Chicago, Ill.

Ray Rushton, president and receiver of the Montgomery Light & Traction Company, Montgomery, Ala., has announced his candidacy for the short term of the United States Senate.

Sigourney B. Olney has been appointed secretary of the Brooklyn (N. Y.) City Railroad. Mr. Olney is a Harvard graduate and a member of the law firm of Cullen & Dykman, New York, N. Y.

H. F. Mayer, auditor of the Kansas City (Mo.) Railways, has resigned to accept a position with the National City Company, New York, N. Y., as manager of the investment department.

Henry J. Ford, professor of politics at Princeton University, has been appointed to membership in the Interstate Commerce Commission to succeed James S. Harlan, whose term expired on Dec. 31, 1918.

Charles W. Halley has been named Deputy Public Service Commissioner for the First District of New York. Mr. Halley succeeds Edward J. Glennon, who has been appointed a Justice of the State Supreme Court.

K. B. Leavitt, superintendent of shops and rolling stock of the Northern Ohio Traction & Light Company, Akron, Ohio, has resigned to become a sales representative of a manufacturer of automobile specialties.

James Duncan, first vice-president of the American Federation of Labor, has been appointed a member of the Interstate Commerce Commission. Mr. Duncan is president of the Granite Cutters' International Association.

A. B. Cole, who has resigned as general passenger and freight agent of the Monongahela Valley Traction Company, Fairmont, W. Va., was recently presented by his fellow employees with a fountain pen and a leather traveling case.

Major-General E. H. Crowder, Provost Marshal of the United States Army during the war, has been invited to become the city member of the board of control of the Kansas City (Mo.) Railways to fill the vacancy caused by the resignation of R. P. Woods.

Britton I. Budd, president of the Chicago (Ill.) Elevated Railways and the Chicago, North Shore & Milwaukee Railroad, has been elected president of the Chicago & Interurban Traction Company, a 52-mile line extending from Chicago south to Kankakee, Ill.

G. W. Jones has been appointed treasurer of the Brooklyn (N. Y.) City Railroad. Mr. Jones became connected with the Brooklyn City lines as auditor when the system resumed independent operation several months ago. He was formerly associated with Sanderson & Porter, engineers, New York City.

M. D. Bartlett, trainmaster for the lines of the Connecticut Company, New Haven, Conn., formerly operated under the name of the Shore Line Electric Railway, has resigned to enter business for himself. Mr. Bartlett has been connected with electric railways in the East for the past twenty-five years.

George H. McMullin has been made superintendent of the Southern Division of the Northwestern Pacific Railroad, San Francisco, Cal. In this capacity Mr. McMullin will have charge of the operation of all of the road's properties south of Willitts. Mr. McMullin has been with the Northwestern Pacific for thirty years, most recently as assistant to W. J. Hunter, superintendent of the Northern Division.

Mark W. Potter, president of the Carolina, Clinchfield & Ohio Railway, has been appointed to the Interstate Commerce Commission. Mr. Potter will retire from steam railroad work and also from the private practice of law as a member of the firm of Hornblower, Miller, Garrison & Potter of New York City. He will withdraw also from participation in other varied interests, including promotion and development of the town of Kingsport, Tenn. This is the first occasion in which a man experienced in railroad management has been appointed to the commission. Mr. Potter's appointment has called forth much favorable comment from the press.

William C. Markham, former assistant engineer of the Public Service Commission for the First District of New York, has been appointed chief engineer of the Detroit (Mich.) Municipal Railways in charge of the construction of the new city-owned electric railway lines authorized by the $15,000,000 bond issue approved by the voters on April 5. Mr. Markham was graduated as a civil engineer from Rensselaer Polytechnic Institute in 1904. From 1905 to 1909 he was superintendent of construction on various building projects, including the Kent Avenue power house, Brooklyn, N. Y., and the Waterside power station of the New York Edison Company. In 1909 he supervised the construction of electric railway lines in Washington, D. C. After acting as superintendent of construction for the United States Government until 1913, he became assistant engineer for the Public Service Commission of New York City, in which capacity he was engaged mainly on subway construction.

Promotions for Los Angeles Officials

E. L. Lewis, General Superintendent, Made Assistant to the General Manager—F. H. Van Vranken and G. B. Anderson Advanced

Three promotions affecting the personnel of the Los Angeles (Cal.) Railway were recently announced by G. J. Kuhrts, general manager. E. L. Lewis, general superintendent, assumes the newly created office of assistant to the general manager. F. H. Van Vranken, assistant to the general superintendent, is advanced to the position of general superintendent, left vacant by the advancement of Mr. Lewis. George B. Anderson, director of public relations, becomes manager of service with jurisdiction over the system's employees in the matters of training and the maintenance of discipline.

EDWIN L. LEWIS, who becomes assistant to the general manager, has been in the service of the Los Angeles traction system since 1888. Mr. Lewis was born in Osceola, Mo. For four years following his graduation from public school he acted as deputy tax collector and county treasurer. In 1887 he went to San Francisco, where he obtained employment with the local traction system as a conductor. After spending several months at this work he went to Los Angeles, entering the employ of the Los Angeles Cable Railway as a clerk.

In August, 1890, Mr. Lewis was made chief clerk to the superintendent of the company. Upon the consolidation of all the lines in the city the latter official, assisted by Mr. Lewis, took charge of the operation of the entire system. In 1902 Mr. Lewis was made assistant superintendent. He continued in that position until 1913, when he was appointed general superintendent.

F. H. Van Vranken, the new general superintendent, was born in Schenectady, N. Y., in 1865. At the age of nineteen he became a brakeman with the Southern Pacific lines. He served the Southern Pacific successively as brakeman, freight conductor, yardmaster and passenger conductor. In 1902 he was appointed division superintendent of the Pacific Electric Railway, continuing in that capacity until 1911, when he resigned to join the Los Angeles Railway as assistant superintendent. Two years later his title was changed to assistant to the general superintendent. He continued to serve in the latter capacity until receiving his new appointment.

George B. Anderson, appointed manager of service, is a native of Amsterdam, N. Y. Mr. Anderson, who is a veteran newspaper man, joined the Los Angeles Railway as publicity agent in October, 1917. Soon after his appointment he established the department of public relations. His jurisdiction was gradually extended to include other work of a supervisory nature. The position of manager of service was recently created for him. In his new capacity he has charge of instruction, discipline, investigation, complaints, public relations and welfare. Since assuming his new duties he has established a merit system for trainmen.

F. H. VAN VRANKEN

E. L. LEWIS

G. B. ANDERSON

New Officials for Des Moines Companies

S. G. Harris has been elected president of the Des Moines (Iowa) City Railway and the Inter Urban Railway, Des Moines, succeeding Emil G. Schmidt, resigned.

F. C. Chambers, formerly electrical engineer for these two companies, has been appointed vice-president and general manager of the Des Moines City Railway, and co-receiver with Homer A. Miller, president of the Iowa National Bank, Des Moines, the property having been in a receivership for the past six months. Mr. Chambers also becomes vice-president and consulting receiver of the Inter Urban Railway.

Will Clapper has been chosen vice-president and general manager of the Inter Urban Railway.

E. B. Bieghler, who has been connected with the city lines for several years, has been appointed assistant treasurer of both the local and the interurban companies.

E. W. Miller, formerly assistant superintendent of transportation, is made superintendent of transportation.

Mr. Harris has been connected with the corporation department of the Harris Trust & Savings Bank, Chicago, for the past eight years, and assumes the presidency of the Des Moines companies as an additional duty. He is a native of Chicago and a graduate of Yale University, class of 1912.

Operator Becomes Consultant

Thomas W. Connette, whose resignation as superintendent of transportation of the International Railway, Buffalo, N. Y., was announced in the ELECTRIC RAILWAY JOURNAL for April 24, has gone into business for himself as a railway industrial engineer. Mr. Connette has opened offices in the Electric Building, Buffalo. A company is now being formed, with Mr. Connette as its president, for the purpose of conducting a consulting engineering practice.

The work which Mr. Connette has undertaken includes the making of valuations and traffic surveys, the rerouting of car lines and the rebuilding of schedules to the best advantage. The new organization is affiliated with the Standard Business Training Institute, which trains men for various occupations, and will therefore be in a position to furnish men for the various branches of electric railway work.

Chinese Traction Operators Here

Peter Hing, general manager, and Y. M. Chu, assistant engineer of the Kwongtung Tramway, Canton, China, are now in this country for the purpose of purchasing motor buses and railway equipment. The Kwongtung Tramway was organized in August, 1919, for the purpose of constructing and operating an electric railway system in the city of Canton. Both Mr. Hing and Mr. Chu were educated in North America, the former at McGill University and the latter at the Massachusetts Institute of Technology.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Safety Tread Manufacturers Making Fine Deliveries

Despite Increased Labor and Material Costs Prices Show Only a Moderate Advance—Accident Expense Reduction Justifies Larger Purchases

Adverse transportation conditions have had little effect on the safety tread market, notwithstanding the fact that manufacturers have encountered delays in receiving raw material. Electric railways and car manufacturers are not purchasing this class of products in very satisfactory volume at present, although in some quarters increased inquiries are noted over last year. The ability to make shipments inside of a week is not confined to a single maker of safety treads, and factory stocks of lengths ready to be cut up are reported in good quantity. Some railways are ordering for delivery six to eight weeks hence and prompt shipments on the agreed dates are being made and appreciated. These shipments are the result of far-sighted buying of raw material and of good accumulations of stocks of this at the factories. One manufacturer has 33 tons of lead on hand at the moment, or enough to carry him a month in production; he is buying special rolled steel four to five months ahead and lead for delivery two months hence. Eight carloads of steel are reported to be on hand in the factory, which can now produce about 1,500 ft. of treads per day.

Demand continues to be subdivided among competitive makes of tread, and shipments are being made for railway station, building and rolling stock use. Car builders are also in the market, but not to an extent that is wholly satisfactory from the tread-makers' viewpoint. A large Eastern electric railway purchases from 6,000 to 10,000 ft. of tread per year, including renewal buying, and orders from this source, according to one manufacturer, help to stabilize conditions; but too few companies appear to realize that the expenditure of more money for safety treads might help to decrease the total outlay for accidents and pay a handsome return upon the investment. The use of such equipment is not required by public utility commissioners to any extent, apparently, and yet the legal and physical phases of step usage deserve consideration from the point of view of accident prevention.

Production costs have risen in this field, but it is fair to state that selling prices have not advanced in proportion. One well-known maker declared recently that on account of the specially fabricated material required, his own costs were about 66⅔ per cent for material and 33⅓ per cent for labor. Within the year this market has advanced wages 15 per cent, but at present his prices are only about 5 per cent above those of 1918. Another maker, producing a type of tread in which cast iron treated with an abrasive forms the unit surface, has been obliged to pay premiums for the delivery of material, and labor advances have caused two price increases of 10 per cent each since Jan. 1, the last occurring during the present week. In this case labor and overhead account for two-thirds of the cost. In 1915 a going price for safety treads of this type was about $1.25 per square foot, compared with $1.60 today. Another maker, selling a tread involving the use of lead and steel, quotes around $1.40 to $1.50 per square foot, compared with about $1.25 to $1 before the war.

United Railways to Buy 120 Cars

Sixty Motor Cars, Fifty Trailers and Ten Safeties Authorized for St. Louis By District Court

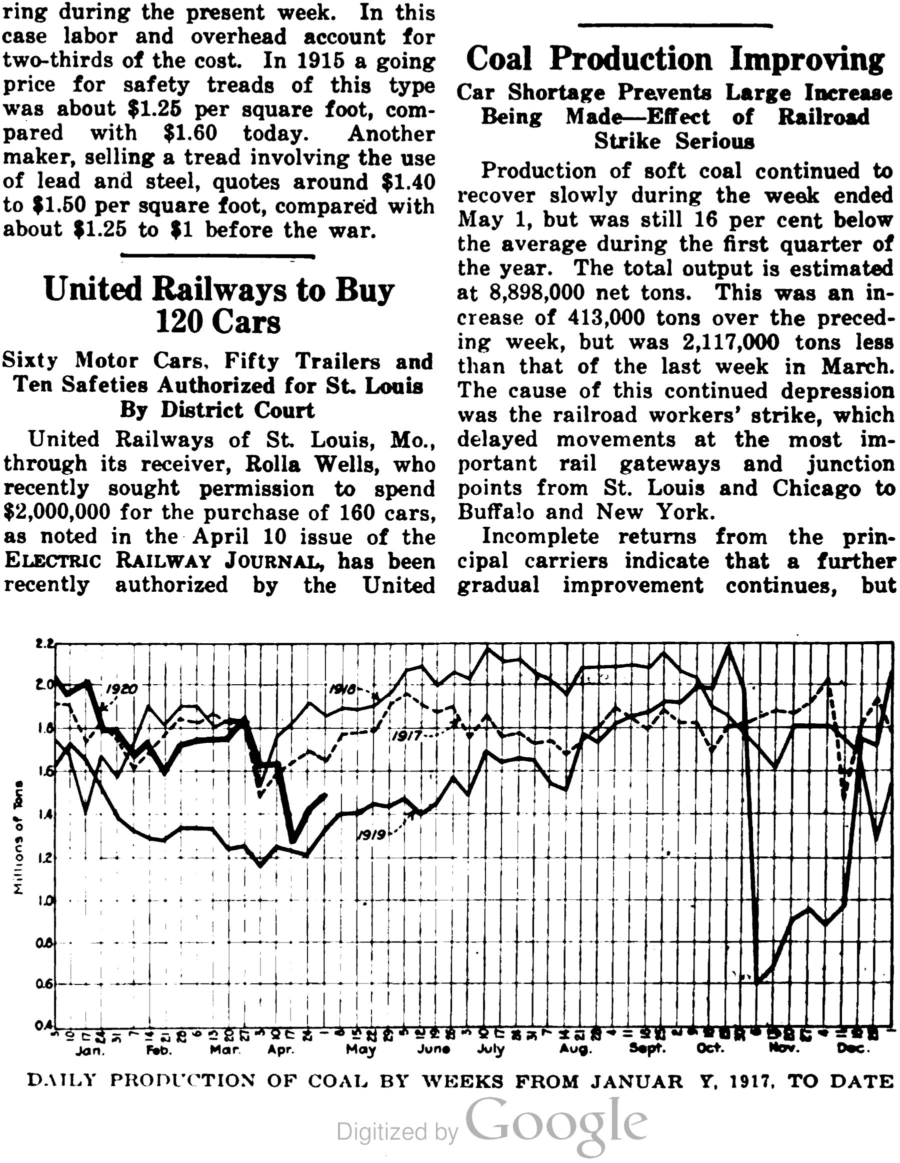
United Railways of St. Louis, Mo., through its receiver, Rolla Wells, who recently sought permission to spend $2,000,000 for the purchase of 160 cars, as noted in the April 10 issue of the ELECTRIC RAILWAY JOURNAL, has been recently authorized by the United States District Court, according to reports, to purchase 120 cars. This order will include sixty motor cars, fifty trailers and ten one-man cars. The new car, according to Albert T. Perkins, general manager of the United Railways, is of the pay-as-you-enter type and will seat fifty-nine people, but has standing room for seventy-one additional. The old type of car has seats for fifty-seven people and has room for sixty-eight straphangers. The new car has been in operation principally on the Grand Avenue line for several months and has indicated a saving of 31 per cent in power, when compared with the present type. Because of the lightness, rapidity with which it can be loaded and unloaded and its greater carrying capacity, the new type of car is said to be much more economical than the old ones. The entrance is at the front and the exit at the center.

Coal Production Improving

Car Shortage Prevents Large Increase Being Made—Effect of Railroad Strike Serious

Production of soft coal continued to recover slowly during the week ended May 1, but was still 16 per cent below the average during the first quarter of the year. The total output is estimated at 8,898,000 net tons. This was an increase of 413,000 tons over the preceding week, but was 2,117,000 tons less than that of the last week in March. The cause of this continued depression was the railroad workers' strike, which delayed movements at the most important rail gateways and junction points from St. Louis and Chicago to Buffalo and New York.

Incomplete returns from the principal carriers indicate that a further gradual improvement continues, but



DAILY PRODUCTION OF COAL BY WEEKS FROM JANUARY, 1917, TO DATE that loadings are still much below normal.

The persistence of the railroad strike has widened the difference between the cumulative production of the present year and the record of the war years 1917 and 1918, according to Geological Survey figures.

Car shortage has been very acute, much congestion resulting from the switchmen's strike, which has had the double effect of blocking trains loaded with coal and of delaying empties returning to the mines.

Production first 104 working days	Tons
1917	181,980,000
1918	183,972,000
1919	141,541,000
1920	175,114,000

The year 1920, although 33,500,000 tons ahead of 1919, is nearly 7,000,000 tons behind 1917, and about 9,000,000 behind 1918.

100 Steel Subway Cars for Brooklyn

Cars and Equipment Costing $3,500,000 for New York Municipal Railway

Contracts for 100 steel subway cars to be built by the Pressed Steel Car Company for the New York Municipal Railway have been signed. The purchase of the cars is subject to the approval of the Public Service Commission. The cars will be similar to the ones now in use and will seat from eighty to ninety passengers.

Specifications on the cars are not complete as yet as there are some details still to be worked out. However, air brakes, control and motors have been decided upon. The Westinghouse Traction Brake Company will furnish the air brakes, which are of the A. M. U. E. type. The control is type A. B. F., to be equipped by the Westinghouse Electric & Manufacturing Company. The motors, 200 of which are required, have been placed with the General Electric Company. They will be type G. E. 248-A, which are inside hung.

The cost of the cars has not been given out officially, although the company executives estimate that each car complete will cost approximately $35,000. Delivery on the cars and equipment may possibly be made during the latter part of 1920. An option to purchase 100 additional cars is included in the contract with the car builder and with other manufacturers.

Steel Rails Sold by Army

62,490 Tons, Both A.R.A. and A.S.C.E., Bring $46 Per Ton

Offerings of steel rails to the amount of 62,490 tons, sealed bids for which were asked last month by the War Department, have been sold for $46 a ton. A large percentage of the rails is of the 80-lb. A. R. A. type, although small quantities of 70-lb., 60-lb. and 40-lb. A. S. C. E. rails in standard lengths without accessories were offered.

Hyman-Michaels Company, Chicago, Ill., was the largest purchaser. It bought 47,367 tons of the 80-lb. rails at $46.05 per ton, 3,199 kegs of track bolts at $3.90 per 100 lb., 126,812 pairs of splice bars at $2.15 per 100 lb., 15,603 kegs of track spikes at $3 per 100 lb., 200 switch stands at $10 each and 200 turnouts at $75 each, the total amounting to about $2,500,000.

Other companies which purchased rails and accessories in varying amounts were Lawler Brothers, Inc.; Bethlehem Steel Corporation, P. R. Phillips & Sons Company, the Godwin Construction Company, Richardson & Company, Aluminum Company of America, Track Specialties Company and a number of railroads.

Rolling Stock

York (Pa.) Railway is reported to be in the market for some new cars.

Quincy Railway Company, Quincy, Ill., lost fifteen summer cars in a fire which partially destroyed ten other cars. The loss is estimated at $25,000.

Illinois Central Railroad, Chicago Ill., has placed an order for fifty steel coaches which will later be equipped with motors and control for use on its suburban lines which are to be electrified.

El Paso (Tex.) Electric Company, noted in the Feb. 21 issue of the ELECTRIC RAILWAY JOURNAL as having placed an order for ten safety cars, has specified the following details on this equipment:

Builders	The J. G. Brill Co.
Type	Birney safety
Total capacity	70
Length over all	28 ft. ½ in.
Truck wheelbase	8 ft.
Rail to trolley base	12 ft. 6 in.
Width over all	8 ft.
Body	Semi-steel
Interior trim	Mahogany, light
Roof	Arch
Air brakes	Safety Car Devices Co.
Armature bearings	Ball
Axles, diameter	3⅜ in.
Car signal system	Faraday
Car trimmings	Bronze
Conduits and junction boxes,	National code
Control	K-63, double end
Compressor	West D H 16
Couplers, 1⅛ in. x 36 in. flat end for	1⅛ in. rim
Curtain fixtures,	Side windows and vestibule
Material	Fabrikoid or Pantasote
Designation signs	Hunter
Door operating mechanism,	Safety Car Service Co.
Fare boxes	Center platform
Wheelguards	Six bar, H B, lifeguard
Gears and pinions	Pressed steel
Governor hand brakes,	West S 6 A Norway iron
Heater equipment, not specified	
Headlight	Golden Glow, S. M-95
Motors	2-West, 506-AM-2
Paint	Varnish, light mahogany
Registers	Stone & Webster standard
Sanders	Air, furnished by builder
Sash fixtures, not specified	
Seats, Heywood Bros.,	57-SF steel mahogany
Seating material,	Rattan, 16 in. x 32 in. cushions
Slack adjuster, not specified	
Step treads	½ in. x 10 in.
Trolley catchers or retrievers	Ideal
Trolley base	1⅛ in. x 16 in. x 16 in.
Trolley wheels or shoes	
Trucks	Brill 29-E-1
Ventilators	Utility standard
Wheels	Southern Wheel Co., standard

Track and Roadway

Calgary (Alta.) Municipal Railway.—The Calgary Municipal Railway will install a manganese steel intersection at Center Street and Eighth Avenue, Alberta, to cost $34,000. A contract for the construction has been let to the Canadian Steel Foundries, Ltd., Montreal.

Los Angeles (Cal.) Railway.—The Los Angeles Railway is constructing a double-track line on South Park Avenue between Slauson Avenue and Merrill Street, to give adequate service to the Goodyear Tire & Rubber Company's plant. The company has secured permission from the Board of Public Utilities to proceed with the work, pending the formality of the Council granting a franchise.

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway plans to reconstruct its line in North Main Street, Santa Ana, at a cost of $100,000.

Union Street Railway, New Bedford, Mass.—The Union Street Railway proposes to extend its lines in Union and Arnold Streets, New Bedford.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway proposes to double-track its line in Boston Street, Lynn, and to lay a track in Federal Street, connecting with the Boston Street line. It also plans to extend its Franklin Street line, in Lynn, to lay a new track through Burns Street and to double-track its Lynn Woods line from Curtis Square to Conomo Avenue.

The Dallas Railway has filed with the City Commission of Dallas formal acceptance of the substitution of the Dallas-Wichita Falls interurban line for two of the interurban lines, each to be thirty miles in length, which the Dallas Railway Company agreed to build under terms of its franchise granted in 1917. It is expected that construction work will be started by July 1 next.

Twin City Rapid Transit Company, Minneapolis, Minn.—The Twin City Rapid Transit Company has begun work on its new loop line in the downtown section of Minneapolis and on lines to the east and west sides of the city. The company also has under construction a line in Seventh Street, Minneapolis, a new thoroughfare.

Central Texas Electric Railway, Waco, Tex.—The Central Texas Electric Railway, which proposes to build an interurban line between Waco and Temple, Tex., has begun the construction of the first unit of the line, from Waco to Robinson, a distance of 6½ miles. It is planned to have this unit in operation within sixty days. C. A. Ryfle is president of the company.

Trade Notes

Hess - Bright Manufacturing Company, Philadelphia, Pa., is planning to erect three one-story additions to its plant.

Canadian Westinghouse Company, Hamilton, Ont., Canada, is planning an addition to its local plant, to cost about $25,000.

W. N. Matthews & Brother, Inc., St. Louis, Mo., announces that the Chicago office is now at 29 South Desplaines Street, with Walter E. Bischoff in charge.

Independent Pneumatic Tool Company, Detroit, Mich., has moved from 736 David Whitney Building to 55 Garfield Building, where it has acquired larger quarters.

Jeffrey Manufacturing Company, Columbus, Ohio, manufacturer of coal-handling equipment, &c., has contracted for an extension 215x253 ft. to its property. The estimated cost is $160,000.

Power Specialty Company, 11 Broadway, New York, N. Y., manufacturer of coolers, heaters, superheaters, etc., is erecting a factory at St. Catharines, Ont., Canada. A foundry will be built later.

Automatic Straight Air Brake Company, 14 Wall Street, New York, N. Y., is operating a testing plant at 183 Greenwich Street and has leased space at Twenty-fifth Street and Eleventh Avenue for a new plant.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis, announces that L. Brandenburger of Salt Lake City, Utah., will hereafter handle the company's line for Utah, the western section of Wyoming and part of the state of Idaho.

Electric Controller & Manufacturing Company, Cleveland, Ohio, has appointed M. B. Goodman manager of the company's Boston office, which will be opened this week at 49 Federal Street. Mr. Goodman was formerly in the New York sales office of the company.

Wellman - Seaver - Morgan Company, Cleveland, Ohio, at a recent meeting of the board of directors, elected John A. Penton, president of the Penton Publishing Company, a director of the company to fill the vacancy on the board caused by the death of Samuel T. Wellman.

Black & Decker Manufacturing Company, Baltimore, Md., has established a branch at 318 North Broad Street, Philadelphia. W. C. Allen is in charge. Its Cleveland branch office has moved from 6523 Euclid Avenue to 6225 Carnegie Avenue, where larger quarters have been obtained.

Davis Bournonville, Jersey City, N. J., manufacturer of oxyacetylene welding and cutting apparatus, elected De Witt V. D. Reiley president of the company, succeeding Augustine Davis, who recently resigned. Charles B. Wortham was elected vice-president and William G. McCune secretary and treasurer. The directors of the company are De Witt V. D. Reiley, Charles B. Wortham, William G. McCune, Augustine Davis, H. Rountree and Daniel E. Evarts.

Carborundum Company, Niagara Falls, N. Y., has acquired a plant at Perth Amboy, N. J., which will be converted to the manufacture of carborundum and refractory cements. The plant was formerly operated by the Didier-March Company and was purchased from the Alien Property Custodian.

Lincoln Products Corporation, 320 Market Street, Newark, N. J., a company which will sell power transmission specialties, has been formed with T. P. Cunningham, formerly sales manager, transmission department, Hyatt Roller Bearings Company, Harrison, N. J., as president of the corporation.

John C. Dolph Company, 168 Emmet Street, Newark, N. J., has discontinued the selling arrangement heretofore in effect with the Dolph Manufacturing Corporation. In the future all orders and requests for information concerning the company's insulating varnishes and compounds should be sent to the above address.

Electrical & Engineering Development, Ltd., 82 Victoria Street, London, S. W., 1, England, advises that it has been formed specifically to develop export trade to Europe, for the acquisition of the American patent rights on European electrical inventions and for the sale or disposition of European patent rights on American inventions. It has appointed engineers and representatives in the principal industrial countries and has laboratories equipped for testing and developing inventions.

Paul Kircher, formerly resident manager of the eastern territory for the Massey Concrete Products Corporation, with headquarters in New York, has been made resident manager, with headquarters in Chicago, in charge of the sales of the reinforced concrete poles which this company manufactures by the centrifugal process. This change will not affect his relations to Canadian business, as he will continue his duty as resident manager of the Canadian Concrete Products Corporation, Ltd.

Holden & White, Inc., Chicago, Ill., announces that Walter E. Hinmon, vice-president of Holden & White, has tendered his resignation, to take effect May 15. Mr. Hinmon leaves his present duties to enter the real estate business, with headquarters in his home city, Detroit, and the severance of his connection with the electric railway supply field, with which he has been identified for such a long period, no doubt will be a surprise to his many friends whose best wishes will follow him.

R. D. Nuttall Company, Pittsburgh, Pa., has appointed L. H. Keim general sales manager of the company. Mr. Keim went with the company in 1911 as engineer in charge of erection work and the installation of equipment. One year later he was promoted to the position of assistant chief engineer, designing and developing heavy duty railway and steel mill gearing. His headquarters were in Chicago, Ill., from where he extended service to gear users of every class. From this work Mr. Keim was brought back to the main office at Pittsburgh, to take charge of his present duties.

New Advertising Literature

Bates Expanded Steel Truss Company, Chicago, Ill.: A 128-page 1921 edition of its steel-pole treatise.

American Car & Foundry Company, 165 Broadway, New York, N. Y.: A booklet describing the Berwick electric rivet heater.

Belden Manufacturing Company, Chicago, Ill.: Catalog No. 8, giving prices and other data on electrical wire, cordage, cable, insulating materials, winding machines and other products manufactured by the company.

Blaw Knox Company, Pittsburgh, Pa.: Issues of the April and May numbers of "Blaw Knox Life," a well illustrated sixteen-page booklet devoted to the business and social activities of employees of the Blaw Knox Company.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis.: Booklet H, a four-page leaflet, describing and illustrating soldering irons, including the automatic rack, soldering fixture and current regulator for temperature control.

Page Steel & Wire Company, Monessen, Pa.: A thirty-two-page booklet, "American Ingot Iron Wire" for electrical and mechanical purposes made from the product of the American Rolling Mill Company, Middletown, Ohio. Contains convenient form data and tables on the properties of iron wire of interest to engineers, superintendents and purchasing agents.

Metal & Thermit Corporation, New York, N. Y.: A third and revised edition of its pamphlet Laboratory Experiments with the Thermit Process of Welding. The pamphlet illustrates and describes various experiments which are intended to show the speed of the reaction, the heat produced thereby and the effects obtained by the superheated liquid slag and the superheated liquid steel.

Westinghouse Electric International Company, East Pittsburgh, Pa.: A monthly magazine containing engineering, semi-technical, merchandising and popular articles, together with international electrical news. One of the features is the pictorial section, illustrating some of the great engineering feats of this county. The column "I Want to Know" is incorporated in order that technical and general questions may be asked and answered. The publication is for foreign distribution and commencing with the July issue portions of the magazine will be printed in Spanish and Portuguese.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors   HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor   N. A. BOWERS, Pacific Coast Editor   H. S. KNOWLTON, New England Editor   C. W. SQUIER, Associate Editor   C. W. STOCKS, Associate Editor
L. C. PAUL, Editorial Representative   A. C. DAVISON, Editorial Representative   G. J. MACMURRAY, News Editor   W. R. ANDERSON, Asst. News Editor

Volume 55   New York, Saturday, May 22, 1920   *Number* 21

Let's Increase Production in Our Own Back Yard

WE HEAR a great deal of talk, and all of us contribute to the general pow-wow, about the other fellow's decreased production. We glibly cite from our friends' conversations examples of work which should be done in an hour, but which took a certain workman two hours; of laziness and refusal to work, etc. And what good does this do, this incrimination of the other fellow, usually unknown?

What we must do is to work ourselves and be sure that there can be no possible ground for a like criticism leveled at us.

Each man must feel his own responsibility and show that he realizes the situation by his production on the job in which he finds himself. This electric railway industry, for example, is a business vitally important to the whole community and to each and every individual in it. And the entire group of men in the industry can well begin their efforts at home. Each of us must realize his obligation to the industry, upon the success of which our own individual successes depend; to appeal our self-interest. If we all did that very thing, and acted upon that realization, *one hundred per cent* we would at least do no more than our duty to our own job, to ourselves, to the industry and through the industry to the country.

In some places this is being done, and the habit is contagious. Let's all commence in our own back yard and get to work on a production basis we've never attempted before. Give the message to the other fellow by example, by advertising, by encouragement.

Why It Was Proper for Mayor Peters to Protest

PROOF is growing of the more general acceptance of the modern conception of the function of a public utility. This is that the utility is not primarily an enterprise for private profit, but a necessary part of the life of the community in whose continuous service the public is vitally concerned. For reasons of policy it has been considered wise to allow this service to be supplied by private enterprise, and the private capital thus engaged must receive a fair return, otherwise the service will not expand with the needs of the community. But outside of this matter of the conduct of the enterprise, it closely resembles actual municipal service, like the police and fire departments, and the public should be as vitally interested as with them in seeing that efficiency and quality are maintained.

With this view in mind it is easy to understand the reason for the recent appeal of Mayor Peters of Boston to the Boston Elevated Railway to refuse the demands of its trainmen for increased wages. The reasons for similar public interest in the question of trainmen's wages in Pittsburgh are also clear. Once this principle is admitted the responsibility of the public for reasonable operating conditions is clear. In a sense this condition is recognized and prevails wherever there is a public service commission. But the commission can do its best work when it is supported by public opinion, and correct thinking on this subject is a matter which all utility companies should do all they can to stimulate.

You Can Help Improve the Mail Service

WE REGRET very much indeed that there is one link in the chain of operation involved in the service of this paper to its readers over which we have no control. While we are endeavoring to keep the industry informed of all developments through a fairly comprehensive contact with the field, and our mechanical department is functioning properly in printing and binding the paper and getting it into the mails promptly on Saturday each week, yet we are frequently confronted with complaints that the paper reaches the subscriber several days after it normally should arrive.

We wish this were a fault of our own, for then we could promptly devise ways and means to correct it. But unfortunately the chief cause of the delay lies in the present lack of adequate postal facilities. We have taken the matter up with the postal authorities and are assured that everything physically possible is being done with the facilities now available and with the number of employees which can be obtained. It remains for you as well as ourselves to bring pressure to bear upon Congress to take such steps as are necessary to alleviate the present great congestion of the mails and to provide a satisfactory postal service.

One of the greatest needs in this connection is for additional employees in the mail service, but it seems to be practically impossible to secure them at the prevailing rates of wages, which nearly every one will admit are distinctly below the level of those prevailing in other comparable occupations. This means that Congress must be urged to arrange for better pay for post office employees.

The inferiority of the service due to labor shortage is a condition prevalent generally throughout the country. It is made worse at some points, notably Chicago, by a lamentable inadequacy of facilities to handle the great volume of matter entrusted to the mails. This could be relieved, it is believed, by an authorization to acquire by renting or otherwise a large amount of additional floor space in which to sort and handle the mail, particularly second-class matter, which seems to be suffering most. This could be done without awaiting the slow process of building new government buildings.

With the present important developments in the industry, with changes taking place daily, it is highly important that one be constantly and promptly advised of the latest developments, for these have such an important bearing on local negotiations. You can help in eliminating the weak link in the JOURNAL service chain by enlisting the interest and active support of your Congressman.

The Electric Railway and the Equipment Trust

ROLLING STOCK purchasers are receiving consideration almost everywhere today as a part of the necessary reconstruction and rehabilitation after the war years. In many places rolling stock must be replaced or augmented, but the means of financing are not so evident as the needs of equipment in these days of new money values.

That the equipment trust as a method of financing these purchases is growing rapidly in favor with the electric railways is evident from the analysis of issues of this sort, presented on another page of this issue. A deferred payment plan, covered by security which is at once safe and salable, ought from its nature to appeal to the industry. That it has not done so to a greater extent in the past probably has been due to a very evident lack of standardization of rolling stock and also to the less stabilized or routine conditions of electric railway finances as compared with those of the trunk lines.

But present conditions have forced the industry to seek the very best methods of financing, and the fact that so many certificates of this kind have been issued recently seems to indicate the fundamental soundness of the equipment trust. It is so satisfactory to a company, so attractive to an investor and so useful to the broker as an additional type of security that it seems nothing but good can be said of it. We suggest a careful study of these issues by every company contemplating rolling stock purchases.

Local Confidence Promotes Local Financing

ONE of the fine features of these equipment trust securities is their adaptability and fitness for local sale. But while local financing engenders local interest and promotes local confidence there must be some local confidence first. Nothing can be done in local financing without the local confidence to start it.

As an evidence of the argument that it is chiefly confidence which is necessary a case in point may be cited.

Only a comparatively short time ago a certain street railway property was badly run down, its service was unsatisfactory and the attitude of the public militant. The people would not approve a fare increase and no one would invest new money in the property to rehabilitate it.

Then a change in management brought new ideas. New cars of a new type which materially reduced the operating expense and made possible a great improvement in service were purchased and installed—mostly on faith on what these cars could do. It goes without saying that this faith and the capital to build the cars did not come from local people, but the new ideas were put into effect.

Recently, to make the installation complete, ten more cars were needed. So transformed was the public opinion of the property that the financing of the new cars was taken by three local banks. Now, one of these three bankers had made his promise to take his share of the paper conditional upon the approval of his investment committee. But one of the three members of this investment committee was very conservative, and after the banker had obtained the approval of two of the members of his committee he approached the third member with a feeling of trepidation because he feared that he would be against the proposition. After he had finished his outline of the situation he was surprised to have this third gentleman tell him that the proposition looked pretty good to him, that he was in favor of it, and that, if possible, he would like to have $5,000 of it for his own personal investment.

The story illustrates the effect of the changing attitude of the people toward public utilities in general and the street railway in particular once confidence is restored in the soundness of the basis upon which the property is being operated.

Why the N. E. L. A. Favors Railroad Electrification

THE report of the National Electric Light Association committee on railroad electrification, presented at the Pasadena convention this week, was unusually significant because of the present coal situation. Much more than ever before the coal situation is focusing attention upon the railroads as great and wasteful fuel consumers, whereas the power companies are producing power with greater and greater economy of fuel. The rapid increase in consumption of the limited fuel resources of the country has long alarmed the conservationists, but only scarcity and resulting high cost have sufficed to cause the country as a whole to "sit up and take notice."

In the agitation for electrification it is natural that the power producers should take a leading part. The coming enormous field for the output of their power plants in furnishing electrical energy to the railroads is a prospect attractive in the highest degree. They can afford to make alluring rates because the added load from this source will not proportionately increase their investment and operating expense. Furthermore, as the costs of coal and fuel oil go up the possibilities of economical water-power development increase. Indeed, the utilization of water powers works in well with railroad electrification because in general there is plenty of this power where the railroads need it most, while industrial customers for the water power are apt to be far away. As a potent force in the conservation movement, therefore, the N. E. L. A. may well devote a share of its activities to stimulating interest in this line.

The report of the N. E. L. A. committee on railroad electrification this year consists of a group of papers by members of the committee who authoritatively represent the railroad, manufacturing and power points of view. From all three viewpoints judicious electrification of the railroads is desirable. We use the word "judicious" because none of these three interests prescribes this remedy as a panacea for railway ills. It is recognized as simply one thing that will help resuscitate the patient, now in a critical condition. The problem before the leaders in the three fields mentioned is to work together toward the gradual substitution of the new motive power for the old, utilizing the savings made at one stage of the substitution for the financing of further improvements.

What Indirect Taxes in Chicago Mean

DURING the fiscal year ended Jan. 31, 1920, the Chicago Surface Lines had to pay to the city of Chicago $348,480 for cleaning the right-of-way, which the street cars do not clutter up. This figure includes the cost to the company of snow removal, of which the greater part is done by the company. It also had to pay to the city $1,488,848 as the latter's 55 per cent share of the net earnings, a benefit to the car riders of very doubtful reality, for while some $25,000,000 has been thus paid into the traction fund, this has been used for other purposes to the benefit of the people in general, thus endangering the availability of the money for traction purposes. The railway company had to pay, also, $418,625 for paving which the street cars do not wear out and the existence or condition of which is of no value or consequence to the car riders as such.

Taken together, these three items form an indirect tax upon the car riders of Chicago for the twelve months mentioned of $2,215,953. Put another way, every revenue passenger during the year made a payment of three-tenths cent for something he did not receive or derive any benefit from—a contribution to the city treasury. If this amount could have been applied as dividends it would have paid 1.4 per cent additional on the city's agreed purchase price of $158,538,423 for the system as of Feb. 1, 1920, thus improving the credit of the company and perhaps making possible the financing of needed improvements which had to be deferred. Or, this indirect tax would have supported an additional 6 per cent capital issue of $36,932,550, which amount would have purchased all the rolling stock, made all the line extensions and everything else needed to meet all public requirements as to service.

Carry this one step further and assume that by some hokus pokus the city is justified in collecting 55 per cent of the net profit and that the car riders derive a benefit from that payment to the city. We cannot justify it in our own minds, for if the city did not have this great transportation system it would willingly pay ten times what it collects to get it. But, assuming this payment to be just, the two other indirect tax items, amounting to $767,105, would have supported a 6 per cent capital issue of $12,785,000. This sum would have purchased 880 new motor cars at $14,500 each, whereas 400 new cars would considerably more than give all the additional rolling stock needed to overcome the overcrowding of cars, from which the riders are now suffering.

These few figures merely point out how inequitable is the practice of forcing the street railway company and therefore the car rider to pay for paving and other items which form no part of the cost of providing transportation. This is a burden for which there is no justification save the antiquated precedent of horse car days, and the sooner the car riders come to an appreciation of this and exert their influence for an adjustment the better it will be for the general public as well as themselves.

Increasing Fuel Shortage a Challenge to the Electric Railway

DIRECTOR MANNING of the United States Bureau of Mines is reported to have said, on May 16, that, with consumption exceeding production, in less than twenty years the supply of oil still underground in this country will be exhausted. At the Pasadena convention of the N. E. L. A. a speaker, on May 21, quoted the State Geologist of Pennsylvania to the effect that the easily mined coal in that State will be exhausted in thirty-five years. These statements serve to emphasize the importance, in the transportation field and elsewhere, of utilizing those means for producing power which do so with the least fuel expenditure. This applies not only to the steam railroads but also to the city and interurban railways. If they can demonstrate ability to give better service with less fuel than other transportation agencies they will ultimately win out.

To be sure, fuel is only one part of the cost of transportation service and other factors will often exercise a controlling influence in competition. However, as the cost of gasoline climbs cent by cent individual and collective bus owners are going to weigh debit and credit more and more carefully. It will not do, however, for the railway manager to sit back expecting time (and fuel scarcity) to solve his troubles. The tendencies in this direction merely favor him.

Good Offices Add Dignity to a Company

TIME was when the public might be fooled as to the financial status of an electric railway company. To this end, it has been the belief of some managements that it was highly desirable that the property should convey the impression, to all outward appearances, of being very poor, even though it might be otherwise. Consequently one finds the officials of a railway here and there housed in exceedingly poor quarters.

We believe this is a mistaken policy; at least it is not in keeping with the enlightened knowledge which the public has on the operation and management of public utilities. Information as to the exact financial condition of a railway is now quite generally public property. So there is not much to be gained by an effort to mislead through dingy, poorly furnished, unattractive offices in which the public must transact its business with the transportation company. And even if a company is poor, we are inclined to the opinion that the impression created by such surroundings is rather to the effect that the management is behind the times, unprogressive and unsuccessful and should give way to new talent, ambitious, aggressive and proud of its activities and environment. In other words, good offices lend dignity to the management and give prestige to the property. The railway is usually one of the big businesses in a community and it should be so taken and accepted in every sense of the word. To talk to an official who sits at a rolltop desk dating its service back to the '70s and surrounded by bare soft-wood floors and the clutter of ages does not tend to make the caller carry away the impression that that man is "on his toes." And since the public utility has come to be so much a business of the public, this public rightfully has an interest in being satisfied that the local management is efficient and progressive. Good offices, like well painted cars, have an important bearing on a patron's attitude.

This Is Number Three of a Series of Articles on Salient Phases of the Electric Railway Situation

Boston—and Her Trolley Cars

By Edward Hungerford

DESPITE the fact that Boston was among the first of the large cities in this country to equip its main lines with electricity, electric railway operation in that city has always had its complications because of the narrow streets, Beacon Hill in the center of the city, and other topographical conditions. In this article Mr. Hungerford tells first how these physical conditions and complications were overcome. He then explains how, when the rising tide of expenses threatened the financial embarrassment of the company, the State stepped in, took over the operation of the property, guaranteed a fixed return to the stockholders and raised the fare to 10 cents. The next article in this series will discuss the situation in a city in the Central States.

I must confess to a genuine warmth of feeling for the system of city traction in and about the metropolitan district of Boston. It seems to have measured at all times to the needs of the community to be served; not invariably, perhaps, but certainly making a very strong average. More than twenty years ago Boston was making a definite—and a successful—effort to solve her transport problem in advance of its becoming so acute as not to permit of intelligent, deliberate solution. In this she was at least a decade ahead of the other metropolitan cities of America physically, not alone in possessing the very first subway in the United States but, in a larger sense, in continuing to plan her traction facilities—intelligently and deliberately—well in advance of the city growth that eventually would make them acutely necessary.

Cambridge would need a subway, so would South Boston; East Boston too. Each was told that its needs would be foreseen—all in abundant good time. In the meantime, the most urgent need was for the relief of the original Tremont Street subway. Its success had been immediate —and overwhelming. Not only had it taken the surface cars completely away from what, in 1893, was perhaps the most congested street in America, but its service of solid trains of multiple-unit cars, in connection with the elevated railway line along Atlantic Avenue and out to Roxbury and to Charlestown, had been Boston's very first introduction to genuine rapid transit. Yet this unique composite system had been in service but a comparatively short time before it was so taxed as to point toward need for its relief.

Some other communities would have waited until this need became acute—until overcrowding in the Tremont Street subway had become a nightly reproach and a disgrace. Not so with Boston. With long-headed New England foresight she set about, without a moment's delay, to enlarge and to relieve her original rapid-transit plan. Washington Street was the logical path for such a relief route. And because the Tremont Street subway, originally planned, I believe, for exclusive trolley car operation, was extremely difficult, with its sharp curves and its stiff grades, for the operation of elevated trains it was planned in the reconstruction and rearrangement program to devote the four tracks of this original tunnel to surface cars alone. This was both simple and logical and involved the abandonment of only a few hundred feet of elevated structure where the south end of one of the arms of the Tremont Street subway had debouched into the elevated railway along Washington Street out toward its Dudley Street terminal.

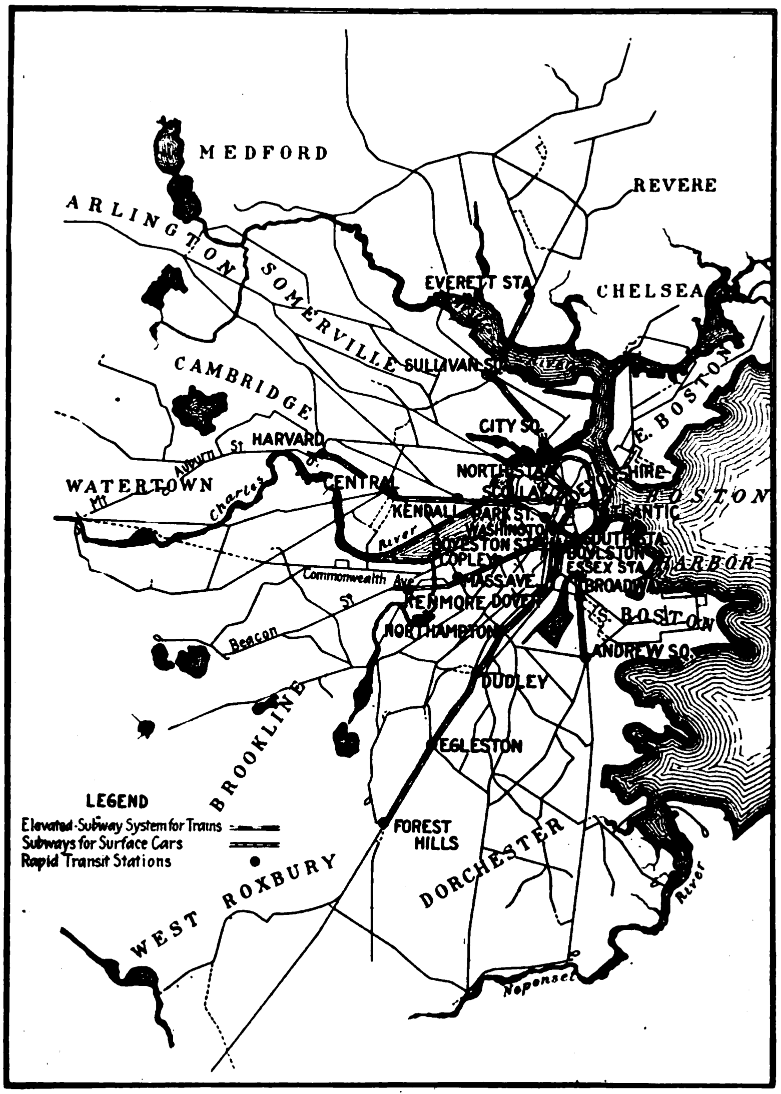
In the original rapid-transit plan this same Dudley Street terminal had been designed as a focal transfer point. To put the thing more clearly, trolley cars which heretofore had found their way down into the crowded heart of the city now ran into the terminal structure upon its intricate but ingenious layout of ramps and inclines and there poured their passengers into the elevated trains before receiving a fresh cargo of outbound folk. There was no ticket taking of any sort involved. The fact that a man was upon the

SURFACE CARS
DUDLEY ST. TERMINAL
PARK ST. SUBWAY
CARS FOR
CHESTNUT HILL
CYPRESS ST.
HARVARD SQ.
SURFACE CARS
DUDLEY ST. TERMINAL
PARK ST. SUBWAY

Two views of Massachusetts Avenue transfer station. This station eliminates the street transfer at a busy intersection station platforms was full enough indication that his fare had been paid and that he was entitled to continue his journey, in any direction he so wished. A very simple plan this, too. I am calling particular attention to it here because, years later, it has begun to be something of a physical problem in a scientific settlement of Boston's problem of rapid-transit fares.

At Sullivan Square, in Charlestown, and at the far end of the original elevated railway system from Dudley Street there was achieved a similar focal or passenger transfer point. The effect of these two upon the street traffic of the downtown sections of the Hub was hardly less than that of the completion of the Tremont Street subway itself, with its actual removal of the surface car tracks in that street—a good portion of Boylston Street as well—as an important and essential part of the program. A great civic benefit was achieved. Yet by the time that the Washington Street tunnel—one finds Boston meticulous in insisting that the Tremont Street line be called "subway" and the parallel one under Washington Street "tunnel"—had been completed, fifteen years later, there was need for an exactly similar civic benefit. The relief achieved by the first trolley car removals had been lost in the steady growth of the city and the street traffic in its heart. The trolley tracks were not removed from Washington Street. For a number of years after the completion of the rapid-transit tunnel under the important thoroughfare a few surface lines retained their routes within it. Recently these too have gone and the tracks it holds stand unused. Nor is it likely that even if they are permitted to remain for any length of time they will ever come into regular usage again.

I have made a point of this because it represents an essential difference in the rapid-transit plan for Boston as compared with those of New York or Philadelphia or Chicago. In these other cities elevated or subway rapid-transit lines have either supplemented or competed with the existing surface-car routes. In Boston they have supplanted them. Which is a distinction with a large difference. The Boston plan in its working out comes nearer representing that of London than that of any other American city. Which, inasmuch as Boston closely resembles London in many, many ways, may be set down as being at least most consistent.


MEDFORD
ARLINGTON
SOMERVILLE
CAMBRIDGE
WATERTOWN
EVERETT STA
SULLIVAN SQ
REVERE
CHELSEA
E. BOSTON
CITY SQ.
HARVARD
CENTRAL
KENDALL
NORTH STA
SCOLLAY SQ
PARK ST.
WASHINGTON
BOYLSTON ST
COPLEY
MASS. AVE
KENMORE
DOVER
NORTHAMPTON
SOUTH STA
BOYLSTON
ESSEX STA
BROADWAY
ATLANTIC
BOSTON HARBOR
S. BOSTON
ANDREW SQ
DUDLEY
EGLESTON
FOREST HILLS
BROOKLINE
WEST ROXBURY
DORCHESTER
Charles River
Commonwealth Ave
Beacon St
Neponset River
LEGEND
Elevated-Subway System for Trains
Subways for Surface Cars
Rapid Transit Stations ●

Lines of the Boston Elevated Railway Company

Enclosed Transfer Points Solve the Problem of Distribution

The construction of the Washington Street tunnel also involved the transformation of Dudley Street and Sullivan Square from exclusive elevated railway terminals into a combination of terminal and through station. In other words, the elevated shot out its long metallic arms south beyond Dudley Street a good two miles to Forest Hills and north over marshy meadows from Sullivan Square to ancient Everett. At each of these new terminals additional focal and transfer points were created and long-distance trolley operation curtailed, with great economy and efficiency. Similarly two other subways have been created in and through the heart of old Boston—one from Scollay Square under the harbor to East Boston and carrying and there distributing a nest of surface lines and the other from Harvard Square, Cambridge, through to South Boston, passing underneath Park Street and the great South Station and operating multiple-unit trains, whose cars far exceed in dimensions and in carrying capacity the original rapid-transit cars of the city. At Harvard Square, at the north end of this line, and at Andrew Square, at its south end, are two more Dudley Streets. The principle of these gatherings and focal points is firmly established in Boston by this time, and Boston likes it and says so, quite frankly and earnestly, as is her way. There is still another new stretch of subway, from Charles Street close by Park Square on under Boylston Street for another mile and a half to a discharging point in Commonwealth Avenue well beyond the congested section of the city. But as this is, in reality, but an outstretching of the original main stem of the old Tremont Street subway and handles trolley cars exclusively it does not come so readily into the picture of the idealized Boston transport plan.

These later cross-cut subways not only intersect the older parallel rapid-transit routes physically but

Andrew Square transfer station—surface to subway

interchange traffic with them freely at each point of intersection. There are no transfers issued, but more ingenious ramps and stairs and elevators and escalators. Until at a point like Park Street one sees what is a real civic heart—veins and arteries pulsing beneath the surface of the city with a traffic that is all but unending and yet showing but little of their activity upon the surface. The aviator flying over old Boston, with all of the sharpness of his well-trained eyes and the precision of his observation apparatus, could detect but little of the presence of her real civic heart—an occasional kiosk at a busy corner sucking in or emitting cross-currents of tiny black humans; that is all the outward evidence that he would find of her very scientific transport system in her oldest, and most sacred, precincts.

These Transit Facilities Have Been Costly to Construct

If I have dilated upon these purely physical features of the Boston transportation system it is because I believe an understanding of them to be essential to a thorough understanding of the difficulties of the companies which today operate it. There are two of these: the Boston Elevated Railway, which operates the lines in the more congested sections of the metropolitan district, old Boston, Charlestown, Brookline, Watertown and the like, and the Eastern Massachusetts system—until recently the Bay State Railway—which operates suburban rapid-transit lines, but in a few cases out of the subway routes and stations. This last system has recently gone from its corporate troubles into the hands of a state trusteeship. But because this trusteeship is still very new we shall leave consideration of it until another time and concentrate our present attention upon the Boston Elevated—a road notable across the land in past few years for the energy and spirit with which it has moved to its problem. Its human equipment has more than kept pace with its mechanical. And, despite the memories of a particularly aggravating strike in the summer of 1919, I think I may fairly say that its operating force has generally been of a high character—clean, well uniformed, well paid, alert, interested.

To gain these things has cost money. Labor is never very cheap in the Massachusetts Bay regions. Around tightly unionized Boston it generally has been particularly high priced. Today the platform men of the Boston system's trolley cars are paid 60 cents an hour, the men on the elevated trains 2 cents an hour in addition, while, when I visited the system early in the present winter, the company's employes were secretly preparing fresh wage demands.

With wages well set in advance of many other communities, with fuel costs high and, because of the elaborate system of rapid-transit lines, overhead a particularly heavy factor in the reckoning, Boston was the very first of our large cities to reach the 10-cent fare. Inside of a year, beginning Aug. 1, 1918, the Boston Elevated advanced its fares by three successive stages from 5 cents to double that figure. And today at the high figure is doing somewhat better than making its operating and fixed costs, including the payment of a stipulated dividend return to its stockholders—of which, more in a moment.

Everett Station—passengers boarding surface car

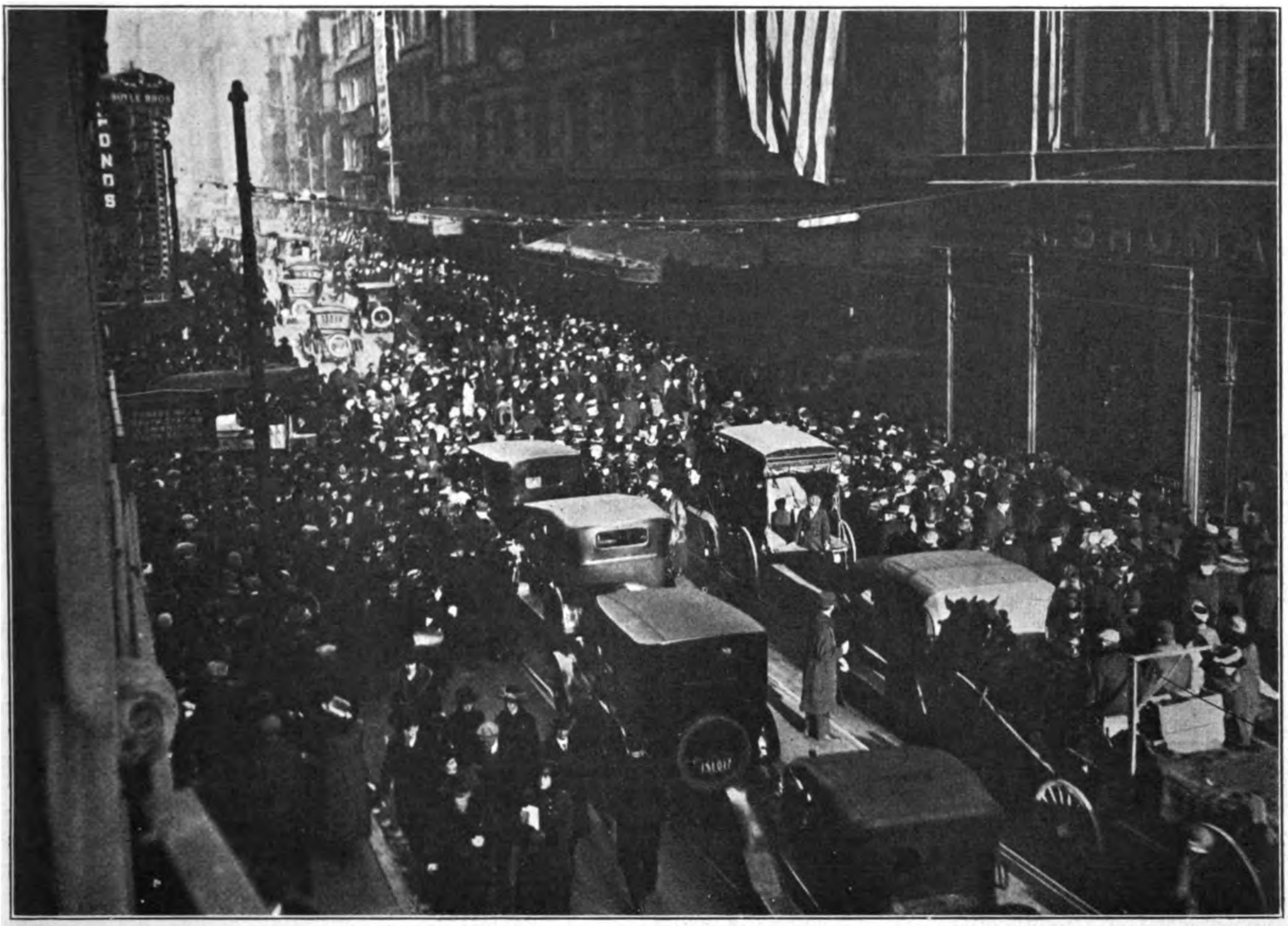
How the State Took Control

For the present moment consider the method by which the Boston Elevated, controlling practically all the surface-car and rapid-transit routes in the heart of metropolitan Boston, was saved, in that same frenzied summer of 1918, from pending bankruptcy and utter ruin and placed on a firm basis so that Boston could be assured of a permanency of efficient city transport. At the risk of boring you with a twice-told tale, permit me to say that under the Massachusetts system of trusteeship, very largely the work of Matthew C. Brush, the brilliant young president of the Boston Elevated of two years ago, five public representatives (trustees) are appointed by the Governor of that commonwealth to give that property a part of their time, each at an annual salary of $5,000. The functions of these five men are supposed to correspond with those of the board of directors and the executive committee of the traction system. As a matter of fact the Boston Elevated actually retains these entities of its organization, but for corporate purposes alone. The actual direction and operation of the property are in the hands of the State's trustees.

Everett Station—elevated train unloading

These are told to operate the property at cost, and please remember that cost in this sense includes not only labor and material, depreciation, obsolescence, taxes and the construction and maintenance of additions and betterments, but interest upon the company's obligations and dividends; these last at the rate of 5 per cent for the next two years, 5½ per cent for the two years following and 6 per cent thereafter. In fact, it was this feature that restored the credit of the Boston Elevated, that brought its stock up from $27 a share to the neighborhood of $70 and made that scrip almost like a bond of the Commonwealth of Massachusetts. To meet this cost the trustees may—and eventually must—fix nine rates or scales of fare; a current rate and four successive steps below

Everett Station—ready for the afternoon rush and four successive steps above it. If at the end of a certain period to be fixed by the trustees, but not to exceed twelve months, the current rates have produced a deficit, the succeeding higher step in fares is adopted, automatically. If, on the other hand, current rates are piling up a surplus, the move is made toward the next lower step.



Christmas crowds along Washington Street, the heart of the retail business district in Boston. Underneath is the Washington Street Tunnel. Only a few surface cars now run on this street

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Now see what actually has happened: We have seen how inside of a twelvemonth the fares were raised three times—from 5 cents to 10. And there came, with the incoming of this last scale, a decrease of 18 per cent in riding. Which to any thoughful student of traction problems is most significant. You can raise the fare, in order to keep pace with the steady increase in operating costs of every sort, to the point where the short-haul rider, always the cream of the business, prefers to think twice, and then to walk. That is what began to happen in Boston; what still is happening there, although that 18 per cent has begun to be lowered, appreciably. But it was a factor that kept the trustees and the actual operators of the Boston Elevated most reluctant even to consider the raising of the fare beyond that extreme 10-cent limit even as a remote possiblity.

For ten cents seems fixed in the public mind today as the ultimate city fare that is even possible of adoption, just as the nickel was the seeming ultimate ten or even five years ago. To board a city street car and pay a fare of more than 10 cents for a ride of but four or five ordinary-sized blocks—as from Scollay Square to North Station right there in Boston—would seem impossible of adoption. And yet—

"How about the zone system for Boston?" you interrupt. "Or even a charge for transfers?"

Let's answer the last question first. Because of the peculiar and distinctive arrangement of the interchange stations of the Boston transit plan, as we have already seen them, the issuance of transfers at them is not only impracticable but well-nigh impossible. And for the self-same reason the zone system is also seemingly impossible of adoption over there. The men who have studied the transit conditions of the Hub have almost uniformly rejected it as a possible solution of reaching steadily mounting cost, without a further increase of a minimum fare, already high as compared with other metropolitan cities of America. And yet, again—

There was a hard-headed president of the Boston Elevated—who slipped into Matthew C. Brush's shoes as that energetic young man went down to Hog Island to help build ships for his Uncle Sam—who told me, less than a year ago, that he felt that the zone system was not only possible but practical for the Boston Elevated. The hard-headed New Englander's name was J. Henry Neal, and as an accounting executive he knew the property of which he spoke thoroughly—"from the ground up," as the Yankees would like to put it.

Mr. Neal understood the traditional objections of the Boston traction sharps to a zone-fare system; how extremely difficult it would be to graduate the fares in the perplexing although successful system of intensifying trolley car operation, comparatively slow moving in the outer and open districts of the city, either to high-speed operation through the subways in its heart or else by transfer to multiple-unit trains, where the same thing is accomplished, although in a radically different way. He understood these things. And then discounted them and prepared a scheme in the rough for giving a 3-mile ride out from the very heart of the city for 6 cents, with 8 cents to be charged for the run to the far ends of the system, some 7 or 8 miles at the outermost. About half the population of metropolitan Boston lives within the limits of the 6-cent zone, as roughly set down; so the average fare ought not to be far from a flat 7 cents.

"But suppose that operating costs should keep climbing?" I asked Mr. Neal. "Would not the irrevocable 7 cents be equally as bad as the irrevocable nickel or the irrevocable dime?"

The former president of the Boston Elevated was quite ready for that reaction. He asserted quite vigorously that the first step in such a condition would be to relieve his company of its considerable rental of the tunnels in the downtown portions of the city—for remember that Boston, like New York, builds and owns most of her rapid-transit routes, but leases them to private operation—and that the next step would be the relief of the company's municipal taxes of every sort. If these very considerable helps should fail to halt increasing operating costs the next step quite obviously would be for Boston to be prepared to assume an operating deficit upon its tax budgets. Obviously the city could not be deprived of its street transportation facilities. The continuance of these is as vital to Boston, or for that matter any other large city, as a continuance of its water supply or its police protection. If you do not believe this ask the next citizen of Toledo that you chance to meet. Street-car service is certainly as important to the average city resident as his parks.

As a matter of actual fact, however, the trustees of the Boston Elevated believe that should the imminent necessity ever arise they or their successors would be permitted to run an operating deficit not to exceed 5 or 6 per cent of the gross receipts of the property. If in time this further margin should be reached and passed further relief would undoubtedly be automatic. For in order to keep within their income they would be forced to reduce service. The reaction from such a situation would quickly fix any necessary readjustments of finances.

Company Working Out of Its Deficit

The imminent necessity today does not seem very close at hand, however, despite a certain growing uneasiness among the platform men of the system. For the management of the Boston Elevated—as personified by Edward Dana, the general manager and chief executive official of the system—has been gradually working the property out of the heavy operating deficit which it had amassed by the first day of October of last year. To the original operating deficit, which first faced the trustees when they took over the property for the commonwealth on July 1, 1918, was added an increasing loss through the twelvemonth, while the next three months added disaster upon disaster, the bitter strike of the elevated's employees, the boycott that followed in its wake, as well as a fear on the part of some Bostonians as to the safety of riding upon the cars. (All of this was prior to the great police strike and Governor Coolidge's firm action in bringing law and order once again in sturdy old Massachusetts.) It is enough to say that these conditions added a fresh deficit fund of $928,694,85 to a deficit of $435,348.46, which had been accruing because of back pay during the inaugural year of state trusteeship and which was not figured in the $4,980,151.67 of loss which had accumulated during the first year of operation by the public trustees in a desperate effort to hold down the fare despite the steadily increasing operating costs of every sort. The loss under trusteeship was assessed on the commonwealth and it was known would have to be paid back before fares were allowed to go one penny back from the high figure of 10 cents as finally established. This last figure—the $435,348.46 of deficit because of back pay for May and June, 1918, plus the $928,694.85 extra deficit in the three strike and boycott-filled months that immediately followed, brought Dana's immediate deficit on Oct. 1 last to about $1,364,043.31.

Talk about millstones! A man less energetic and less optimistic than the youthful manager of Boston Elevated might well have quailed before so stout a collar. But youth and energy—and the resources of a 10-cent fare—accomplished wonders in the final months of 1919 and the first thirty days of the present year. By the first day of February, 1920, Dana had repaid not only all that $928,694.85 of state-accumulated deficit but also a part of the back pay award.

Then things began to happen. The weather man must have borne him an especial grudge. For Boston went into the worst New England winter for thirty-five years—according to the weather man's own records—and the elevated system went into battle for the second time in a half year; but a fight of a far different sort. It did not give up. In a storm of far less magnitude and at the same time practically all the surface car lines of Manhattan Island gave up the ghost. Which of itself constituted something of an exposition as to the difference in the morale between a state-protected line and one which is state-neglected. The Boston Elevated kept all of its surface routes running as well as its elevated and subway ones. Some of the surface lines wavered a bit at times, but none of them gave up; not even the Mount Auburn Street line over in Cambridge, where a water main burst between the tracks and put twenty cars out of commission in one place. It took nine tons of salt to open that line, but it was opened, and stayed open. Altogether 2,000 tons of salt were used to keep tracks clear in Boston this past winter.

Moreover, despite constant and eternal delays—the trolley tracks of Boston were the only pathways for weeks through which the teamsters and the trucksters might drive—the company maintained its headways. What that meant only a seasoned traction operator can really appreciate. But even the layman, with pencil in hand, can figure out that to maintain a five-minute headway at 9 miles an hour on a line 5 miles in length will require ninety minutes for the round trip and eighteen cars to maintain the service. But if vehicular traffic keeps breaking down in the tracks and therefore your round trips begin to average two hours and one-half instead of one and one-half your pencil will show you equally well that you will need six more cars in order to maintain that five-minute headway. Which was precisely what was done in Boston. The older folk of the town saw cars come forth upon the city streets that they had not seen since the Stadium was built and the Boston Museum torn down. These venerables it was that saved the day—and saved the headways.

These things cost many, many

thousands of dollars. And set Dana back a considerable distance in his repayment of the deficit. By this time he has recovered and is back at it again—whittling down that overload. His labor troubles are perplexing but apparently not overwhelming. For one thing, and a most important thing, there is no labor shortage these days in Boston. The company has not hired a new man since February, 1919, and does not expect to go seeking for new material before August, 1920, at the earliest. Its ordinary needs of turn-over are being very nicely taken care of by its waiting lists of ex-service men, whom it has promised to re-employ at the earliest available opportunity.

One thing more: The 10-cent fare still sticks in my crop. It comes as a little shock to a stranger to the city's gates, particularly one who, like myself, has been in Philadelphia but a few days previous. I chanced to mention Mr. Mitten and his 5-cent fares to Mr. Dana. He came back at me—just as I knew he would:

"It is not fair to compare this town with Philadelphia," he expostulated. "Boston has progressed four times as fast in her solution of her transportation problems as that town, and yet in the past eight years traction revenues here have increased but $5,000,000 as against $12,000,000 over there. Yet in those same years $35,000,000 has been spent here for increased traction facilities as against less than $21,500,000 in Philadelphia in the same time. Reduced to the ratio of investment to revenue this shows $6.90 for Boston as against $1.76 for Philadelphia.

"Now suppose that Philadelphia had increased her transit facilities as they have been increased here. Today she would find her fixed charges increased $3,000,000 and her operating charges $6,000,000. And assuming that her traction system had incurred no loss of riding she could hardly be operating at less than a 7½-cent fare. Moreover, we have the eight-hour day here for our platform men, with fourteen hours as the maximum outside span of their day's employment. Both the average day's service and the maximum span are appreciably longer over there by the Delaware, while the Philadelphia Rapid Transit is not bound down by any such elaborate agreement as was our heritage from the strike of last summer, with its varied expensive provisions. All these things cost money—and a lot of it."

Mr. Dana is right. Running trolley cars and rapid-transit trains in narrow-streeted and congested Boston, where pretty nearly one-third of the entire mileage of the elevated's system is in curvature, is no child's play. The plant is both elaborate and expensive—in first cost, in maintenance and in operation. It has, as we said at the beginning, anticipated the growth of Boston, rather than dragged behind it. Which is a good thing for the community. But not quite so good a thing for the operating company. That the operating company has done even as well as it has done is due, in my opinion, to three things: New England conservatism, New England thrift and New England brains. That is a combination genuinely hard to beat.

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Tremont Street near corner of Park Street, Boston, Mass. There were formerly car tracks here. Now all cars run underground

N.E.L.A. Discusses Heavy Traction

At Pasadena Convention, Held May 18 to 22, Committee on Electrification of Steam Railroads Presented Symposium Covering Electrification from Several Angles

THE forty-third convention of the National Electric Light Association was held at the Hotel Huntington, Pasadena, Cal., from May 18 to 22. Of the many reports of committees and addresses several bear more or less directly on the electric railway field. This is conspicuously true of the report of the committee on electrification of steam railroads, of which F. M. Kerr, vice-president Montana Power Company, is chairman. This committee includes also in its membership A. H. Armstrong, chairman electrification committee General Electric Company; R. Beeuwkes, electrical engineer Chicago, Milwaukee & St. Paul Railway; H. H. Cochrane, chief engineer Montana Power Company; Peter Junkersfeld, engineering manager Stone & Webster; F. H. Shepard, director of heavy traction Westinghouse Electric & Manufacturing Company, and J. E. Woodbridge, resident engineer Ford, Bacon & Davis, San Francisco.

A part of this symposium is abstracted this week, and the abstract will be concluded in early issues of the ELECTRIC RAILWAY JOURNAL. Abstracts will also be given of the reports of the committees on prime movers, electrical apparatus, overhead systems, underground systems and other subjects.

THE HEAVY TRACTION SYMPOSIUM

In introducing the symposium, Mr. Kerr explained that the committee found it advisable to submit its report in this form rather than as a unified joint report and had arranged for papers presenting the case for electrification from the points of view of the purchaser and the seller of electrical energy for railway purposes. Papers were also secured from representatives of manufacturers and consulting and operating engineers. While most of the papers are from members of the committee, men prominent in the industry were invited to contribute pertinent comments and the committee presented abstracts from a number of letters received in response.

From his own point of view, Mr. Kerr stated that he considered the experimental stage of railway electrification to be past. The Chicago, Milwaukee & St. Paul Railway and the Montana Power Company have demonstrated, in Montana, the entire practicability and the great superiority of electric power for the operation of a heavy trunk-line railway by more than four years of 100 per cent operation. The demonstration has been so satisfactory that the question of applying electric operation to other roads is a matter only of securing the necessary capital.

The change from steam to electric operation means more than a mere change in type of locomotive used. It means a change in the entire conception of the art of railroad transportation. The old limitations of boiler capacity and the handicaps of low-grade fuel, impure water and zero weather are all swept away. The locomotive becomes a device for hauling trains and nothing more. By adopting electrification the railroad is relieved entirely of the business of generating power and is enabled to concentrate on its main business of transportation.

Mr. Kerr said that the energy required for railroad electrification can best be supplied by the power companies of the country. The power companies have had years of experience in the application of electric power and understand its capabilities to a much greater extent than do the steam railroads. For this reason the power companies should take the initiative in bringing before the railroads the fact that electric power, which during the last quarter century has been gradually superseding other forms of power, now stands ready to take one more step and relieve the transportation systems of the burden of maintaining the obsolescent reciprocating locomotive steam engines.

Mr. Kerr pointed out the following items, which should not be lost sight of in discussing the operating economies of electric as against steam operation:

1. The cost of coal should be taken at its actual market value delivered at the point of use.
2. Comparisons of maintenance cost should include not only locomotives but also cars, for especially on mountain divisions where regenerative braking is used the rolling stock of a road is subjected to much less abuse with electric than with steam operation.
3. The cost of obtaining, and frequently of treating, water for boiler feed is an item of considerable importance chargeable to steam but not to electric operation.
4. The higher speed at which cars can be hauled over roads with electric operation allows the same amount of freight to be handled with considerably fewer cars.
5. With the size and speed of trains increased by electric operation the item of train labor is reduced. Roundhouse and shop labor is reduced even more.
6. The cost of purchasing electric energy is in some cases given undue prominence by roads considering electrification. That this is not necessarily a controlling item is indicated by the following figures: The total yearly cost of operation on the Chicago, Milwaukee & St. Paul Railway averages about $11,000 per mile for the entire system of 10,000 miles. The cost of electric energy purchased for the Rocky Mountain division is $1,600 per mile, or less than 15 per cent of the average total cost for the system.

THE ELECTRIFIED RAILROAD AS A POWER CONSUMER

Mr. Cochrane discussed the power end of the electrification problem on the basis of experience obtained in supplying power to the Butte, Anaconda & Pacific and the Chicago, Milwaukee & St. Paul Railways. He explained why he believed that the purchase of power from existing systems, either hydro-electric or steam, is more economical for the railroads than the generation and distribution of their own power.

For example, if the Chicago, Milwaukee & St. Paul Railway had undertaken to generate its own power for the 440 miles electrified in Montana by means of water-power development it would have had to make two 25,000-kw. developments to provide a reasonable reserve for future growth and to allow one spare generating unit in each power plant. It would also have had to build high-voltage feeders from its plant to feed points not more than 100 miles apart on the electrified division in addition to its so-called bus line, paralleling the track and tapping in at each substation. This would have called for approximately 700 miles of high-voltage line.

By taking power from the Montana Power Company the railroad was able to deliver power to the substations on its two 220-mile divisions by building approximately 400 miles of high-voltage line, while the power company built 200 miles, which is used partly for transmitting power to the railroad and partly for other purposes. The plant required for this purpose is of approximately 30,000-kw. capacity.

The saving in plant capacity is due partly to the diversity factor between the railroad load and the balance of the power company's load and partly to the fact that it is unnecessary for the power company to provide any more spare capacity for growth and for other purposes with the railroad load than would be necessary without it. Furthermore, it would have been difficult for the railroad to find power sites suitable in size and location for its requirements.

In the case of the Butte, Anaconda & Pacific Railway the economic advantages of purchasing power are even more marked, because this road is so situated that the entire system could be supplied by two substations, one at Butte and the other at Anaconda. The power company already had large substations at these points and the railway requirements were taken care of by merely installing motor-generator sets in them.

Mr. Cochrane suggested that in future electrification projects the power company own all high-voltage lines, switches and transformers and deliver power to the railway at a suitable voltage for its converting apparatus. With this arrangement the power company would own all the equipment necessary to supply consumers other than the railroad along the electrified sections. All towns in which substations are located could be supplied with practically no additional investment except for the necessary local distribution systems. He sees no reason why the power company should not own and operate the railroad substations entirely, selling power to the railroad in the form required by it and delivering directly to its contact wire. This would cut the railroad's investment to that required to cover overhead construction and rail bonds.

Shifting a part of the investment from the railroad to the power company will, of course, necessitate a higher rate for power. It should be immaterial to the railroad whether the expense is met in the form of fixed and operating charges on equipment or in the form of an increased power bill.

POWER RATES FOR ELECTRIFIED RAILROAD

Mr. Cochrane pointed out that a rate should be flexible enough to allow quite a wide variation in the amount of power taken and in the load factor without penalizing the railroad to such an extent that it will restrict its operations in order to save on power.

The ideal rate from the railroad point of view is a straight kilowatt-hour rate. Such a rate is hardly feasible from a power company's standpoint, for a peak load can be taken without let, hindrance or compensation, and such a load at times might prove burdensome. A reasonable compromise can be reached by basing the major part of the charge on the small amount of energy taken, but with a small maximum-demand charge, just sufficient to offer an incentive to the railroad to keep its demand as low as good operation will permit.

Perhaps the most prominent characteristic of a railroad load, said Mr. Cochrane, is its lack of any outstanding characteristics. The two electrified divisions of the Chicago, Milwaukee & St. Paul Railway take peak loads of about 15,000 kw. each and the Butte, Anaconda & Pacific takes about 8,000 kw. These peak loads do not come at the same time, in general, and the fact that they exist is ascertained by referring to the records rather than by any physical effect which they have on the power system. The power factor is about unity and the load is so scattered that fluctuations in railroad loads have practically no effect on voltage regulation.

Mr. Cochrane showed a typical daily load curve of one of the St. Paul substations indicating a load factor of about 20 per cent. The load factor on the entire Rocky Mountain division was 50 per cent. The Missoula division takes a load very similar to the Butte, Anaconda & Pacific Railway, except that the latter "peaks" at about 8,000 kw. and has a load factor of 30 per cent. Taking the three loads together, however, the total load factor is higher than that of any constituent part. Combining a total railway load with that of the balance of the Montana Power Company's system makes a total with a daily load factor which frequently exceeds 90 per cent, typical figures at present being 144,000 kw. average and 160,000 kw. maximum.

THE POWER CONTRACT IN MORE DETAIL

Mr. Junkersfeld went into detail regarding the requisites of an equitable power contract in this field. He said that during the four years since the 1916 report of the committee was prepared the economic advantages of centralized production of electrical energy have become better understood by all parties interested. The 1916 report contained a section under the heading "Form of Equitable Contract for Energy in Bulk." The form suggested tended toward approximations of investment cost and of operating cost from time to time. The extraordinary experience in the meantime and the present outlook would indicate that this suggestion or tendency should now be given further consideration.

Mr. Junkersfeld pointed out that in the sale of power by a power company to a railroad both parties to the transaction are public service corporations. Each should share in the financial benefits resulting from the co-ordination of the power supply systems. The contract for power should provide automatically for wide fluctuations in cost of labor, fuel and other principal elements. This may take the form of a simple rate, perhaps a "block" rate, based upon both demand and consumption, with a provision for revision at suitable intervals at the option of either party to correct it for unforeseen conditions, for changes in the art, in the purchasing power of money, in the interest rates and in taxes, and for other factors which may affect the cost.

Additional provisions may be introduced, such as coal clauses, labor clauses, etc., to apply corrections for anticipated changes in cost, without the delay incident to periodical revision. It would appear wise to lay down clearly the intentions of the contracting parties and the principles upon which charges are to be based from time to time, keeping the relationship in a simple and easily understood form.

In order to minimize the effect of any uncertainty of termination of the contract, for which the seller must charge and the purchaser must pay, the contract should be written for a long term of years, or some arrangement made whereby at termination the load is so removed that the power company will be reasonably sure of finding suitable use for the capacity as it is released.

In addition to the immediate benefits to be obtained by both the power company and the railroad by electrification of the latter, it is becoming increasingly apparent that the national interest in this is very great on account of the saving in fuel consumption.

Mr. Junkersfeld said that the State Geologist of Pennsylvania has reported that practically all of the thick, easily mined beds of coal in Pennsylvania, with veins 6 ft. and deeper, will be exhausted at the present rate within thirty-five years. Further, if the present rate of increase is maintained, the veins of the same thickness in Virginia and West Virginia will disappear within the same length of time. Every opportunity should, therefore, be taken to conserve this valuable natural resource.

Concluding, Mr. Junkersfeld said that great saving can be made by replacing steam locomotives with more efficient central steam stations. A further tremendous saving can be made where the electrified railroads can be supplied from otherwise unused water powers, as has been done, notably on the Chicago, Milwaukee & St. Paul Railway.

THE FUTURE OF OUR RAILWAYS

In his contribution to the symposium Mr. Armstrong emphasized the fact that with the return of the railways on March 1 to their owners, the latter were confronted with general conditions never paralleled in history. The present gross income is insufficient to make any reasonable return on the capital invested after meeting the greatly increased demands of labor. No funds are available to buy locomotives and cars needed because the government failed to make such purchases during its period of control. The trouble with our railways is perhaps fundamentally deeper than the issues raised by increased cost of labor and material and lack of ready funds. It is considered by many that it is an engineering rather than a strictly financial crisis that confronts us today and that our transportation needs have outgrown the possibilities of the steam engine.

The trying period of war transportation, said Mr. Armstrong, brought the steam engine failure sharply into the public view and served to emphasize its complete inability to meet overloads or operate successfully under adverse climatic conditions. Unlike the steam engine, with its restricting boilers, the electric locomotive taps an unlimited supply of power through its trolley connection and can thus be built of any tractive power and speed demanded to meet future transportation requirements.

The steam engine is consuming one-quarter of all the coal mined in this country, in addition to 6 per cent of the oil, whereas the electric locomotive can utilize water power where available or, if dependent upon coal-fired generating stations, can haul the railway tonnage of the country with an expenditure of one-third the coal now consumed by the railways. The safety of mountain railroading has also been much enhanced by the introduction of electric braking provided by electric locomotives on down grades, and the electric locomotive has established new levels for low maintenance cost and reliability, with greater flexibility in meeting the varied requirements of general transportation service.

Continuing, Mr. Armstrong said that the fuel economy has become a necessity on account of the high cost of fuel. The reciprocating steam engine is a notable offender in wasting fuel. This type of prime mover has been driven from the stationary power field by the steam turbine. One-third of the coal now burned on our steam engines is wasted in "standby" losses. The steam engines demand continual stoking of coal to keep the boiler hot, requiring for this purpose 300 lb. or more per hour. There are some 63,000 steam engines in this country going through the same cycle of losses every day with no direct supervision of the vast army of firemen employed.

In addition to inefficient burning of coal under the steam locomotive boiler, the distribution of railway coal calls for a tonnage movement approximately 20 per cent of the total revenue freight ton-miles. All coal burned journeys over the road twice, first in the coal car from mine to coaling station, then back again on the engine tenders. A third journey is made by the returning empty coal cars. The hauling about of the engine tenders adds 11 per cent to the ton-mileage of the total revenue freight movement.

During 1918 our railways consumed 163,000,000 tons of coal and 45,700,000 bbl. of oil. On the basis of 3½ bbl. of oil being equal to one ton of coal, the equivalent total coal consumption during 1918 was 176,000,000 tons. It is estimated that the coal consumption is about 290 lb. per 1,000 ton-miles of gross tonnage moved. It is estimated further that 1,000 ton-miles can be hauled electrically with an expenditure of 40 kw.-hr., which in a modern generating station can be produced with a consumption of 100 lb. of coal.

A total consumption of about 53,500,000 tons was estimated by Mr. Armstrong as a rough approximation of the coal required to produce the electric power to haul the tonnage of 1918 by electric locomotives. This indicates a possible saving of 122,500,000 tons of coal as the annual return on universal electrification of the country's railways. Many of the present steam engines, he said, are antiquated and most inefficient fuel burners, but the improvement resulting from their replacement by modern steam engines can never approach the fuel savings outlined above, while new steam engines will cost nearly as much as the equivalent capacity in electric locomotives. While fuel economy alone may hardly justify the expense of electrification, except in extreme instances, careful consideration of this subject is timely and important, as the war period has shown how vitally dependent every country is upon its coal supply.

ST. PAUL LOCOMOTIVES HAVE MADE GOOD

To illustrate points cited above Mr. Armstrong said that such a powerful and flexible type of motive power as the gearless electric locomotive just put into operation on the Cascade Division of the Chicago, Milwaukee & St. Paul Railway gives assurance that passenger trains will be run on schedule time, regardless of temperature changes, independent of rail conditions and free from the vagaries of firemen and steaming qualities of fuel. This locomotive requires no helper to assist in hauling twelve steel cars, weighing 1,000 tons, against the 2.2 per cent ruling grade at 25 m.p.h., and is equally capable of reaching 60 to 65 m.p.h. with the same train on level track. Electric operation practically eliminates the dangers and costly features of mountain grades, so much dreaded by the steam engine operator.

It would appear to the casual observer, said Mr. Armstrong, that the requirements of mountain railroading have been reasonably well met by the steam engine available today were it not for the comparison afforded by the results of electric operation. While the Mallet compound steam locomotive is capable of giving great tractive power, this is done at sacrifice of speed; to reach the speed in freight service possible with a single electric locomotive operating under similar conditions would necessitate running two or more Mallet engines, with the prohibitive operating expense inseparable from such excess of engine power. No steam engine can be built and operated with a single crew that will provide such a combination of great tractive effort and speed as is entirely practicable in electric locomotive construction. The steam engine on heavy grades loses some 12 per cent of its effectiveness in revenue hauling capacity by being compelled to haul its own coal on tenders and coal cars. The equivalent of one train in every eight is required to haul its own fuel. In addition the rigid wheelbase of the more powerful steam engines may reach 21 ft., which is entirely too great for successful running on the 10 deg. curves so often necessary on mountain divisions. Electric locomotives of equal pulling power require but one-half this wheelbase. Finally, an electric locomotive can be maintained at materially less expense than a steam engine of equal capacity. Even under present high prices the St. Paul electric freight locomotives are being kept in repair for approximately 13 cents per mile, while Mallet engines are costing from 30 to 50 cents.

In conclusion Mr. Armstrong pointed out that electrification involves no experiment with novel and untried apparatus. On the contrary, universal electrification could well follow closely along the lines of installations now in successful operation. Future development will direct the adoption of detailed changes, but offers small opportunity to bring about any fundamental improvements that will call for the untimely retirement of such an efficient mechanism as the 300-ton locomotives now operating on the St. Paul railway. We are, he said, justly proud of the greatest railway system on earth, but in the coming competition for the world's markets we are threatened with serious disaster if our rail highways are not kept in the highest state of efficiency. The railways are suffering from physical stagnation, produced by the fact that the steam engine development has not kept pace with the needs of modern transportation. The most effective known remedy is the immediate electrification of the more difficult divisions, where the limitations of the steam engines are most keenly felt, and the future extension of the electrified zones to meet progressive needs.

A MOSSES NEEDED IN THE TRANSPORTATION FIELD

Mr. Shepard, in his paper, viewed broadly the transportation requirements of the country, with reference to the fact that the success of all industry depends upon the free and expeditious movement of railroad traffic. The normal growth of transportation facilities has been arrested for the last dozen years. Now, with the resumption of private operation, the future of the railroads is perhaps the one problem of overwhelming importance.

Railroad operation in America is in a class by itself, said Mr. Shepard, for the American railroad operator has already developed methods of operation which are far superior in economy of traffic movement to the methods of other countries. He gave general data on the operations for the last year as reported by the United States Railroad Administration as of interest in this connection. These cover some 230,000 miles of railroad line. The gross revenue was more than $5,000,000,000, of which about $500,000,000 was saved for net income, while the standard return guaranteed to the roads by the Railroad Administration was about $900,000,000. Of the total income, 80 per cent more or less was from freight traffic. About 50,000,000 freight train-miles were operated per month and nearly 45,000,000 passenger train-miles. There were roughly 2,500,000 freight cars, 30,000 freight locomotives, 15,000 switch engines and about the same number of passenger engines.

The actual service record of the engines was as follows: The freight engines were in service 35 per cent of the time, in the engine house 50 per cent; passenger engines were in road service about 25 per cent of the time, in the engine house 65 per cent; switch engines were in service about 55 per cent of the time, in the engine house 42 per cent; the remaining time of all classes was spent at terminals in readiness for service.

The average freight-car mileage per day was about twenty-two, the tonnage carried per loaded car was less than thirty, while one-third of the car mileage was run without lading. The average mileage per day for freight engines was about sixty, while that for passenger engines was about 105.

Of the cost of operating freight engines, which totals about 25 per cent of all operating expenses, 32 per cent was for locomotive maintenance, 30 per cent for locomotive fuel and 31 per cent for train service labor. The coal used per locomotive-mile for freight locomotives was about 250 lb. and for passenger locomotives 120.

WHY ELECTRIFICATION IS ESSENTIAL

Mr. Shepard stated that the traffic of the country doubles about each twelve years, so that unless facilities are increased the burden resulting from congestion and inability to move traffic expeditiously will be augmented each year. The solution of the railroad problems should, therefore, be based upon broad lines. Facilities must be provided in advance of needs without regard to the necessity for immediate financial return. This is, in fact, the way in which the major facilities of a railroad are provided, for no revision of lines, additional trackage or improved terminals reflect immediately a full return on the additional capital expended. On those roads whose financial position permitted the provision of facilities in excess of the immediate requirements the freedom of traffic flow has worked out to the ultimate financial advantage of the railroads and to the far greater advantage of the communities served. The country needs a Moses, said Mr. Shepard, or perhaps several of them in this important situation.

The physical means by which the most can be secured from the railroad plant, in Mr. Shepard's opinion, is electrification, the most important reason being that, due to the mobility of electric power, more power can be used to move a ton and more tons can be hauled in a single train than is possible with steam locomotives. While electric locomotives so far in use have in general merely replaced steam locomotives, they have in a number of cases been of greater power than the steam locomotives replaced, and consequently their greater ability for service has invariably resulted in marked improvement over steam conditions. The possibilities of electrified operation have not as yet been visualized, due largely to the newness of the tool to those who are responsible for our railroad operation and to the method of operation which has been determined by the limitations surrounding the use of the steam locomotives.

The growth in the size of the trains has been the greatest single reason for the economy of traffic movement in America. The size of trains will inevitably be larger, and to handle the inevitable increase in traffic the trains of the future will have to be operated at greatly increased speed. The most recent equipment is vastly stronger than the early types of car. The life of a freight car is only about twenty-five years, so that the weak cars of the present will not determine the size of trains in the future. The present limit of speed is that due to the limit of power of a steam locomotive, but this will not obtain with electric locomotives.

HEAVIER TRACTION STILL IS TO COME

Mr. Shepard looks forward to the use of 10,000 kw. for the propulsion of single trains, and in some cases very much more than this. He said that the amount of power used on the lines of roads already electrified differs widely, depending upon the density of traffic and the measures for limiting power at times of maximum demand. Through regulation the maximum demand on the St. Paul railway is limited to about 70 kw. per mile of road, while the average was formerly 40 kw. On the Norfolk & Western Railway the maximum demand is more than 800 kw., while the average is about 280 kw. On the New York, New Haven & Hartford Railroad the maximum is about 400 kw., with an average of 150 kw. On the Pennsylvania Railroad at Philadelphia, for a portion of the suburban service only, the maximum is about the same as that for the New Haven, while the average is 100 kw. The method of use of power in every case properly should be that which makes the best use of the dollar, considering the factors involved; that is, the carrying charge for the cost of investment and the cost of operation.

Mr. Shepard concluded his paper by saying that the maintaining of efficient production and distribution of electric power is essentially a business and science by itself, and for the most economical production of power our power companies are undoubtedly best suited to secure this continuing result. The railroad load should be an important factor in the rounding out of every comprehensive scheme of power development and transmission. With the numerous points of contact which can be established with our power system, it is practicable for the railroads to take on power on a basis which should be acceptable and attractive to the power companies. The basis for establishing these conditions will, during the inauguration and the extension of railroad electrification, be determined analytically in each case. Ultimately, with the continued growth of railroad electrification, the supply of power will be more or less established on a uniform basis. In the meantime, common knowledge of the possibilities of electrification on the part of those responsible for our railroad operation, as well as greater familiarity with the needs of the railroad on the part of those directing our power development, is manifestly desirable to the end that both these utilities will serve the purpose more economically, more universally and more extensively. It may well be that the advantages of electrification will be so great that the much mooted saving of fuel in the use of electric power over steam will be considered a by-product of railroad electrification.

COMMENTS FROM THE FIELD

In concluding its report the committee quoted from letters received from prominent men interested directly or indirectly in electrification. A. H. Smith, president New York Central Railroad, analyzed its technical aspects, and concluded by saying that the further extension of electric operation on steam railroads depends to a considerable extent on the cost of power. Extensions, however, cannot be expected unless the pending railroad legislation results in the restoration of railroad credit. H. E. Byram, president Chicago, Milwaukee & St. Paul Railway, wrote that the installation of electric operation on that road has been of distinct advantage from many standpoints, the principal one being the economy over steam operation.

Ralph Budd, president Great Northern Railway, stated that one of the things that would help in the coming extension of electrification would be an agreement among electrical engineers upon a type of electrification which could be considered as standard. Others who expressed interest included Walker D. Hines, Director-General of Railroads; Senator Henry L. Myers, Representative John J. Esch and Fairfax Harrison, president Southern Railway.

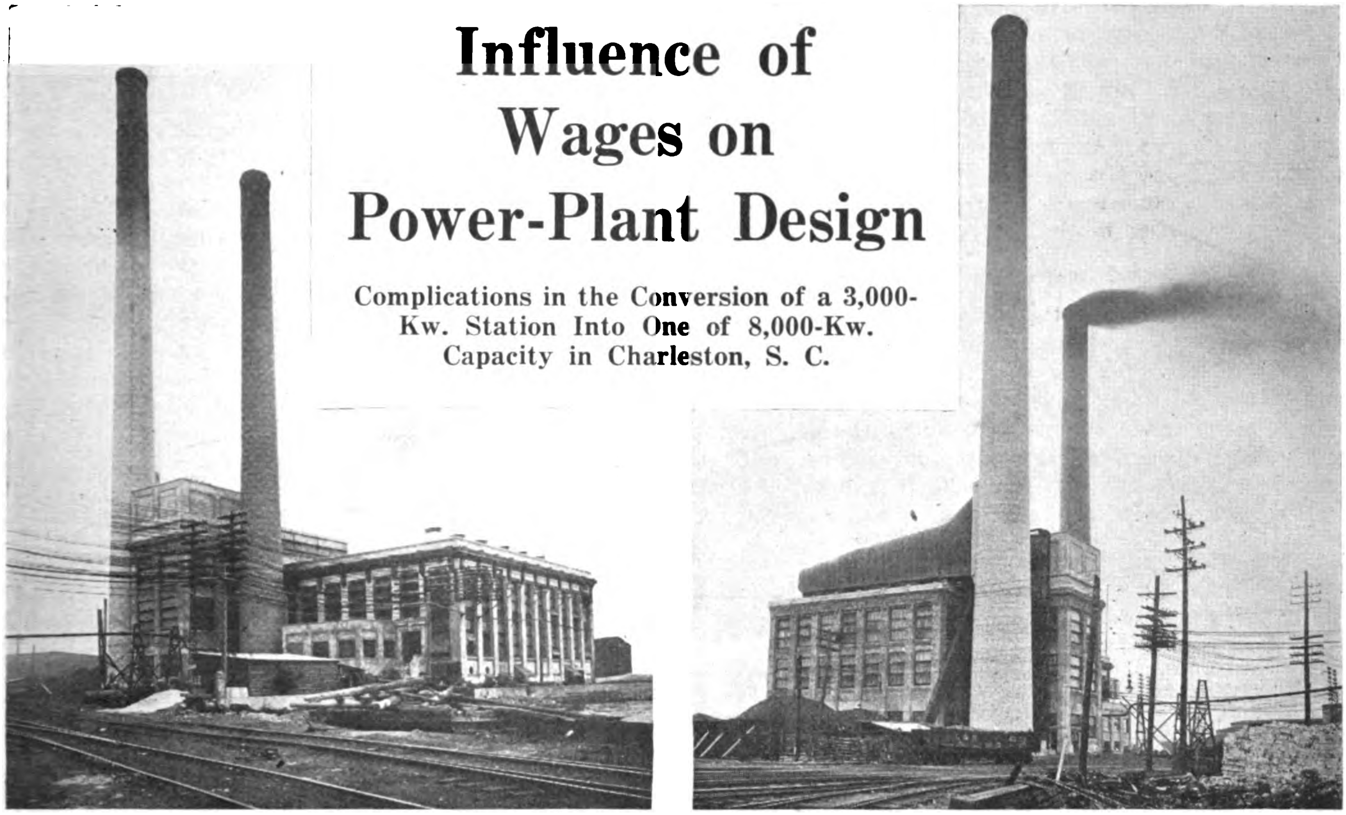
Chileans Tire of German Tramway

AN ACCOMPANYING illustration shows a street scene in Valparaiso, Chile, at the present time. This photograph, sent to the ELECTRIC RAILWAY JOURNAL, was accompanied by the explanation that the reason for the absence of street cars on the tracks was that on March 10 the Chileans became tired of the German tramway and burned some twenty-seven cars. Since 1914 the company has been unable to do much in the way of extension or improvement because it could not import materials from Germany and the allies would not sell any to the company. Control in the company may be turned over to the British to help pay the German war indemnity.

STREET SCENE IN VALPARAISO, CHILE, WITH STREET CARS DESTROYED

Influence of Wages on Power-Plant Design

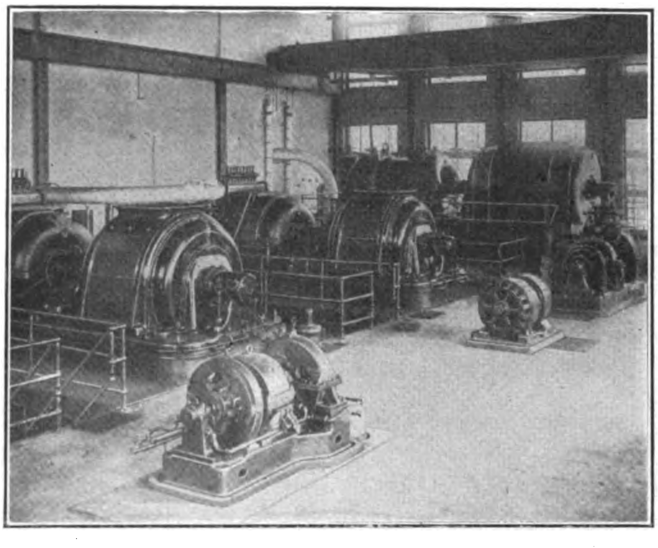
Complications in the Conversion of a 3,000-Kw. Station Into One of 8,000-Kw. Capacity in Charleston, S. C.



CHARLOTTE STREET POWER HOUSE, CHARLESTON, S. C.
At left, looking from the turbine room side toward the new boiler addition. At right, view from the boiler room side, showing boiler breeching and chain bucket coal conveyor between the new stack and the building

The important influence of the rate of wages upon boiler-plant design is strikingly shown in connection with the enlargement of the Charlotte Street power plant of the Charleston (S. C.) Consolidated Railway & Lighting Company, recently completed. When this station was originally built, in 1912, colored firemen could be hired a-plenty for $1 a day, and therefore the need for labor-saving stokers was not felt to anything like the degree that it is today. Nor was the better efficiency of stokers so potent a factor, for the price of coal was also low. Consequently, the boiler plant for the original station was laid out for hand firing.

But when the war brought on the necessity for a large expansion of the power-plant capacity colored firemen could be secured only with difficulty at $4.50 a day. In the face of this, there could be no argument as to whether stokers should be employed for the new boilers needed to increase the station capacity from 3,000 to 8,000 kw., and this was easily justifiable even though it involved many complications in working a modern stoker-fired battery into the old layout, the plan of enlargement being to retain the hand-fired boilers until a later date. How some of these difficulties of design were worked out is brought out in what follows:



TURBINE ROOM OF CHARLOTTE STREET POWER HOUSE, SHOWING NEW 5,000-KW. UNIT IN THE BACKGROUND

The Charlotte Street station, prior to reconstruction, was laid out with a long boiler room parallel to the turbine room, the boilers being set in a single row backed up against the turbine-room wall and with the firing aisle along the outside building wall. The equipment of the boiler room comprised one 518-hp. Heine boiler and five 528-hp. Franklin boilers, all hand-fired. They were installed on a floor level several feet below that of the turbine room and supplied steam at 160-lb. pressure to two 2,000-kw. and one 1,000-kw., 2,300-volt, three-phase General Electric turbo-generator sets, equipped with jet condensers. The turbine room was originally designed for an ultimate installation of four 2,000-kw. units, so that there was ample space in which to place additional machines at the time enlargement became necessary in 1918. The pressing demand for a large increase in output, due to government operations and to an unprecedented growth of the city, however, made it advisable to install a 5,000-kw. unit instead of an additional 2,000-kw. machine as originally planned. The resulting installation of a Westinghouse-Parsons 5,000-kw., 13,200-volt, three-phase unit, operating at 200-lb. steam pressure and equipped with a surface condenser, did not involve any particular difficulties in so far as the turbine-room construction was concerned. The real problems lay in the boiler plant.

In the boiler room it was necessary to install three new Babcock & Wilcox 509-hp. boilers and Westinghouse underfeed stokers, generating steam at 220-lb. pressure and 125-deg. superheat to serve the new turbine. This necessitated a considerable enlargement and rearrangement of the boiler house.

BOILER HOUSE RECONSTRUCTION

The side and part of the end wall of the boiler room were knocked out and the building extended sufficiently to provide space for the new boilers on the opposite side of the old firing aisle, the layout of new and old boilers being made symmetrical about the center line of the firing aisle. Taking out the old wall necessitated some special construction in order to support the old roof trusses, which were cut off to make way for the new skylight and roof construction. This was done by supporting these shortened existing trusses in a cantilever construction from the roof trusses of the new extension, which were at a considerably higher elevation. This construction may be seen in the accompanying cross-sectional drawing of the boiler room addition.

The present boiler room extension was made large enough for the present installation of three of the newer type boilers and one more. Later, by removing a temporary wall and extending the building longitudinally, two more boilers of the same size can be installed. When the capacity of this battery of six is exceeded the hand-fired boilers on the opposite side of the aisle will be replaced with six of the stoker-fired type, giving an ultimate total capacity of twelve boilers and 6,108 boiler horsepower.

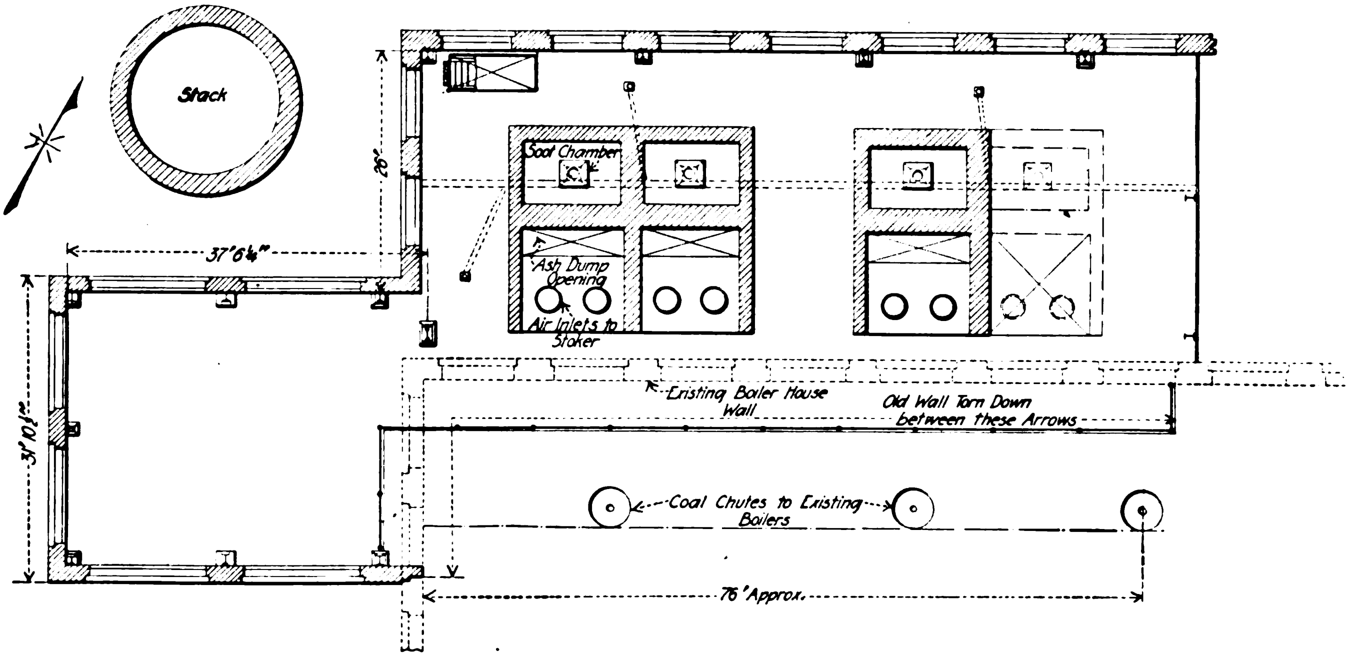
The most interesting part of the boiler room construction was that the use of the underfeed stokers made it necessary to raise the operating floor for the new boilers to a height 18 ft. above the old boiler room floor, in order to provide sufficient space for the grates and blowers and ash chambers. This meant that in combining the old and new boiler equipment into a single plant there must be two operating floor levels. However, the new boilers and their equipment were so installed as to be in proper location for the ultimate arrangement of stoker-fired boilers on both sides of the firing aisle, doing away with the lower operating floor.

The new battery of boilers made it necessary, also, to build a new brick smokestack, which is the higher of the two stacks seen in the accompanying halftones, and to install a new coal and ash handling system, etc. The steel breeching connecting the uptake flues from the three new boilers was mounted on top of the boiler house and connected to the chimney at a point some 60 ft. above the ground, as seen in one of the illustrations. The uptake flues were carried up nearly vertically within the building to connect to this overhead breeching. This arrangement gives ample space for the future installation of economizers if they are desired.

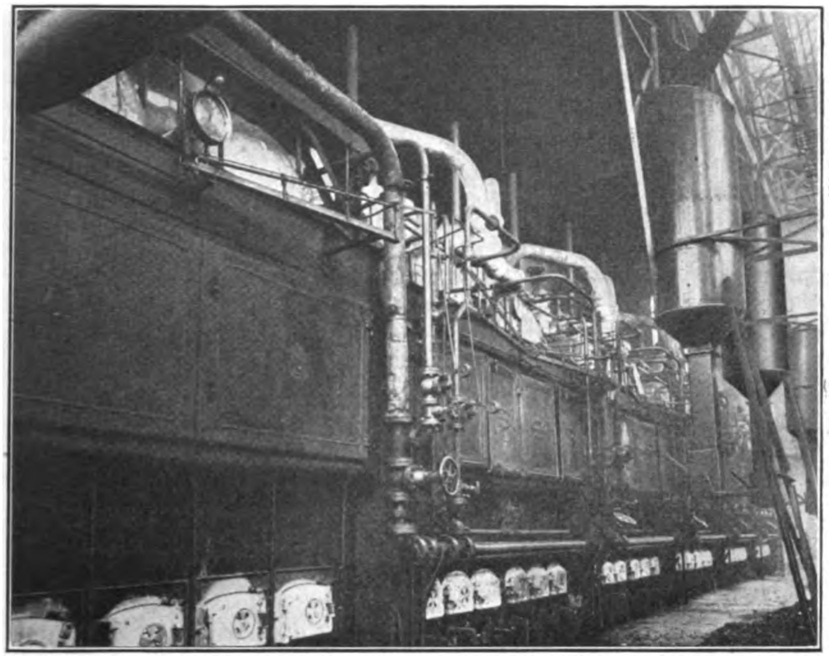
On the same consideration that determined the use of hand-fired boilers in the original plant, coal was handled into the firing aisle, and ashes out, by wheelbarrow. Likewise, the same consideration which determined the installation of stokers in the new boiler plant dictated the installation of a modern labor-saving coal-handling plant.

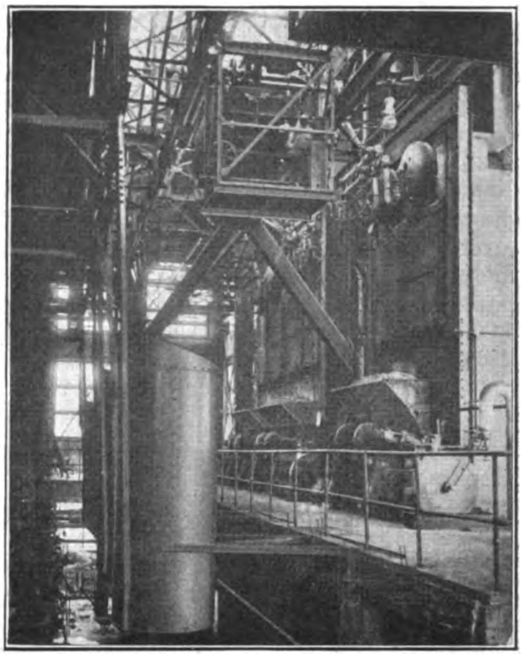
Coal delivered in side or bottom dump cars is unloaded into a pit beside the boiler house. From here it passes through a crusher installed underneath the pit, discharging into a bucket conveyor. This, in turn, elevates the coal up to the top of the building and across over the roof, discharging into an overhead concrete bunker of 350 tons capacity. The size of this overhead bunker was made large enough to meet the requirements of the ultimate boiler plant for three days' supply. The bucket conveyor can be seen in one of the accompanying exterior views of the station, located between the stack and the building, and another view shows this conveyor as it passes over the top of the building to the discharge point over the concrete bunker.

From the overhead bunker coal is discharged by gravity into a Beaumont weighing lorry mounted on


Stack
26'
37'6¼"
37'10½"
Soot Chamber
Ash Dump Opening
Air Inlets to Stoker
Existing Boiler House Wall
Old Wall Torn Down between these Arrows
Coal Chutes to Existing Boilers
76' Approx.

PLAN OF BOILER HOUSE EXTENSION, SHOWING STACK LOCATION, BOILER FOUNDATION AND MANNER OF JOINING EXTENSION TO OLD BUILDING





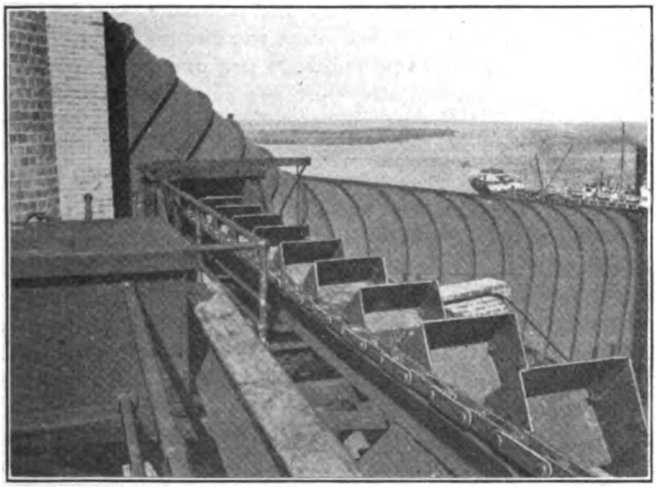
AT LEFT, LOWER FLOOR LEVEL IN BOILER PLANT, SHOWING HAND-FIRED BOILERS AND TEMPORARY COAL BUNKERS. AT RIGHT, FIRING AISLE IN THE NEW BOILER PLANT, SHOWING THE NEW UPPER OPERATING FLOOR LEVEL AND THE COAL BUNKERS FOR THE HAND-FIRED BOILERS ON THE LOWER FLOOR LEVEL

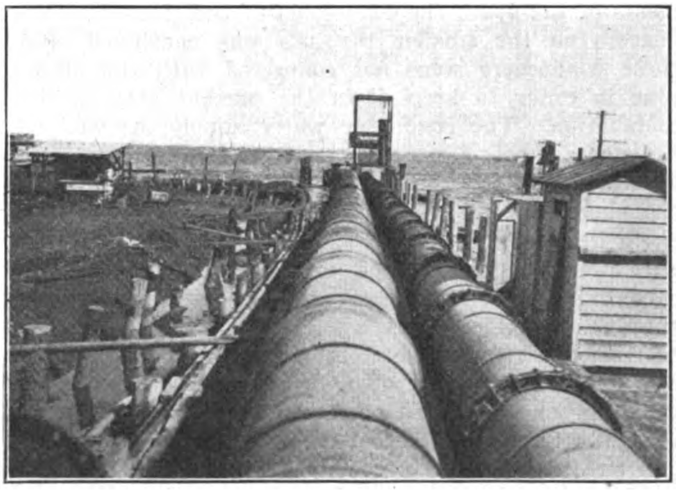
a runway over the center of the firing aisle. Then a spout from the lorry discharges the coal into the stokers of the new boilers.

An ingenious scheme was worked out with the installation of the coal-handling equipment to make it serve the hand-fired boilers also and thereby do away entirely with the wheelbarrow method of bringing coal into the plant. The lorry spout which will ultimately serve the row of stoker-fired boilers on the opposite side of the firing aisle from the present new boilers is used in this connection. Coal is discharged through it into three vertical cylindrical steel bunkers, each serving two of the hand-fired boilers. These bunkers were suspended from above on one side and supported by steel bracing from the lower operating floor on the opposite side and braced laterally by angle irons bolted to the upper concrete floor. A vertical spout was provided at the bottom of each of these bunkers and extended down to a level sufficiently low so that coal can be discharged by opening a valve, to the lower operating floor or firing aisle. From here it is shoveled into the boilers by hand in the usual manner. These temporary bunkers may be clearly seen from both the upper and the lower operating floors in two of the accompanying illustrations.

For reserve coal supply an area adjacent to the track pit provides a storage capacity sufficient to operate the plant for seventy to eighty days. The coal is unloaded from cars and delivered to the storage pile by means of a Browning locomotive crane, steam driven, equipped with a one-ton bucket. This crane is also used to shift cars. When running normally all the storage coal needed is within reach of this crane so that it may be picked up from storage and dumped directly into the track pit.

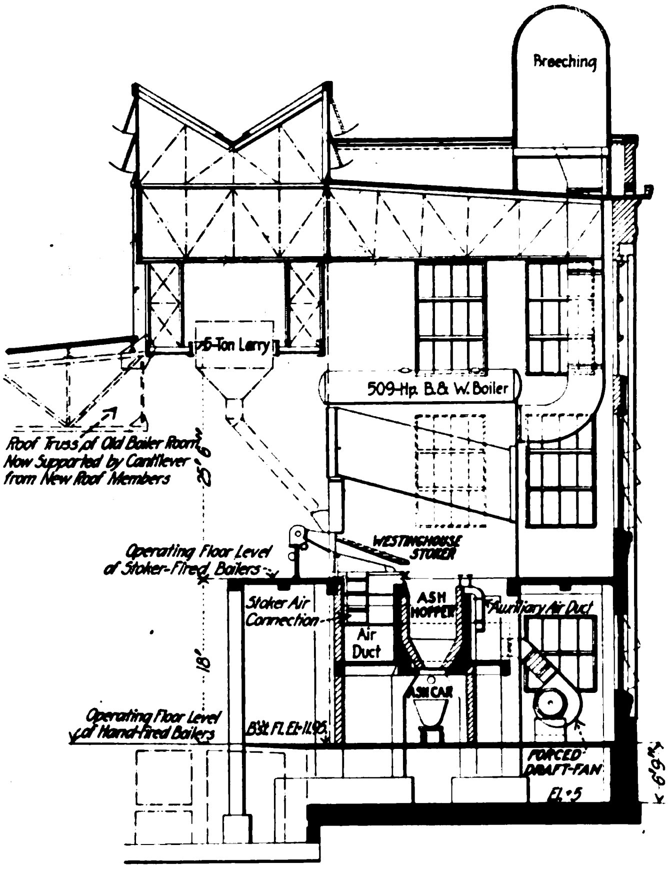
The ashes from the stokers are dumped into quenching hoppers and discharged into small cars underneath, which run on a track on the ground level. Ashes from the hand-fired boilers are raked into the firing aisle and taken out in wheelbarrows, as heretofore.





AT LEFT, CHAIN BUCKET COAL CONVEYOR AS IT PASSES OVER THE TOP OF THE BOILER HOUSE TO DISCHARGE IN THE OVERHEAD BUNKER. AT RIGHT, NEW AND OLD SIPHON PIPE LINES EXTENDING OUT INTO THE COOPER RIVER

In connection with the supply of circulating water for the condensers, two new 500-gal. per minute turbine-driven pumps were installed, each of them being large enough to handle the supply for the entire station. Water is taken from the Cooper River, on which the station is located, by means of a long siphon which dips down into a concrete pit at the river end and discharges into a tunnel under the power house. The several condensers draw water from this tunnel. For the old plant a 36-in. pipe was used for the siphon lead into the tunnel, but with the installation of the new 5,000-kw. units a new 48-in. pipe was installed. While this is large enough to take care of the total requirements of the plant, the connection of the three jet condensers on the smaller turbines was continued, and these condensers were not connected with the 48-in. pipe in order to keep down the present cost of the installation. The condenser water supply, as well as the steam supply for the new unit, is therefore entirely separate from that provided for the older machines in the plant.



CROSS-SECTION THROUGH BOILER HOUSE EXTENSION

An interesting scheme was worked out in connection with the old siphon pipe in order to increase the capacity. When all three of the older units were running the siphon would not deliver water fast enough to meet the requirements, the tunnel from which the condensers draw being open to the atmosphere at the time this scheme was adopted. To increase the capacity, then, the tunnel was sealed off and a steam exhauster put on it to create a vacuum of about 5 in. The employment of this method increased the flow of water to such an extent that the supply was ample for the then full capacity of the plant.

Citizens Responsible

Mr. Gadsden Tells New Jersey Manufacturers Why They Are Concerned in Utility Prosperity and How They Can Help

PHILIP H. GADSDEN, president Charleston Consolidated Railway & Lighting Company, Charleston, S. C., was the speaker on the subject "Public Utilities" at the convention of the Manufacturers' Association of New Jersey at Atlantic City on May 1. He expressed the belief that the principal difficulty with the public utilities question was that the manufacturers and business men in the different communities had not realized that this question is one which concerned them more than it did the utilities themselves. The fact that the most intimate relation exists between the service given by the utilities and industries in general, said Mr. Gadsden, was clearly shown during the war.

The speaker then pointed out that electric railways as a class are practically prostrate and that this condition is not confined to any particular part of the country. As the element of labor does not enter so largely into the manufacture of gas the gas companies were not so immediately affected by the extraordinary increase in the cost of labor that came about during the war, but they have been affected by increases in the cost of labor and material and most of them have obtained some measure of relief in the way of rates. A serious problem which is facing them is the reduced supply of oil with which they enrich their gas.

A common belief, Mr. Gadsden said, is that one cause for this trouble with the railway companies is "watered stock" and another is "poor management," but the speaker pointed out that in Massachusetts, where the records are available to show that there is no water in the railway stocks, the situation is no better than elsewhere, and this disposes largely of the first cause, while the universality of the trouble shows that there is little in the second reason. Railway companies could not have overlooked all the people in the United States who know how to run a street railway.

The fundamental difficulty is that the railways have been trying to give an indefinitely increasing service for a rigid price in a time of rising costs. The merchants whom the speaker was addressing, he thought, would understand that this could not be done in any line of business. Due to these conditions, the utilities have not been able to raise money for necessary extensions and improvements. Nevertheless the demands for transportation on the electric railways are greater than ever before, not only absolutely but per capita. This shows that the general use of automobiles, instead of cutting down the traffic, has at least not retarded it.

In conclusion, the speaker compared the returns from investment in industrial enterprises with those in utility enterprises. The promoter of a new manufacturing plant, who presumably expects to get transportation and power from his local utility company, can offer the prospective investor 20 per cent or more return, whereas the utility is often limited to 6 or 8 per cent. It is said that one reason the utility is so limited is that there is added security in the investment. If such is the case, the public should see that this added security is present. As market conditions increase the cost of operation rates should be advanced promptly, and the utility should not be obliged to wait before it can prove to a commission that it is losing money before rates are raised.

The Equipment Trust Grows in Favor

Many Recent Purchases Made in This Manner—What the Investor, the Broker and the Trustee See in This Security—A Survey of Electric Railway Issues—The Coming Standard Method of Purchasing Rolling Stock

"'DO YOU see that street car coming around the corner? And do you see that word "lessee" on the car? That car is the property of this bank.' The president of a leading bank had let a customer to the big glass window and in this manner directed his attention to the interest of the bank in the local electric railway property. 'You see,' he continued, 'we own several cars, or at least part interest in a good many cars of the company, and lease them to the company. We are therefore interested in the company's prosperity, not only from a civic standpoint but from a standpoint of the material welfare of the bank. You can't expect us to be sympathetic toward any move which would squeeze the railway company financially and tend to impair its credit.'"

It was with some such words as these that the president of one of the larger electric railway properties of the country indicated one of the many advantages of financing rolling stock purchases for electric railways by means of equipment trust bonds and by marketing the certificates based on these bonds in the home community of the company. There is apparently a great difference in the attitude of the holder of these equipment trust certificates as compared with the attitude of a holder of the ordinary mortgage bond sold by a corporation. This is true whether the holder be an individual or a banking or insurance company. In fact the growing interest of the latter class of security buyer has aided materially in some cases in making easier the financial program of the railway. If the certificates are marketed locally and with the right background the holder of a security feels his actual ownership of the equipment and is continually reminded of this ownership every time he sees a unit of rolling stock with the word "lessee" painted on it. There is a greater sense of partnership impressed upon him and he is more constantly and more vitally interested in the continued successful operation of the company than if he merely owned a bond, or, in some cases, even stock of the company. In the case of bondholders, even though the bonds are held locally, about the only thought given to the company is when the holder goes to his safe deposit vault to clip his coupons. There is no particular and constant reminder of close relation to and vital interest in the company's prosperity.

There are, of course, many other standpoints from which the railway benefits by the purchase of its rolling stock through equipment trust issues. And these are by no means confined to companies which are experiencing difficult financial situations. The equipment trust method of purchase is coming to be recognized as one of the best, if not the best, method of purchasing rolling stock, even by companies which are thoroughly able financially to use any method of purchase they wish. The reason for this is that it is a perfectly sound and legitimate financial operation which can be shown to the investor not to be tied to or mixed with the capitalization of the company, but is established on the basis of an operating charge. No extensions of a general mortgage, no junior mortgages or debenture bonds have to be created, and the difficulties attendant upon such issues and the usual increased cost of money obtained by such methods, legitimate though they may be, are well appreciated.

ISSUES ARE INCREASINGLY POPULAR

That the above points are recognized by a good many companies is indicated by the increasing number of equipment trust bonds which are being issued today and have been issued in the past few years. This method of purchasing equipment originated, of course, with the steam railroads, the first record of such an issue being found in the early '70s of the last century. A history of the amounts invested in securities of this sort from 1888 to 1909, an analysis of the course of a ten-year equipment and an explanation of the usual trust provisions were presented in an article by W. B. Brockway in the ELECTRIC RAILWAY JOURNAL, Vol. 38, issue of July 8, page 82. Since that time, and as was predicted in that article, the electric railways have adopted this plan in many instances. In fact, the records today, as obtained from railway companies and trust companies themselves, indicate that in excess of $45,000,000 worth of rolling stock has been purchased by electric railway properties in this manner.

From the information given by these various railways and trust companies the accompanying table was made up to indicate the issues of these equipment trust securities for the purchase of electric railway stock. The table is probably not complete, but it does contain most of the electric railway issues. It has been constructed in chronological order, as it appeared that this was perhaps the most useful interpretation of the utilization of these securities. It will be noted from this table that the number of companies using this method of financing has increased very materially within the last two or three years, but it is still doubted whether a very large number of companies appreciate the possibilities, and at times the advisability, of financing rolling stock purchases in this way.

Exactly what is an equipment trust bond? The answer to this question must vary considerably, depending upon the state under whose laws the security is issued. Fundamentally it is a means by which the company purchases rolling stock and pays for the same in a certain number of equal installments so that the total price is paid within 50 per cent to 60 per cent of the estimated minimum life of the equipment purchased. Technically the company leases the equipment from a trustee, in whom the title to the equipment rests, or from the manufacturer directly, who retains the title, in either case title in fee being transferred to the railway company only upon satisfactory payment of the last serial installment. These fundamental conceptions are present in all of the various types of contract arranged to meet the legal requirements of the various states.

In addition to the legal requirements as to form of contract which is possible in the various states, another governing factor during the last few years has been the exact technical method of issuing the security.

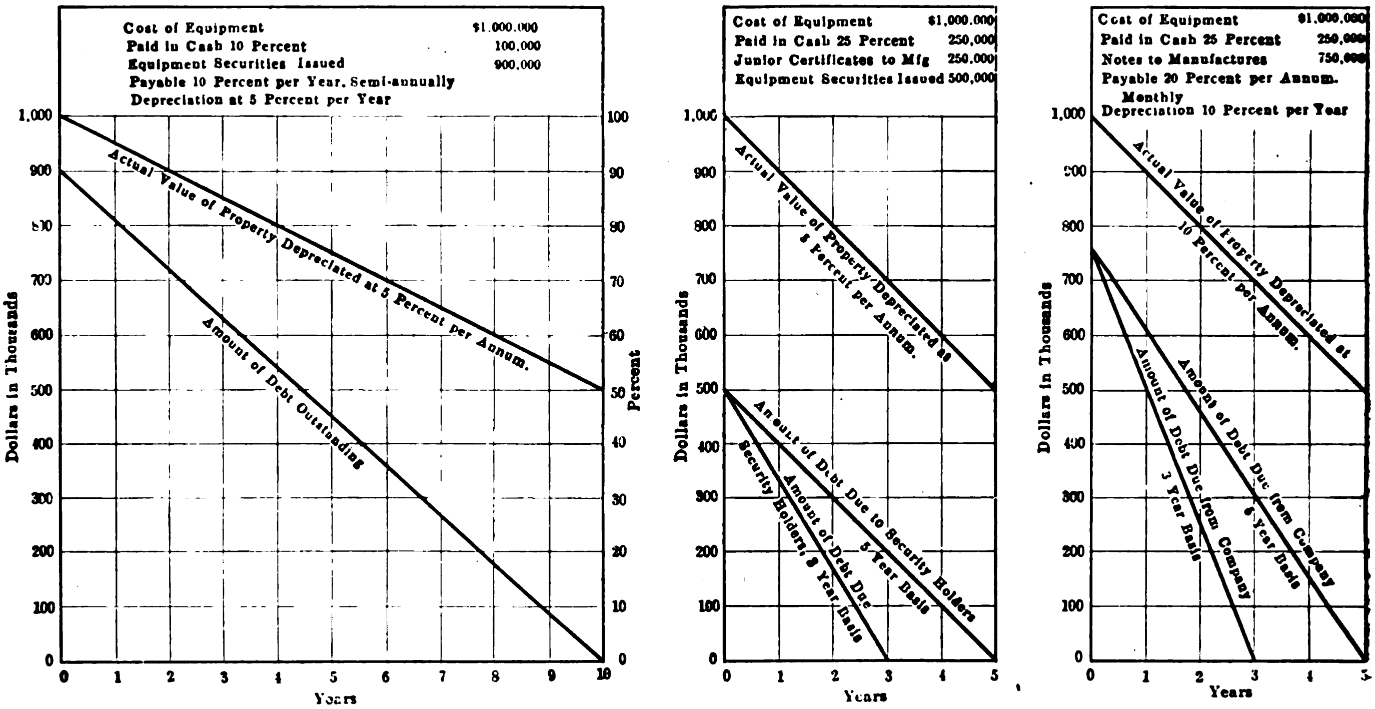
In Connecticut a lease and conditional sale is legal, but is not sanctioned by the laws of some other states. In Pennsylvania the so-called "Philadelphia plan" has been evolved, which is similar in its working but differs some in provisions.

HOW TRUST PROVISIONS DIFFER

A typical provision of a Connecticut issue states:

Whereas the railway company is desirous of securing the use, upon or in connection with its lines of railway, of the following described equipment, to wit. . . .

Whereas the trustee is willing to purchase and provide said equipment for the use of and according to specifications to be furnished by the railway company upon the terms and conditions hereinafter expressed;



AT LEFT, THE COURSE OF A TEN-YEAR TRUST WITH A 10 PER CENT FIRST PAYMENT. AT RIGHT, THE COMPANY'S SIDE OF A THREE OR FIVE YEAR TRUST. IN CENTER, THE INVESTOR'S SIDE OF A THREE OR FIVE YEAR TRUST, THE MANUFACTURER TAKING 25 PER CENT IN JUNIOR CERTIFICATES

Now, therefore, in consideration of the premises and of the mutual agreements hereinafter contained, it is agreed by the parties hereto as follows:

First, the trustee agrees to lease for the term of five years from and after Sept. 15, 1916, and to deliver into the possession of the railway company with the right of the lessee to purchase all of said equipment upon the terms and conditions of this agreement, said equipment to be delivered to the railway company as and when received by the trustee from the builders.

Second, the railway company agrees to take such a lease of and to purchase and receive from the trustee all of said equipment as aforesaid upon and subject to all the terms and conditions of this agreement and agrees faithfully to carry out, perform and observe all the said terms and conditions.

Third, until the payment by the railway company to the trustee of the entire rental and purchase price of said equipment . . . the title to the said equipment aforesaid shall not pass to nor vest in the railway company. . . .

Fourth, the railway company agrees to pay, at the office of the trustees, for the aforesaid equipment, as a rental and conditional purchase price therefor, the sum of $...., of which amount $.... shall be paid in cash to the trustee upon the execution hereof or prior to the certification of any notes by the trustee hereunder.

Under the Philadelphia plan an agreement is first made between the vendors of the equipment, a trust company and a railroad company, which sets forth:

That the railway company desires equipment, the vendors have acquired or contracted to acquire the necessary equipment and that subscriptions have been obtained to establish a fund known as the .... railway equipment trust. A three-part agreement is made which sets forth that "the vendors hereby agree to sell, assign, transfer and set over unto the trustee, as trustee for the holders of the certificates hereinafter described, the aforesaid equipment, and all the right, title and interest of said vendors therein. The vendors will deliver said equipment to any one or more of the officers and agents of the railway company designated by the trustee as its agent or agents to receive such delivery, and the certificate of any and every agent so designated shall be conclusive evidence of such delivery. The trustee will, upon or before receipt by him of said equipment or any thereof, execute a lease of all of said equipment in the form of the copy of such lease prefixed hereto and upon the transfer and delivery to it of any such equipment will issue to the vendors or on their order, for distribution to the several subscribers to the said .... railway equipment trust, certificates to be known as .... railway equipment trust certificates, . . . to a principal amount equal to .. per cent of the cost of said equipment so delivered."

Subsequent to this agreement a lease of the equipment is arranged between the trust company and the railway company, worded as follows:

"that the .... trust company trustee as aforesaid party of the first part for and consideration as well of the sum of $1 to it, paid by the .... railway company, party of the second part, . . . has let and leased . . . to the .... railway company all the railway equipment of the .... railway equipment trust, the interests in which are represented by the trust certificates aggregating $....."

It is further provided that the railway company does accept this lease, and "will pay to the trustee or its assign a rent hereunder which shall be sufficient to pay and discharge the following items when and as the same shall become due and payable." The items referred to are expenses of the trust connected with the equipment, taxes upon the income or property of the trust, the dividend warrants attached to the certificates, and finally the principal of the certificates when and as they shall become payable.

It is then provided that the lease shall continue in force until the rent so paid shall furnish moneys sufficient to meet and cancel all interests in the trust. At the termination of the lease, the equipment thereby leased shall be released by the trustee and shall become the absolute property of the railway company.

Under the Illinois provision an agreement is drawn up between three parties, the vendor, the railway company and the trustee, under which:

First, the vendor agrees to have manufactured and delivered to the trustee such equipment as is specified by the railway.

Second, "the trustee shall sell and does hereby sell, upon the terms of this agreement, to the railway all of the above described equipment, which the trustee may receive from the vendor . . . The railway agrees to purchase and to receive and accept all said equipment upon and subject to the terms and conditions of this agreement."

Third, the railroad agrees to comply with the provisions of the agreement and also to pay certain amounts of principal and interest and a first cash payment upon the execution and delivery of the agreement and the balance to be paid to the holders of notes, serially, as specified in detail.

TAX EXEMPTION FEATURES DESIRABLE

Equipment trust certificates issued on leases under the Philadelphia plan, where the trustee is a Pennsylvania person or corporation, are free from the normal federal income taxes, whereas if the trustee were outside of Pennsylvania this exemption would not exist. In Indiana the dividends on preferred stock are exempt from the income tax and a method used there is to form a new corporation for each equipment purchase and issue preferred stock, which is marketed. The company has the right to purchase, and agrees to purchase, this preferred stock serially at stated intervals.

But while various means are used to comply with the legal and tax regulations of the various states, the ultimate result is the same, namely, the title to the rolling stock rests technically and actually with some corporation or person other than the railway company and the railway company leases this equipment and obtains complete title to the equipment upon the payment of the last of a series of rental installments.

On a system of any appreciable size it can easily be shown to be practicable to make rolling stock purchases at regular intervals, on the equipment trust basis, and adjust the amount of rolling stock included in each purchase and the time spacing of the purchases so that the actual money outlay to retire the equipment trust certificates is very nearly equal to the annual amount which should be charged off due to depreciation or abandonment of rolling stock. In other words, it appears feasible practically to eliminate bookkeeping on depreciation of rolling stock because each year the cost of the wearing out or using up of rolling stock is paid in actual cash. So rolling stock becomes an operating item like coal.

Naturally, the value of the cars as security is not usually accepted as being equal to 100 per cent of the face value of the certificates. The company, that is, is required to make an initial cash payment upon the receipt of the rolling stock. This initial cash payment has sometimes been absent, as indicated in one or two cases below, but usually is required and varies from 10 to 30 per cent of the cost of the equipment. Present practice seems to be about 20 or 25 per cent of the purchase price. The life of these leases varies from three to ten years in most cases, although there have been a few issues of twelve and one-half years. The life of the lease is, of course, a function of the estimated life of the equipment, it generally being assumed that the lease should be paid up before the equipment has depreciated more than 50 per cent. The older leases of ten years were all for standard double-truck cars and were based upon steam railroad practice. The newer leases, many of which are on one-man safety cars, are made for three years or occasionally five years. In practically all cases payment of the certificates is arranged by equal installments over the life of the lease, and these installments are usually semi-annual or annual. In some of the leases direct from manufacturer to company these payments are arranged on a monthly basis to the trustee, but the certificates themselves are paid on semi-annual or annual installments.

ELECTRICAL EQUIPMENT USUALLY INCLUDED

The equipment purchased and covered by the trust agreements usually include not only the trucks and car bodies but also the complete electrical and control equipment. There have been instances where the equipment was put on the car by the company, a notable example being in the case of the Pittsburgh Railway and the Consolidated Traction Company, operated by the Pittsburgh Company. In this case the cost of equipment given in the table is the cost of the total equipment. Payments back and forth between the trustee and the company account for the apparent discrepancy between the amount of issue plus the first cash payment and total cost of equipment in the issues of the two companies.

Space does not permit at this time to give a comparison of the requirements placed upon the company as to the care of rolling stock in the various issues, nor yet to give a complete comparison of the methods of protection of the investor in the various issues, but this will probably be handled in a later article. Suffice to say at this time that in general the railway company assumes entire responsibility for the maintenance of the rolling stock, the company pays all taxes and it insures all of the equipment with provision that insurance benefits shall be paid to the trustee. It is always provided that the cars are to be plainly marked showing the trustee to be the owner and the lessor of the equipment. Naturally there are terms which relate to the contingency of default and consequent right of the trustee to seize and sell the equipment, if necessary, the company accepting responsibility for any deficiency which may occur as the result of such sale.

Provisions as to the time when the trustee may seize the equipment vary somewhat. In some cases it is provided that the trustee may act upon written notice mailed immediately after there is a default in payment and deposit of notice in the United States mail is a sufficient act on the part of the trustee. Other agreements provide that such action cannot be taken until there has been a default in interest of thirty days or a default in principal payment of thirty days. Other provisions allow ninety days' default in principal before the trustee may act. Still other provisions make it necessary for the trustee to give written notice of the default, after which the railway company is allowed thirty days before the trustee may act in the seizure of the equipment.

ADVANTAGES TO THE INVESTOR

From the standpoint of the investor securities of this sort are very attractive in several ways. They are, on account of the very nature of the form of agreement, covered by rentals and are thus treated from the

(*Continued on page 1057*)

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, in so far as Information Has Been Obtainable. Issues Are Arranged Chronologically by Years.

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
June 2, 1902	Chicago & Oak Park Elevated Railroad, Chicago, Ill.	Illinois Trust & Savings Bank, Chicago, Ill.	8 motor cars and 20 trailer cars	$145,000.00	$15,000.00	$130,000.00	5%	......	....	....	$40,000 past due; outstanding.
**§Dec. 1, 1905	Pittsburgh Railways, Pittsburgh, Pa.	Colonial Trust Company, Pittsburgh, Pa.	100 double-truck closed motors	$530,940.59	$100,000.00	400,000.00	5%	10 yrs.	$40,000.00	Annual	....
**§Feb. 1, 1908	Consolidated Traction Co. (Pittsburgh Railways), Pittsburgh, Pa.	Colonial Trust Company, Pittsburgh, Pa.	50 double-truck closed motors	325,054.85	None	280,000.00	6%	10 yrs.	28,000.00	Annual	Series "A".
§April 1, 1908	Cincinnati Traction Company, Cincinnati, Ohio	Fidelity Trust Company, Philadelphia, Pa.	50 double-truckclosed motors	260,000.00	60,000.00	200,000.00	6%	10 yrs.	10,000.00	Semi-annual	Series "A".
1908	Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.	Cleveland Trust Company, Cleveland, Ohio	....	....	....	....	6%	......	....	....	$50,000 past due. All securities reported owned by a syndicate.
§Jan. 2, 1908	Public Service Railway, New Jersey	Fidelity Trust Company, Philadelphia, Pa.	150 P. A. Y. E. motor cars and 50 semi-convertible motors	1,066,284.00	266,284.00	800,000.00	6%	10 yrs.	40,000.00	Semi-annual	Series "A".
§Sept. 1, 1909	Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.	Fidelity Trust Company, Philadelphia, Pa.	26 single-truck motor cars; 2 double-truck freight motor cars; 4 double-truck trailer express cars; 4 combination interurban passenger cars	135,800.00	35,800.00	100,000.00	5%	10 yrs.	5,000.00	Semi-annual	Series "A".
§Mar. 1, 1909	Hudson & Manhattan Railroad, New York	Guaranty Trust Company, New York	....	....	322,220.00	920,000.00	5%	10 yrs.	46,000.00	Semi-annual	Series "A".
§May 1, 1909	Indianapolis Street Railway, Indianapolis, Ind.	Fidelity Trust Company, Philadelphia, Pa.	10 open and 44 closed motor cars	266,666.66	66,666.66	200,000.00	5%	10 yrs.	10,000.00	Semi-annual	Series "A".
July 1, 1910	Cincinnati Traction Company, Cincinnati, Ohio	Fidelity Trust Company, Philadelphia, Pa.	50 double-truck closed motors 50 single-truck open motors.	480,000.00	120,000.00	360,000.00	5%	10 yrs.	18,000.00	Semi-annual	Series "B".
Feb. 1, 1910	Chicago & Oak Park Elevated Railroad, Chicago, Ill.	Illinois Trust & Savings Bank, Chicago, Ill.	20 combination motor cars	200,000.00	35,000.00	165,000.00	6%	10 yrs.	....	....	$111,000 past due and $13,000 due Aug. 1, 1920.
Oct. 1, 1910	Hudson & Manhattan Railroad, New York	Guaranty Trust Company, New York	....	....	162,500.00	500,000.00	5%	10 yrs.	25,000.00	Semi-annual	Series "B".
July 1, 1910	Ohio Electric Railway, Columbus, Ohio	Fidelity Trust Company, Philadelphia, Pa.	14 single-truck semi-convertible; 6 double-truck motor express; 8 double-truck trailer express, and 10 interurban combination cars	217,230.00	57,230.00	160,000.00	5%	10 yrs.	8,000.00	Semi-annual	Series "A".
July 2, 1910	Philadelphia Rapid Transit Co., Philadelphia, Pa.	Commercial Trust Company, Philadelphia, Pa.	17 elevated passenger cars; 445 surface passenger cars; 94 utility cars	Not known	Not known	1,500,000.00	5%	10 yrs.	75,000.00	Semi-annual	Series "A".
July 1, 1910	Public Service Railway, Newark, N. J.	Fidelity Trust Company, Philadelphia, Pa.	100 double-truck cars	600,000.00	150,000.00	450,000.00	5%	10 yrs.	22,000.00 23,000.00	Semi-annual	Series "B".
June 15, 1910	United Railroads of San Francisco, San Francisco, Cal.	Union Trust Company, New York	80 P. A. Y. E. double-truck cars	547,651.00	147,651.00	400,000.00	6%	8 yrs.	50,000.00	Annual	....
July 1, 1911	Cincinnati Traction Company, Cincinnati, Ohio	Fidelity Trust Company, Philadelphia, Pa.	50 double-truck closed motors	300,000.00	80,000.00	220,000.00	5%	10 yrs.	11,000.00	Semi-annual	Series "C".
Aug. 1, 1911	Hudson & Manhattan Railroad, New York	Guaranty Trust Company, New York	36 multiple-control steel coaches	510,000.00	90,000.00	420,000.00	5%	10 yrs.	21,000.00	Semi-annual	Series "C".
Jan. 2, 1911	Indianapolis Street Railway, Indianapolis, Ind.	Fidelity Trust Company, Philadelphia, Pa.	25 closed cars	132,500.00	32,500.00	100,000.00	5%	10 yrs.	5,000.00	Semi-annual	Series "B".

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc. (Continued)

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
Jan. 3, 1911	Market Street Elevated Passenger Railway, Philadelphia, Pa.	Commercial Trust Company, Philadelphia, Pa.	35 passenger cars	$420,000.00	$95,000.00	$325,000.00	5%	10 yrs.	$ 16,000.00 17,000.00	Semi-annual	Series "A".
June 15, 1911	Ohio Electric Railway, Columbus, Ohio	Fidelity Trust Company, Philadelphia, Pa.	9 interurban combination motors; 3 excursion motors; 2 excursion trailers; 12 freight trailers	178,990.00	48,990.00	130,000.00	5%	10 yrs.	6,000.00 7,000.00	Semi-annual	Series "B".
§1911	Oakland Traction Company, Oakland, Cal.	1st Federal Trust Company, San Francisco, Cal.	60 P. A. Y. E. cars	....	....	250,000.00	6%	8 yrs.	31,000.00	Semi-annual	....
**Sept. 1, 1911	Pittsburgh Railways, Pittsburgh, Pa.	Fidelity Title & Trust Company, Pittsburgh, Pa.	50 double-truck closed motor cars	295,542.00	None	270,000.00	5%	10 yrs.	27,000.00	Annual	....
Oct. 1, 1912	Cincinnati Traction Company, Cincinnati, Ohio	Fidelity Trust Company, Philadelphia, Pa.	76 double-truck closed motors	456,000.00	116,000.00	340,000.00	5%	10 yrs.	17,000.00	Semi-annual	Series "D".
1912	Ohio Electric Railway, Columbus, Ohio	Fidelity Trust Company, Philadelphia, Pa.	43 cars	161,800.00	41,800.00	120,000.00	5%	10 yrs.	8,000.00	Semi-annual	Series "C".
Aug. 31, 1912	Public Service Railway, Newark, N. J.	†Pennsylvania Company, F. I. L. G. A., Philadelphia, Pa.	100 double-truck motor cars	669,946.00	169,946.00	500,000.00	5%	10 yrs.	25,000.00	Semi-annual	Series "C".
Jan. 1, 1912	Reading Transit Company, Reading, Pa.	Girard Trust Company, Philadelphia, Pa.	26 cars	221,276.00	71,276.00	150,000.00	5%	10 yrs.	7,500.00	Semi-annual	Series "A".
July 1, 1912	United Railroads of San Francisco, San Francisco, Cal.	Anglo-California Trust Company, San Francisco, Cal.	65 P. A. Y. E. cars	392,816.00	92,816.00	300,000.00	6%	10 yrs.	30,000.00	Annual	....
‡Aug. 1, 1913	American Railways, Philadelphia, Pa. for Scranton Railways, Scranton, Pa. Chicago & Joliet Electric Ry., Joliet, Ill. Ohio Valley Electric Railway, Huntington, W. Va.	Logan Trust Company, Philadelphia, Pa.	.... 5 double-truck city cars; 10 double-truck city cars; 8 double-truck city cars; 10 double-truck interurban cars.	187,000.00	37,000.00	150,000.00	6%	10 yrs.	15,000.00	Annual	Series "A".
Feb. 1, 1913	Ft. Wayne & Northern Indiana Traction Co., Ft. Wayne, Ind.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	19 near side cars	66,831.00	16,831.00	50,000.00	5%	10 yrs.	2,000.00 3,000.00	Semi-annual	Series "A".
Mar. 15, 1913	Ft. Wayne & Northern Indiana Traction Company, Lafayette, Ind.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	7 near side cars	27,832.00	7,832.00	20,000.00	5%	10 yrs.	1,000.00	Semi-annual	Series "B".
Mar. 1, 1913	Indianapolis Street Railway, Indianapolis, Ind.	Fidelity Trust Company, Philadelphia, Pa.	25 closed cars	133,225.00	33,225.00	100,000.00	5%	10 yrs.	5,000.00	Semi-annual	Series "C".
Dec. 1, 1913	Indianapolis Street Railway, Indianapolis, Ind.	Commercial Trust Company, Philadelphia, Pa.	25 closed cars	134,375.00	34,375.00	100,000.00	6%	10 yrs.	5,000.00	Semi-annual	Series "D".
**Sept. 1, 1913	Pittsburgh Railways, Pittsburgh, Pa.	Fidelity Title & Trust Company, Pittsburgh, Pa.	50 double-truck closed motor cars; 50 double-truck trailer cars; 5 double-deck motor cars	513,813.00	None	450,000.00	6%	12 yrs.	18,000.00 19,000.00 21,000.00 22,000.00	Semi-annual Last two installments	....
Mar. 1, 1913	Philadelphia Rapid Transit Company, Philadelphia, Pa.	Fidelity Trust Company, Philadelphia, Pa.	950 double-truck near side cars; 80 steel elevated cars.	5,254,137.00	1,054,137.00	4,200,000.00	5%	12 yrs.	175,000.00	Semi-annual	Series "B".
May 1, 1913	Philadelphia Rapid Transit Company, Philadelphia, Pa.	Fidelity Trust Company, Philadelphia, Pa.	500 double-truck near side cars	2,451,732.00	507,732.00	1,944,000.00	5%	12 yrs.	81,000.00	Semi-annual	Series "C".
Nov. 19, 1913	Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.	First National Bank, Chicago, Ill.	40 gondola cars; 50 box cars; 20 stock cars	110,194.00	8,820.00	101,374.00	.....	....	2,535.00	Quarterly	Series "A".

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc. (Continued)

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
‡Aug. 1, 1914	American Railways, Philadelphia, Pa. for Scranton Railways, Scranton, Pa. Altoona & Logan Valley Electric Railway, Altoona, Pa. Chicago & Joliet Electric Railway, Joliet, Ill.	Logan Trust Company, Philadelphia, Pa.	.... 10 double-truck city cars; 5 double-truck city cars; 4 double-truck interurban cars; 4 double-truck trail cars.	$175,000.00	$39,000.00	$136,000.00	6%	12 yrs	$11,000.00 15,000.00	Annual Last	Series "B".
**April 1, 1914	Consolidated Traction Company (Pittsburgh Railways), Pittsburgh, Pa.										
‡Aug. 1, 1914	Chicago Elevated Railroads, Chicago, Ill., comprising Metropolitan Elevated Railroad; Northwestern Elevated Railroad; South Side Elevated Railroad	Union Trust Company, Pittsburgh, Pa.	100 double-truck closed motor cars	581,945.00	70,000.00	500,000.00	5%	10½ yrs.	25,000.00	Semi-annual	Series "B".
		Commercial Trust Company, Philadelphia, Pa.	184 passenger motor cars; 66 passenger trailer cars	2,600,000.00	....	2,050,000.00 55,000.00	5%	10 yrs. To 2/1/29	102,500.00 110,000.00	Semi-annual Semi-annual 2/1/27–2/1/29	Series "A". Series "B"; this takes place of usual first payment.
Mar. 2, 1914	Cincinnati Traction Company, Cincinnati, Ohio										
Aug. 1, 1914	Morris County Traction Company, Morristown, N. J.	Fidelity Trust Company, Philadelphia, Pa.	60 double-truck trail cars	253,500.00	53,500.00	200,000.00	5%	10 yrs.	10,000.00	Semi-annual	Series "E".
1914	Memphis Street Railway	Peoples Savings & Trust Company, Pittsburgh, Pa.	10 steel double-truck motor cars	62,000.00	18,000.00	44,000.00	6%	9 yrs.	4,888.00	Annual	Series "A".
		....	....	....	....	....	6%	10 yrs.	....	....	$72,000 now outstanding.
Oct. 1, 1914	New Orleans Railway & Light Company, New Orleans, La.										
Mar. 2, 1914	Ohio Electric Railway, Columbus, Ohio	Fidelity Trust Company, Philadelphia, Pa.	50 double-truck cars	254,275.00	64,275.00	199,000.00	6%	10 yrs.	20,000.00	Annual	....
		Fidelity Trust Company, Philadelphia, Pa.									
1915	Binghamton Railway, Binghamton, N. Y.	....	5 interurban steel cars; 4 motor express cars; 14 freight trailer cars	125,800.00	25,800.00	100,000.00	5%	10 yrs.	5,000.00	Semi-annual	Series "D".
Oct. 5, 1915	The Connecticut Company, New Haven, Conn.		20 double-truck cars	118,503.00	....	90,000.00	6%	....	5,000.00	Semi-annual	....
1915	Lehigh Traction Company (Lehigh Valley Transit Company), Hazelton, Pa.	Security Trust Company, Hartford, Conn.	92 convertible P. A. Y. E. cars	520,000.00	110,000.00	410,000.00	5%	5 yrs.	41,000.00	Semi-annual	Series "A".
July 1, 1915	Staten Island Midland Railway, Staten Island, N. Y.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	10 closed steel cars	81,775.00	21,775.00	60,000.00	5%	10 yrs.	3,000.00	Semi-annual	Series "A".
1915	Westmoreland County Railway, Derry, Pa.	Bankers Trust Company, New York	32 double-truck closed cars	....	....	135,000.00	6%	10 yrs.	7,000.00 6,500.00	Semi-annual	Series "A".
1915	Wilkes-Barre & Hazelton Railway, Hazelton, Pa.	....	....	....	....	12,000.00	.....	....	600.00	Semi-annual	....
‡Aug. 1, 1916	American Railways, Philadelphia, Pa.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	10 steel interurban cars	117,000.00	....	89,000.00	5%	10 yrs.	4,000.00	Semi-annual	Series "A".
	for Scranton Railways, Scranton, Pa. Altoona & Logan Valley Electric Railway, Altoona, Pa. Peoples' Railway, Dayton, Ohio	Logan Trust Company, Philadelphia, Pa.	.... 10 double-truck city cars; 5 double-truck city cars; 10 double-truck city cars.	175,000.00	35,000.00	140,000.00	5%	12 yrs.	11,000.00 (1917-20) 12,000.00 (1921-28)	Annual	Series "C".
**April 1, 1916	Consolidated Traction Company (Pittsburgh Railways), Pittsburgh, Pa.										
**April 1, 1916	Consolidated Traction Company (Pittsburgh Railways), Pittsburgh, Pa.	Colonial Trust Company, Pittsburgh, Pa.	25 single end motor cars; 25 single end trailer cars	221,863.00	27,000.00	200,000.00	5%	10½ yrs.	20,000.00	Semi-annual	Series "C".
		Union Trust Company, Pittsburgh, Pa.	125 double-truck motor cars; 50 double-truck trailers	891,258.00	132,000.00	800,000.00	5%	10½ yrs.	40,000.00	Semi-annual	Series "D".

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc. (Continued)

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
Sept. 15, 1916	The Connecticut Company, New Haven, Conn.	Security Trust Company, Hartford, Conn.	60 double end 4-motor P. A. Y. E. cars; 30 double end 2-motor P. A. Y. E. cars; 10 single end 4-motor P. A. Y. E. cars	$580,000.00	$120,000.00	$460,000.00	4½%	5 yrs.	$46,000.00	Semi-annual	Series "B".
Dec. 1, 1916	Indianapolis Street Railway, Indianapolis, Ind.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	25 closed cars	157,275.00	32,275.00	125,000.00	5%	10 yrs.	6,250.00	Semi-annual	Series "E".
July 1, 1916	Lehigh Valley Transit Company, Allentown, Pa.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	12 steel center entrance, double end cars	120,000.00	20,000.00	100,000.00	5%	10 yrs.	5,000.00	Semi-annual	Series "B".
May 1, 1916	Morris County Traction Company, Morristown, N. J.	Peoples Savings and Trust Company, Pittsburgh, Pa.	5 double-truck steel cars	31,000.00	7,000.00	24,000.00	6%	8 yrs.	3,000.00	Annual	Series "B".
**April 1, 1916	Pittsburgh Railways, Pittsburgh, Pa.	Colonial Trust Company, Pittsburgh, Pa.	15 single-end motor cars, interurban	130,666.00	10,000.00	110,000.00	5%	10 yrs.	11,000.00	Annual	....
June 30, 1916	Reading Transit & Light Company, Reading, Pa.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	25 cars	135,611.00	35,611.00	100,000.00	5%	10 yrs.	10,000.00	Annual	Series "A".
Sept. 1, 1916	Toledo Railways & Light Company, Toledo, Ohio	Girard Trust Company, Philadelphia, Pa.	60 semi-steel front entrance center exit	397,350.00	67,350.00	330,000.00	6%	10 yrs.	16,000.00 17,000.00	Semi-annual	....
June 1, 1916	San Francisco & Oakland Terminal Railway, Oakland, Cal.	Anglo-California Trust Company, San Francisco, Cal.	32 steel cars	234,000.00	....	180,000.00	.....	9 yrs.	10,000.00	Semi-annual	....
Dec. 1, 1916	Wheeling Traction Company, Wheeling, W. Va.	....	8 P. A. Y. E. steel cars	43,698.00	....	40,000.00	5½%	5 yrs.	4,000.00	Semi-annual	....
‡July 1, 1917	American Railways, Philadelphia, Pa. for Peoples Railway, Dayton, Ohio Wilmington & Philadelphia Traction Company, Wilmington, Del. Roanoke Ry. & Elec. Co., Roanoke, Va.	Logan Trust Company, Philadelphia, Pa.	10 double-truck city cars; 10 trailer cars; 15 double-truck cars; 6 double-truck cars;	265,000.00	53,000.00	212,000.00	6%	10 yrs.	21,000.00	Annual	Series "D".
Jan. 1, 1917	Beaver Valley Traction Company, Pittsburg, Pa.	Fidelity Title and Trust Company, Pittsburgh, Pa.	12 double-truck steel motor cars	76,524.00	4,524.00	72,000.00	5%	12 yrs.	6,000,00	Annual	....
Jan. 1, 1917	Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.	Northern Trust Company, Chicago, Ill.	3 steel combination dining and parlor cars; 7 steel passenger cars with baggage compartment; 5 steel passenger cars	200,000.00	30,000.00	170,000.00	6%	10 yrs.	8,500.00	Semi-annual	....
**Nov. 1, 1917	Consolidated Traction Company (Pittsburgh Railway), Pittsburgh, Pa.	Fidelity Title & Trust Company, Pittsburgh, Pa.	50 single-end trailer cars	223,215.00	25,000.00	200,000.00	5%	12 yrs.	17,000.00 16,000.00	Annual	Series "E".
June 1917	Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio	Guardian Savings & Trust Co., Cleveland, Ohio	8 cars	....	....	75,000.00	6%	....	10,000.00	Annual	....
Aug. 1, 1917	Cincinnati Traction Company, Cincinnati, Ohio	Fidelity Trust Company, Philadelphia, Pa.	100 double-truck closed cars	719,000.00	169,000.00	550,000.00	5%	10 yrs.	27,000.00 28,000.00	Semi-annual	Series "F".
Aug. 29, 1917	The Bay State St. Ry. (now Eastern Massachusetts St. Ry.) Boston, Mass.	Old Colony Trust Company, Boston, Mass.	200 semi-convertible passenger cars	1,631,000.00	323,000.00	1,308,000.00	6%	10 yrs.	131,000.00	Annual	....
Sept. 1, 1917	Fort Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.	Tri-State Loan & Trust Company, Ft. Wayne, Ind.	10 double-truck city cars	73,968.00	23,968.00	50,000.00	6%	6¼ yrs.	2,000.00	Quarterly	Series "C".
1917	Lake Shore Electric Railway, Sandusky, Ohio	Guardian Savings & Trust Company	10 cars	....	....	176,000.00	6%	....	....	....	....

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc. (Continued)

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
July 1, 1917	Lehigh Valley Transit Company, Allentown, Pa.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	24 steel center entrance cars	$240,000.00	$40,000.00	$200,000.00	5%	10 yrs.	$10,000.00	Semi-annual	Series "C".
Aug. 1, 1917	Northwestern Pennsylvania Railway Company, Erie, Pa.	Erie Trust Company, Erie, Pa.	6 one-man safety cars; 5 interurban passenger cars; 2 motor freight cars; 2 trailer box freight cars	95,200.00	35,200.00	60,000.00	6%	6 yrs.	10,000.00	Annual	....
June 25, 1917	Ohio Electric Railway Company, Columbus, Ohio	Fidelity Trust Company, Philadelphia, Pa.	4 motor express cars; 16 freight trailer box cars; 10 freight trailer flat cars	130,000.00	None	100,000.00 30,000.00	6% 6%	10 yrs. To 1928	5,000.00 15,000.00	Semi-annual Dec. 31, 1927, June 30, 1928	Series "E-1". Series "E-2".
June 1, 1917	Public Service Railway, Newark, N. J.	Philadelphia Trust Company, Philadelphia, Pa.	75 double-truck 4-motor closed cars; 25 double-truck 2-motor closed cars; 50 double-truck 4-motor open cars	1,128,500.00	248,500.00	880,000.00	5%	10 yrs.	44,000.00	Semi-annual	Series "D".
Nov. 15, 1917	Reading Transit & Light Company, Reading, Pa.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	9 cars	67,605.00	17,605.00	50,000.00	5%	10 yrs.	5,000.00	Annual	Series "B".
1917	Schuylkill Railway, Girardville, Pa.	Thomas Evans	....	40,000.00	None	40,000.00	.....	5 yrs.	4,000.00	Semi-annual	....
June 1, 1917	Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa	First Trust & Savings Bank	4 combination cars; 3 observation cars; 5 electric locomotives	160,000.00	40,000.00	120,000.00	6%	3 yrs.	3,333.00	Monthly	Series "B".
Oct. 1, 1918	Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute Ind.	Car Trust Equipment Company, Indianapolis, Ind. J.F. Wild & Co., Fiscal Agts.	30 one-man safety cars	180,892.00	10,892.00	170,000.00	6%	10 yrs.	8,500.00	Semi-annual	A preferred stock issue, retired serially.
1918	Wheeling Traction Company, Wheeling, W. Va.	....	....	....	....	125,000.00	6%	5 yrs.	12,000.00 13,000.00	Semi-annual	....
Aug. 1, 1919	Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.	Northern Trust Company, Chicago, Ill.	13 steel interurban motor passenger cars; 2 steel interurban motor parlor and dining cars; 15 steel interurban trailer passenger cars; 12 parcel dispatch motor cars; 10 one-man safety cars	800,000.00	250,000.00	550,000.00	6%	10 yrs.	55,000.00 27,500.00	Aug., 1920 Semi-annual	....
April 1, 1919	Cincinnati Traction Company, Cincinnati, Ohio	53rd National Bank, Cincinnati, Ohio	105 double-truck closed cars	1,250,000.00	None	1,000,000.00 250,000.00	6% 6%	10 yrs. 5 yrs.	50,000.00 25,000.00	Semi-annual Semi-annual	Series "G-1". Series "G-2," junior to "G-1".
Dec. 1, 1919	Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.	Tri-State Loan & Trust Co., Ft. Wayne, Ind.	35 one-man safety cars	221,000.00	56,000.00	165,000.00	6%	8¼ yrs.	5,000.00	Quarterly	....
Oct. 11, 1919	Indianapolis Street Railway, Indianapolis, Ind.	Indianapolis Car Equipment Company, Indianapolis, Ind. Breed, Elliott & Harrison, Fiscal Agents	25 closed cars	255,802.00	55,802.00	200,000.00	6%	10 yrs.	10,000.00	Semi-annual	A preferred stock issue, retired serially.
Mar. 1, 1919	Philadelphia Rapid Transit Company, Philadelphia, Pa.	Commercial Trust Company, Philadelphia, Pa.	25 double end safety cars	152,075.00	64,075.00	88,000.00	6%	10 yrs.	9,000.00	Semi-annual	Series "D".
Nov. 1, 1919	Morris County Traction Company, Morristown, N. J.	People's Savings & Trust Co., Pittsburgh, Pa.	14 one-man safety cars	80,000.00	22,000.00	58,000.00	6%	5 yrs.	1,000.00	Monthly	Series "C".
Oct. 15, 1919	Philadelphia Rapid Transit Company, Philadelphia, Pa.	Commercial Trust Company, Philadelphia, Pa.	30 double-end, double-truck cars	423,471.00	135,471.00	288,000.00	6%	10 yrs.	29,000.00	Semi-annual	Series "E".
1919	Schuylkill Railway, Girardville, Pa.	Thomas Evans	....	50,000.00	None	50,000.00	.....	5 yrs.	5,000.00	Semi-annual	....

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc. (Continued)

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
Dec. 31, 1919	Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind........	Car Trust Equipment Company, Indianapolis, Ind. J.F.Wild & Co.,Fiscal Agts.	25 one-man safety cars......	$137,650.00	$37,650.00	$110,000.00	6%	10 yrs.	$5,500.00	Semi-annual	A preferred stock issue retired serially.
Oct. 1, 1919	Issued on leases to seven companies, as follows, under J. G. Brill Equipment Trust No. 1................................	Fidelity Trust Company, Philadelphia, Pa..........	47 one-man safety cars, distributed as follows...........	....	....	130,000.00	6%	3 yrs.	40,000.00 35,000.00 20,000.00	Apr. 1, 1921 Oct.1,'21-Apr.1,'22 Aug. 1, 1922	Series "A".
						48,000.00	None	9 mos.	5,500.00 4,000.00	Monthly,except Last month	Series "B", Junior to "A".
	Bangor Railway & Electric Company, Bangor, Me...........................		12 one-man safety cars......	70,356.00	17,589.00	52,767.00	6%	3 yrs.	1,465.00	Monthly	5 payments before trust was formed.
	*Cumberland County Power & Light Company, Portland, Me....................		5 one-man safety cars.......	29,315.00	7,329.00	21,986.00	6%	3 yrs.	611.00	Monthly	5 payments before trust was formed.
	*Jackson Railway & Light Company, Jackson, Miss............................		3 one-man safety cars.......	14,000.00	3,500.00	10,500.00	6%	3 yrs.	275.00	Monthly	4 payments before trust was formed.
	*Nashville Railway & Light Company, Nashville, Tenn.......................		10 one-man safety cars......	58,272.00	14,568.00	43,704.00	6%	3 yrs.	1,214.00	Monthly	3 payments before trust was formed.
	*Marshall Traction Company, Marshall, Tex.		2 one-man safety cars.......	11,800.00	2,950.00	8,850.00	6%	3 yrs.	246.00	Monthly	2 payments before trust was formed.
	*Wichita Railroad & Light Company, Wichita, Kan..............................		6 one-man safety cars.......	29,792.00	7,448.00	22,344.00	6%	3 yrs.	624.00	Monthly	2 payments before trust was formed.
	*Decatur Railway & Light Company, Decatur, Ill...........................		9 one-man safety cars.......	48,374.00	12,093.00	36,281.00	6%	3 yrs.	1,008.00	Monthly	2 payments before trust was formed.
Nov. 1, 1919	Issued on leases to six companies, as follows, under J. G. Brill Equipment Trust No. 2	Fidelity Trust Company, Philadelphia, Pa..........	64 one-man safety cars, distributed as follows...........	....	....	167,000.00	6%	3 yrs.	52,000.00 40,000.00 35,000.00	May 1, 1921 Nov.1,'21-May1,'22 Oct. 1, 1922	Series "A".
						77,500.00	None	11 mos.	7,500.00 2,500.00	Monthly,except last month	Series "B," Junior to "A".
	*Quincy Railway, Quincy, Ill.............		25 one-man safety cars......	124,800.00	31,200.00	93,600.00	6%	3 yrs.	2,600.00	Monthly	1 payment before trust was formed.
	*Kansas City Railways, Kansas City, Mo..		5 one-man safety cars......	27,264.00	6,816.00	20,448.00	6%	3 yrs.	568.00	Monthly	1 payment before trust was formed.
	*Aberdeen Railroad, Aberdeen, S. D.......		4 one-man safety cars......	20,188.00	5,047.00	15,141.00	6%	3 yrs.	420.00	Monthly	2 payments before trust was formed.
	*Wichita Railroad & Light Company, Wichita, Kan.........................		10 one-man safety cars......	49,920.00	12,480.00	37,440.00	6%	3 yrs.	1,040.00	Monthly	1 payment before trust was formed.
	*Lincoln Traction Company, Lincoln, Neb.		10 one-man safety cars......	53,280.00	13,320.00	39,960.00	6%	3 yrs.	1,110.00	Monthly	2 payments before trust was formed.
	*Cumberland County Power & Light Company, Portland, Me....................		10 one-man safety cars......	58,704.00	14,676.00	44,028.00	6%	3 yrs.	1,223.00	Monthly	1 payment before trust was formed.

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc.

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
Dec. 1, 1919	Issued on leases to four companies, as follows, under J. G. Brill Equipment Trust No. 3.	Fidelity Trust Company, Philadelphia, Pa.	41 one-man safety cars, distributed as follows	....	....	$121,000.00	6%	3 yrs.	$35,000.00 30,000.00 29,000.00 27,000.00	June 1, 1921 Dec. 1, 1921 June 1, 1922 Dec. 1, 1922	Series "A".
						56,500.00	None	1 yr.	1,000.00 to 9,000.00	Monthly	Series "B," Junior to "A".
	*Springfield Street Railway, Springfield, Mass.		10 one-man safety cars	$59,808.00	$14,952.00	44,856.00	6%	3 yrs.	1,246.00	Monthly	1 payment before trust was formed.
	*Nashua Street Railway, Nashua, N. H.		4 one-man safety cars	24,000.00	6,000.00	18,000.00	6%	3 yrs.	500.00	Monthly	....
	*Kansas City Railways, Kansas City, Mo.		15 one-man safety cars	86,304.00	21,576.00	64,728.00	6%	3 yrs.	1,798.00	Monthly	1 payment before trust was formed.
	*The Connecticut Company, New Haven, Conn.		12 one-man safety cars	72,000.00	18,000.00	54,000.00	6%	3 yrs.	4,500.00	Quarterly	....
Jan. 1, 1920	Issued on a lease as follows, under J. G. Brill Equipment Trust No. 4	Fidelity Trust Company, Philadelphia, Pa.	73 one-man safety cars, all for one company, as follows	....	....	208,000.00	6%	3½ yrs.	52,000.00	Semi-annual 1/1/22—6/1/23	Series "A".
						129,000.00	None	1½ yrs.	4,000.00 to 12,000.00	Monthly from July 1,'20-Aug.1,'21	Series "B," Junior to "A".
	*The Nassau Electric Railroad, Brooklyn, N. Y., through Lindley M. Garrison, Receiver		73 one-man safety cars	444,960.00	111,240.00	333,720.00	6%	3½ yrs.	9,270.00	Monthly	Starting June 13, 1920.
Jan. 15, 1920	Issued on a lease as follows, under J. G. Brill Equipment Trust No. 5	Fidelity Trust Company, Philadelphia, Pa.	40 one-man safety cars, all for one company, as follows	....	....	114,000.00	6%	3 yrs.	29,000.00 28,000.00	Semi-annual July 1,'12-Dec.1,'22	Series "A".
						56,000.00	None	1 yr.	4,000.00 to 6,000.00	Monthly	Series "B," Junior to "A".
	*Kansas City Railways, Kansas City, Mo.		40 one-man safety cars	235,392.00	58,848.00	176,544.00	6%	3 yrs.	4,904.00	Monthly	1 payment before trust was formed.
Feb. 16, 1920	Issued on leases to three companies, as follows, under J.G.Brill Equipment Trust No.6	Fidelity Trust Company, Philadelphia, Pa.	127 one-man safety cars, distributed as follows	....	....	362,000.00	6%	3½ yrs.	90,000.00 91,000.00	Semi-annual Feb.15,'22-July 15,'23	Series "A".
						225,000.00	None	1½ yrs.	8,000.00 to 27,000.00	Monthly from July 15,'20	Series "B," Junior to "A".
	*Brooklyn Heights Railroad, Brooklyn, N.Y.	All through Lindley M. Garrison, Receiver	108 one-man safety cars	658,272.00	164,568.00	493,704.00	6%	3½ yrs.	13,714.00	Monthly	Starting June 19, 1920.
	*Coney Island & Brooklyn Railroad, Brooklyn, N. Y.		11 one-man safety cars	67,046.00	16,761.00	50,285.00	6%	3½ yrs.	1,397.00	Monthly	Starting July 31, 1920.
	*Brooklyn, Queens County & Suburban Railroad, Brooklyn, N. Y.		8 one-man safety cars	48,768.00	12,192.00	36,576.00	6%	3½ yrs.	1,016.00	Monthly	Starting July 28, 1920.
Jan. 15, 1920	The Connecticut Company, New Haven, Conn.	Bankers' Trust Company, New York	40 one-man safety cars	235,390.00	55,390.00	180,000.00	6%	5 yrs.	9,000.00	Quarterly	Series "C".
Feb. 1, 1920	Interstate Public Service Company, Indianapolis, Ind.	Interstate Car Trust Equipment Company, Indianapolis, Ind. J. F. Wild & Company, Fiscal Agents	8 steel interurban cars	195,000.00	45,000.00	150,000.00	6%	10 yrs.	10,000.00 5,000.00	Semi-annual to Aug. 1, 1925 Semi-annual from Feb.1,1926	A preferred stock issue, retired serially. First payment covers common stock ownership in Equipment Co. by Railway.
1920	Schuylkill Railway, Girardville, Pa.	MacGovern & Co.	....	18,000.00	7,500.00	10,500.00	6%	10 mos.	1,050.00	Monthly	Starting May 1, 1920.

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* Complete figures on total cost and first payment not received. Figures given are calculated upon the assumption that the notes of the individual company represent 75 per cent. of the purchase price, as they are known to do in some cases. In other cases this sum may be 80 per cent., in which case the total cost is in error by a corresponding amount.

** Equipment is not included in the trust issue, but is included in the total purchase price. See text, page 1049.

† The Pennsylvania Company for Insurance on Lives and Granting Annuities.

‡ Rolling stock owned by holding company and subleased to operating companies. See text, page 1058.

§ These issues are reported retired.

(*Continued from page 1049*)

standpoint of the company as operating charges and not as fixed charges. In other words, the company must pay for the use of this equipment exactly as it pays for wages, for power and for office rent and before it can declare any money available for interest upon its funded debt or for dividends and surplus. It is a method which is used a great deal therefore by receivers in order to provide the necessary additions and replacements in rolling stock of the companies which the receivers are operating, but the fact that it is so used by receivers does not at all indicate that it is limited to companies in financial distress.

CERTIFICATES HAVE GOOD RECORD

Another inviting feature to the investor at times is that he may obtain a security which matures in from one to ten years and he may choose the date at which his particular certificate or certificates will mature. This feature is especially attractive to those who can predict a definite need for liquidating a certain amount of their holdings at a certain time; it is a useful feature to executors, whether individual or trust company, who hold moneys which must be accounted for and produced in cash at some subsequent and known date. There is only the most remote possibility that the certificate will not be paid in cash, or that the holder will be presented with some subsequent security at the date of maturity of the certificate he holds.

These equipment trust certificates, so far as data have been available, have an almost perfect record of no default on payment. In fact, only two cases of default on these certificates have been found, and in both of these cases the main securities of the defaulting companies are owned by holding companies or other railways, so that the default has no particular significance. There was no seizure of equipment in these cases. Any outstanding certificates were bought in by the bankers of the holding companies.

In these days, when most public utility securities are finding a difficult market, securities of this sort which call for payment as an operating charge are marketed satisfactorily, because the investor sees in them an assured return of principal with satisfactory interest.

The investor feels himself further protected by the fact that what he owns is movable and if for any reason the company using his equipment should fail to meet its payments, or have to cease operation, he with his partners in the ownership of the equipment could move it to some other locality and lease it to some other company. Arguments of this sort with investors have proved efficacious in the marketing of the securities.

EFFECT OF THE ONE-MAN CAR

In this connection, if the equipment purchased is of a standard nature, that is, if it is of the sort that many railway companies in the country are known to be using, rather than of the sort which has been designed for some particular railway specifications, this argument of transferability to another property is much strengthened. According to one banker, who is dealing very largely in these securities at the present time, this very point has increased in many quarters the sale of these certificates. This appears to be another argument for the attempts of the electric railway industry to standardize rolling stock to the greatest possible extent.

The fact that the one-man safety car is to all intents and purposes practically a standardized piece of apparatus has made it a very popular form of rolling stock to purchase through these equipment trust issues. This is not the only advantage of the one-man car in its relation to equipment trust certificates, but from the standpoint of the investor this feature of the one-man car has been found to be an appealing argument. It is interesting to note in this connection that several of the more recent issues of equipment trust certificates have covered purchases of one-man cars, which have been distributed to several companies under each trust. In other words, a wholesale purchase of one-man cars has been made and they have been leased in lots to several operating companies. It is this treatment of the one-man car in bulk and the recognition of this treatment that has made an argument to the investor, strengthening his sense of security in his investment.

The one-man car has another advantage, this from the standpoint of the company. In these days of decreased net per car-mile and consequent effort to reduce operating cost per car-mile many companies have seen in the one-man car a means of meeting the situation. An outright purchase of the new equipment desired would be out of the question on former means of financing, but the savings resulting from the introduction of one-man cars can frequently be shown to be sufficient to make the necessary periodic payments for the purchase of one-man cars under equipment trusts. In this way the economy of the one-man car is capitalized to pay immediately its purchase price. The result is twofold, in that the company has new equipment which helps merchandise its transportation and that it is enabled to secure lower operating costs. In some cases this change-over could not have been financed except by some such means as the equipment trust.

WHAT THE BROKER SAYS

Brokers have found many and various attitudes on the part of investors when they have tried to market certificates of this sort. Some brokers float these securities almost entirely with banks, who as investors are very much impressed with the standardization of equipment argument and the consequent interchangeability or transferability to other properties in case of default. Some of the newer types of issues which were put out last year were a little difficult to market at first on account of the general fear of traction securities, but as soon as their nature was better understood a market was established which now absorbs the issues practically as fast as they are offered. With the individual buyer peculiar viewpoints were found. Various buyers thought the certificates were all sorts of things, such as bonds of the manufacturer, stock of the railway, notes of the trust company, etc., but brokers claim that this lack of accurate conception of what the securities are has disappeared and that the largely increased amounts of the securities are salable to a satisfactory degree.

Of course, the earlier equipment certificates, which were issued on the ten-year basis, were so much like the car trust equipment of the trunk line roads that they were marketed in the same way and largely, to the same buying personnel as these trunk-line car trusts. It is only since the shorter term issues, which are specifically of an electric railway nature, have been put on the market that some of the above-mentioned viewpoints have been met.

The broker or the banker gets into this game from either one of two approaches. In many cases, the company approaches a broker or banker as soon as it decides to seek money for the purchase of equipment, and an arrangement is made for the broker to absorb whatever certificates are issued by the company, or rather by the trustee for the company. In other cases, the manufacturer makes the sale of his equipment and executes a lease, then deposits this lease with a trustee, who issues equipment trust certificates based upon the lease. The manufacturer then must make arrangements with his broker through the issue of equipment trust certificates created, thus keeping himself supplied with necessary capital for the continuance of his business. In either case the result is the same, that the trustee purchases the equipment with the money received from the broker, the equipment is furnished to the railway company and the latter's payments commence. The broker, however, must now market the securities which he has on hand and the amount that he can get for the certificates is of course a natural function of the prevailing rate of return on securities of similar risk. At the present writing most of the certificates are being marketed at a price to pay approximately or slightly in excess of 7 per cent. It is noted from the accompanying table that the prevailing rate of interest on the certificates is 6 per cent, these being sold at such a discount as to pay the higher rate. But, at the present rate of money, the broker cannot afford to buy these certificates except on a basis which will assure him of something nearer 9 per cent in order that he may be protected in his cost of selling and realize a satisfactory profit.

THE GROUP ISSUE

Most of the issues of equipment trust certificates have been made upon the initiative of the railway companies and their bankers. Of the other type of arranging for equipment trust certificate issues, the six Brill equipment trusts listed are examples. In this case, the manufacturer as indicated sold equipment to several companies on independent leases, each lease having provisions similar to an individual equipment trust lease, and several leases, or in some cases only one lease, are filed with a trustee and certificates issued thereon. In these cases the manufacturer has assisted in the financing at least to the extent of taking as part payment the Series B certificates. These certificates do not bear any interest until after maturity.

Actually, then, in these Brill issues the railway companies have paid 20 to 25 per cent of the cost of the cars, the manufacturer has accepted the Series B certificates for the next 30 or 25 per cent and the marketed certificates have paid for the other 50 per cent. In the case of the Chicago Elevated Railway issue the Series B certificates there, payable after the Series A certificates are retired, served to all practical purposes as the first payment, or rather took the place of the cash payment to the manufacturer.

Another possibility, as indicated by the issues to the American Railway Company, is that of a holding company purchasing the equipment and issuing the certificates through its broker and trustee. In this case the holding company owns the cars through its trustee and pays the certificates from rentals received from its subsidiary operating companies.

Car trust certificates tend to complete the list of securities which brokers have to offer their customers. The certificates provide a very welcome addition to the class of paper which a broker can provide in trying to meet the varied needs, wishes and whims of the investing public, and it further makes a very satisfactory type of security to market in a given locality when the equipment will be used in that same locality.

One of the objections at the present time to marketing in the home locality of the railway is that the local bankers may not be familiar with this sort of security and the cost of marketing them through the local bankers is therefore frequently excessive. This is unfortunate, because local sales are advantageous, as previously indicated. But the fact that the securities must be marketed away from home does not slow up the sales. In other words, the security is a good one on the general market, and so far as its actual sale is concerned is absorbed perhaps more rapidly in the general market than in the local market. But if it may be sold in the local market there are local results which are to the benefit of the railway company.

THE TRUSTEE "HOLDS THE SACK"

From the standpoint of the trustee it might be said in a way that he "holds the sack," to paraphrase one trust company officer. After the company and banker and manufacturer of equipment have agreed to the price, form of trust agreement, type of equipment, rates of payment, kind of security, etc., they must select a trustee who is willing to act. The trustee examines the lease and trust agreement, to see if it is correct and to see if it conforms with the legal requirements of the state and provides sufficient protection for the purchasers of certificates. If the agreement passes the trustee's scrutiny and the trustee consents to act it charges a small examination fee and issues the necessary certificates and papers. But the trustee apparently is not destined to make a large amount of money on the deal, as a typical fee ranges from $1 per certificate in small issues to 50 cents per certificate in large issues, and, again quoting a trustee officer, "Unfortunately, most issues are large issues." The trustee of course collects the rental money and makes payment to retire the certificates, for which service he charges a small fraction of 1 per cent of the amount collected. However, this sort of transaction conforms to the usual trust company program and naturally attracts other accounts, with ultimate profit to the trust company, even though the remuneration for the specific acts performed with reference to the equipment trust certificates themselves is not very large.

Philadelphia seems to be the home of most of the trust companies handling issues of this sort. One reason is probably the fact that Philadelphia is the home of a large car building company. Another is that street railway securities have always been a popular investment in that city. The Fidelity Trust Company, as indicated in the table, is especially prominent in handling issues of this sort. The holders of the securities are scattered far and wide and include all classes of security buyers. Certain banks, certain life and fire insurance companies, some trust companies and large numbers of individual buyers find these securities attractive.

Whether this method of purchase can be satisfactorily applied to other than rolling stock or not is another question. So far as it has been possible to determine, no other electric railway equipment, with the possible exception of the appliances of rolling stock, such as meters and fare boxes, have been purchased by this method. The Philadelphia Rapid Transit Company has recently proposed a $6,000,000 issue, about half of which would be used to retire existing issues, the other half to be available for track, buildings, power plant improvements, etc. There have been several instances in other lines of business, particularly industrial, where certain kinds of equipment are purchased through equipment trust bonds. A recent interesting case is the purchase of telephone exchange and subscriber station equipment by one of the larger independent companies on this basis.

However, in these days when economies of operation are being analyzed to the most minute detail and when it is sometimes seen that changes in, or additions to, rolling stock would assist materially in the operation of a railway, it is well to investigate this method of purchase of equipment. In many cases it will be found that the savings and increased earnings due to rolling stock additions or replacements will amply take care of the periodical payments which have to be made to retire the equipment trust certificates upon which the new equipment has been purchased.

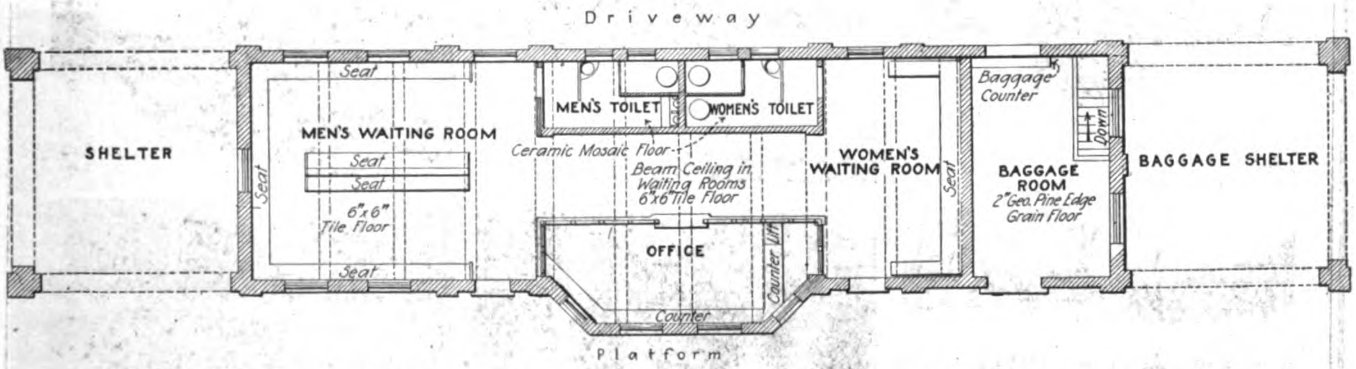
Apparently, and judging from the present volume of purchases made in this way, this method of financing is already growing fast in favor and may well become the standard in purchasing rolling stock.

Dignified Station Design for Interurban

London & Port Stanley Railway of Ontario Erects Typical Building at St. Thomas

THE people of the province of Ontario, who during the past ten years have established and built up a publicly owned hydro-electric power business, in which they are investing $100,000,000, are now about to embark on the associated enterprise of constructing and operating a vast system of hydro-electric radial railways.

The London & Port Stanley Railway, a 25-mile steam railroad, electrified four years ago as a practical demonstration of the standards to be adopted in the hydro-radial system, has just completed a new station for the city of St. Thomas, Ont.



PLAN OF STATION OF LONDON & PORT STANLEY RAILWAY AT ST. THOMAS, ONT.

While structures and facilities will vary in accordance with the requirements of different centers of population, the St. Thomas station is typical of stations projected. It has a white stone foundation, red wire-cut tapestry-brick walls and an attractive red tile roof. The floors of the waiting room are of 6-in. red tile, meeting wainscoting of the same material in dustless tile corners. Ceilings are heavily and attractively beamed, while all seats are in mahogany finish. The office fittings are of the same material. Lavatories have floors of ceramic mosaic tile, excellent hygienic plumbing installations and partitions of marble slabs with white enameled metal doors.

There is an ample baggage room, floored with 2-in. Georgia pine, and adjoining, on the end of the building, is a shelter for the accommodation of trucks loading baggage. Balance is given to the building on the opposite end by the provision of a similar shelter for passengers.

WHEN THE GROUNDS ARE IMPROVED THIS STATION AT ST. THOMAS WILL BE AN ATTRACTIVE LANDMARK

A neatly curbed asphalt roadway has been constructed behind the building, while the railway right-of-way opposite the building is to be leveled, sodded and suitably ornamented by landscape men. This work has been placed under the direction of the St. Thomas Horticultural Society, an organization of St. Thomas citizens, which will be reimbursed for all reasonable expenditure. A high, closely picketed fence has been constructed on both sides of the line for a considerable distance to conceal a number of unsightly yards on the adjoining properties.

The adoption of this policy has had a marked effect upon the attitude of many people in St. Thomas who were formerly charged by some with being antagonistic to the railway.

The L. & P. S. R. in St. Thomas has direct connections for freight and passengers with the Michigan Central, the Grand Trunk, the Wabash and the Père Marquette Railroads. The passenger trains of the last-named company operate into the L. & P. S. R. station at this point.

Memories of the Not Far Distant Past

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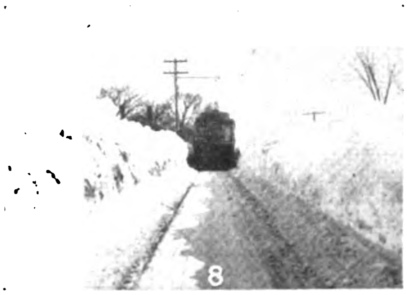
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Nos. 1, 2, 3, 4 and 6—The Holyoke (Mass.) Street Railway had no easy time of it.

Nos. 5, 7, 9, 13, 14 and 15—The Concord (N. H.) Electric Railway had able assistance from the citizens. Photographs from Curtis Studio.

Nos. 8 and 11—The Cumberland County Power & Light Company, Portland, Me., was subjected to a slight fall of snow.

No. 10—The safety cars did the work on the Levis County Railway, Quebec, Canada.

No. 12—Pusher plow service was necessary with the Bangor Railway & Electric Company, Bangor, Maine.

City Building and Transportation

Some Technical Relationships Involved—Need of Broad Vision, Executive Skill and Courage—New Field for Technical Professions

IN a paper presented before the joint meeting of the American Institute of Electrical Engineers and the Western Society of Engineers at Fullerton Hall, Art Institute, Chicago, May 12, 1920, James R. Bibbins, supervising engineer the Arnold Company, gave a paper showing how the technical professions should assume leadership in city building and how transportation is largely the determining factor in this work. He said:

"Our American cities are gradually absorbing and increasing percentage of the total population, as is indicated by the study of consecutive census figures. Our problems are therefore growing and there appear two alternatives: First, to neglect the cities, driving the people back to the smaller communities, and, second, to render them so efficient as to decrease the cost of living, production and distribution. In this effort engineers are taking and must take a leading part, and transportation becomes one of the first and deciding factors in the development.

"What is needed is a group of city builders who predict developments far into the future. Problems encountered and matters of procedure which tend toward a satisfactory plan of city building include questions of excess condemnations for public improvements, local district assessments for non-paying extensions, an amendment with reference to frontage consent for carrying out public works, consolidation of condemnation suits, regulation of tramp carriers or jitneys, a variable road tax assessment of vehicles according to size, weight, use and probable wear on streets, a comprehensive street paving program, control of front door delivery in congested districts, control and organization of transportation and distribution of foods and market products, cost-of-service franchises and conservation of utilities with enlightened public regulation.

"In order to realize on any such program as this the various branches of the technical profession must act together in a group to secure good results along the lines of regulation, publicity, co-operation of the various agencies and, finally, the preparation of adequate physical plans."

After reviewing some of the notable mistakes in city planning with reference to transportation, the paper discusses the fundamental conception of the physical plan of a city by considering it broadly as an industrial plant. Under consideration of the site we see the present tendencies of expansion from the former cities' areas, the questions of zone fares versus unit fares and the consequent population distribution, the relation of topography to the plan of a city, the question of waste spaces and examples of intensive development of certain locations. Looking toward the future, we must give relief to densely settled metropolitan areas, must provide for the rapidly increasing motor vehicle traffic and must lay out restricted industrial areas. The administrative business center presents a peculiar problem particularly as related to transportation. Transportation must here assume the function of centrifugal action to counteract the centripetal tendency of long-established precedents. The general street plan as a means of intercommunication and as a means of providing for transportation agencies is the one great remedy for harmonizing various conflicting elements and problems in the city plan, and transportation systems must be located on these streets with maximum skill and judgment to safeguard the needs of the future. Traffic problems are reduced but not eliminated by any plan of streets. With the available street capacity and the present freight trucking, with motor trucks and other similar vehicles, the transportation systems should be used to their utmost at night and at other off-peak hours to do most of the cities' tonnage movement.

Rush hours, of course, present the most serious problems, and in any analysis it is found that finally the street railways and in the larger cities the rapid transit lines must be depended upon to do the great volume of transportation work. The technical professions must teach the layman the true cost of service as it is affected by this rush-hour situation. Expedients to mitigate the rush-hour problems are through-routing of cars and tapering off the service by superimposed short lines to suit the traffic in outlying sections. In planning for growth of transportation facilities standardization should be a guiding principle. Rapid transit must grow with the city, and it should start right to secure the best permanent results. Electrification of strategic steam lines must of course play an important factor in the suburban service of metropolitan areas.

There are many undeveloped possibilities of relief pending the maturing of a basic transportation plan. One of these is the Chicago freight tunnel, which removes much traffic from the street level, and this method has been little used in other places.

In conclusion the author directs attention to certain matters which he regards as fundamental:

1. Are city transportation plans being developed along intelligent, economic lines with a proper conception of the future and on the principle of the greatest good to the greatest number?

2. We do not want mere bigness in population, industry or wealth if civic development cannot be efficient and wholesome.

3. Cities must be decentralized when they grow beyond certain convenient transportation limits, both as to passenger and freight movement; to focus all business, traffic and community life in a single downtown district is wholly improper, inefficient and inequitable.

4. Intercommunication by streets and transit lines should be as direct as possible to avoid detours and unnecessary passenger mileage; the city center should not be turned into a terminal yard or transfer platform.

5. Through-routing offers the best cure for the remaining traffic necessarily reaching the business district and encourages normal and equitable business expansion.

6. Sub-centers of business and industry should be encouraged and developed to the maximum possible extent; also the walking habit in the outlying residential districts and industrial localities—a matter intimately associated with the program of city zoning.

7. Perfection of the existing street system is the first necessity to permit local transit development without causing needless restrictions and detours; centralized control of future subdivisions and the city plan is equally necessary with the same end in view.

8. Rapid transit development should be carried out with complete unification and should be standardized as fully as possible in its major divisions of street, elevated, subway and railroad suburban service. Any system conceived upon selfish, predatory or even com-

petitive lines must eventually fail or the cost be finally absorbed by the public.

9. The broad economic problem is not one of today alone, but involving the rights and responsibilities of several generations—past, present and future. No other conception permits of equitable adjustment.

10. The American people broadly want good transportation service first and are willing to pay for it. Any restrictive plan of development must result in stunted civic growth and untold economic loss too complex to estimate in mere figures.

11. Finally, conservation, the one big national concept of the century, stands out as a profound public need at the present time. It must be based on sound economics and not be warped by either corporate aggrandizement or political expediency. Chicago is indeed fortunate in having the benefit of the vision of a broad city plan and possessing the existing elements of an unexcelled future transportation system. Moreover, it has the tools to work with in the form of a $26,000,000 traction fund, accumulated not from capital issues, but from net receipts of local transit.

The entire address of Mr. Bibbins is a thirty-one page pamphlet, issued by the Western Society of Engineers, Chicago, Ill.

Teuton Trolleys Handle Freight

War Experiences and Higher Costs for Fodder and Fuel Expected to Extend the Use of German and Austrian Tramways

A RECENT paper by Wilhelm Neumann, Councillor Austrian State Railways, read before the Austrian Engineering and Architectural Society, discusses encouraging possibilities for the further development of freight haulage on street railways. At the opening of the world war the Vienna tramway system installed a track connection with one steam terminal to take over the passenger traffic released by the closing of the Stadtbahn to such business. The next step was to make use of these connecting tracks for freight.

The pressure for freight haulage on the street railways of Germany evidently was less, for it was not until December, 1916, that the War Department sent out a questionnaire to learn their facilities for freight business. Such business was less of a novelty to German than to Austrian electric railways. The latter had handled freight only spasmodically, whereas the Germans as long ago as April, 1903, were moving freight on sixty of the 148 tramways in the country. Others were not doing so purely because of franchise restrictions.

In those days, also, the cheapness of horse transport and the cost of rehandling were limiting factors. However, by 1913 sixty out of 135 Prussian street railways and nineteen of the railways in the other German states were handling freight. These seventy-nine companies then had 2,600 cars for package, mail and freight, of which 964 were regular freight cars, averaging 6 metric tons each in capacity.

Conclusions Reached by German Roads

According to Chief Engineer Winkler of Charlottenburg, Berlin, the German roads before the war had reached the following conclusions on the subject of handling freight.

Street railways should be considered freight feeders to the steam lines and should have direct or indirect connection with them. Car interchange is impracticable because of the sharper curves, smaller clearances, narrower wheel treads and coupler differences of the street railways. The use of sub-trucks, even if clearances are ample, is of but limited application. Transshipment is then necessary, and for this labor-saving devices should be used as much as possible. The freight was usually hauled in a train consisting of one motor car and two or three trailers. Most freight service was handled at night.

The war led to a tremendous development of trolley freight. In February, 1918, practically all haulage on the electric lines was with trailer cars. In some cities garbage transport was instituted. Düsseldorf was the only city in which a package business was conducted. Most of the roads confined their efforts to carload transfers between the steam railroads and large shippers. Generally the freight trains were run at passenger car speeds and were often interpolated with passenger service. A disadvantage found with wagon trailers on their own wheels was the low speed of 4 to 8 km. an hour (2½ to 5 m.p.h.), compelled by the character of their spring suspension and brakes.

The tariff charges are usually based upon the capacity (not actual load) of the trailer and the distance run. The prices are considerably below those charged for horse drays. An auxiliary saving, due to easier transfer from steam to electric cars, is the quicker release of the steam cars, made possible by the better use of mechanical transfer devices. More freight business by electric railways would not only enlarge the steam railroad revenues but give a better use factor of men, power plant, track and line.

Heavy War Traffic in Vienna

Referring to Vienna, Mr. Neumann said that up to February, 1918, the local street railways had made 110,000 car-trips, the equivalent of 310,000 wagon-trips. For the same amount of work 350 horse trucks or 100 motor trucks would have been needed. A great variety of materials was handled, the local distribution of mail being especially successful.

As regards post-war conditions, an upland country like Austria could hardly afford to raise fodder for farm horses, let alone city draft animals. Gasoline was also extremely costly, aside from the fact that motor trucks were not economical in frequent-stop service and were also injurious to street paving and the piping beneath. On the other hand, the development of local hydro-electric power was possible and would tend to lower the cost of transporting goods via electric railway. The speaker recommended the extension of the system, the creation of an electric railway terminal warehouse, construction of sidings, etc.

Motor Cars Kill Eighty-two

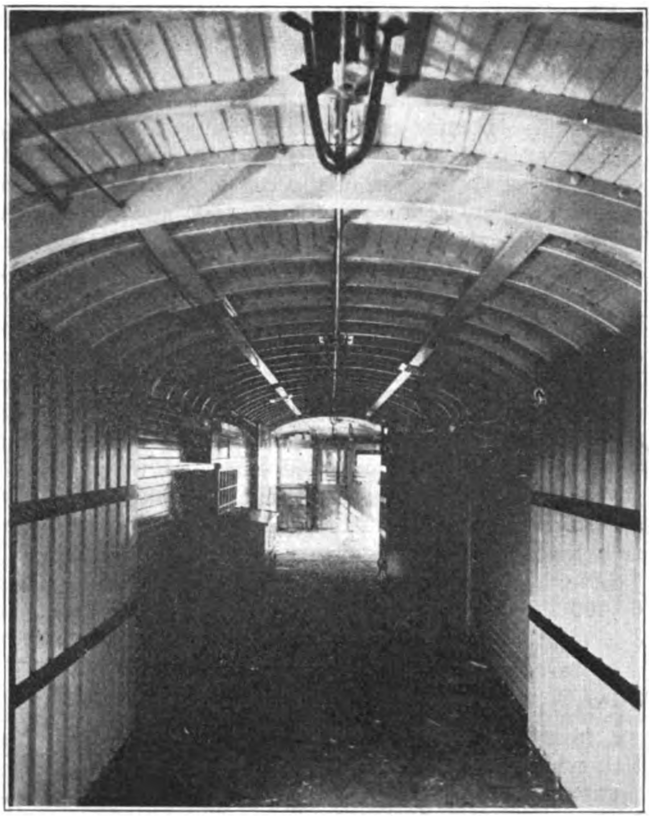
ACCORDING to the report of the National Highways Protective Society, there were ninety-three accidents due to vehicular traffic in the State of New York during April, 1920. The number of persons killed by auto cars was eighty-two, while trolley cars caused the death of five and wagons six. In New York City alone fifty persons were killed during the month by automobiles, nineteen being children under sixteen years of age. Trolley cars caused the death of four persons and wagons six.

Motor Dispatch Line Successful

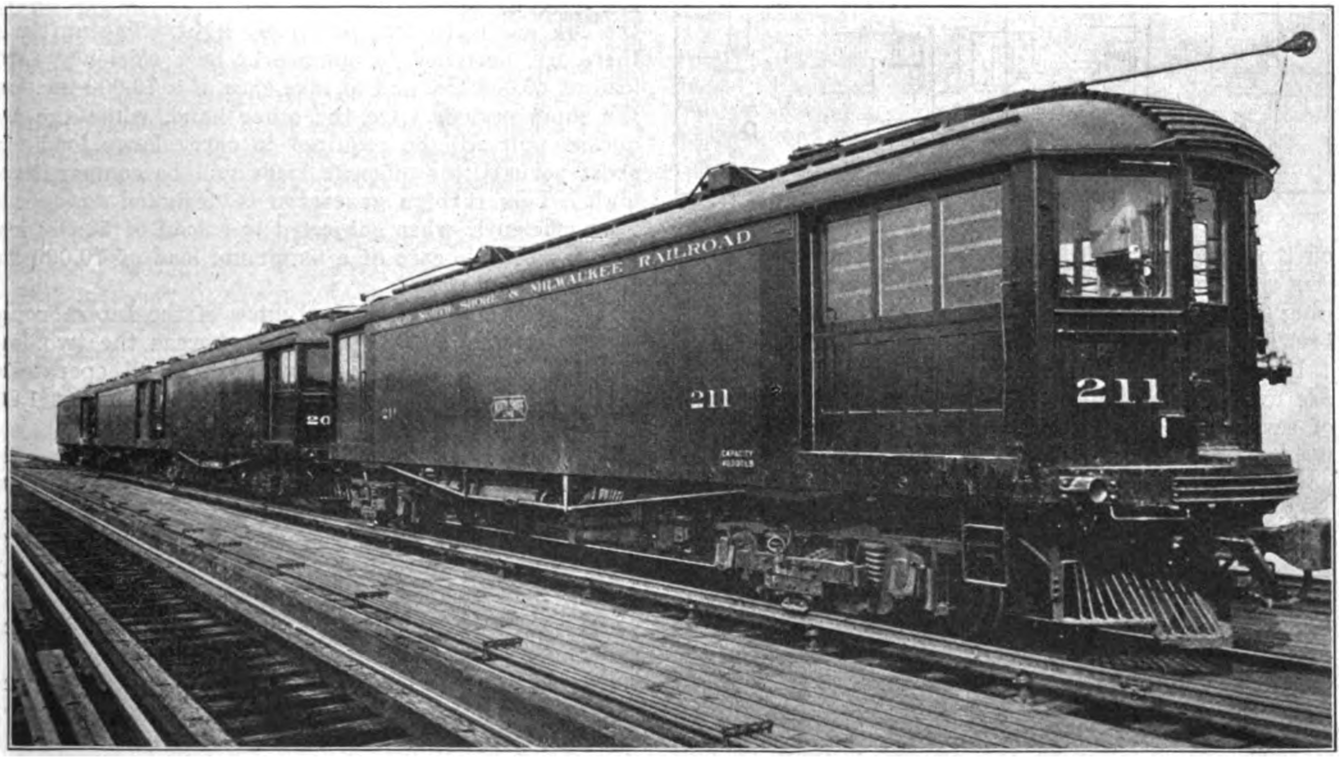
The North Shore Line Has Placed Twelve New Multiple-Unit Cars in Service to Take Care of This Business

THE Chicago, North Shore & Milwaukee Railroad is enjoying an increasingly popular freight business, which it calls its "merchandise dispatch service" and for which it charges a 30 per cent higher rate than the corresponding steam road freight rate. While the company was at first laughed at for assuming that it could secure business at 30 per cent higher rates than prevailed on the paralleling steam line, its practice of making deliveries within five hours from the time shipments are received has won a volume of business which has forced the company to purchase twelve new motor dispatch cars.

These twelve new cars are of wood construction except for the composite underframe and are 50 ft. long over all, 8 ft. 8 in. wide and 12 ft. 3 in. high from rail to top of roof. They are equipped with Baldwin trucks having a 78-in. wheelbase and with two Westinghouse 557-R-5, 140-hp. motors, mounted on one truck. Westinghouse tapped field HL control and automatic universal airbrakes are used. The motors and control are of the same type that is used on the North Shore Line passenger cars. Both trucks on the motor dispatch cars are built for equipping with motors and the control is a four-motor control, so that these cars can later be very radily equipped with four motors if the service demands. At the present time, equipped with two motors, the cars have a free running speed of 50 miles per hour and are used daily for hauling carload shipments in addition to the l. c. l. shipments carried on the motor car itself, the two motors seeming equal to this work of hauling standard freight-car trailers. This hauling of steam road equipment is made possible by the use of Tomlinson M.C.B. radial drawbars, with which all the cars are equipped. In the l. c. l. shipments the equipment of all cars with motors and multiple-unit double-end control makes it possible for any number of cars, depending on whatever the volume of business may require, to be run as a single train. The limiting factor at present is that for any shipments which pass through Wilmette, Ill., a four-car train is the maximum which may be taken through the streets, in compliance with a local ordinance.



DESK AND STOVE INSIDE THE NEW MOTOR DISPATCH CARS



A FOUR-CAR TRAIN OF THE NEW MOTOR DISPATCH CARS RECENTLY PUT IN SERVICE BY THE NORTH SHORE LINE

Since one of the main receiving terminals for this merchandise service is at Wilson Avenue in Chicago, necessitating that the cars run over the elevated structure from Wilson Avenue to Wilmette, all cars are equipped with third-rail shoes as well as double trolleys.

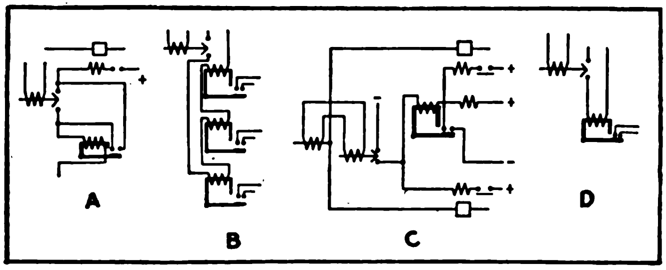
The car bodies are built with four end-side sliding doors and a train door in the center of each vestibule. Inside the car, at the center, a desk and pigeon-hole rack are provided for the conductor to make out and distribute his waybills and records. The lower part of this desk forms a cabinet, in which the air governor, the control and motor cutouts and what other control and brake equipment must be placed within the car body are installed. Opposite the desk an ordinary caboose coal stove is placed. A special blox-on-end floor was used, this being a special patented floor which is widely used in steam road cars and which affords particularly good wearing qualities under the heavy service it encounters. The arched roof is equipped with four Railway Utility Company automatic ventilators.

Completely equipped the motor dispatch cars weigh 66,000 lb. and have a carrying capacity of 40,000 lb.

Uses of the Auxiliary Relay

THE accompanying diagrams show methods of applying the comparatively new auxiliary relay, Type HG, which has been developed by the General Electric Company. In general, this device can be used on any direct-current circuit to close or open automatically a direct or alternating-current circuit of small capacity up to 600 volts. When the operating coil is energized the relay contacts close, and when current is cut off the coil the armature falls by gravity, assisted by the spring action of bronze movable contacts which are under pressure when closed.

A is an application of the relay to "seal in" a circuit made by another relay, so that once current is thrown on the tripping coil of an oil circuit breaker this current will remain on until the breaker opens, and the tripping circuit is opened by an auxiliary switch on the breaker.



SOME USES FOR AN AUXILIARY RELAY

In *B* three auxiliary relays with the coils in series are used to control the automatic opening and closing of several circuits, depending upon the operation of a master relay which may function on overload, reverse power or other abnormal circuit condition.

C shows an auxiliary relay connected in one circuit to control a second circuit. This is accomplished by connecting the auxiliary relay with its resistance (if the voltage requires the use of the resistance) across the control bus. It will be necessary, in this case, for the protective relay contact to be capable of breaking the current through the auxiliary relay coil.

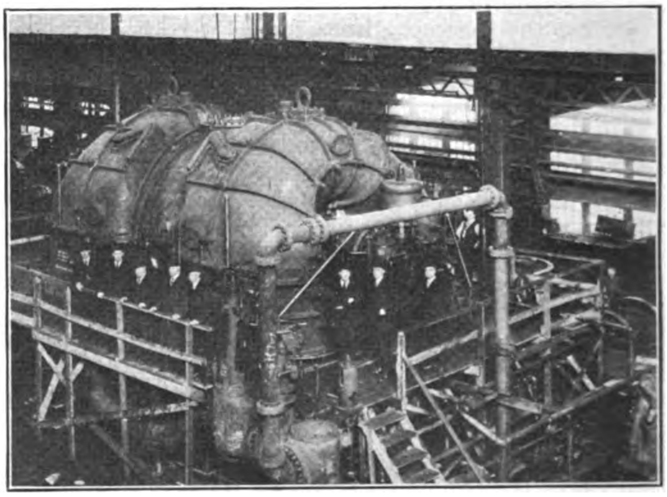
In *D* the auxiliary relay is used in connection with an overload relay to relieve the contacts of the latter from making or breaking a comparatively large current.

Another 60,000-Kw. Turbine Generator

ON APRIL 15 the low-pressure steam-unit of a new triple-compound turbine generator for the Duquesne Light Company was officially "turned over" for the first time in the East Pittsburgh shops of the Westinghouse Electric & Manufacturing Company. This unit will be installed at the new Cheswick station of the Duquesne company to serve a combined power, light and railway load.

On account of the unusual size of this machine it will be of interest to compare it with the 25-cycle, 60,000-kw. unit installed several years ago by the Interborough Rapid Transit Company, as described last in the issue of this paper for May 10, 1919, page 906.

As the load conditions under which these two units work are different they differ somewhat in design. The load carried by the Interborough turbine is a transportation load only. For this reason extremely high peaks are encountered during the rush hours, while during the day the load is comparatively light. The unit was, therefore, designed to operate at best efficiency for a load of 40,000 kw. and to take care of a 70,000-kw. load for short periods. On the other hand, while the Duquesne unit will be required to carry large loads for short periods, the off-peak loads will be comparatively high. This turbine generator is designed to operate most efficiently when subjected to a load of 50,000 kw., but also to take care of a maximum load of 70,000 kw. for short periods.



LOW PRESSURE UNIT FOR 60,000-KW. TURBINE

All three of the individual units of the Interborough turbine operate at 1,500 r.p.m., whereas the two low-pressure units of the Duquesne unit will operate at 1,200 r.p.m. and the high-pressure installation at 1,800 r.p.m.

Like the Interborough turbine, this unit is of the pure-reaction, three-cylinder, 88-stage type, designed to divide the load equally among the three generators at 50,000 kw. The entire generating unit measures 53 ft. 8 in. in length, 56 ft. 2 in. in width and 19 ft. 3 in. in depth.

Steam will be supplied to the turbine at 275 lb. pressure and 175 deg. F. superheat and will exhaust into a 29-in. vacuum. It will enter the single-flow, high pressure element through two 18-in. steam headers, each of which is equipped with an 18-in. combination throttle valve.

Fuel Oil and Electrification in California

Increasing Cost and Scarcity of Fuel Are Hastening the Day of Heavy Electric Traction on the Pacific Coast

AT THE convention of the Pacific Coast Section of the N. E. L. A., held during the first week of May, J. E. Woodbridge, resident engineer Ford, Bacon & Davis, San Francisco, Cal., gave data regarding the increasing price and decreasing supply of fuel oil and discussed the relation of these to railroad operation in the State.

It appears that the price of delivered fuel oil in California has advanced during the last five years from 60 cents to about $1.85 per barrel, the two approximations covering slight variations due to locality.

Due to surplus production, approximately 60,000,000 bbl. of oil (nearly a year's consumption) was accumulated early in 1915. Price advances during the subsequent three years were due largely to war demands and a depreciation of currency, which made all field development difficult and expensive. The price advance and other factors so stimulated production and controlled consumption that stock increased during a portion of 1918 and 1919 by 3,000,000 bbl. Many who have not looked further into the fuel oil situation have reasoned from these facts that we may rest easy as to the price of this raw material in the immediate future. Mr. Woodbridge, however, quotes President Kingsbury of the Standard Oil Company of California to the effect that the Pacific Coast supply of fuel oil and of petroleum is rapidly approaching exhaustion. Since May 1, 1915, crude oil stocks have decreased from over 60,000,000 bbl. to less than 29,000,000 bbl. on March 1, 1920. The available supply of crude oil in stock is today less than 13,000,000 bbl. At the present rate of consumption and of production the available stocks will be exhausted in about twelve months, at which time consumers of California fuel oil will be cut off from between 25,000 and 30,000 bbl. per day. Mr. Kingsbury gives examples of increases in demand for oil from various sources and states that the company is now installing new processes by which it is estimated that more refined products, including gasoline, will be recovered from crude oil in such quantities that the company's production of fuel oil within a year will be necessarily lessened about 30 per cent.

The point which Mr. Woodbridge desired to make from the data quoted and other data is that power development, as in the ordinary steam station, at an average "efficiency" of 185 to 200 kw.-hr. per barrel will cost for fuel alone at least 1 cent per kilowatt-hour with fuel prices of $1.85 and upward. This figure added to other steam operating costs and all fixed charges makes the total cost of power so developed much higher than that of hydro-power, even at present high cost of money and construction. This being the case for steam turbine plants of reasonably fair to good efficiencies, it is much more true of the steam locomotive, with its wasteful boiler and non-condensing reciprocating engine.

In other words, the cost of the fuel oil alone used in the steam locomotives in California and neighboring states, based on its value at the market (amounting to approximately $50,000,000 per annum, which will increase year by year until this fuel can with difficulty be obtained at all), will in turn compel the steam railroads to seek other methods of operation, the most promising of which is electrical. Disregarding all other reasons and arguments for electrification, the cost of fuel is going to force this.

In view of the inability of the power companies to meet their present commercial demands and the apparently insuperable financial program involved in meeting future demands a large railroad load cannot be anticipated by these companies with any great degree of satisfaction. The solution, however, is obvious, namely, a railroad power rate which will finance the necessary developments.

Investment Bankers Speak

AT a meeting on May 8 of the board of governors of the Investment Bankers' Association of America the following resolution relating to public utilities was adopted:

> Whereas investment bankers are expected to purchase and distribute the securities of public utility companies, which must be sold if utilities are adequately to supply the demands upon them for local transportation, light, heat, power and the transmission of messages, and
>
> Whereas the credit of many of the public utility companies will not permit the sale and distribution of such securities, thus interfering with the development of many commercial enterprises, the welfare of many communities and the comfort and convenience of a great many people, and
>
> Whereas the credit of the public utilities is largely dependent upon the attitude of the public as expressed through the various governing and regulatory bodies,
>
> It is hereby resolved by the board of governors of the Investment Bankers' Association of America that, as steps in the restoration of the credit of the public utilities,
>
> 1. Term franchises should be superseded by indeterminate permits securing the right to operate under proper regulation during good behavior, with provisions for equitable adjustment of rates from time to time, as tending to eliminate controversies which inevitably impair the public service, the credit of the companies involved and the value of their securities.
>
> 2. The power of regulation and control of public utilities should be vested in state commissions, as tending toward standardization of regulation, which is not possible under local regulation.
>
> 3. Members of state commissions should be appointed. If commissioners are elected they are frequently embarrassed by political policies and platforms in the consideration of questions which should be decided only on sound economic and financial principles.

Reinforcing Corroded Steel Poles

IN THE recent triple number of *L'Industrie des Tramways et Chemins de Fer* two engineers of the Nogentais Railway give details of their plan for rehabilitating steel poles, used for supporting trolley wires, particularly at the ground line where corrosion occurs. Their plan is to drop into the pole a reinforcing cage, afterward pouring in enough concrete to surround the reinforcing. The reinforcement consists of six rods about ¾ in. in diameter and 14 ft. long, equally spaced around the outside of steel rings of 3¼-in. outside diameter. Three spacing rings are used, one near the middle and one near each end of the cage, their width being about 1 in.

Where necessary the poles can also be reinforced by means of a sleeve placed at the ground line on the outside. Unless the fittings can be removed from the pole this sleeve has to be made in two sections with suitable clamping arrangement to hold it together. The internal reinforcing requires the work of four men for one hour.

Letters to the Editors

Cost of Preparing Pulverized Fuel

FULLER ENGINEERING COMPANY
ALLENTOWN, PA., May 14, 1920.

To the Editors:

The writer has read with considerable interest the remarks published in the issue of the ELECTRIC RAILWAY JOURNAL for April 10 by T. A. Marsh, chief engineer of the Green Engineering Company, on the subject of preparing and burning pulverized coal.

In his first paragraph Mr. Marsh states that he believes it to be fundamentally wrong to burn coal in a powdered condition. The writer takes exception to this statement, because it certainly is better and easier to burn coal in pulverized form than in lumps on grates subjected to the action of the heat.

In his second paragraph Mr. Marsh states that some accurate way of measuring the ash discharged from the stacks from pulverized-coal-fired furnaces should be found before definite statements concerning it are made. It is true that a large percentage of the ash from pulverized-coal-fired furnaces will be discharged from the stacks. The percentage, however, dissipated from a first-class installation, equipped with economizers and settling chambers, will not be sufficient to cause a complaint, as has already been shown by installations using pulverized coal in thickly populated districts. This question of ash dissipation depends greatly upon the velocity of the gases passing through the setting and the percentage would naturally vary according to the operating conditions and the general design of the installation. The same is true with the ash discharged from a stoker installation, which varies according to the conditions under which the stokers are operated.

In his fourth paragraph Mr. Marsh states that the cement industry has more data on the subject of pulverized coal than have steam producers. This statement is absolutely correct. We are in touch with practically every plant in the United States, and in fact have more data on what is being done in connection with pulverized coal in the cement industry than any other organization. We are positive that any one who at present is operating his coal plant so that the cost of preparing the coal is as high as $1 per ton is not operating that plant efficiently unless the particular coal plant has a very small capacity and is operated only periodically.

In order to show just what the cost of preparing coal is at present, the following figures are given for the month of August, 1919, for the plant of the Allentown Portland Cement Company, where 2,976 gross tons of coal was pulverized. The details are:

Operation	Cents
Drying	8.04
Grinding	8.74
Operation	0.43
Power	17.93
Labor	3.68
Repairs	7.65
	46.47

The cost is thus slightly under 46½ cents per gross ton, or 41 cents per net ton, no interest or depreciation included. This can be taken as representing the average cost in Portland cement plants in the Lehigh Valley district, for the quantity of coal pulverized daily in this plant is not large, and no doubt in larger plants even these figures would be bettered materially.

The cost of preparing coal will vary primarily according to the quantity of coal pulverized daily, so that any general statements or criticisms that are made as to the cost of pulverizing coal in one plant have no bearing on the subject as a whole. H. G. BARNHURST,
Chief Engineer.

The Single-Truck Car and the Double-Truck Track

NEW YORK CITY, May 15, 1920.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 31, 1920, you commented upon public misunderstanding of the single-truck car. The riding qualities of such cars as compared with double-truck cars were considered, somewhat unfavorably for the former, although you expressed the belief that the modern single-truck safety car possessed such good riding qualities that it should become more popular with the public.

In this connection it may be well to call attention to the fact that even the modern safety car, since it perpetuates the single-truck idea, cannot make good riding track out of poor riding track. We are advised that even before the advent of the safety car some roads had to take single-truck cars off of their lines and substitute double-truck cars simply because the latter rode the poorly surfaced tracks much more smoothly. It was either this or spend exceptional sums in reconstruction of the tracks. Thus the safety car may lead to another source of maintenance expense in that it requires a better and more costly degree of track maintenance to keep the tracks safe for the safety cars. "ENGINEER."

[NOTE—"Engineer" is undoubtedly correct in his contention that a single-truck car emphasizes the defects in the track over which it runs, the poor condition of which is partly due to the damage done by its double-truck predecessors. However, once the track is in reasonably good condition, as it should be in normal times for the comfort of riders and for the conservation of the equipment, the track itself and the adjoining pavement, then the safety car should operate without producing serious wear and tear of the track.—EDS.]

Calls One Express Organization Most Efficient

PRESIDENT George C. Taylor of the American Railway Express Company in a recent address to the Merchants' Association of New York said that he could not see the best and cheapest express service come from a restoration of several old companies nor the formation of several new ones. He argued that one express company operating over all transportation lines can give a better service by the use of the most direct route. One such company avoids duplicate service and expense, also divided responsibility and resultant delay in case of loss, avoids all circuitous routing and rehandling of packages at junction points in transfer to or from other companies, can maintain through car routes, and realize other economies not possible when several agencies divide the express business. The best service should come from one organization which now comprises over 135,000 employees and has 35,000 offices.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Engineers to Confer

Returns on May 15 Indicate 90,000 Engineers Will Be Represented at Meeting Next Month

At least 100 delegates, representing a membership of more than 90,000 engineers, will attend the organizing conference of technical societies to be held in Washington, D. C., June 3 and 4, according to a statement given out May 15 by the joint conference committee, which has just announced a tentative program for the meeting to consider the formation of a country-wide federation of national, state and regional engineering bodies.

THIRTY-ONE SOCIETIES REPRESENTED

Thirty-one different societies, on May 15, had advised the committee that delegates had been named or would be appointed forthwith. Among them are the American Society of Civil Engineers, American Institute of Mining & Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Society for Testing Materials and American Electric Railway Engineering Association.

The committee urges all engineering societies to be represented and to participate in the deliberations of the conference, which, the committee believes, will be "one of the most important gatherings that has been held in the history of the engineering profession in this country."

Richard L. Humphrey, chairman of the joint conference committee, will call the conference to order at 10 a.m., June 3, in the New Willard Hotel. Following the election of a temporary chairman and the appointment of committees there will be fifteen-minute addresses on the general subject of the engineer in public affairs by Arthur P. Davis, president of the American Society of Civil Engineers; Philip N. Moore, past-president of the American Institute of Mining Engineers; William F. Durand, chairman, San Francisco Section of the American Society of Mechanical Engineers; and Le Roy K. Sherman, president of the American Association of Engineers.

MR. MCGRAW WILL DISCUSS PUBLICITY

At a round-table luncheon, June 3, James H. McGraw, president of the McGraw-Hill Company, Inc., publishers of the ELECTRIC RAILWAY JOURNAL, will speak on "The Value of Publicity for Engineers." The afternoon session will be devoted to committee reports and ten-minute discussions on licensing of engineers, good roads and other topics. In the evening, Homer L. Ferguson, past-president of the United States Chamber of Commerce, will talk on "Co-operation of the Business Man and the Engineer in Public Affairs."

A business session will occupy the morning of June 4. Prof. F. H. Newell will be the speaker at luncheon, while in the afternoon, at the Cosmos Club, the general subject will be co-operation of engineers in local affairs. A number of addresses are on the program for the evening session. The speakers include Robert S. Woodward, president Carnegie Institute; George Otis Smith, director United States Geological Survey, and James R. Angell, chairman National Research Council.

Hearings Begun on Schedules

Hearings on the rearrangement of schedules on the Cleveland (Ohio) Railway before a special committee of the City Council were opened during the week ended May 22. Councilman Alva R. Dittrick is chairman of the committee.

At the same time the compromise agreement was made John J. Stanley, president of the railway, stipulated that he would discuss schedule changes with the special committee, but not payment under those schedules.

Union officials have stated that this stipulation will not prevent them from seeking changes in accordance with their original demands concerning hours of labor and over-time payments. In other words, their demands on these points will be the same as those presented prior to May 1.

These demands are to the effect that 60 per cent of the runs be arranged on a straight eight-hour basis, 30 per cent on eight hours' running time completed in ten and one-half hours and 10 per cent on eight hours' running time to be completed in twelve and one-half hours.

The old agreement called for time and one-half for over-time above the ten-hour schedule. If they get their demands, the union officials say, they will have time and one-half above the eight hours originally demanded.

Paul E. Wilson, assistant secretary of the railway, said that cars will be run on any schedule changes that are made by the committee. He feels that it will not be difficult to reach any agreement on the proposed changes. Other officials said that a certain amount of shortening can be made in the schedules without materially increasing the operating expenses through over-time charges.

Court Called Upon

Federal Authority Asked to Settle Wage Matter in Des Moines—Decision Expected Soon

Both sides in the controversy over a wage agreement between the Des Moines (Ia.) City Railway and its employees are waiting for a ruling of Judge Martin J. Wade of the federal court, under whose direction the road is being operated by the receivers.

The receivers have requested Judge Wade to direct what measures should be taken to meet the award of the arbitration board in the wage settlement. Two of the arbitrators brought in a report fixing a maximum wage scale of 70 cents an hour. The receivers maintain that the revenues are insufficient to meet this increased cost. They have requested the court to direct the company's next step.

The contract between the Des Moines City Railway and its men provides that differences as to wage demands are to be settled by arbitration. When the two parties were unable to agree on a wage this spring the company named J. G. Gamble, an attorney, as its arbitrator. The men named Ben Wiley, the business agent. These two men named as the third arbitrator Rev. J. E. Kirby, pastor of the Plymouth Congregational Church. After hearing the evidence Mr. Wiley and Rev. Kirby decided that the men's demand for an 80-cent maximum should be met by a maximum of 70 cents. The present maximum is 57 cents.

COMPANY NEEDS MORE REVENUE

In making his findings, Rev. Kirby issued a statement announcing that while he felt that the men must have at least 70 cents an hour to live decently he could not see how the company could meet this wage increase without an increase in rates. At present there seems to be little disposition to put the question of a higher fare before the people again at this time.

In presenting its case before the federal court, attorneys for the railway maintained that if the 70-cent maximum wage was granted the company would have to cut service or put the cars in the carhouse.

Des Moines is operating under a 5-cent maximum fare granted by a franchise secured in 1913. A year ago the people, largely through a fight among union labor organizations, defeated a proposal for a 6-cent fare. Last fall, on a showing that the company could not maintain its service on the 5-cent rate, Judge Wade ordered a very material cut in service.

Open Shop in Buffalo

Mitten Management Takes Usual Liberal Attitude on Wages, but Insists Union Shall Not Dominate Employees

After four weeks of negotiations between officials of the International Railway, Buffalo, N. Y., and representatives of the employees, members of the Buffalo local of the Amalgamated Association, an agreement has been reached whereby the open shop principle is effective on the local and interurban lines of the company. Danger of a strike was averted when Herbert G. Tulley, president of the company, announced the company would not stop employees from joining the union and would not discriminate against union men. The men will receive a wage increase of 12 cents an hour retroactive to May 1, thus bringing their scale up to 60 cents an hour. The men sought a maximum scale of 88 cents an hour with an eight-hour day. The company and the employees have agreed to submit to a board of arbitration the question of hours and any additional wage increase.

C. J. JOYCE, counsel for the Mitten traction interests, who are now in control of the International Railway, has been selected by the company as its member of the board and James J. Vahey, Boston, senior counsel for the Amalgamated Association, is the choice of the men. These two men will meet and select a third member of the board. President Tulley has suggested that Chairman Charles B. Hill of the Public Service Commission, some representative of the commission or a man selected by the commission serve as the umpire. This suggestion is said to be opposed by the union.

The wage advance granted the employees will increase the International's payroll about $1,000,000 a year. President Tulley says it will consume all of the increased revenue obtained by reason of the 7-cent fare. The wages of shopmen, carhouse men, power house men, etc., will also be increased 12 cents an hour. The increase in wages in the first week in May amounts to $20,122 over the payroll of the week immediately preceding and the increase in gross earnings of the company derived from the 7-cent fare for the same week was $14,201.

MR. TULLEY'S PRONUNCIAMENTO

The letter of Mr. Tulley to the local division of the Amalgamated Association follows:

> The following recital covers the proposed adjustments and procedure which it is understood are to be now submitted by your committee to the employees of this company for their consideration:
>
> 1. The question of employees becoming members of Division 623 shall not be made a part of the agreement, and there shall be no discrimination by either the company or Division 623 against any employees for joining or not joining the union.
>
> 2. The provisions of the present contract covering hours shall continue as at present until changed by mutual agreement.
>
> 3. In accordance with our understanding, the wages of all trainmen are advanced as of May 1, 1920, from the maximum of 48 cents an hour to the new rate of 60 cents an hour, with wages of all other employees adjusted accordingly. This increase in wages for the first week in May amounts to $20,122 over the payroll of the week immediately preceding. The increase in gross earnings derived from the 7-cent fare for the first week in May was $14,201. This shows that all of the increased earnings gained from the increased fare during this period are now being paid to the men by the company under the new 60-cent scale.
>
> The company's present earnings will not permit it to pay a higher scale than that based on 60 cents an hour for trainmen until some means be found to increase the earnings, from which increased wages must be paid. The present contract calls for arbitration, but arbitration of wages under present conditions can only be effective if the deciding vote be cast by a representative of the Public Service Commission, which today alone has the power to grant the increased fares necessary to make the payment of an increased wage award possible.
>
> It is, therefore, now understood that the question of adequate wages shall be submitted to a board of arbitration, as provided under the contract, and that the chairman of the Public Service Commission, Second District, State of New York, shall be requested to serve as the third arbitrator, or that he select a member of, or some one associated with, the Public Service Commission as his representative to serve as such arbitrator.
>
> The Public Service Commission alone has the authority to say what service the company shall render and what fare may be charged, and further, it is only just to the company that the deciding vote shall rest with one who, having the power to determine what increased expenditures shall be made by the company, also has the authority to secure for it sufficient revenue to meet such expenditures.
>
> The Public Service Commission represents the interested public who must pay the bill and should, therefore, have a voice in determining the rate of wages to be paid.

Under the caption "Big Open Shop Victory," the Buffalo *Commercial*, one of the afternoon newspapers, in an editorial, said:

> There will be no street car strike. The officers of the International and the employees acting through their union have come to an agreement. The men will get the increase that President Tulley offered them several weeks ago and more later on if an arbitration board thinks they are entitled to it and the company can afford to pay it.
>
> But of far greater importance to the public was the yielding of the men to the principle of the open shop. The demand for a closed-shop provision in the contract of employment is withdrawn, and there will be no discrimination shown by either company or union against employees for joining or not joining the union.
>
> An American principle has triumphed. It is the triumph that comes when right battles firmly and unyieldingly against wrong. It came in this case because Mr. Mitten and Mr. Tulley stood out manfully and unflinchingly against yielding in a matter of principle. Whether this triumph does or does not mean anything so far as altering the practice of the company is concerned, it does mean a great moral victory for the friends of the open shop in Buffalo. It will encourage employers to insist upon hereafter eliminating all closed-shop provisions from future agreements, where such provisions now exist. It will hasten the day when all the employers of Buffalo shall get together and adopt the slogan of industrial freedom for themselves and their employees.
>
> We congratulate Mr. Tulley and the other officers of the International Railway upon the firm and intelligent manner in which they have handled this affair and brought it to a successful conclusion.
>
> We congratulate the employees of Division 623 for their good judgment in yielding a principle that was untenable and unsound. But more than all we congratulate the people of Buffalo that a principle as old as the Magna Charta and as sound as democracy itself has been vindicated. It strikes the death-knell of autocracy in the labor world and foreshadows the universal emancipation of both labor and capital from the tyranny of a sovereignty unknown to our Constitution and a standing menace to our liberties.

Court Decision Ends Dubuque Strike

United States Judge Voids City's Jurisdiction Over Rates and Orders Higher Fares Permitting Wage Increase

Dubuque's railway strike has been settled. Service was restored by the Dubuque (Iowa) Electric Company on May 1. The new fare is 8 cents, with seven tickets for 50 cents. The demand of the company for permission to run one-man cars was dismissed without prejudice. The company must continue the operation of cars from now until the franchise expires, unless conditions should develop which it is beyond the company to control. The right is reserved to the city to review the books of the company at any time in order to determine whether an 8-cent fare is justified. Thus means were provided for making wage concessions to the men, and an agreement on this matter was the subject of later negotiations.

THE settlement agreement was reached at a conference of counsel for the company and the city with the City Commission, after urgent appeal from Judge Henry T. Reed in the federal district court. Judge Reed played no favorites. He said that from the information he had received it seemed that the railway had taken the matter into its own hands and was trying to hold the city by the throat until it had secured its demands. The company suspended operations without an attempt to fulfill its obligations to the city, and had refused, up to the time at which the court spoke, to concede to propositions that did not fully comply with its own ideas of an adjustment.

The strike was declared March 1. Judge Reed has declared void the authority of the city to prescribe or control rates of fare. The details leading up to the strike were given in full in ELECTRIC RAILWAY JOURNAL for April 17, page 824.

At the time of the strike a 7-cent fare with four tickets for 25 cents was being charged and the wage was 42 cents an hour maximum. The new rates set up by Judge Reed are 8-cent cash fare, seven tickets for 50 cents, and a 4-cent cash fare for children under twelve years of age with seven tickets for 25 cents. The new wage settlement is 54 cents to 60 cents an hour after eighteen months.

In opposing the rates of fare in open court the company contended that they were not reasonable or just. In his finding Judge Reed said:

> The court does not determine that question, nor does the defendant (company) waive any of its rights in that respect. In case the defendant shall at any time desire

> a change in said rate, it shall first apply to the proper rate-fixing body, if there be such, for a change in such rates and the defendant shall not increase such rates until it has been authorized to do so either by such rate-fixing body or has been granted release against such rates by some court of competent jurisdiction by a temporary or permanent injunction or otherwise.

At the present time there is no public utilities commission in Iowa and it is presumed that this explains in part the circumstances under which the case was heard in a federal court, the details in this connection not being available at the time of this writing.

NO CONTRACT BETWEEN CITY AND COMPANY

The most important part of the decision of Judge Reed was his finding that "the provisions as to rates of fare contained in the defendant's franchise ordinances do not constitute a contract between the plaintiff (city) and the defendant; that the said provisions were and are beyond the power of the plaintiff to enact, and are void, and the plaintiff is hereby permanently enjoined from imposing such provisions against the defendant."

The order that was made by the court then goes on to say that the defendant is entitled to a reasonable and just rate for service furnished by it and that the City Council is empowered from time to time to fix reasonable and just rates for such service subject to the right of the company to have the reasonableness and justice determined by a court of competent jurisdiction. The decision further reads that the company is "ordered to furnish continuous street-car service during the remaining period of its franchises, in accordance with all the terms thereof except the provisions as to rates of fare."

A local ordinance forbids the use of safety cars on the city streets. A counter-claim against this ordinance was made a part of the suit in the district court, but this was dismissed without prejudice.

More Than 50 Per Cent Advance Asked

Motormen and conductors of the Toronto (Ont.) Railway have fixed a flat rate of 85 cents an hour as their demand for 1920. The present schedule gives 50 cents an hour for the first three months, 52½ cents an hour for the succeeding nine months, and 55 cents an hour thereafter. With the abolition of the ratings, the demand of the railway men means an increase of from 54 to 70 per cent. There is at present a short period of grace to the company over the regular day, but the employees now ask overtime after eight hours have been worked.

The present wage schedule on the Toronto Civic Railway in the city ranges from 63 cents an hour, for beginners, to 66 cents for experienced men. In connection with this schedule, the Civic Railway employees receive back pay dating to the beginning of the present year.

Fare and Labor Crisis in Tri Cities

Iowa and Illinois Cities Confronted with Problem Involving Fares and Wages

On the decision of a Socialist majority in the City Council of Davenport, Iowa, rests the answer as to whether this community will walk or have electric railway transportation after June 1. The Council was elected on a platform which included a 5-cent fare promise. There are five Socialist Aldermen and a Socialist Mayor, with a Republican minority of three Aldermen. All of the Socialist Aldermen are understood to be in favor of reducing the fare on the traction lines to 5 cents from the present 7-cent charge.

MAYOR C. L. BAREWALD, while elected on the Socialist platform, is understood to be in favor of granting the Tri-City Railway's request for an extension of the 7-cent fare until Sept. 1, by which time the company will have had a chance to come to a working agreement with its trainmen and shopmen. Whether the Mayor will be able to lead a majority of his Socialist Aldermen to this point of view is now the crux of the situation. The Republican minority favors the 7-cent extension.

NEW FARE EXPIRES ON MAY 1

This 7-cent fare expires automatically on June 1, according to an agreement made between the city and the company last fall, following a five-day strike and five-day tie-up of the traction lines last August. Since this 7-cent fare has been in effect the Tri-City Railway has barely been able to pay operating expenses. The lines of the company in Iowa have been in worse shape in this respect than the Illinois lines, although even in Illinois the lines have not been profitable on the 7-cent fare.

A further complication in the situation is the new wage scale demanded by the trainmen and shopmen. They have asked a 66⅔ wage increase over their present scale of 60 cents an hour and have coupled this wage demand with a plea for an eight-hour day and a closed shop. At present the men work a nine-hour shift and have a practical but not an official closed shop. They submitted a contract on May 5 calling for 96 cents an hour the first six months in company employ, 98 cents for the second six months and $1 an hour afterward. They are at present earning 54, 57, 60 cents an hour. On the Clinton, Davenport & Muscatine interurban, operating between Clinton and Muscatine, Iowa, through Davenport, the wage demands were even higher, calling for $1.01, $1.03 and $1.05 an hour. The former interurban scale was the same as the city lines, 54, 57 and 60 cents.

NEW DEMAND CONSIDERED UNREASONABLE

This scale was demanded following a conference between union heads and the international officials of the Amalgamated Association the latter part of April. Trainmen say that they did not vote to ask this scale. The city trainmen, however, are following the lead of their scale board now conducting negotiations with J. G. Huntoon, vice-president and general manager of the company.

Public sentiment regards the demand for a $1-an-hour scale as unreasonable.

If the Council does not grant an extension of the 7-cent fare a traction tie-up is predicted. The trainmen state they will not work for less than 60 cents an hour and the company states it cannot pay that on a 5-cent fare.

There is a possibility that the Council, if it refuses to grant the 7-cent extension after June 1, will call for a special election, putting the 7-cent fare to a vote of the people. The trainmen's present agreement expires at the same time as the 7-cent fare, on June 1. A special election could not be called until June 20 at the earliest.

On the Illinois lines of the Tri-city Railway the wage situation prevails exactly as in Iowa, but the fare situation is not the same. In Illinois the 7-cent fare does not expire on June 1, but may be changed at any time on action of the Public Utility Commission. The railway officials have not made application for an increased fare of the Illinois commission, preferring to solve the Iowa situation first.

There is a compulsory arbitration clause in the trainmen's present contract, but it appears at present writing that the wage question cannot be satisfactorily solved before June 1 unless the Council of Davenport grants the petition of the traction lines for an extension of the fare. In consequence a tie-up threatens after June 1.

The petition for an extension of the 7-cent fare by the Tri-City Railway was refused by the City Council on the evening of May 20, the vote being five to three, with the Socialists in the majority. The company has not yet formulated plans for action after June 1, when the fare reverts to 5 cents.

New Working Conditions at Boston

Edward Dana, general manager of the Boston (Mass.) Elevated Railway, has announced that new agreements have been made at the conference now being held between the company and the representatives of its employees. They are:

A guarantee of eight hours' work a day for extra men when called.

Compensation for time lost in the course of doing outside work.

Seventy-cent meal tickets for men unable to eat at home and for those working three hours or more overtime.

Extra pay for work on "owl cars" and on one-man cars.

These changes in working conditions will add about $250,000 to the payroll.

Popular Vote on Fares

Denver Apparently Faces Grave Dangers as Result of Council's Unwillingness to Meet Issue

Despite strong recommendations by the Colorado Industrial Commission the City Council of Denver, Col., on May 10, voted five to four to refer the 7-cent fare ordinance to popular vote at the next regular municipal election. This will not be held until May, 1921. No reasons were given by the Council for its action and no investigation of any nature whatsoever of the company's financial condition was conducted by or for it to determine whether the higher rate of fare is necessary.

BUSINESS INTERESTS IGNORED

The Council's action was also taken despite the indorsement of the measure by the business interests of the city as represented by the Denver Civic & Commercial Association. A meeting was held by the public utilities committee of the Council for the purpose of securing expressions from the citizens regarding the measure, but neither at this meeting nor at the regular meetings of the Council was a single protest made other than those which were voiced by some of the Councilmen themselves.

The ordinance was initiated by the Denver Tramway as an immediate means of relief to provide the additional revenues necessary in order to permit it to continue to pay the wage increases of 10 cents an hour granted to employees by a local board of arbitration on March 18.

Prior to the circulation of the petitions for the measure and anticipating that political or other reasons entirely apart from the merits of the case might determine the action of the Council, the railway served notice on the local branch of the Amalgamated Association that effective on June 1 the contract between them would be canceled and the wage scale of 58 cents an hour maximum for trainmen fixed by the board of arbitration would be reduced to the 48-cent-an-hour maximum scale established by the National War Labor Board.

The Colorado laws require that thirty days' notice be given the State Industrial Commission of any contemplated reduction in wage scales or of cessation of service and in compliance therewith similar notices were served on that body.

INDUSTRIAL COMMISSION RECOMMENDED LEGISLATION

The Industrial Commission conducted hearings and made a comprehensive study and investigation of the company's finances and its findings substantiated those of the numerous previous investigators and the claims of the company that the revenues from the present 6-cent fare are barely sufficient to pay the wage scales previously effective. These were established by the National War Labor Board. The commission, therefore, recommended to the City Council that it pass the 7-cent fare measure.

The Industrial Commission did not establish the new wage scales which are to prevail on and after June 1, 1920, by reason of the refusal of the City Council to pass the 7-cent-fare ordinance, but by its findings and recommendations has in effect authorized and approved the action of the company.

The company has now exhausted all legal means in its power and as the rate regulating authority has ruled that the present 6-cent fare shall continue in effect for another year, the only recourse which it has left is to establish wage scales which the revenues derived from that rate of fare will permit it to pay.

The local representatives of the Amalgamated Association have stated that they will not work for a lower wage than that granted by the board of arbitration. The stage is, therefore, apparently set for a strike of the employees and a temporary demoralization of service on June 1.

Public Invited to Arbitration Hearings

The question of wages to be paid trainmen in the employ of the railway lines of the Northern Ohio Traction & Light Company, Akron, Ohio, has been submitted to arbitration and the hearings will be held daily until all the evidence is submitted.

Charles Currie, arbitrator for the company, and E. E. Zeisger, representing the employees, have extended an invitation to the city and public generally to take part in the proceedings, both holding the arbitration to be a matter of great public interest.

The only difference to be adjusted by the board is that of wages. The employees ask 80 cents an hour, ten hours' pay for eight hours' work. The company contends it has not the money, and its income will not permit of the payment of an additional wage.

A. C. Blinn, vice-president and general manager, has issued the following statement relative to the position of the company:

> I feel that the men are entitled to receive more pay. Wages in every line of work in this vicinity have advanced and it is only fair that the men who operate cars should receive higher pay. The situation, however, is such that the present cost of the service is not being met by the income from fares and the street railway has no other source of income.

On May 15 Governor Cox named S. D. Hutchins, Columbus, as the third arbitrator in the wage dispute between the Northern Ohio Traction & Light Company and its platform men. Mr. Hutchins is resident representative at Columbus for the Westinghouse Traction Brake Company. Mr. Currie, the arbitrator for the company, is very well known in traction circles in the Central West. He is president of the London (Ont.) Street Railway. Messrs. Currie and Zeisger failed to agree upon a third member.

Disagreement at Toledo

Final Terms of Railway Settlement Measure Still a Matter of Contention

Members of the cost-of-service commission at Toledo, Ohio, and Henry L. Doherty failed to agree on the final terms of the ordinance being drafted for a permanent settlement of the railway problem at Toledo. The sessions of the week ended May 15 were consumed largely in trying to reach an agreement on valuation of the railway property.

MR. DOHERTY WANTS $9,000,000

Early in the week Mr. Doherty submitted as his last and lowest figure $9,000,000. He had offered the road for $11,000,000 on time payment basis previously. The suit now pending in the federal court seeks to determine a valuation of $15,000,000 for the same property.

In the meantime the city representatives are holding out for the original valuation of $7,110,000 placed upon the lines by their valuating committee. It was hinted that they might be favorable to raising this figure to $8,000,000 to secure an agreement before the measure was placed before the voters for their approval.

The measure will not be submitted to Council this week, but may be ready in time for the meeting a week hence. It will first be submitted to Federal Judge John M. Killits and then handed over to the City Council. Both may have something to do with making compromising changes, but Judge Killits has said it is the intention to pass it along unchanged.

When the commission and Mr. Doherty could not agree on three points he said he wanted to withdraw his offer on valuation. In addition to the valuation these questions could not be satisfactorily worked out:

> The right of the city to insist upon electric power at a rate that could be given by a modern plant and as supplied at other cities.
>
> That stocks should be sold at a discount upon the par value, if necessary to provide money for improvements and betterments.

Law Director Martin also wants a provision so that the city may have control of the board of trustees to provide against the issuance of securities beyond the capital value of the company organized to carry on the business on the cost-of-service plan.

Notwithstanding the break between the principals in the problem, the attorneys for the Toledo Railways & Light Company and the city are ironing out rough places in the wording of the ordinance.

COURT POSTPONES ACTION

No effort has been made to press the case of the Rail-Light and the city now pending in court. Judge Killits has felt no disposition to place the case on the calendar at an early date and so far the city has hired no special counsel with the $20,000 war fund appropriated by the Council.

As a part of the railway settlement of April, 1916, Judge Killits created the Craig fund, an account to which 6 per cent of the weekly earnings of the company should be paid and the money administered by an appointee of the court for betterments of service. This money was a portion of a fare increase not needed immediately to take care of salary increases.

COURT APPROVES EXPENDITURES

Sixty Peter Witt cars were purchased with proceeds of the fund. However, since that time the changes in labor conditions and expenses of the Toledo Railways & Light Company have been mounting till other fare increases have been made.

The company has been allowed by the court to spend $100,000 for track improvements. This was subsequently increased by $21,014 to take care of a deficit. The court also ordered the custodian of the fund to pay $75,347 for 300 fare boxes which were installed last September. Since the beginning of the operation of the fund there has been paid into the fund a total of $652,057 and for improvements there has been paid out $442,582.

RAILWAY EARNINGS INCREASE

The amounts paid to the fund indicate that the earnings of the company on railway business have been increasing slightly over a period of ten months.

Movies in a Railway Campaign

Motion pictures were used by the advocates of municipal ownership in the recent campaign of Mayor Couzens to establish city-owned lines in competition with the Detroit United Railway. The picture was largely animated drawings. Tiny cartoon street cars flitted across the screen to show the roundabout way which, it is claimed, workers living in some sections of the town now have to travel. The pictures emphasized the waste of time and pointed out the number of transfers many workers have to make in order to reach their destinations. Pictures were also shown of cars loaded to overflowing. An idea was then given of the type of transportation which the advocates of municipal ownership hoped to obtain by their program.

What effect the pictures had in winning votes to the municipal ownership proposal will probably always remain problematic, but there is no doubt left as to the interest which the pictures aroused. It is said that as a result of the showing of the pictures a railway company elsewhere is planning to have a film prepared in its campaign for increased revenue. This company is not receiving a fare large enough to maintain the present service, let alone build the new lines which the city wants and needs. The company plans to show the citizens by means of the "movies" what an increase in fare would enable it to give in the way of electric railway service in the future.

Wages Doubled in Three Years

Franklin T. Griffith, president of the Portland Railway, Light & Power Company, Portland, Ore., has signed a new wage agreement with the Portland officials of the Amalgamated Association dating from May 1, 1920, for one year. It is in effect an extension of the present wage scale of the company. There is no change in the schedule for platform men since Oct. 1, 1919, the maximum wage being 62 cents an hour, with an average wage of 61½ cents. The only change will be in the schedule of a limited number of men employed in work in the shops. The wages of these men were not fixed by the War Labor Board on a basis comparable with those of the platform men. These men will accordingly receive slight increases, amounting in the aggregate to about $11,000 annually. The wage for platform men has been increased from a maximum of 29 cents in 1917 to the present wage of 62 cents an hour.

Philadelphia Wages Readjusted

In conformity with the wage increase of the Cleveland (Ohio) Railway, effective on May 1, 1920, the general committee, under the co-operative plan, has recommended to the management of the Philadelphia (Pa.) Rapid Transit Company that an increase in the existing scale of wages of the trainmen of the Philadelphia Rapid Transit Company be established, effective as of May 1, 1920, on the following basis of pay in cents per hour:

Surface motormen and conductors	58½, 62 and 65
Elevated motormen	61½, 65 and 68
Elevated conductors	58½, 62 and 65
Elevated guards	58½, 61 and 63

The wages of other employees will be adjusted according to the provisions of the co-operative plan as soon as the necessary facts and figures are obtainable, to be effective as of May 1, 1920.

The co-operative plan for collective bargaining of the Philadelphia Rapid Transit Company provides as a basis for determining wages the average of the wage scales of the employees of the street railway companies of Buffalo, Cleveland, Detroit and Chicago.

Third New York Arbitrator Chosen

Judge A. E. Sutherland, Rochester, N. Y., was picked on May 18 by B. E. Tilton, general manager of the New York State Railways, Syracuse, N. Y., as the arbitrator representing the company. Judge Sutherland was selected out of a list of seventeen eligible men, one of whom was to be chosen as the neutral arbitrator in the wage and hour dispute arbitration proceedings to be held to settle the differences between the organized employees of the New York State Railways in Utica, Rochester and Syracuse and the company. The list of names was compiled by James H. Vahey, counsel for the Amalgamated Association and arbitrator for the union. The ease with which agreement was reached over the selection of the third arbitrator has been the subject of much favorable comment.

Detroit Wage Conference Unproductive

Employees of the Detroit (Mich.) United Railways and company officials conferred on May 18, but the results were not made public. The men are asking an increase of wages, which the company claims it will be unable to pay unless an increase of fare is granted by the city. A hearing before the City Council has been requested by the railway officials.

A letter from General Manager Burdick to the City Council states that the company has had presented for consideration demands in behalf of the city motormen and conductors for an increase in wages and for a change in working conditions which aggregate many millions of dollars more than the revenue will support that is now derived from operation at the present rate of fare.

It is expected that a 6-cent fare will be asked to meet the wage increase demanded. The Kronk ordinance is still on the books; although the Corporation Counsel argued in the Circuit Court hearing on the company's motion for the dismissal of the city's ouster suit that the Kronk ordinance was invalid. It fixed the rate of fare at 5 cents on non-franchise lines.

The rate of fare on the franchise lines is 5 cents except the Pingree lines. It is believed, however, that the city could agree to a fare increase, inasmuch as an understanding now obtains in regard to the Pingree lines where a straight 5-cent fare is charged although the franchises specify eight tickets for 25 cents during certain hours of the day.

Increase of Four Cents an Hour

An increase in wages has been granted to the employees of the British Columbia Electric Railway, Vancouver, B. C., as from April 1, 1920. The new scale is as follows:

First six months	49 cents an hour
Second six months	54 cents an hour
Third six months	57 cents an hour
Thereafter	60 cents an hour

This is an increase of 4 cents an hour to all classes.

The interurban line passenger motormen and conductors will be paid as follows:

First six months	49 cents an hour
Second six months	55 cents an hour
Third six months	59 cents an hour
Thereafter	62 cents an hour

Pro rata increases have been made in all other lines represented under the Amalgamated Association. The new wage scale was the result of negotiations between the company and the men in which the company's offer was accepted. The existing agreement was not opened, but a supplementary agreement entered into.

News Notes

Butte Lines Suspended.—Service on the Butte (Mont.) Electric Railway was suspended on May 9 on account of the strike of the members of the workingmen's union for an increase in wages of $1 a day. Jitneys have been resorted to in the emergency.

Strikers Will Not Be Restored.—Gaylord Thompson, general manager of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., has announced that the employees who went on strike will not be restored to their old positions under any circumstances. The company has not attempted to operate cars at night.

Rapid Transit Commission Will Retire.—Because of the defeat of the $15,000,000 bond issue in a referendum vote at Cleveland, Ohio, recently, the Rapid Transit Commission appointed by Mayor Harry L. Davis will automatically retire. Mayor W. S. Fitzgerald, successor to Mayor Davis, has made no announcement of his intentions with respect to the rapid transit and subway matter. It may be taken up later, but the decisive vote against the bond issue would indicate the uselessness of endeavoring to get this important and needed improvement through until general conditions are better.

Pension System Announced.—A non-contributory pension system for all employees of the Boston (Mass.) Elevated Railway, effective as of Feb. 1 of this year, was announced on May 10 by John H. Moran, chief auditor, in his testimony before a special board of arbitration which is investigating demands of the employees for increased wages. The pension will be computed on the basis of 1 per cent of an employee's average yearly earnings for ten years prior to his retirement, multiplied by the number of years he was continuously employed. No pension will be less than $300 nor more than $2,000 a year.

Toronto Car Case Concluded.—Argument by counsel upon the application of the city of Toronto to the Ontario Railway & Municipal Board for an order to compel the Toronto Railway to produce 200 new cars and put them into commission, or pay a fine of $100 a day for every day the company is in default, was concluded on April 26, after several adjournments. Judgment was reserved. The chief contention of counsel for the company, in opposing the application, was that the company should not be compelled to get 200 new cars, as the city could refuse to take them over next year, when the company's franchise expires.

Plans for No-Accident Week.—The committee in New York and Pennsylvania in charge of "No-Accident Week" campaign is completing its program to make the seven days from June 6 to 12 as free from accidents as its efforts can bring this about. Several local committees have been organized, and a series of posters has been prepared. The principal poster is 14 in. x 17 in. It is a symbolic one representing carefulness guarding against accidents. It is reproduced in the four-color process. Smaller relay posters or dodgers have also been compiled. G. R. Rinke, Utilities Mutual Insurance Company, New York, is secretary of the committee.

Wages Increased on Shore Line.—The Connecticut Company, New Haven, Conn., has posted notices of an increase in wages of the trainmen on the Shore Line Electric Railway, Norwich, Conn., operation of which has reverted to the Connecticut Company. The increase became effective on May 1. The men were getting 42½ cents. For the first year of employment men will receive 44 cents an hour, 45 cents for the second year, 46 cents for the third year, 47 cents for the fourth year and 48 cents for the fifth year. After the fifth year the wage per hour will be 50 cents. This wage increase is only slightly lower than the wages asked by the men of the Shore Line road when they struck on July 16, 1919.

Power Shortage Threatened.—Large users of power in California have been warned that the deficient rainfall this year and the large increase in the use of electricity may result in a serious power shortage during the summer. State Power Administrator H. G. Butler has sent letters to all gold dredgers and cement mills operating in northern California, interurban electric railways both north and south and the street railways in the northern cities urging power conservation. He says that it is probable that some restrictions will be necessary later in the year. As a means of conserving power, he suggested that after May 15 the interurban roads arrange as far as they could to run their freight trains and do their switching during the night hours.

Boston Wage Hearings Concluded.—Final evidence was submitted on May 12 by both the company and the employees in the Boston (Mass.) Elevated Railway wage arbitration. The arbiters considered the statement of Mayor Peters protesting against the increase being allowed to the men "until they showed themselves worth more" in enabling the road to increase its earning power. Edward Dana, general manager of the company, agreed with the Mayor in his contention that a number of employees were not giving the company full labor for the compensation received. He added, however, that as a whole, the employees were an efficient body comparable with any other body of electric railway men in the country. The hearing was adjourned until May 20, when the final argument was presented by counsel for both sides.

Ten Per Cent Wage Advance Offered.—The demand of the brotherhood of employees of the Interborough Rapid Transit Company, New York, N. Y., for an increase in wages of 25 per cent over the 25 per cent increase granted Aug. 1 last was met by the company on May 19 with an offer of an increase of approximately 10 per cent. This offer was made after a four-hour conference in the offices of the railway between the executive committee of the brotherhood and Frank Hedley, James L. Quackenbush and J. A. Doyle, president, general counsel and superintendent of car equipment, respectively. It was arranged for the committee to submit the offer to the general committee of the brotherhood as soon as this body could be called together and report back to the company. If the offered increase is accepted it will go into effect on June 6.

Programs of Meetings

California Electric Railway Association

The annual meeting of the California Electric Railway Association has been set to be held at the Palace Hotel, San Francisco, Cal., on May 25. A number of very important matters now confronting the industry in California will be discussed. The association has also arranged with the Railroad Commission for an informal hearing on that date to submit its views and suggestions for relief. The present status of the passenger automobile and motor truck competition with electric lines will also be taken up.

Missouri Association of Public Utilities

The entertainment committee of the Missouri Association of Public Utilities, with the approval of the executive committee, has arranged to hold the 1920 convention at the New Madison House, Jefferson City, Mo., on June 3, 4 and 5. An opportunity will thus be presented to inspect the new Capitol building. An interesting and instructive formal program has been arranged for discussion. The entertainment features have also been arranged with a view to affording a wide variety of choice. Handsome prizes will be awarded in the contests in which ladies will engage.

New York Electric Railway Association

The thirty-eighth annual meeting of the New York Electric Railway Association will be held at the Hotel Champlain, Buff Point, Lake Champlain, N. Y., on Saturday, June 26. The meeting will be called promptly at 9 o'clock. The program of subjects to be discussed and the list of speakers at the dinner will be available later. Requests for hotel accommodation should be made as early as possible to Joseph P. Greaves, 243 Fifth Avenue, New York. William F. Stanton, Rochester, N.Y., secretary of the association, desires to be advised at the earliest possible moment the names of representatives who will attend.

Financial and Corporate

Chicago Surface Lines' Net Increased

Under Unified Operation with Increases in Fares the Chicago Surface Lines Show Prosperous Year

The Chicago Surface Lines' operating statement for the twelve months ended Jan. 31, 1920, showed an increase in gross earnings under unified operation that kept pace very closely with the increase in operating expenses, with the result that the gross income for division between the companies participating was 19.17 per cent greater than at the end of the previous year. Up to Aug. 1, 1919, gross receipts increased approximately 13 per cent, due largely to the return of the soldiers. The increase of 27 per cent in passenger revenues, however, is due chiefly to the fact that since August, 1919, an increased rate of fare has been in effect.

The gross earnings amounted to $43,963,438, of which 99 per cent was from passenger revenue. Operating expenses and taxes amounted to $33,254,015, equivalent to 75.64 per cent of the gross revenue, while the gross income, before division of the city, was 24.4 per cent of the total revenue earned.

During the year the passenger car revenue increased $9,251,062, due to the several fare changes. This was made necessary by the increase in wages and decrease in basic workday demanded by the employees. The wage increases from 48 to 65 cents per hour are responsible for the great proportion of the increases in the operating costs.

In April, 1919, the Illinois Public Utilities Commission denied the November, 1918, petition of the railways for an increase in fare. Later it denied a petition for a rehearing. However, an appeal to the Appellate Court resulted in an order upon the Commission to receive further information bearing on the case and in August, 1919, immediately after the strike settlement, which materially increased the wages of the employees, the companies again petitioned for an increase in fare to pay the granted increases in wages. After hearings the Public Utilities Commission on Aug. 8 fixed the rate of fare temporarily at 7 cents. By supplemental order, effective Dec. 1, 1919, two ticket rates were established, namely, fifty for $3 and ten for 65 cents. A second supplemental order, effective on Dec. 27, 1919, abolished these ticket rates and reduced the unit cash fare from 7 to 6 cents. This latter rate of fare is still in effect as an emergency rate.

On the Chicago Railways, as is shown by its income statement, the net income amounted to $182,461, as against a deficit of $374,017 a year ago. As there were no earnings the previous year available for the annual $250,000 sinking fund on series "C" consolidated mortgage bonds, that accrual became a cumulative charge against future earnings, in accordance with the terms of the consolidated mortgage. The $182,461 net income, therefore, was necessarily applied to this deferred sinking fund payment and is the reason why the Chicago Railways failed to pay a dividend on its outstanding capital stock.

The Chicago City Railway paid four quarterly dividends of 1.25 per cent each, or 5 per cent on its outstanding capital stock, during the year. The accompanying tables show the income statement, first under unified operations and then for each of the separate companies, together with the percentage change in each instance. Detailed statistical information is also given for the unified operations.

The city of Chicago under the 1907 traction ordinance should receive $1,448,848 as its share of the railway

EARNINGS, EXPENSES AND DISTRIBUTION OF RESIDUE RECEIPTS—CHICAGO SURFACE LINES.

Year ended Jan. 31:	1920	1919	Per cent Change +Inc.—Dec.
Revenues:			
Passenger cars (a)	$43,417,640	$34,186,578	+27.00
Chartered cars	7,102	4,387	+61.80
Funeral cars	816	2,459	—66.80
Total passenger revenue	$43,425,558	$34,193,424	+27.00
Newspaper cars	10,127	9,318	+8.68
Freight earnings	1,985	1,925	+ 3.11
Hospital car service	2,175	1,582	+37.50
Advertising in cars and stations	235,965	231,742	+ 1.82
Rents of buildings, etc.	73,332	74,412	— 1.45
Rent of equipment	14,647	18,871	—18.28
Sale of power	94,302	87,340	+ 7.98
Interests on deposits	99,921	88,962	+12.32
Miscellaneous	5,426	3,315	+63.70
Gross earnings	$43,963,438	$34,710,098	+26.64
Expenses:			
Maintenance way and structures	1,991,810	1,135,568	+75.40
Maintenance equipment	3,057,446	2,400,827	+27.30
Power maintenance	298,750	273,870	+ 9.10
Renewals	3,009,196	2,776,808	+ 8.35
Power operation (b)	2,990,479	2,841,212	+ 5.26
Conducting transportation	16,633,324	12,477,148	+33.28
General and miscellaneous (c)	3,199,010	2,366,504	+35.20
Total operating expenses	$31,180,015	$24,271,937	+28.42
Net operating revenue	12,783,423	10,438,161	+22.45
Taxes	2,074,000	1,460,000	+42.10
Residue receipts	$10,709,423	$ 8,978,161	+19.30
Chicago Railway Co.—60%	$ 6,425,654	$ 5,386,897	+19.30
Chicago City Railway Co.—40%	4,283,769	3,591,264	+19.30

(a) Includes revenue from transportation of mail carriers.
(b) This low power figure is due to a long term contract made in 1912 for the purchase of energy.
(c) Includes expenses of Board of Supervising Engineers.

STATISTICAL INFORMATION—CHICAGO SURFACE LINES.

Year ended Jan. 31:	1920	1919	Per cent Change, +Inc.—Dec.
Total mileage all tracks	1059.48	1059.29	......
Revenue car-miles	115,012,243	113,223,258	+15.76
Revenue car-hours	12,924,273	12,854,669	+ 0.54
Total car-hours (a)	19,922,185	....	......
Ratio CM/CH (speed m.p.h.)	8.90	8.81	+10.21
Passenger traffic:			
Revenue passengers	743,742,491	685,300,718	+ 8.52
Transfer passengers	528,760,761	491,659,702	+ 7.55
Other free passengers	29,772,504	27,401,922	+ 8.65
Total passengers	1,302,275,756	1,204,362,342	+ 8.12
Gross passenger revenue	$43,425,558	$34,193,424	+27.00
Average fare per revenue passenger (cents)	5.83	4.99	+16.84
Average fare per total passenger (cents)	3.34	2.84	+17.60
Car-mile statistics:			
Operating revenue (cents) (b)	38.00	30.42	+24.85
Operating expenses (cents)	27.08	21.42	+26.45
Residue receipts (cents)	9.32	7.92	+14.39
Passenger traffic (total)	11.31	10.62	+ 6.49
Car-miles per revenue passenger	0.0884	0.0941	— 6.06
Car-hour statistics:			
Operating revenue (a)	$3.38	$2.68	+25.10
Operating expenses	$2.41	$1.89	+27.50
Residue receipts	$0.83	$0.70	+18.58
Passenger traffic (total)	100.70	93.70	+ 7.47
			Increase
Taxes—Per cent of gross revenue	4.72	4.22	+ 0.50
Taxes—Per cent of net revenue	16.20	13.99	+ 2.21
Depreciation—Per cent of operating revenue (b)	6.86	8.28	— 1.42

(a) Includes dead time, etc.
(b) Based on following: $43,769,214 for 1920, and $34,533,796 for 1919.

company's net earnings. Last year the city received only $381,216. It is understood, however, that the city will refuse to accept its division, claiming that the increases in the unit rate of fare abrogated the ordinance providing for this distribution of net income.

President Busby of the Chicago City Railway, in addressing the stockholders, referred to the recent court decisions settling certain fundamental principles to be followed by the Public Service Commission in making valuations of utility properties. He expressed the hope that these decisions would eventually result in a valuation and findings which will fully protect the purchase price of the company's property as fixed by ordinance and which will provide for a rate of return on such valuation that will restore the credit of the company and enable it to procure the new capital necessary to provide for extensions and betterments.

INCOME AND PROFIT AND LOSS STATEMENT OF CHICAGO CITY RAILWAY.

Year ended Jan. 31:	1920	1919	Per cent Change +Inc.—Dec.
Division of income of C. S. L. (40%)	$4,283,770	$3,591,264	+ 19.30
Expenses, including interest on capital investment	3,477,245	3,580,614	—2.89
Net earnings of south side lines	806,525	10,650	+7470.00
City's 55 per cent as per Jan., 1907, ordinance	443,589	3,858	+7470.00
South side lines 45 per cent as per ordinance	362,936	4,793	+7470.00
Deduct Southern St. Ry. proportion as per ordinance	19,962	....	+ 100.00
Balance—Chicago city proportion	342,975	4,793	+7070.00
Add—Interest on capital investment	2,705,676	2,668,657	+ 1.38
Other income—net	36,170	*72,047	+ 150.5
Total income	$3,084,821	$2,601,403	+ 18.58
Deduct interest on bonds and notes outstanding	1,780,884	1,755,217	+ 1.46
Net income	1,303,937	846,186	+ 54.10
Add—Surplus from previous year	50,640	104,614	+ 51.60
Surplus	1,354,577	950,800	+ 42.20
Dividends (5%)	900,000	900,000	....
Miscellaneous	46	160	— 71.30
Total deductions	$ 900,046	$ 900,160	— 0.12
Surplus at end of year	$ 454,531	$ 50,640	+ 797.00
Net return earned on capital (per cent)	7.24	4.70	+ 54.10

* Deficit.

Foreclosure Proceedings Begun

A petition of foreclosure of $3,000,000 in bonds, containing an application for the appointment of a receiver, has been filed in the Federal Court against the New York & North Shore Traction Company by the Citizens' Savings & Trust Company, Cleveland, Ohio. The court has reserved action on the request for a receiver.

The New York & North Shore Traction Company operates between the village of Mineola, L. I., and the hamlet of Port Washington, L. I. High cost of maintenance of the road is said to have brought the company into court. The action is based on the $3,000,000 in bonds held by the Cleveland company. The bonds were issued May 15, 1914, for fifty years. Interest amounting to $38,500, due April and Oct. 1 of last year, was not paid, the action charges.

Public Service Commissioner Lewis Nixon, of the First District, has sent a letter to Mayor Hylan, enclosing a copy of a letter from the New York & North Shore Traction Company announcing that the road is practically ready to cease operation and go through foreclosure proceedings. The company, in its letter to Commissioner Nixon, however, said that it would be willing to lease that portion of its road within New York City to the city for municipal operation, and such portion as lies in Nassau County to the various communities there served, for local operation. Commissioner Nixon stated that he had a suggestion as to a plan under which the lines within New York might be taken over by the city, which was originally prepared to meet the Staten Island Midland situation in Staten Island. He assured the Mayor of the support of the commission to aid in any way in securing adequate transportation to the people.

Illinois Financial Inquiry Continued

On May 3 the so-called down-state public utilities were heard at Springfield, Ill., by the Public Utilities Commission, the inquiry into their financial needs being along the same lines as that held in Chicago on April 29 and reported at length on pages 939-941 of this paper for May 8. The down-state utilities estimated their immediate needs as between $50,000,000 and $80,000,000. The hearing at Springfield differed from the Chicago hearing, however, in that the public utilities men in making their statements told what they thought was necessary as to rate of return.

W. H. Sawyer, president of the East St. Louis & Suburban Railway, declared that the utilities must have a return of 12 per cent on the value of their properties and also a 4 per cent reserve in addition. Another witness put the rate of return at 10 per cent. Other witnesses said that industrial corporations are now able to outbid the public utilities corporations for money. All the witnesses took a rap at the political demagogues as being largely responsible for the present difficulties.

Among those who appeared at Springfield, in addition to Mr. Sawyer, were B. J. Denman, president of the Tri-City Railway & Light Company, Davenport, Iowa, which operates several properties in Illinois; Edgar S. Bloom, Central Union Telephone Company; Marshall E. Sampsell, president of the Central Illinois Public Service Company, and O. F. Barry, representing independent telephone companies which are said to serve 800 communities in Illinois.

The hearings in Chicago have been reviewed previously in this paper.

INCOME AND PROFIT AND LOSS STATEMENT OF CHICAGO RAILWAYS

	1920	1919	Per cent Change +Inc.—Dec.
Division of income of C. S. L. (60%)	$6,425,654	$5,386,897	+ 19.1
Deduct: Expenses, including interest at 5% valuation	4,597,910	4,700,792	— 2.2
Net earnings of Chicago Railways	$1,827,744	$ 686,105	+166.2
City's 55 per cent—per 1907 ordinance	1,005,259	377,358	+166.5
Chicago Railway Company's 45 per cent	822,485	308,747	+166.0
Add—Interest allowance on valuation (5 per cent)	4,541,539	4,501,961	+ 0.9
Interest on bank balances	46,980	31,146	+ 51.0
Interest on treasury securities	72,100	78,778	— 8.5
Total income	$5,483,104	$4,920,632	+ 11.4
Deduct—Interest on			
First mortgage bonds	$2,784,700	$2,784,050	+ 0.02
Consolidated mortgage bonds	1,756,538	1,772,947	— 0.9
Purchase money bonds	203,650	203,650	....
Interest on loans	115,839	19,475	+495.0
Sinking fund reserve accrued	250,000	450,000	....
Federal income tax on interest coupons	42,000	42,000	....
Corporate expenses and adjustments	147,916	222,528	— 32.2
Total deductions	$5,300,643	$5,294,649	+ 0.1
Net income	182,461	* 374,017	+148.9
Surplus from previous year	37,126	511,143	— 92.8
Total surplus at end of year	$ 219,587	$ 137,126	+ 60.2
Less proportion of percentages allowed on additions to property for the year ended Jan. 31, 1914, appropriated to income that year, now returned out of surplus to reduce cost of property	175,000	....	....
Interest on income bonds	....	100,000	....
Surplus at end of year	(a) $ 44,587	$ 37,126	+ 20.2

(a) The surplus stated is before making provision for interest on the adjustment income bonds for the two years ended Jan. 31, 1920.

* Deficit or Loss.

$6,000,000 Note Issue

The American Light & Traction Company New York, N. Y., has sold to Halsey, Stuart & Company an issue of $6,000,000 of five-year 6 per cent gold notes, convertible into the company's common or preferred stock.

Engineering Investigation Begun

Ford, Bacon & Davis, New York, N. Y., are to investigate the Syracuse unit of the New York State Railways preparatory to the adoption of a service-at-cost agreement. Their engineers and accountants are already at work in Syracuse.

City Engineer Henry C. Allen, who has officially approved the contract between the city and firm of investigators, said:

> The investigation will cover every angle of the street railway problem and every fact in connection with the finances, property, rolling stock and necessary improvements of the New York State Railways.

Increase in Net Income in Philadelphia

The Philadelphia (Pa.) Rapid Transit Company reports earnings as follows:

April	1920	1919
Operating revenue	$3,174,883	$2,909,234
Operation and taxes	2,172,118	1,936,218
Operating income	1,002,765	973,015
Non-operating income	36,571	46,562
Gross income	1,039,336	1,019,578
Fixed charges	819,036	820,090
Net income	$220,300	$199,487
Four Months Ended April 30	1920	1919
Operating revenue	$12,096,560	$11,126,351
Operation and taxes	8,671,745	7,818,630
Operating income	3,424,815	3,307,720
Non-operating income	160,568	188,685
Gross income	3,585,384	3,496,406
Fixed charges	3,265,703	3,238,155
Net income	$319,680	$258,251

Financial News Notes

Milton Contributes to Railway.—The town of Milton, Mass., has voted to contribute $10,000 to the cost of operation of the lines of the Eastern Massachusetts Street Railway.

Second Preferred Stock Created.—The stockholders of the American Railways, Philadelphia, Pa., at a special meeting approved the proposal to create $4,000,000 of second preferred stock and to amend the charter accordingly.

Bonds Extended and Interest Increased.—The Department of Public Utilities of Massachusetts has approved an agreement between the East Taunton Street Railway, the Boston Safe Deposit & Trust Company and the Bristol County Savings Bank, whereby the maturing date of railway bonds to the amount of $21,000 is to be extended from March 1, 1920, to March 1, 1923. Under the agreement the interest rate is raised from 5 to 6 per cent.

Deficit for Quarter $488,225.—The total operating revenue of $646,886 exceeded the total operating expense of $646,713 by only $172 for the month of March, according to the financial statement of the Rhode Island Company, Providence, R. I. The statement shows the net income for the three months of $43,509, from which total deductions of $531,735 are made, leaving a deficit of $488,225 for the quarter.

4.97 Per Cent Return at Dallas.—Gross earnings of the Dallas (Tex.) Railway during April were $246,341, while total expenditures were $209,925, leaving net profits of $36,416, or a return of 4.97 per cent on the agreed valuation. A total of 5,355,000 passengers was carried during the month. Of this number more than 650,000 were transfer passengers. Of the expenditures $20,000 was for improvements, more than $38,000 for repairs to tracks and $18,200 for repairs to equipment.

Power Lines Divorced from Railway.—The Niagara & Erie Power Company, Buffalo, N. Y., has completed details by which it becomes sole owner of the high tension transmission power line of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., between Lackawanna and Dunkirk, from which the railway obtains its power for the operation of interurban cars. It is reported the lines were sold for $220,000. By the terms of the deed the power company is divorced from the railway.

Another Estimate of Chicago Surface Value.—The firm of Mitchell, Castenholz & Company, employed by the city of Chicago to value the surface lines for rate-making purposes as a check against the figures established by Stone & Webster and the Public Utilities Commission, has set the total value at approximately $115,000,000. This is $43,500,000 less than the official traction figures based on the 1907 settlement, according to which the present value is about $158,500,000.

Abandonment Denied.—Plans are under way for the reorganization of the Buffalo & Lake Erie Traction Company, according to reports following the sale of the transmission lines along the company's right-of-way to the Niagara & Erie Power Company. The line is now being operated by a receiver. Rumors that the company would abandon its line between Buffalo and Dunkirk are denied by company officials. It is said the line between Dunkirk, N. Y., and Erie, Pa., is the most profitable division.

Monongahela Company Conserving Cash.—G. M. Alexander, president of the Monongahela Valley Traction Company, Fairmont, W. Va., submitted his report at the annual meeting of the stockholders. The statement shows that after the payment of operating expenses, taxes and interest, sinking fund charges and depreciation reserves, as well as payment of dividends on preferred stock, net profits for the year ended Dec. 31, 1919, totaled $414,034. This amount, equivalent to more than 5 per cent on the common stock, has been carried to the profit and loss account. The report explains that no dividends were paid on the junior issue in 1919.

One-Year Railway Notes.—Hambleton & Company, Baltimore, Md., are offering for subscription at 98½ and interest, yielding more than 8.50 per cent, $2,000,000 of one-year 7 per cent gold notes of the Monongahela Valley Traction Company, Fairmont, W. Va. The notes are dated May 15, 1920, and the principal is due May 15, 1921. The interest is payable quarterly May 15, Aug. 15, Nov. 15 and Feb. 15 in Baltimore. The notes are in coupon form in the denomination of $1,000 and $5,000 each. The holder of the notes has the privilege of exchanging them at 100 and accrued interest, any time before maturity or redemption, into an equal amount of the company's general mortgage 7 per cent five-year bonds due in 1923.

Interborough Doing Better.—A comparative statement of earnings of the Interborough Rapid Transit Company, New York, N. Y., for the month of April with the same month a year ago shows the operating revenue for the month as $4,599,227, an increase of $584,190 over April, 1919, and that operating expenses increased $400,055, reaching a total of $2,737,820. The increase in net operating expenses for the month was $184,134. Non-operating income increased $207,100, making the total $1,694,709, and there was also a net corporate income, exclusive of accruals under contract provisions, of $14,963, as compared with a deficit in April, 1919, of $130,767. Operating percentage increased from 58.22 per cent to 59.53. During the month the company carried 86,186,189 passengers as compared with 75,271,333 in April of last year. The figures also show that for the ten months ended with April 30 last the deficit of the Interborough company decreased from $3,457,832 to $1,979,817.

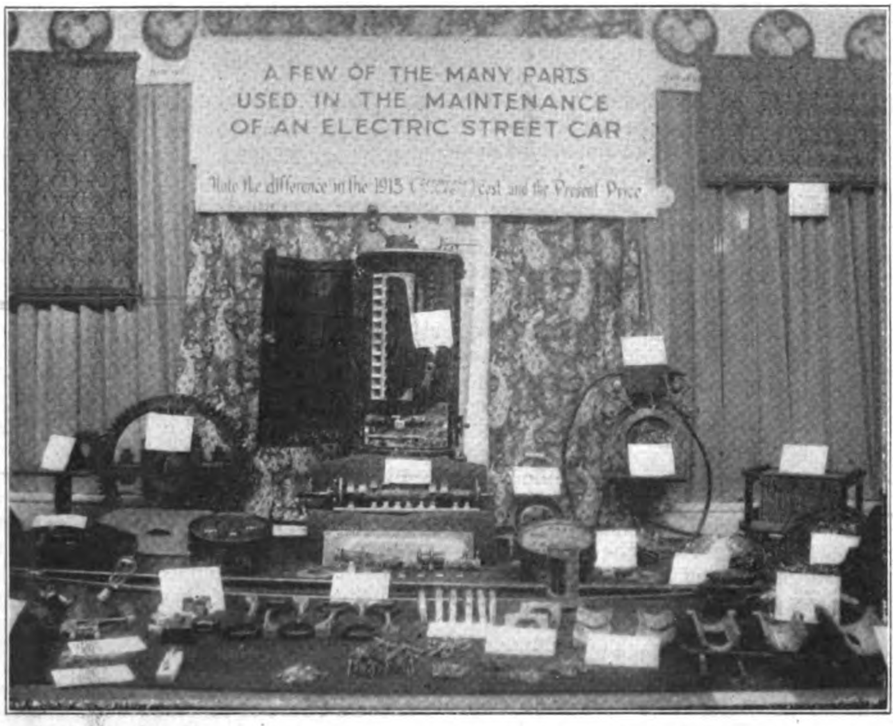
Step Toward Foreclosure Sale.—The Supreme Court of Massachusetts has issued an order of notice in the bill of equity of Howard P. Converse against the Plymouth & Sandwich Street Railway, Plymouth, Mass., that on the petition of Myron E. Barker, interviewing petitioner, the receiver of the railway be directed to sell the assets as the court shall direct. A hearing in equity session was set for May 11. The railway was projected and partly built a number of years ago and extended from the southern terminus of the Brockton & Plymouth Street Railway to Manomet. It was originally planned to go through to the center of Sandwich. Several years ago a section was constructed from Sagamore station in Bourne to Sagamore Beach and this was operated. It was planned to join the road with the New Bedford & Onset Street Railway by a track along the Cape Cod canal to meet the other road at Buzzards Bay, but the war prevented this. In spite of the advance in materials a section was constructed from Fresh Pond through to join the Sagamore section. It was operated for a few weeks and then the road went out of business.

Traffic and Transportation

Traffic Changes Urged

New Orleans Committee Recommends Rerouting of Many Lines—Company's Educational Campaign

Rerouting and straightening of car lines and strict regulation of vehicular traffic in congested areas are recommended in a report recently submitted to the Association of Commerce of New Orleans, La., by a special committee which has been investigating electric railway service in that city. The committee was appointed by the association in March, its task being to study the local traction situation with a view to formulating plans for bettering the service furnished by the New Orleans Railway & Light Company.


A FEW OF THE MANY PARTS
USED IN THE MAINTENANCE
OF AN ELECTRIC STREET CAR
Note the difference in the 1915 Cost and the Present Price

CAR PARTS SHOWN WITH PRICE CARDS IN NEW ORLEANS

LINES SHOULD BE STRAIGHTENED

The committee's report declares that:

> There will never be an ideal street railway system until a radical rerouting and straightening of lines is arranged. The ancient system peculiar to New Orleans of centering all lines on Canal Street, by which that locality is simply made a parking place for trolley cars, establishes a state of constant congestion with its waste of time and expense of upkeep that affects the entire system.

The committee recommends the elimination of as many lines as possible from Canal Street. Poor equipment, it is added, except on a few lines, has undoubtedly played a prominent part in the delays from which the public suffers.

With respect to automobile regulation, the report says:

> After much discussion with auto owners and others, your committee has decided to recommend that existing ordinances be rigidly enforced, and if that cannot be done, that parking of cars for extended periods in the congested district between Poydras and Conti and Elk Place and South Peters, with the exception of Canal Street, be prohibited.

WANTS MORE ONE-WAY STREETS

The report recommends further that automobile traffic be kept on the move as much as possible. There should be an increase in the number of one-way streets. The paving program of the city should be pressed. The committee also declares that the transfer system should be extended so that passengers may take any one of a number of cars to reach their destination.

Automobile drivers should be punished for running by street cars while the cars are taking on or discharging passengers, as this endangers the lives of hundreds daily. Hasty starting of street cars also is condemned. Signs telling routes of cars are suggested and use of the front door as an exit is urged. A bureau of complaints should be established. The report concludes:

> The committee is impressed with the fact that the management of the railways company is striving to improve the service to the best of its ability under present conditions.

The company has been conducting a campaign of education to impress upon its patrons the need for their co-operation if the service is to be improved. The "move forward" competition, the object of which was to induce riders to move to the front of the car, was described in a previous issue of the ELECTRIC RAILWAY JOURNAL. Recently the company has been running a series of advertisements in the local newspapers asking the public to "learn the truth" about electric railway operation. In one of these ads the company shows that delays are often unavoidable because of the blocking of the tracks by automobiles and horse-drawn vehicles.

A special feature of this educational campaign has been a window-display showing a trolley car's "innards." The company assumed that, if the public realized the complicated structure of a car, it would more readily appreciate the reasons why riders were not carried free. On the wall were hung car curtains and placed on mounds and on the floor were a number of the many parts that go to making and operating an electric car. To each part was attached a card showing the cost of that particular part in 1915 and in 1920—the advance in each instance being from 25 per cent to 100 per cent. A photograph of the exhibit appears in the adjoining column.

Appeals Milwaukee Interurban Case

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has appealed to the Wisconsin Supreme Court from the decision of Circuit Judge E. T. Fairchild barring its interurban cars from Milwaukee thoroughfares. The Supreme Court recently issued a stay of execution in the case, exercising its right of original jurisdiction. The interurban cars were to have stopped operating over city streets, beginning at midnight on May 5, but the court's stay of execution prevented interruption of service.

In bringing the suit, the city contended that the company's interurban business was being run illegally because of the absence of an interurban franchise. The company contended it could not afford to accept a franchise, as it would be held liable to numerous damage suits which might be brought by abutting property owners along its rights of way.

With John I. Beggs assuming control of the lines of the company, there comes the word that a compromise with respect to the entrance of interurban cars into the city will shortly be worked out. The local Association of Commerce has interested itself in this matter and has offered to secure the full sanction of the property owners along the right-of-way so that there could follow no suits against the company as a result of its entering into a franchise agreement for the interurbans with the city.

Mr. Beggs promptly signified his willingness to accept the co-operation of the Association of Commerce for securing a franchise under these conditions. Clifford Williams, city attorney, issued a statement to the effect that the matter might be settled in this way.

Routing Changes Thorough

Los Angeles Railway Follows Commission's Recommendations for Complete Rerouting

A comprehensive program for the rerouting of car lines in Los Angeles, Cal., was placed in effect on May 9. The traffic changes, which are the most extensive and far-reaching in the history of the Los Angeles Railway, affect practically every line in the city. By the elimination of many curves and by the providing of more direct routes, they are expected to result in a marked reduction in car headway. The saving in car mileage alone, it is estimated, will amount to 4,000,000 miles annually.

The principle followed in the rerouting of the cars has been the straightening out of circuitous lines by giving a direct run from terminal to terminal. At the same time, the ends of many runs have been trimmed. In such cases shuttle cars will be operated to the ends of lines, with through service in the morning and evening rush hours.

MANY SECTIONS BENEFITED

Many localities in the city are benefited by this rerouting of the cars, as additional service is now provided to the Southern Pacific Station and other important centers. Special attention has been given to evening travel on the downtown streets. Aiding this general scheme, two thoroughfares are provided for the exclusive use of automobile and pedestrian traffic. This has been accomplished by removing all cars from Third Street west of Main Street and from Eighth Street.

Changes of equipment to conserve power will be made as a part of the general rerouting plans and economy scheme. One-man safety cars will shortly be placed in service. The "safeties" will be used on shuttle lines reaching outlying districts and making connections with the through lines. The arrival of the cars, which were ordered several months ago, has been delayed owing to unsettled industrial conditions in the East. They were to have been introduced simultaneously with the changes in routing.

CHANGES COST $500,000

The rerouting program has entailed expenditures on the part of the Los Angeles Railway to the extent of approximately $500,000, principally caused by the construction work on additional curves, various track alterations and readjusting of overhead construction and power lines. Offsetting this expenditure, the State Railroad Commission estimates a saving of 13 per cent of the operating cost to be effected through the rerouting scheme. However, this estimate was based on 1918 costs, so that with the increased expenses of two years, it is yet to be determined whether the plan results in a credit of dollars and cents.

Recommendations made by the State Railroad Commission and the Los Angeles Board of Public Utilities were largely responsible for bringing about the routing changes. The Railroad Commission, after a thorough investigation of the Los Angeles system, advised the enactment by the city of drastic anti-parking legislation and the complete reorganization by the company of its car routes.

The no-parking ordinance subsequently enacted by the City Council has been in effect for several weeks, and has already resulted in speeding up the movement of cars. The plan, which has been described in previous issues, establishes a zone within which the parking of vehicles is barred.

Fare Snatchers Go to Jail

Three of a gang of "floaters" who "knocked down" while employed as conductors on the Hartford lines of the Connecticut Company were sentenced to jail by Judge Alexander W. Creedon in Hartford police court on May 18. A fourth conductor, for whom a warrant was issued, got out of town.

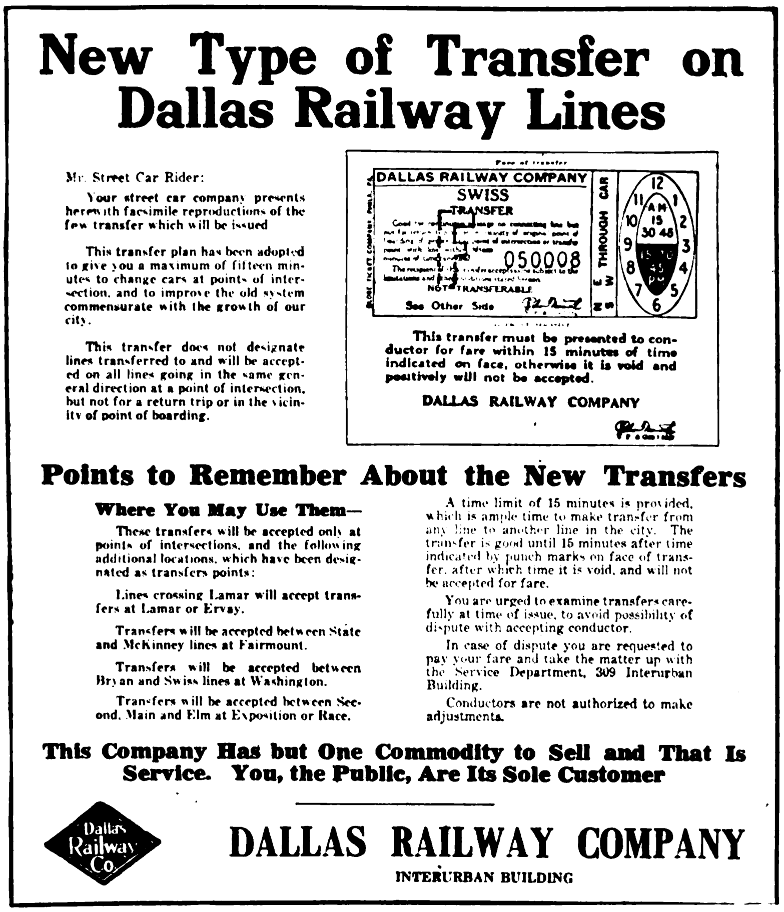
Charles E. Brown will serve forty days in jail for taking small sums on four occasions and Joseph T. Degnan will serve thirty days for stealing money three times. Albion J. Cusick, who pleaded not guilty to the charge and forced the company to put on two of its secret inspectors to testify, was sentenced to thirty days. The men gave assumed names upon being employed in Hartford. They had been discharged by the company after working in Waterbury.

New Form of Transfer for Dallas

To do away with the abuse of the transfer privilege by car riders the Dallas (Tex.) Railway has adopted a modified form of transfer good for a limited period after its issuance. The new transfer bears a dial on which the hours and quarter-hours are indicated, and to be accepted as fare must be presented within fifteen minutes of the time punched. The company's application to John W. Everman, supervisor of public utilities, for permission to issue the new form of transfer was noted in the ELECTRIC RAILWAY JOURNAL for May 15. The application has since been granted.

Under the new system the use of differently colored transfers to indicate various routes is eliminated. Only the line of origin is indicated, the transfer being good on any line going in the same general direction as the line from which it was issued. The day of the week is indicated on the new transfers by the color of the latter, the date being not otherwise indicated. The cost of printing is therefore lessened.

In announcing the change in the form of transfer, the company ran quarter-page advertisements in the Dallas newspapers. In addition to describing the new system these ads carried a facsimile of the transfer which the company proposed to introduce. One of these advertisements is reproduced above.



New Type of Transfer on Dallas Railway Lines

Mr. Street Car Rider:

Your street car company presents herewith facsimile reproductions of the few transfer which will be issued

This transfer plan has been adopted to give you a maximum of fifteen minutes to change cars at points of intersection, and to improve the old system commensurate with the growth of our city.

This transfer does not designate lines transferred to and will be accepted on all lines going in the same general direction at a point of intersection, but not for a return trip or in the vicinity of point of boarding.

Face of transfer

DALLAS RAILWAY COMPANY
SWISS
TRANSFER
050008
NOT TRANSFERABLE
See Other Side
THROUGH CAR
E W
N S

This transfer must be presented to conductor for fare within 15 minutes of time indicated on face, otherwise it is void and positively will not be accepted.

DALLAS RAILWAY COMPANY

Points to Remember About the New Transfers

Where You May Use Them—

These transfers will be accepted only at points of intersections, and the following additional locations, which have been designated as transfers points:

Lines crossing Lamar will accept transfers at Lamar or Ervay.

Transfers will be accepted between State and McKinney lines at Fairmount.

Transfers will be accepted between Bryan and Swiss lines at Washington.

Transfers will be accepted between Second, Main and Elm at Exposition or Race.

A time limit of 15 minutes is provided, which is ample time to make transfer from any line to another line in the city. The transfer is good until 15 minutes after time indicated by punch marks on face of transfer, after which time it is void, and will not be accepted for fare.

You are urged to examine transfers carefully at time of issue, to avoid possibility of dispute with accepting conductor.

In case of dispute you are requested to pay your fare and take the matter up with the Service Department, 309 Interurban Building.

Conductors are not authorized to make adjustments.

This Company Has but One Commodity to Sell and That Is Service. You, the Public, Are Its Sole Customer

Dallas Railway Co.

DALLAS RAILWAY COMPANY
INTERURBAN BUILDING

HOW DALLAS LEARNS TO TRANSFER, 1920

Seattle Won't Tolerate Jitney Competition

Strict regulation of jitney bus service in Seattle, Wash., became effective recently when Mayor Hugh M. Caldwell signed an ordinance, with an emergency clause, which prohibits the operation of buses in districts adequately served by the Seattle Municipal Railway. It is estimated this will increase the railway receipts about $1,000 a day.

The ordinance requires jitney bus operators to apply to the city comptroller for a permit, the application to give full information of the route, schedule proposed and character and capacity of vehicle. The application will be referred to the utilities department for investigation. If a favorable report is made, the license will be issued by the City Council. The license will require operation on definite schedule over a specified route. The carrying capacity of each machine will be limited to two passengers in excess of the number of seats.

Washington Changes from Tickets to Tokens

Simultaneously with the change in rate of fare from four rides for a quarter to four rides for 30 cents and from 7 cents cash to 8 cents cash for single rides the Capital Traction Company and the Washington Railway & Electric Company have introduced the use of metal tokens of a size somewhat smaller than a dime in place of the paper tickets formerly sold in strips of four. In order to redeem the outstanding paper tickets both companies arranged to repurchase these at convenient points throughout the city.

The metal tokens have come to be popularly known in Washington as "suspender buttons" because of the perforations by which a small letter "W" is formed in the center of the piece. There have naturally been some protests against the change. The suggestion has been widely advertised that a safe way to carry the tokens is to fasten them together with a safety pin.

Effect of California Bus Development

The great differences in burdens under which buses and electric railways operate in California are brought out clearly in an address made before the Optimists' Club of Los Angeles on April 29 by H. B. Titcomb, vice-president of the Pacific Electric Railway. Mr. Titcomb estimates that the electric railways in Southern California are paying out of every $10,000 which they receive approximately $3,000 in taxes, interest on money invested in roadway and maintenance of its roadway and paving adjoining thereto. At the same time the jitney buses and auto trucks do not pay out more than $200 from every $10,000 gross they take in for these items. They have no investment in roadbed and no maintenance tax on such a roadbed.

Until there is a tax of from 25 to 30 per cent on the gross receipts of all automobiles that use the roads for hire the two means of transport will not be on the same basis. The electric roads, added Mr. Titcomb, are anxious to improve their rail transportation and elevated tracks and make other improvements, but these are practicable only when the company is prosperous and can secure credit.

Transportation News Notes

Will Lengthen Zones.—The Northern Massachusetts Street Railway, Athol, Mass., rezoned its line on May 13. The number of zones has been reduced from forty-two to twenty-five.

Trial Period Soon to Expire.—The three months probation or trial period of operation of the Louisville (Ky.) Railway is about up. T. J. Minary resigned the presidency in February to become chairman of the board of directors of the railway, and since that time the affairs of the company have been in direct charge of an executive board of control.

Asks 10 Cents Cash.—The Jamestown (N. Y.) Street Railway has petitioned the Public Service Commission for permission to increase its fares from 7 cents to 10 cents and to sell ten cash-fare tickets for 75 cents instead of fifteen tickets for 75 cents. The proposed increases affect the lines between Jamestown, Falconer, Celeron, Lakewood, Busti and Ellicott.

Six-Cent Fare Planned.—The New York & Stamford Railway, Port Chester, N. Y., has announced its intention of rezoning its line and of charging a 6-cent fare in each zone. L. S. Miller, president of the company, has informed the Chamber of Commerce of Greenwich, Conn., that, if present service is to be continued, jitney competition in that city must cease.

Seven-Cent Fare Stands.—The Scranton (Pa.) Railway on May 15 was given permission by the State Public Service Commission to continue in effect until further orders the 7-cent fare prescribed by the commission on May 7, 1919. Eight complaints were filed with the commission against continuance of these rates. Experts in the employ of the commission have not completed their survey of the company's property.

Would Raise Columbus Rates.—The Columbus (Ga.) Railroad has announced its intention of applying to the State Railroad Commission for an increase in its railway, lighting and heating rates. The company recently stated that a 10-cent fare would be necessary for the carrying out of its contemplated improvement program. It has asked the commission to appoint an appraisal board to audit its books and to determine the amount of its investment.

Would Raise Jersey Rates.—Two electric railways operating in the State of New Jersey recently applied to the State Board of Public Utility Commissioners for permission to raise their rates. The Atlantic Coast Electric Railroad, Asbury Park, has asked for an increase in its rate from 6 cents to 8 cents. The Atlantic City & Shore Railroad, Atlantic City, seeks a 7-cent fare in Atlantic City, with a 3-cent charge for each transfer.

Eight Cents in Morgantown.—An 8-cent cash fare has been granted the West Virginia Traction & Electric Company, Morgantown, (W. Va.) on its Morgantown City lines by the State Public Service Commission. The company will sell thirteen tickets for $1. The present 3-cent charge for transfers will be continued. The fare was formerly 6 cents. The increase in rates has already been approved by the Morgantown municipal authorities.

Seven Cents Asked in Niagara Falls.—Application has been made to the Public Service Commission by the International Railway, Buffalo, N.Y., for permission to increase its fare in the city of Niagara Falls from 5 cents to 7 cents. The company would sell four tickets for 25 cents, the same as is charged in Buffalo. The company's application, made through Herbert G. Tulley, president, also has been sent to the City Council of Niagara Falls.

Wants 8 Cents in Salt Lake.—A cash fare of 8 cents has been asked by the Utah Light & Traction Company, Salt Lake City, Utah. The company, whose application for a 7-cent fare was presented to the State Public Utilities Commission some time ago, has filed with that body an amended petition, requesting an 8-cent cash fare with a ticket rate of thirteen tickets for $1. The company also asks permission to charge 5 cents each for school tickets.

Ten-Cent Fare Asked.—The Union Traction Company of Indiana, Anderson, Ind., has applied to the State Public Service Commission for authority to charge a 10-cent fare on its Broad Ripple line, Indianapolis. In asking for the increase the company stated that 2 cents of each fare was paid to the Indianapolis Street Railway for use of the latter's tracks. The company recently petitioned for an increase in the rate on its interurban lines from 2¾ cents to 3 cents a mile.

Would Raise Interurban Rate.—The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has filed with the State Public Service Commission a revised fare schedule which it proposes to place in effect on its line between St. Joseph and Savannah. The company would charge 7 cents to the city limits and 8 cents in each of the four zones between the two municipalities. The commission has suspended the new tariffs until Aug. 17.

Wants More in Hornell.—Stating that, unless more revenue was obtained in the immediate future, the Hornell (N. Y.) Traction Company would be compelled to cease operation, R. W. Bull, receiver and general manager of the company, announced recently that he would shortly apply to the Public Service Commission for the First District for an increase in fare from 6 cents to 7 cents. The commission a short time ago refused to allow the railway to operate one-man cars on the North Hornell line.

One-Man Cars Barred.—The City Council of Bay City, Mich., has passed an ordinance requiring the placing of two platform men on all cars operating within the city limits. The measure was adopted in the face of a vigorous protest from the Saginaw-Bay City Railway. The company contends that, if it is compelled to operate its cars with two men each, it cannot continue to furnish the present standard of service. Enforcement of the ordinance will, it is estimated, result in a loss to the company of $55,000 a year.

Buses Authorized in Rockford.—Motor bus lines can legally operate in the city of Rockford, Ill., in competition with the Rockford City Railway, according to a recent decision of the State Public Utilities Commission. The commission has issued a certificate of convenience and necessity to the Fay Motor Bus Company to operate through the streets of Rockford. The commission's action in permitting a private transportation company to compete with the railway is expected to furnish a precedent for other cities of the State.

Higher Express Rates Asked.—Petition for a 40-cent minimum rate for single line interurban express shipments and a 50-cent minimum rate for joint line shipments have been filed with the Indiana Public Service Commission by the Indianapolis & Cincinnati Traction Company, the Terre Haute, Indianapolis & Eastern Traction Company and the Union Traction Company of Indiana. The present minimum rate is 25 cents. The roads have also asked for an increase in the basic passenger rate from 2¾ cents to 3 cents a mile.

Favors Grand Rapids Increase.—The street railway committee of the City Commission of Grand Rapids, Mich., has recommended to the latter body that an ordinance be passed authorizing the Grand Rapids Railway to charge 7-cent cash fares with sixteen tickets for $1 and to reroute its cars in accordance with plans already submitted to the commission. The ordinance will specify that in case the increased fare more than provides for operating expenses and a reasonable return on the investment, the excess shall be charged against the company's capital account when a valuation is made.

Would Charge 6 Cents in Dallas.—The Dallas (Tex.) Railway, in response to a request of the City Commission for a specific statement of the system's needs, has presented a petition asking for a 6-cent fare with a 1-cent charge for transfers. This action follows a letter recently sent by Richard Meriwether, vice-president and general manager, to the City Commission, going into details regarding the system's financial condition and explaining that additional revenue was necessary for the company. Upon receipt of Mr. Meriwether's letter, the commissioners voted to ask Mr. Meriwether to place some concrete proposal before them so that action might be taken thereon.

Wants More in Fort Worth.—The Northern Texas Traction Company, operating the electric railway system in Fort Worth, Tex., and the Fort Worth-Dallas and Fort Worth-Cleburne interurbans, has formally applied for an increase in fares. Either 6 or 7 cents is asked, the raise to be determined by an investigation of earnings and expenditures. Under the franchise, the city of Fort Worth cannot set the fare, the provision of the franchise being that the company is entitled to a reasonable rate. The increase in fuel contracts, price of material, interest rates and the necessity of spending $1,000,000 on extensions in Fort Worth necessitate raising the rates, according to the company.

Efficiency Bonus Made Permanent.—The Dallas (Tex.) Railway, after a four months' trial of its efficiency bonus plan, has announced that the system will be continued in force. Richard Meriwether, vice-president and general manager, said that the plan, which was first tried out at the beginning of the year to promote efficiency among trainmen and as a means of reducing avoidable accidents, had proved most satisfactory. Under the plan trainmen who maintain a perfect score during the month are given bonus pay. During the month of March only eighty-five trainmen out of a total of 560 failed to receive bonus pay. Awards under the plan are made by a board composed of representatives of trainmen and company officials.

Free Hand for Seattle Manager.—As a possible means of increasing revenues on the Seattle (Wash.) Municipal Street Railway, the City Council has agreed to give Superintendent David W. Henderson a free hand in all matters pertaining to the routing of cars and the fixing of schedules. This means that when Mr. Henderson determines that a material saving may be effected by a change in route or schedule, he will have authority to proceed without consulting with the Council. Mayor Caldwell and a majority of the members of the Council have expressed themselves as extremely opposed to an increase in fares and as determined to exhaust every possible means of increasing revenues without resorting to an increased fare.

New Franchise Being Drawn. — Patrons of the New York State Railways, Rochester Lines, will probably have to pay a 7-cent fare in Rochester as matters stand under the service-at-cost agreement now being drown up. Corporation Counsel Charles L. Pierce is working on the contract which the Common Council directed him and the Mayor to prepare and submit to the Council for its action. It is expected that the agreement will be ready by May 25. City authorities have decided to work on a tentative valuation of the railway property in order to get adequate service as soon as possible. For the present, it was pointed out, the city will not attempt to consider a permanent valuation. All the revenues derived from the city lines will be kept entirely separate from the returns of the lines which run out of the city.

Would Charge 10 Cents in Lansing.—Ten-cent cash fare or four tickets for 30 cents, with 5 cents straight for children and no special rates for workingmen, are the fares which the Michigan Railway, Kalamazoo, Mich., will ask in Lansing, Jackson, Battle Creek and Kalamazoo, according to J. F. Collins, general manager, in a statement to the City Council of Lansing on May 10, after a petition for higher fares had been read. The petition says the matter must be settled before June 1, to avoid serious consequences. Since the 6-cent fare was granted in June, 1919, all expenses have increased, according to the petition, while the men now demand nearly a 100 per cent increase in wages. The wage agreement expires June 1, and the men on the city lines ask raises from 40 and 42 cents an hour to 75 and 80 cents, and interurbans from 46 and 48 cents to 85 and 90 cents. Until this scale is adjusted and service improved it is reported that the Council will grant no fare increase.

One-Man Car Ban Lifted.—The Nashville Railway & Light Company has been granted the right to operate one-man cars by order of the State Public Utilities Commission. The commission overruled the recent ordinance of the City Commission, ordering the cars replaced by double-entrance, two-crew cars. The company appealed to the Public Utilities Commission, claiming a shortage of cars if the thirty-three one-man cars now in use should be withdrawn from operation. Although the petition set forth merits claimed for the one-man car, the commission did not act upon that contention, but on the basis that removal of the cars would unfavorably affect the public. The report of the commission quotes an opinion given by Frank M. Thompson, Attorney-General, in which he states that the Public Utilities Commission has the sole power to handle the question of the one-man car, instead of the City Commission. In February, the City Commission passed the ordinance which directed that the street railway company cease operation of the one-man cars by May 25. It was directed that a motorman and a conductor be used and that entrances at both front and rear be installed on all cars in operation carrying passengers.

New Publications

Americanism Versus Bolshevism

By Ole Hanson. Doubleday, Page & Company, Garden City, N. Y. 299 pages, 5 x 7½ in.

After reciting his own experience with the I. W. W. in Seattle, Mr. Hanson passes on to sketch briefly the history of syndicalism in France, Germany, England, Russia and the United States. He regards the syndicalist as "simply a revolutionary criminal." The last part of the book is devoted to a discussion and explanation of the cures for bolshevism. Mr. Hanson says "we have had enough of weakness, conciliation and pandering." His motto is "America First."

The Practical Solution of the Chicago Terminal Electrification Problem.

By H. B. Barnes, consulting engineer, Denver, Col.

In a brief monograph Mr. Barnes has outlined the possibilities of applying the electric locomotive with a storage battery tender to yard service in the terminals of steam railroads in large cities. He has cited Chicago as an example, but points out the principles which apply elsewhere also. He estimates that in this service the energy consumption with battery locomotives would not be substantially different from that with the contact system. Moreover, the use of the battery would permit charging at off-peak hours and hence would enable a central station to sell energy to a railroad at an advantageous rate.

The New Industrial Unrest

By Ray Stannard Baker. Doubleday, Page & Company, Garden City, N. Y. 231 pages. 5¼ x 8 in.

Mr. Baker is a trained observer. He has nothing to present but perspective. This he does, in so far as the nature of the work will permit, with all the charm that has made his writings in other fields so popular. The author says that it was his effort to present a survey, for the general reader, of the present industrial crises and the various reconstructive experiments now under way to meet it. He has succeeded. In concluding Mr. Baker develops the shop council system of settling labor disputes, the system greatly favored by the Industrial Commission, before which he testified. As has been indicated, the great value of the work lies in the detached portrayal of the facts by the observer.

Personal Mention

High Honor for Mr. Emmet

General Electric Engineer Awarded Edison Medal by American Institute of Electrical Engineers

William LeRoy Emmet, consulting engineer of the General Electric Company, was awarded the Edison Medal by the American Institute of Electrical Engineers on May 21. Mr. Emmet has spent most of his professional life with the General Electric Company and one of its predecessors, the Sprague Electric Railway & Motor Company.

He is a graduate of the United States Naval Academy, class of '81, and served as a cadet midshipman until 1883. He re-entered the navy as junior lieutenant in 1898, serving as navigator on the U. S. S. *Justin* during the Spanish-American War. He is a direct descendant of a brother of Robert Emmet, the famous Irish patriot.

W. L. R. EMMET

Mr. Emmet's inventions have contributed much to electric railway developments on the power side. His most important electrical work has been along the line of alternating-current devices, but he is best known for his contributions to the development of the steam turbine. He designed and directed the development of the Curtis turbine by the General Electric Company, and was instrumental in applying the turbine in connection with electric motor drive to steamships.

He is the inventor of several types of transformers, including a form of air-blast type and of several types of insulation of alternators. After experimentally investigating the possibilities of oil switches at Brooklyn and Niagara Falls, on the heaviest circuits then existing, he designed and used the first switches of this type. The varnished cambric cable is also an Emmet invention.

Mr. Emmet has contributed many technical papers of importance to national societies. He is a member of the Naval Consulting Board of the United States. He holds the degree of Doctor of Science from Union College.

Changes in Journal Staff

The following changes have been made in the editorial staff of this paper: H. V. Bozell, who joined the organization recently as associate editor, as was noted in the issue for Feb. 7, 1920, has been appointed co-editor. Henry H. Norris has been appointed managing editor; Harry L. Brown, Western editor, and C. W. Squier and C. W. Stocks, associate editors.

J. D. Mortimer Honored by Milwaukee Employees

James D. Mortimer, retiring president of the North American Company, which controls the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., was the guest of the employees of the latter company at a reception at the Public Service Building, Milwaukee, on May 13. The reception, which was under the auspices of the Employees' Mutual Benefit Association of the Milwaukee company, was arranged to afford the system's personnel an opportunity to bid Mr. Mortimer good-by. During the course of the evening Mr. Mortimer was presented with a handsome diamond ring on behalf of the E. M. B. A.

The reception at the Public Service Building was preceded by a dinner at the Hotel Pfister tendered President Mortimer by the officers and staff of the company and the officers and directors of the employees' association. S. B. Way, vice-president and general manager of the company, delivered an address in which he pointed to the growth of the system under Mr. Mortimer's direction. He stated that in the ten-year period in which Mr. Mortimer has been in charge of the system passenger revenues have increased from $4,220,609 to $8,076,724.

Adrian J. Hughes, Jr., has been appointed superintendent of the motive power department of the United Railways & Electric Company, Baltimore, Md. Mr. Hughes has been connected with the company since 1914. He was graduated from Cornell University in 1912 with the degree of electrical engineer, and shortly thereafter entered the employ of the Edgar Thomson Steel Mills, Pittsburgh, Pa. Early in 1914 he resigned to become connected with the United Railways as engineer in the lines and cables division.

Des Moines Management in New Hands

F. C. Chambers Made Operating Head of City Lines—W. Clapper to Manage Interurban System

New officers have been elected to take charge of the Des Moines City Railway and the Inter Urban Railway, Des Moines, Iowa. The changes in the operating personnel of the two companies were noted briefly in the ELECTRIC RAILWAY JOURNAL for May 15. S. G. Harris of the Harris Trust & Savings Bank, Chicago, succeeds Emil G. Schmidt as president of the city and interurban lines. F. C. Chambers, electrical engineer of the two companies, has been made vice-president and general manager of the Des Moines City Railway and a vice-president of the Inter Urban Railway, while Will Clapper becomes general manager and a vice-president of the Inter Urban Railway. E. B. Bieghler has been appointed assistant treasurer of both companies. E. W. Miller is made superintendent of transportation.

F. C. CHAMBERS, now vice-president and general manager of the Des Moines City Railway and a vice-president of the Inter Urban Railway, has been connected with the Des Moines traction system for the past seven years. He joined the city lines as electrical and mechanical engineer in 1913. In April, 1918, he took charge of power generation and distribution for both the city and the interurban lines. Later he was placed in charge of rolling stock. For several years he has had charge of substation equipment.

F. C. CHAMBERS

Mr. Chambers entered the traction field in 1896, in power house work for the Adrian Light, Heat & Power Company, Adrian, Mich. In 1901 he went to Rome, N. Y., as chief engineer for the Rome Gas & Electric Company. He left Rome in 1905 to become electrical engineer for the East St. Louis & Suburban Railway. From 1908 to 1911 Mr. Chambers was superintendent of power for the Springfield (Ill.) Consolidated Railway. In 1911 Mr. Chambers went to Chicago, where he became superintendent for the County Traction Company, now known as the Chicago & West Towns Railway. He remained with the company until 1913, when he went to Des Moines.

Will Clapper, who becomes vice-president and general manager of the Inter Urban Railway, was formerly traffic manager of that system. Mr. Clapper was born in Iowa. He entered the railroad business as chief clerk to the commercial agent of the Missouri & St. Louis Railroad in Minneapolis in June, 1899. In January, 1900, he went to Des Moines as chief clerk to the division freight agent of the Wabash Railway. He was subsequently promoted to traveling freight agent, to commercial agent, and still later to division freight and passenger agent. He continued in the employ of the Wabash Railway as the Iowa representative until March, 1915, when he took up his work as traffic manager of the Inter Urban Railway.

E. W. Miller, promoted to the position of superintendent of transportation of the city lines, has been with the company for about ten years. Three years ago he was appointed assistant superintendent of transportation, and on May 1 of this year was appointed superintendent to succeed L. L. Sloss, resigned. Prior to his connection with the electric railway industry, Mr. Miller served the Chicago, Burlington & Quincy Railroad at Quincy and various other points in Illinois for about four years, finally being transferred to Des Moines, Iowa, where he shortly afterward became connected with the Des Moines City Railway.

Herbert F. Rech has been appointed assistant chief engineer of the Detroit power stations of the Detroit (Mich.) United Railway. Mr. Rech will have particular charge of combustion work.

R. V. Miller, general superintendent of the Oklahoma Union Railway, Tulsa, Okla., has been appointed general manager of the company, and will have general charge of the operation of the system. The position of general superintendent has been abolished.

Edward J. Peartree has been appointed general manager of the Trenton & Mercer County Traction Corporation, Trenton, N. J., to succeed the late Peter E. Hurley. Since the death of Mr. Hurley in June, 1918, Mr. Peartree has been acting general manager of the company.

Walter R. Moynihan has been appointed assistant treasurer of the United Railways, St. Louis, Mo. Mr. Moynihan was formerly in the employ of the Boston & Albany Railroad, for which he had charge of land and tax matters in the legal department, with headquarters in Boston.

R. C. Brooks, manager of the electric light and power properties of Stone & Webster at Pawtucket, R. I., has been appointed manager of the Savannah (Ga.) Electric Company. Mr. Brooks succeeds R. G. Carroll, who has been made manager of the Galveston (Tex.) Electric Company. Before going to Pawtucket three years ago, Mr. Brooks was manager of the Dallas (Tex.) Electric Company and, still earlier, manager of the Austin (Tex.) Light & Power Company.

R. G. Carroll, manager of the Savannah (Ga.) Electric Company, has been appointed manager of the Galveston (Tex.) Electric Company to succeed W. E. Wood, recently made manager of the Houston (Tex.) Electric Company. Mr. Carroll has been connected with Stone & Webster properties for a number of years, serving successively as assistant treasurer of the Pensacola Traction Company, assistant treasurer of the Northern Texas Traction Company and acting manager of the Beaumont and Port Arthur traction and lighting systems. He was subsequently transferred to Key West, Fla., as acting manager of the Key West Electric Company. Two years ago he was appointed manager of the Stone & Webster properties in Savannah, remaining until his recent promotion.

W. CLAPPER

Charles F. Lederer, until recently superintendent of way of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has become associated with the rail welding department of the Metal & Thermit Corporation, New York, N. Y. Mr. Lederer entered the track department of the Milwaukee Electric Railway & Light Company in April, 1908, and was soon promoted to construction gang foreman. Later he was appointed division roadmaster and in 1912 became city roadmaster. In May, 1919, he rose to assistant superintendent, and in September, 1919, became superintendent of way, which position he held until his recent resignation from that company. In the above-mentioned capacities Mr. Lederer obtained much practical experience in rail welding and in the construction of welded special work as well as in making repairs to broken frogs, switches and mates. In fact, Mr. Lederer, so far as is known, is believed to have made, in April, 1915, the first thermit-welded frog.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Armature and Field Coils

Hard Winter Responsible for Heavy Demand—Labor Troubles Hold Up Deliveries

Volume of sales of armature and field coils and supplies has been very large during the past winter. Manufacturers have had much trouble in keeping up production on coils. The past winter has been one of the hardest experienced by railway men for many years. Many burnouts occurred and manufacturers have been so swamped that in at least two instances they have not caught up yet with the rush of orders resulting from the bad weather. Labor trouble in the Naugatuck Valley has held up copper strip and the railroad tie-up has further lengthened deliveries, which are now thirty to sixty days on coils.

A great number of companies called in many motor equipments after the heavy snowstorm of February and found it necessary to replace many coils. The armatures were tested, shellacked and baked and coils renewed wherever necessary.

One large railway which previous to the storm had received a large consignment of new motors from a manufacturer called in the entire number after the heavy snow and had them all inspected and baked.

Cotton Sheeting Shortage Hurts Tape Makers

Deliveries Excellent Considering Transportation Difficulties—Prices Firm and Further Rise Is Possible

Manufacturers of friction tape, like other producers of electrical material, are making an uphill fight to fill orders. Purchases for electrical uses are heavy, one leading manufacturer having done more than 40 per cent more tape business so far this year than for the first quarter of 1919. Raw material shortage presses harder than labor conditions. For some time cotton sheeting, the chief material used in tape production, has been very scarce and high priced to boot. Before the war this material sold around 5 or 6 cents per yard and could be had in ample quantities. Today 30 cents per yard must be paid, or about $1.08 per pound, and as this material is uncertain in regard to future supply in the quantities needed for satisfactory deliveries, it is entirely within the bounds of reason that a further price advance may be forced in the not distant future.

Electric railways are buying tape at about the same rate as last year. Ninety-nine per cent of the roads purchase black tape of a few widths, the ½ and ¾ inch sizes being most common. The grades vary considerably with different manufacturers and with different railway specifications. Present prices range in general from about 58 to 70 cents per pound, depending upon quantity and quality. In urgent cases shipments can be made from jobbers' stocks practically on receipt of order, and some manufacturing plants can fill such orders within three or four days. By and large, however, four or five weeks represents manufacturing delivery for new orders placed direct, one of the larger plants being at this time just about a month and a half behind on its orders. Not long since this factory had seventy carloads of finished material in its works awaiting shipment, but conditions have improved materially, so that today carload shipments are going forward pretty well in comparison with the late period of extreme congestion. Of course, jobbers located near the factories, especially in New England, have had the benefit of freight embargoes and have taken the opportunity to fill up their stocks.

Sales of Rail and Track Supplies Increase

Heavy Demand for T-Rails—Special Work Sales Improving—Girder Rails Fairly Active—Labor Shortage Affects Relaying

Sales of track supplies, including rails, special work and miscellaneous accessories are improving. With one exception, manufacturers report sales to date this year considerably ahead of the corresponding period last year and even better than sales of last fall.

One manufacturer is quoting four to six weeks delivery on turnouts, crossings, mates and small pieces, while a month to six weeks longer is required for the heavy, complicated, special work pieces. This company will accept a limited amount of tonnage in the standard sections for third and fourth quarter delivery.

Another manufacturer of special work is making deliveries of from two to three weeks on the smaller pieces of special work and from two to three months on the heavy types of crossings. Considerable difficulty has been encountered in making delivery on mates, etc., as manufacturers have been unable to get supplies of rail sections from which they are made on account of the railroad tie-up. From one source special work sales are reported as greatly improved over the years 1917 and 1918, but not quite up to the mark of a normal pre-war year. It is agreed that the present demand is largely because of deferred maintenance requirements. However, no decrease in sales is expected, as representatives who have been scouring the East, Central and Middle West sections generally advise that the electric railways, including both city and interurban lines, are from one to two years behind schedule on track work. This work must necessarily be delayed further for the reason that track labor is scarce, maintenance-of-way departments in most instances having only about 50 to 60 per cent of the usual number of laborers. Rail deliveries will also hold up a considerable amount of work, as shipments normally scheduled to go forward during the fall months may not be delivered until midwinter.

Considerable welding and patching up is being done by the railways in order to delay purchasing, but the enormous amount of deferred maintenance, covering a period of from four to five years, has finally forced a buying movement that is considered quite satisfactory.

The Bethlehem Steel Company has produced a chart of percentages of special work prices from the year 1912 up to date, based upon the average price of all orders received by the company in this line during the year 1919.

With 100 per cent given as the 1919 price, the percentage effective from 1912 to July, 1915, was 55; for 1916, 51 per cent; for 1917, 68 per cent; for 1918, 120 per cent, and for the first four months of 1920, 95 per cent. Inquiries for bolts, spikes and nuts, fish plates, etc., have been active, but the majority of producers are sold so far ahead that delivery rather than price is the deciding factor.

American Construction Materials Needed by Brazil

Brazil offers a market for all kinds of construction materials and machinery, not only in the immediate future but for an indefinite time to come, according to Trade Commissioner W. W. Ewing, whose report on that country has just been issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce.

Mr. Ewing recently returned to the

United States after a tour of investigation covering all the South American republics. He is convinced that Brazil, by reason of its vast undeveloped territory and its immense resources, is rapidly increasing in importance as an export field.

Some of the goods that it will most urgently need in the next few years are coal, iron, steel and most manufactured materials. Railway materials of all kinds are included.

Contracts received recently by both the General Electric Company and the Westinghouse Electric & Manufacturing Company for electric locomotives and equipment for the Paulista Railway electrification bear out this statement in regard to railway supplies.

In at least two other instances reports are being prepared by consulting engineers for the installations of railway and other electrical equipment which may be undertaken this year.

New Air Brake Company

Organized to Manufacture Brake with Uniform Cylinder Pressure

The Automatic Straight Air Brake Company has been acquired by Kidder, Peabody & Company, John F. Alvord and George W. Goethals and under their direction will commence the manufacture and sale of a new air brake. The construction of the new brake, it is asserted, is such that it will give uniform brake cylinder pressure and uniform brake resistance simultaneously on all cars in the train, both standard passenger trains and the modern long freight train. At the same time, the company states, there can be no undesired emergency application of the brakes nor failure to release the brakes when desired.

New directors elected to the board of the Automatic Straight Air Brake Company are John F. Alvord, who has also been elected president of the company; William L. Benedict, of Kidder, Peabody & Company; Robert E. Graham, of George W. Goethals & Company, Inc.; Edward D. Kenna, formerly vice-president of the Atchison, Topeka & Santa Fe Railway, and Robert Winsor, of Kidder, Peabody & Company. Other directors are Carl R. Ganter, of Shattuck, Glenn, Huse & Ganter; Harry I. Miller, who has been elected a vice-president; James D. Mortimer, president of the North American Company; Morgan J. O'Brien, of O'Brien, Boardman, Parker & Fox, and Harry B. Hunt, of the American Locomotive Company, also a vice-president of the new company, and A. M. McCrea, Union Spring Company.

The company has leased a plant in New York City at Twenty-fifth Street and Eleventh Avenue for manufacturing purposes. It is also operating a testing plant at 183 Greenwich Street, New York City.

For the present, it is the intention of the company to concentrate its efforts in the steam railway field, although the manufacture of air brakes for electric railways will be taken up later.

Rolling Stock

Beaver Valley Traction Company, New Brighton, Pa., has placed an order for five safety cars with the Osgood-Bradley Car Company.

Columbus (Ga.) Railroad, noted in the Feb. 21 issue of the ELECTRIC RAILWAY JOURNAL as having placed an order for nine safety cars, has specified the following details on this equipment:

Builders	J. G. Brill Co.
Type	Birney safety
Total capacity	70
Length over all	28 ft. ½ in.
Truck wheelbase	8 ft.
Rail to trolley base	12 ft. 6 in.
Width over all	8 ft.
Body	Semi-steel
Interior trim	Mahogany, light
Roof	Arch
Air brakes	Safety Car Devices Co.
Armature bearings	Ball
Axles, diameter	3⅜ in.
Car signal system	Faraday
Car trimmings	Bronze
Conduits and junction boxes,	National code
Control	K-63, double end
Compressor	West D H 16
Curtain fixtures,	For side windows and vestibule
Material	Fabrikoid or Pantasote
Designation signs	Hunter
Door operating mechanism,	Safety Car Service Co.
Fare boxes	Center platform
Wheelguards	Six bar, H B, lifeguard
Gears and pinions	Pressed steel
Governor hand brakes,	West S 6 A Norway iron
Heater equipment, not specified	
Headlight	Golden Glow, S. M-95
Motors	2-West, 506-AM-2
Paint or varnish	Light mahogany
Registers	Stone & Webster standard
Sanders	Air, furnished by builder
Sash fixtures, not specified	
Seats, Heywood Bros.,	57-SF steel mahogany
Seating material,	Rattan, 16 in. x 32 in. cushions
Slack adjuster, not specified	
Step treads	½ in. x 10 in.
Trolley catchers or retrievers	Ideal
Trolley base	1½ in. x 16 in. x 16 in.
Trolley wheels or shoes	
Trucks	Brill 29-E-1
Ventilators	Utility standard
Wheels	Southern Wheel Co., standard

Boston Specifies Details for 170 Cars

The Boston Elevated Railway, noted in the March 20 issue of the ELECTRIC RAILWAY JOURNAL as being in the market for seventy-five center-entrance motor cars, in addition to thirty center-entrance motor cars and sixty-five all-steel elevated cars previously announced as having been purchased, has specified the following details on this equipment:

Number	65
Date of order	April 12, 1920
Car builder	Pressed Steel Car Company
Type	Elevated
Seating capacity	44
Weight of car body	31,750 lb.
Weight of trucks, motor	10,130 lb.
Weight of trucks, trailer	3,680 lb.
Weight of equipment	20,955 lb.
Total weight	71,515 lb.
Bolster centers	32 ft. 3½ in.
Length, over all	46 ft. 7½ in.
Truck wheelbase	6 ft.
Width, over all	8 ft. 9 1/16 in.
Height, rail to top of roof	12 ft. 6½ in.
Body	All Steel
Interior trim	Bronze and enamel
Headlining	½ Agasote
Roof	Monitor
Air brakes	Westinghouse
Axles	4¼ x 8 Journal
Bumpers	Anti-climber
Car door signals	National Pneumatic
Car trimmings	Pressed Steel Car Company
Bearings	Stucke side bearings Center plate, steel casting
Conduits and junction boxes	West.
Control	West. A. L. F. M.
Couplers	Tomlinson
Curtain fixtures	Curtain Supply
Curtain material	Double face Pantasote
Door operating mechanism	National Pneumatic
Gears and pinions	G. E. and West.
Hand brakes	Vertical wheel
Heater equipment	Consolidated Car Heating Company
Journal boxes	Symington
Motors	2 motors, G. E. 259, and West. 301
Motors	Inside hung
Paint, varnish	Chicago Varnish Co.
Sash fixtures	Forsythe
Seats	Longitudinal
Seating material	Not yet decided
Springs	Open hearth steel
Step treads	M. I. thresholds
Trolley shoes	B. E. Ry. Co.
Trucks	Standard Motor Co., C-60
Ventilators	Perry
Wheels (type and size)	Trailer 3 K., 31 Motor 3 K., 34

The order for seventy-five center-entrance cars was placed with the G. C. Kuhlman Car Company, the Laconia Car Company having received the first order for thirty cars of the center-entrance type.

Number	105
Date of order	April 24, 1920
Delivery	To begin during Aug., 1920
Car builder	Laconia Car Company, 30
Car builder	G. C. Kuhlman Car Co., 75
Type	Center entrance, motor
Seating capacity	56
Weight of car body	21,000 lb.
Total weight	44,000 lb.
Bolster centers, length	24 ft.
Length, over all	48 ft. 9½ in.
Truck wheelbase	5 ft. 6 in.
Width, over all	8 ft. 8¾ in.
Height	11 ft. 8¼ in.
Body	Semi-steel
Interior trim	Cherry finish-bronze
Headlining lower deck	3/16 Agasote
Headlining, upper deck	None
Roof	Monitor
Air brakes	West. St. with Emer. feature
Armature bearings	Plain
Axles	Cambria steel 3¾ x 7 journal
Bumpers	Rico anti-climbers
Car signal system	Consolidated Car Heating Co., National Pneumatic Co.
Car trimmings	Aero metal and bronze
Bearings	Stucki side bearing M. I. plates
Control	G. E., K 35
Couplers	Tomlinson type A, form 8
Curtain fixtures	Curtain Supply 48 and 63
Curtain material	Pantasote
Designation signs	Hunter, end Keystone, side
Door mechanism	National Pneumatic
Fare boxes	International motor driven
Fenders or wheelguards	Not yet placed
Gears and pinions	G. E.
Hand brakes	National staffless
Heater Equipment	Consolidated Car Heating Co.
Headlights	Not yet placed
Journal boxes	Taylor Electric Truck Co.
Lightning arresters	G. E. type M, form D.3
Motors	4 G. E. 247, inside lining
Paint, varnish or enamel	Not yet placed
Registers	International
Sanders	Ohio Brass
Seats	Heywood & Wakefield—30 cars
Seats	J. G. Brill—75 cars
Seating material	Wood slat
Slack adjuster	Gould
Springs	Taylor Elec. Truck Co.
Step treads	Universal
Trolley catchers	Q. P. catcher
Trolley wheels	B. E. Ry.
Trucks	Taylor Electric Truck Co.
Ventilators	Perry
Wheels	26 in. rolled steel

Recent Incorporations

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway proposes to build a line in Long Beach from the harbor district to Dominguez Junction. Provision has been made to connect with the Daisy Avenue line at State Street.

Franchises

Indiana Service Corporation, Fort Wayne, Ind.—The board of public works of Fort Wayne has signed franchises giving the Indiana Service Corporation authority to lay double tracks on Clinton Street, from Main Street to Lewis Street; on Creighton Avenue, from Calhoun Street to Fairfield Avenue, and on Wells Street from the St. Mary's River bridge to Fairmount Place. In addition to this some improvements will be made to the Calhoun Street line.

Track and Roadway

Los Angeles, Cal.—The California Railroad Commission will hold a hearing on June 15 in Los Angeles for the purpose of selecting a site for the proposed union railway terminal in that city. As a part of the terminal development the Pacific Electric Railway proposes to extend its elevated tracks from Sixth and Main Streets to the Brooklyn Avenue bridge.

Indiana Service Corporation, Fort Wayne, Ind.—Plans are under way for extending the Hueman Street line of this company west through the northwestern part of the Fort Wayne west of St. Mary's Avenue and north of the Nickel Plate tracks. This section of the city has built up very rapidly within the past few years and is in bad need of car service.

Southern Public Utilities Company, Charlotte, N. C.—The Southern Public Utilities Company is double-tracking its Myers Park line in Charlotte.

Toronto, Ont.—The City Council of Toronto has authorized the city treasurer to deposit with the Hydro-Electric Power Commission of Ontario debentures amounting to $4,328,665 in connection with the construction of the proposed hydro-radial between Toronto and Bowmanville.

Portland, Ore.—The Commission of Public Docks of Portland, has announced its intention of building an extension of the St. Johns Street line of the Portland Railway, Light & Power Company to connect with municipal terminal No. 4. C. B. Moores, chairman of the commission, and G. B. Hegardt, chief engineer and secretary, have been authorized to enter into an agreement for this purpose with the railway company.

Philadelphia, Pa.—Mayor Moore and William S. Twining, director of the Department of City Transit, have awarded contracts aggregating $410,732 for work on the Frankford elevated line. The awards are as follows: Steel superstructure on Front Street near Arch and Frankford Avenue between Dyre and Bridge Streets to the Phoenix Bridge Company, for $272,436. Column foundations for the superstructure to Brown-King Construction Company for $37,299. Passenger station at Kensington Avenue and Tioga Street, Standard Construction Company for $100,790.

Professional Note

Edward H. Rockwell and Frank C. Doble announce the establishment of the engineering firm of Rockwell & Doble, with offices at 40 Central Street, Boston, Mass. The firm will handle a general engineering and construction business. Mr. Rockwell is a civil engineer, and is head of that department at Tufts College. He is a graduate of the Worcester Polytechnic Institute and has had a wide experience, including work for industrial clients, bridge builders, consultation service and special work for the United States government. Dr. Doble is a graduate in electrical engineering from Tufts College, class of 1911. His experience includes service in the electrified zone of the New York Central lines in the transmission department, in street-railway work and in a consulting capacity for several years.

Trade Notes

The Delta-Star Electric Company's New York office was removed from 100 Broadway to 25 Broad Street on May 6.

Ralph D. Mershon, consulting and electrical engineer, has removed his offices to 143 Liberty Street, New York City.

Los Angeles Railway Corporation, Los Angeles, Cal., has purchased 575 registering fare boxes from the Johnson Fare Box Company, Chicago.

Electrical Securities Corporation, New York, N. Y., announces the removal of its offices from 71 Broadway to 165 Broadway, New York City.

The Collyer Insulated Wire Company, Pawtucket, R. I., has awarded contract for two additions, one 25 ft. x 75 ft. and the other 20 ft. x 32 ft., to its plant.

Locke Insulator Company, Baltimore, Md., has awarded a contract for the construction of three buildings at Light and Cromwell Streets, which will be used for the manufacture of insulators and bushings.

Norton Company, Worcester, Mass., will erect a large building which will enable the company to doube the capacity of its abrasive storage and milling department.

Transportation Engineering Corporation, Chicago, Ill., has moved from its former quarters in the Manhattan Building to new quarters in the Transportation Building.

Western Electric Company, New York, N. Y., has let a contract for the construction of a ten-story, reinforced concrete and steel building at Greenwich and Clarkson Streets to be built by the Turner Construction Company. The cost is estimated at $2,500.000.

Safety Electric Products Corporation, Los Angeles, Cal., recently incorporated, is manufacturing switches, metal boxes, etc. Frank H. Trimble, formerly connected with the F. H. Trimble Manufacturing Company, now out of existence, is interested in the company.

Herman H. Sticht & Company, New York, N. Y., announces that it has added a carbon-brush department to its business and is acting as Eastern agent for the Boxill Bruell Carbon Brush Company, Indianapolis, Ind. The latter company does not manufacture a universal brush but rather a series to suit conditions.

New Advertising Literature

Appleton Electric Company Chicago, Ill.: Bulletin No. 13 giving a complete list of its "Pagrip" metal moldings and fittings.

Griscom-Russell Company, 90 West Street, New York, N. Y.: Bulletin No. 902, describing its multiwhirl cooler for lubricating oils.

Sullivan Machinery Company, Chicago, Ill.: Bulletin 75T on its class WK-31 gasoline-engine driven portable air compressor.

Trumbull-Vanderpoel Electric Manufacturing Company, Bantam, Conn.: A 128 page catalog, No. 2, giving price list and other data on electrical supplies manufactured by the company.

R. Thomas & Sons Company, East Liverpool, Ohio., Catalog No. 19, giving descriptions and illustrations of its transmission-line insulators and other insulating devices and material.

Belden Manufacturing Company, Chicago, Ill.: Catalog No. 8, with new discount sheets, covering rubber covered wire, switchboard cables, tips, terminals, tapes, insulating materials and many other products.

Shepard Electric Crane & Hoist Company, Contour Falls, N. Y.: Booklet, "A Hoist Below the Hook," showing different rigs to be used with electric hoists in moving heavy cases, motors, heavy gears and other equipment.

The Continental Fiber Company, Newark, Del: An eighty-eight-page booklet entitled "Insulation," in which it describes the various products manufactured by the company, including vulcanized fiber, "conite," "bakelite-dilecto," etc.

Iron Age Publishing Company, New York, N. Y.: A 1216-page 9 x 12 in., Catalogue of American Exports, containing catalogs of leading American manufacturers of engineering, railway, foundry and electric equipment and supplies, iron and steel, machinery and tools, hardware and cutlery. It is written in five languages, English, Spanish, French, Portuguese and Russian. Metric equivalents are used throughout, and data and other information are included which will make it useful to the technical as well as other buyers.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
L. C. PAUL, Editorial Representative A. C. DAVISON, Editorial Representative G. J. MACMURRAY, News Editor W. B. ANDERSON, Asst. News Editor

Volume 55 New York, Saturday, May 29, 1920 *Number* 22

"We Cannot Comply with Your Order"

WHEN the city "dads" are considering or expect to consider any extensive improvements in streets in which car tracks are located it might be well for them to give ear to appeals from the street railway companies asking for permission to earn a sufficient return on their investment to pay operating expenses and taxes, plus a little on the side for depreciation and improvements.

This was forcefully brought home recently in a certain Eastern city when after having refused the request of the company for an increase in fare the Mayor let contracts for the repaving of a certain avenue. It is an important thoroughfare and is traveled daily by thousands of motorists. The repaving had been planned as one of the big improvements. It was also planned to change the tracks from the sides of the avenue to the center and to repave within the railway area.

A communication was sent to the president of the railway company directing him to proceed with the repaving within the railway area as required by the company's franchise and also to move the tracks as stated. In answer the president replied:

"The —— Railway Company is not now taking in enough money to pay operating expenses with taxes and interest excluded. The company cannot borrow money. We have no money to pay for this repaving and cannot comply with your order. You have no authority to direct us to move our tracks from one position in a street to another. We do not intend to obey your order and will not move our tracks."

It is now up to the municipal authorities to determine what action they can take. Money cannot be obtained from a source where it is non-existent, and the city will not gain by forcing the company into bankruptcy. This particular case may not bring any immediate relief to the railway company in question, but a few more cases of a similar nature in the same city will eventually make an impression on the hard-headed politicians.

Yale Establishes Chair of Transportation

LORD STRATHCONA, the great Canadian railroad builder, like James J. Hill and E. H. Harriman, had a creative visualization of what transportation means to the North American continent. When he died he bequeathed to Yale University an amount now found to be in excess of $600,000, to be used to construct a building and support professorships in the interest of the physical agencies and the economics of transportation.

Yale has now given expression to a broad conception of transportation as a combined engineering and economic agency by her decision to establish a chair of transportation, under which, apparently, all various elements of engineering and economics will be grouped and correlated. Yale has been known to be considering this question for some time and is to be congratulated on her decision to view the question broadly and not divide her efforts under various heads, such as railroad engineering, electric traction, economics of transportation, etc. We hope that she may be most fortunate in her selection of the man to fill this chair and that he may be as broad as the conception of Lord Strathcona, who made this development possible.

What's the Matter with Iowa?

CONSIDER the three "D's"! They are Dubuque, Des Moines and Davenport. All are in Iowa. Dubuque walked for two months. At first Dubuque didn't mind. It took the suspension of electric railway service with good nature. As time wore on, however, the residents became petulant. They sought the reason for their inconvenience. And so seeking, they finally found the truth. It is a simple truth. Reduced to its lowest terms, it is that no public utility that is starved to death financially can function properly. The federal court had to drive this lesson home to Dubuque. In consequence, Dubuque has an 8-cent cash fare, with seven tickets for 50 cents. The trainmen got an increase in wages.

Des Moines hasn't walked yet. But it appears to be heading that way. The road is in receivers' hands. It is subject to the terms of a franchise made in 1916. The Des Moines City Railway appears not to be able under its franchise to increase fares. At least the court has so ruled. The same court, however, has held that the company may keep its service within the bounds which the 5-cent fare justifies. Thus service, with the court's sanction, has already been reduced. Moreover, the court has materially reduced the recent wage award, the umpire in the arbitration having admitted that the current earnings were insufficient. Dubuque has meant nothing to Des Moines.

And now Davenport. Dire consequences threaten there for June 1. On that date the term of the temporary 7-cent fare expires. The men are clamoring for more pay. Even under an extension of the present temporary rate of 7 cents the ability of the company to increase pay is doubtful. It is absolutely impossible under a 5-cent fare. The company's plea for an extension of the 7-cent fare has fallen upon deaf ears. The majority of the City Council are Socialists. They have voted to throw the company back on June 1 where it was before the temporary fare increase was allowed. Dubuque and Des Moines have meant nothing to Davenport.

In the Dubuque case resort was apparently made to the court because there is no State body duly authorized to assume jurisdiction over rates on electric railways. It is, of course, unfortunate that such a commission does not exist. That is one of the sins of the State's legislators. Here is home rule at its worst. Iowa's deadly "D's" are delay, distrust and disaster. There are twenty-two other cities in Iowa in which electric railways are operated. Before them stand the lessons of Dubuque, Des Moines and Davenport. Heaven forfend such an end for them.

Labor, Politicians and the Safety Car

IT IS highly creditable to the intelligence of most platform men that objection to the one-man feature of the safety car should be the exception instead of the rule. These men know, in the first instance, that if the railway cannot make use of safety car operation it will have to shut up shop or close down the thinner routes at least. In the second instance, they know that even on a car for car basis the rate of turnover is too fast to make it likely that any of them will lose their jobs. Finally, in the third instance, the increase of 50 to 100 per cent in car units operated by so many companies puts the "jobs lost" bugaboo down for good.

As a matter of caution, however, we should not ignore the few controversies that have arisen, if only for the lessons that they convey. The electric railways which were so tardy in recognizing the merits of the safety car must needs have a little patience with those who think that it may be an injury to their particular group and even with the cheap politician who tries to capitalize that feeling. Hence the following experiences may not be found malapropos.

In one community the committee of the local Council had returned from a safety car scouting trip full of enthusiasm. Their political proclivities, also, led them to insist that the price of giving the public some 50 per cent better service at an expenditure of $250,000 to $300,000 should be the immediate return from a 7-cent to a 5-cent fare. Obviously, this was most unfair inasmuch as no one could foretell whether the increased net would justify so big a cut, and, in any event, the railway was surely entitled to have a breathing spell. Convinced that further argument with the Councilmen was useless, the company before appealing to the state commission called a public meeting to determine the sentiments of the most frequent riders, the shopmen of the city. It was a meeting at least 90 per cent proletarian. What was the dominant note? Lower fares? No. Objection to one man per car? No. Better service? Yes, decidedly so. The big job of the meeting was not in explaining why fares could not be reduced or why one man with an automatic tool can do more and better work than two men with a hand tool. What they had to be told over and over again was that the railway really, truly, honestly, "cross-my-heart" did intend to run new cars and more cars. Such news seemed too good to be true, but was accepted at last.

In a second community, the first batch of safety cars gave such satisfaction that enemy newspapers were turned into friends and the railway obtained such encouragement from the riders that it has duplicated the first order. Now note the irony of the situation. Two years ago the company was abused by political interests up hill and down dale because it was not ready to accept the city expert's recommendation to use safety cars. Today, the same interests are stirring up the platform men to object to the modern method of operation suggested originally by themselves!

In a third community, safety car operation was in operation on one line and rehabilitated cars temporarily on some others. Seizing upon the latter as an excuse for a play to the labor gallery, certain members of the Council are determined to drive any and every one-man car out of town, stupidly believing that the company will have to continue operating two-man, heavyweight cars at the old 5-cent fare. Indignant protests from the passengers who now get a 7- instead of a 10-minute headway at 10 to 15 per cent greater speed mean nothing to their sworn servants(?). They have grabbed Mrs. Partington's broom and are determined to sweep back the resistless oncoming of the safety car. Today they do not even deign to argue the case, but when service goes down as fares go up they will probably discover that they didn't do such a great favor to the workingman after all and will be glad to recant.

As a parting shot, it is well to recall where such arguments arise that the municipal electric railways of the United States seem exceptionally eager to take advantage of the economies and better-service possibilities of the safety car. Aside from the smaller properties like Alexandria, Monroe and Pekin, there is the big Seattle system with scores of safeties at work and a request before the Council from the superintendent for enough money to convert all cars to safety type. Evidently the city does not believe in using two men where one will do the trick. And, in the slang of Shakespeare and today, Seattle is "some labor town, too!"

How Can Motor Maintenance in Winter Be Reduced?

AS A result of the severe weather conditions in the New England section during the recent winter many railway officials have been wondering if we have not over-rated the reliability of our railway motors. Reliability has always been considered as the first and most necessary requirement for electric railway service, and to maintain this motors must withstand the most severe service and abuse under the extreme conditions of winter service. We have received considerable information regarding failures to various types of motors during the past winter and have already commented on these in previous issues of this paper. In attempting to analyze the relative merits of the different motors we have found some quite contradictory results in different cases. This has been brought about because all of the information furnished did not contain data regarding operating conditions. The troubles that have occurred were largely due to the operation of cars over ice, to the slipping of wheels which caused spinning of motors and the operation of motors through water. The information received, however, does show that a vast amount of trouble was experienced, and it is evident that the solution, or at least the alleviation, of the troubles will be found in improvement of motor insulation and improvement in operation. To bring about the desired result it is thus necessary for both the manufacturer and the operator to make improvements.

The manufacturers already have begun to take active steps to make the insulating materials used in railway motors more completely impervious to moisture, and there is no doubt that substantial progress can be made in this direction. Another line of investigation should determine whether it is not possible to close ventilating motors more effectively during the winter season and still not endanger the admirable results of forced or self-ventilation.

In order to obtain far-reaching results it will be necessary also for the various railway companies to improve their methods of rewinding armatures and field coils and taking care of other repairs, for obviously the motors which are now in operation will be continued in service for several years and improvements in these motors cannot be made by the manufacturers. Electric railways which are not already dipping and baking their railway windings should consider this most carefully, for it is evident that only through a more thorough waterproofing of the motors can improvements and beneficial results be obtained under these extreme weather conditions. Improvements in snow and ice fighting equipment should ~~also~~ be provided, and particularly means must be found for removing the snow and ice, which is often allowed to accumulate between the rails to such a height that gear cases and motors slide on the ice or compacted snow. While operating conditions during the recent winter were entirely abnormal in the New England section, especially because of operation through water and the dragging of motors over ice, still if companies will work along the lines indicated they can accomplish marked improvement and will be able to meet more satisfactorily the conditions when they arise again, as they most surely will some time.

Why Not Electrify the Steam Roads at Once?

WHEN one reads reports of the results of electrification like those contained in the papers read by Messrs. Beeuwkes and Bellinger at the N. E. L. A. convention last week, which are abstracted elsewhere in this issue, he is apt to ask why steam roads other than the present few have not adopted electric motive power. The arguments in favor of early electrification of certain sections of the steam railways of the country are cogent and convincing. Actual progress as measured by electrified track mileage seems, however, quite slow.

While of course the ELECTRIC RAILWAY JOURNAL is desirous of seeing a more rapid adoption of electricity as steam railroad motive power, this paper recognizes certain gains which are to come through the present enforced comparative stagnation. Considerations of economics always control in a development of this sort, but at the moment they are dominated in turn by the financial stringency. In other words, no matter what the possibilities of immediate and ultimate profit, the railroads have not the money or the credit to electrify extensively. It is to be hoped and expected that the coming freight rate increases will alter the situation materially.

In the meantime the country is becoming more and more interested in conservation, and conservation means electrification. The public is coming to see that conservation along this line means the investment of large sums. These the railroads can secure only when they are permitted to earn a fair income. While this conviction is being built up, a few pioneers are blazing the trail for the procession which is to follow. The C., M. & St. P., the B., A. & P., the Norfolk & Western, the Pennsylvania, the New Haven, the New York Central, the Michigan Central, the Great Northern, the Erie, the Long Island and a few other railways deserve honorable mention. And the manufacturers are building up a solid foundation of experience which will serve well as the basis of the transportation structure of the future.

It will pay to be patient in this matter, but alert withal. Father Time is working in the interest of electrification. He invites those interested to grasp him by the forelock.

Capitalize the Local Investor's Self-Interest

VARIOUS attempts at direct sale of public utility securities to the immediate community have been made and various plans of showing the closely allied interests of public and public utility have been tried, but a new idea embracing both these purposes was brought ~~to our~~ attention recently as having been tried practically in the central station field and we believe it merits passing on with an appeal to try to apply it directly to problems at hand.

The idea is to use the natural "self-interest" of any individual or group of individuals as a basis of proving the consequent proper and necessary interest in the welfare of the public utility. In other words, show in dollars and cents what each man loses as a result of lack of a given public utility service or what he would gain if a given public service were available. When there is a demand for additional service calling for extensions and construction or replacements, show in dollars and cents the direct and indirect benefit to each individual and group. His very self-interest will make every individual interested in the company's ability to maintain and extend service. A natural result of this is his desire to invest his own money in a business which of necessity affects his prosperity so vitally.

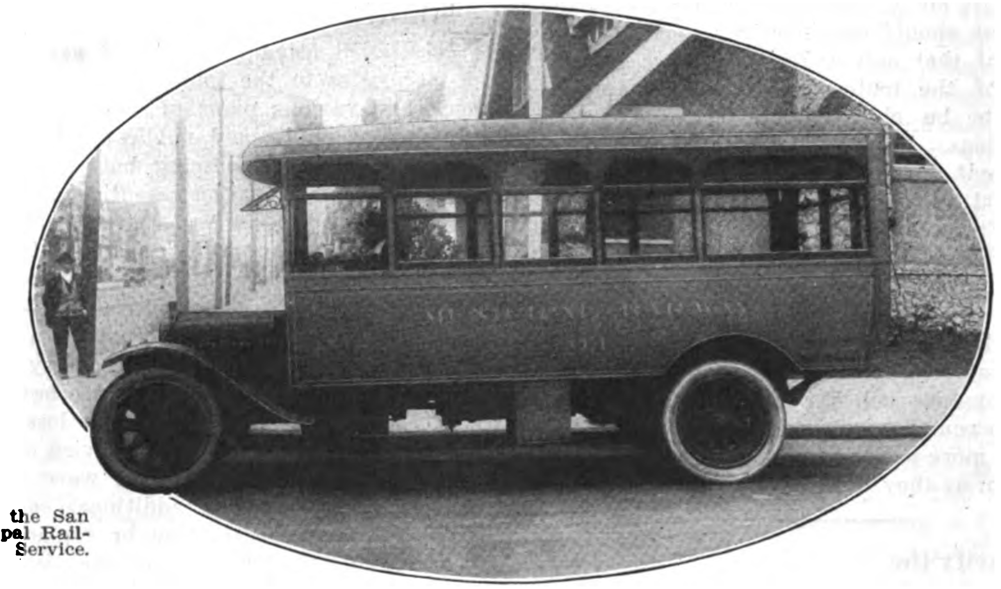
"Be more specific," you say. "How does it apply to railways?" The challenge is accepted. Assume an outlying district with the residences of a few persons who are willing to walk a half mile to a car, or who have automobiles, but who desire railway extension which can't be financed. Prove the number of additional homes which would be built in the district if the extension were made. Show the downtown merchant how many more patrons would call on him each day and show the average annual business thus added for him. Find the value of the new homes which would be built and show the carpenter, the lumber merchant, the banker, the mason, the painter, the contractor and the rest of those similarly interested how much of this, in dollars and cents, will come his way. And the whole thing held up by lack of money or credit! The very self-interest of each of these is an impelling motive to assist the utility and prompts the individual actually to purchase securities.

The foregoing is merely typical of a direct application to a given condition. Similar analyses and campaigns are said by representatives of the San Joaquin Light & Power Corporation in California to have produced satisfactory results in its territory. Something of this sort should be applicable to the railway field. When successful the result is not only the necessary financial support of the utility by the community but a better and a concrete realization of how closely knit are the success of the utility and the progress and success of each individual and the community as a whole.

The Place of the Bus—IV

The New York Municipality's Inauguration of Bus Service and Some Other Competitive Undertakings—De Luxe Operation in New York, Chicago and St. Louis

By WALTER JACKSON
Consulting Engineer



A Motor Bus of the San Francisco Municipal Railway's Extension Service.

THE necessity for electric railways to concern themselves with the motor bus and its possibilities is clear from the dire situation that has arisen in New York City. As the reasons for the municipal bus service there may not be so well understood outside of New York as they are to residents of that city, a brief survey of this development may be clarifying.

The greater part of the electric railway mileage in the Borough of Manhattan (old New York) is on the underground conduit system. This system, compelled by city ordinance, was much too costly for the electrification of certain routes which had lost their traffic importance with the decline of the ferries. Indeed, by 1913 several miles of practically hopeless trackage had been removed from the streets by order of the city. This year also marked the substitution of the storage battery car for the horse car on such unelectrified trackage as remained.

At no time did these storage battery cars make any money, even when operated under such modest conditions as those of the Third Avenue Railway system, which used both new cars and rebuilt horse cars. In May, 1916, when this company was operating the now defunct Twenty-eighth and Twenty-ninth Street Crosstown Railway, the operating and depreciation expense of a 16,000-lb. twenty-four seat car was 29.1 cents, whereas the revenue was but 20.9 cents. This cost might have been brought nearer the point of subsistence if these cars had been operated with but one man each. The city ordinance which barred this practice with a slow car traveling on a fixed route does not apply evidently to the operation of the faster jitney buses, which can twist and turn at will.

With the further increase in costs due to the war the New York Railways, in particular, found the burden of these storage battery lines too great to bear at a 5-cent fare. Application to permit certain discontinuances therefore was made by the receiver on Sept. 19, 1919, before Judge Mayer of the United States District Court, Southern District of New York. The application was granted at once, with the result that on Sept. 20 the Madison Street, Sixth Avenue ferry, Avenue C and Spring-Delancey Street routes ceased to function. The answer of the city administration was the installation of a "scratch" bus service, which, despite obvious shortcomings, has given the public more and faster service than was received before. The fare remained at 5 cents, but, as will be pointed out later, this is made possible only by a tax on the community as a whole.

A portion of the Spring-Delancey Street line was restored Feb. 1, 1920 (chiefly for transfer reasons), but it is doubtful whether the other routes ever will be. The fact must be faced that the railways on these and similar streets had become obsolete. Storage battery two-men-per-car operation had proved both too slow and too costly to justify frequent service in territory where almost all of the traffic was of a short-ride character. The narrowness of some of the streets traversed had also been a factor in discouraging a renaissance of these lines following the elimination of the horse car.

All in all, then, the policy of substituting motor buses for the cars was the only correct one from a transportation standpoint under the conditions as they existed. It is doubtful whether any increase in fare would have done the railway operators any good. While a proposition from them to operate buses might have met with more favor, a higher fare than 5 cents would have been inevitable, since the cost per seat furnished is at least as high on a bus as on a battery car.

The lines now operated by the city of New York in the Borough of Manhattan to replace abandoned storage battery routes are the following, as shown on the accompanying map:

Route A, Delancey-Spring Street line, 2 miles, opened Sept. 21, 1919.
Route B, Avenue C line, 3.5 miles, opened Sept. 21, 1919.
Route C, Madison-Chambers Street line, 2 miles, opened Sept. 21, 1919.

Route E, Seventh Avenue-Williamsburg Bridge route was opened March 7, 1920. It runs from Seventh Avenue and West Twenty-third Street, Manhattan, over the Williamsburg Bridge to the Brooklyn terminal of the latter via West Eighth and other streets.

Route F, Fourteenth Street-Williamsburg Bridge, runs from the ferry terminal on West Twenty-third Street, Manhattan, to the Williamsburg Bridge Plaza via West Fourteenth and other streets.

In addition, this map shows Route D, Yorkville, 2 miles long, which is in direct competition with the Eighty-sixth Street line of the New York Railways. For many years the New York Railways vainly endeavored to secure the right to extend this route through the fashionable streets on the west side up to Riverside Drive, thus giving a badly needed crosstown line across the island via Central Park. The property owners who objected to this necessary extension may now have the double enjoyment of hearing the honk of the municipal buses and of helping to pay any deficits arising out of their operation.

A feature of this route, indicating the flexibility of the bus, is that, when necessary, vehicles run to the foot of East 86th Street instead of East 92d Street to take care of visitors to the city institutions on Blackwell's Island.

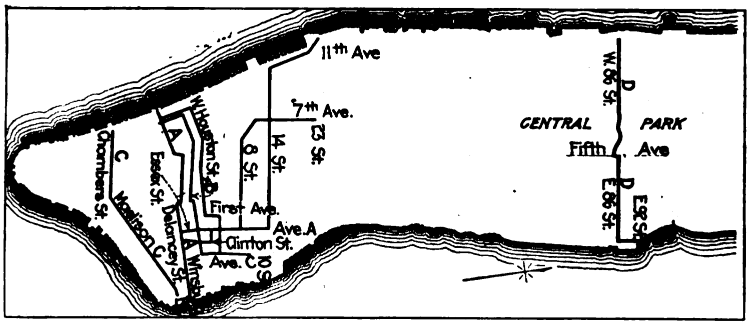
BREAKUP OF BROOKLYN RAPID TRANSIT SYSTEM BROUGHT MOTOR BUS INTO BROOKLYN

While the complete abandonment of service was the occasion for the advent of motor bus operation in three out of the four instances in the Borough of Manhattan, a somewhat different cause led to the same consequence in the Borough of Brooklyn. The Brooklyn Rapid Transit system, finding that a 2-cent transfer charge did not afford sufficient relief, was broken up into several of the underlying companies on Oct. 18, 1919. Rental and intertrackage agreements that had stood for a generation were abolished overnight. The result was that a number of the suburban lines were left hanging in midair, that certain cars were restored to old, uneconomical roundabout routes and that some people were obliged to pay two, and in some cases three, fares on as many cars instead of one fare on one car. It is a pity that some temporary leasing plan was not devised to continue the old routings upon the basis of the conditions that had led to the receivership. Had this been done there would have been far less need or excuse for the bus service which the city immediately inaugurated.

As a matter of fact, the bus services installed in Brooklyn are doing very little to save people from double and triple fares. Brooklyn distances are so magnificent that the sum of all the subsidies and other privileges enjoyed by the individual bus operators is not a makeweight to the heavy losses that would follow any attempt to duplicate the original through routes of the trolley lines. The actual situation is that the bus lines simply parallel trolley lines for part of the way, stealing a portion of their traffic from the cars, but also undoubtedly creating some traffic due to the greater frequency of service and to their better accessibility where they happen to have pre-empted a trackless street.

The fragmentary character of the Brooklyn bus routes, which tend to parallel rather than overlap the car lines, will be better understood by the reader if he will refer to the partial map of the Borough of Brooklyn on page 1091 and then consider that under the full-fledged trolley system a single 5-cent fare carried the passenger from any part of the borough to any other part of the borough or over the bridges to Manhattan. The chief of the few exceptions was the 10-cent fare to Coney Island, and even in this instance the residents of the Isle of Pleasure long enjoyed a 5-cent fare on weekdays. A list of the routes follows:

Route No. 2, Coney Island line, 1.5 miles, opened Oct. 24, 1919.
Route No. 3, Greenpoint line, 3 miles, opened Oct. 27, 1919.
Route No. 4, Park Slope line, 4 miles, opened Oct. 27, 1919.



BOROUGH OF MANHATTAN, SHOWING JITNEY BUS ROUTES PERMITTED BY THE CITY OF NEW YORK

Route No. 5, Bay Ridge line, 3.25 miles, opened Nov. 3, 1919, and quit Nov. 12, 1919, because of poor business (not shown on map).
Route No. 6. Bushwick-Lafayette line, 3 miles, opened Nov. 3, 1919.
Route No. 7, Bedford-Hanson Place line, 3 miles, opened Nov. 3, 1919, and quit Nov. 7, 1919, because of better pickings elsewhere.
Route No. 9, Borough Hall via Flatbush Avenue to Nostrand Avenue, opened Dec. 15, 1919, 4.5 miles (approximately).

No one has manifested an avid desire to run on the proposed Route No. 8, Atlantic and Flatbush Avenues to Atkins Street and Atlantic Avenue, also a distance of 5 miles. Most of the riders on Route 9, also, go no further than the Atlantic Avenue subway station (approximately 4 miles). Although in competition with the Flatbush Avenue car route, a detour is made via Washington Avenue to avoid the bad paving along Prospect Park.

Route No. 1 was a bus route which replaced Manhattan Bridge operation abandoned on Oct. 4, 1919, by the Brooklyn & North River Railroad Company. This company, which was owned jointly by the Brooklyn and Manhattan systems, was of considerable advantage to the public because of the free transfer privileges obtainable at either end and because the bridge cars also continued across Manhattan Island to the North (Hudson) River. Practically all of its business was long haul, for on the bridge itself it was in competition with the 3-cent Line, which is still operating. The importance of the suspended company may be judged from the fact that for the fiscal year ended June 30, 1919, it carried 5,340,619 cash and 3,777,192 transfer passengers. The 5-cent bus route which superseded this operation was 3.75 miles long from the Brooklyn terminus to Desbrosses Street ferry, Manhattan, with a shorter run extending from the Manhattan terminus of the bridge for 0.75 miles to Grand Street and Broadway. It suspended operation March 16 owing to inability to compete with the local 3-cent bridge trolley, which does not run beyond the Manhattan terminal of the bridge.

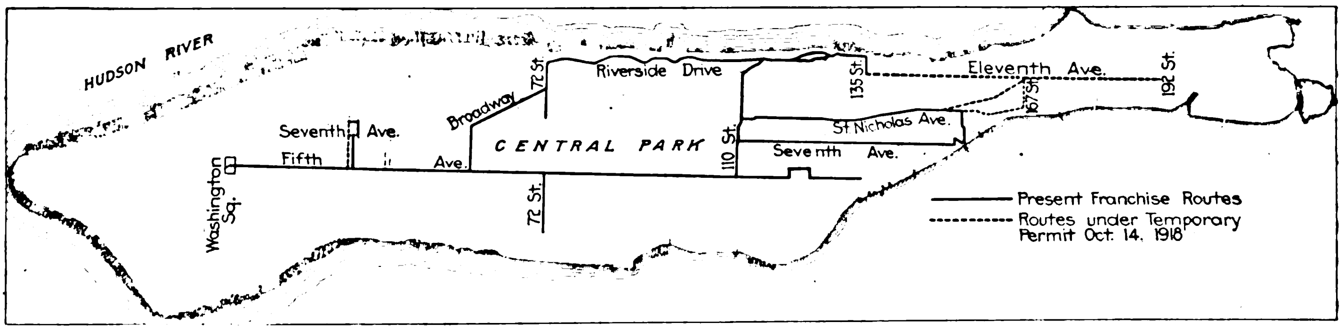
As previously stated, the city has hardly made good its promise to Brooklynites that the bus routes would save them from paying multiple fares. It has, however, given them additional service and minimized the inconveniences caused by the destruction of long-established trolley routes. A good example is the Park Slope line, with which the writer is most familiar.

The map on page 1091 shows the course of the original Sixteenth (and Ninth) Avenue line (*A*) which served the New York subway terminals and the Brooklyn shopping and business center, the Seventh Avenue and Flatbush-Seventh (*B*) and Ninth Street-Smith Street (*C*) lines still available and (4) the Park Slope bus route. It will be quite obvious that the people living at the upper end of the original Sixteenth Avenue line are not being served by the bus route at all. Their fare from Sixty-fifth Street and Gravesend Avenue via car to downtown is 12 cents. On the other hand, people who live along the southern side of Prospect Park are furnished with a more direct and faster route than is afforded by the Ninth Street-Smith Street (*C*) line, which skirts the lower edge of Brooklyn's business and shopping center instead of going straight through. So, also, people living on Prospect Park West (Ninth Avenue), having been deprived of a downtown route via Ninth Avenue, will naturally tend to patronize the buses running via Eighth Avenue instead of walking another 700 ft. to Seventh Avenue. Home-bound passengers so circumstanced are particularly likely to favor the bus, as the grade up the Park Slope is quite perceptible. In bad weather people in the Ninth and Eighth Avenue areas generally prefer the bus.

A bit of irony in this connection is that during the February blizzards the Park Slope or Eighth Avenue bus calmly appropriated the cleared tracks on Seventh Avenue for a period of several weeks, waiting until the drifts, hummocks and bergs had been removed by city employees and Old Sol combined. Following an earlier snowstorm, the writer noted a municipal motor plow working during the night to smooth the way for the buses on this thoroughfare. However, the same little favors were extended to the Fifth Avenue Coach Company. It's all due to the condition that the motor bus uses the same roadway as all other trackless vehicles and therefore gets the benefit of general street-clearing expenditures.

Incidentally, the distressing condition which the break-up of the Brooklyn Rapid Transit system has brought to various routes is indicated in the case of the two Seventh Avenue lines. When a Seventh Avenue car reaches Flatbush and Fifth Avenue it meanders to Flatbush and Atlantic Avenues, via the Fifth and Atlantic Avenue loop. This adherence to what may be some aboriginal franchise obligation wastes time, power and track. It is also a source of accident, inasmuch as it means cutting across a Flatbush Avenue track at two places instead of merely turning in from Atlantic Avenue (in the case of "Seventh Avenue" cars) or from the Atlantic Avenue loop (in the case of shortliners). Many cars are held up because passengers get off at Fifth Avenue to walk to the subway entrances instead of taking the extra ride.

Compare this tortuous roundabout route, which certainly does not relieve track congestion, with the straightaway run of the bus and its delivery of the passengers at the curb. It is true that the addition of buses to an already crowded terminal area has added to the hazards of both pedestrians and passengers, but a patronage of 13,000 riders a day indicates that the best way to eliminate the bus menace is to restore the original Sixteenth Avenue route, with better headways than obtained formerly and also with a somewhat shorter route (Ninth Avenue and Flatbush) instead of the Ninth, Vanderbilt and Atlantic Avenue loop. No matter what franchise complications stand in the way, means must be found to remove them if the electric railway is to give as direct service as the bus. The public has no enduring favoritism toward the bus nor enduring ill will toward the car. It simply takes the vehicle that serves its convenience better.



BOROUGH OF MANHATTAN (NEW YORK) SHOWING ROUTES OF THE FIFTH AVENUE COACH COMPANY

(On Monday, April 12, several weeks after the foregoing was written, the Brooklyn Rapid Transit System installed the Park Slope line (*D*), which competes more effectively with the bus than the original Sixteenth Avenue route since it is more direct.)

EXTRAORDINARY JITNEY BUS DEVELOPMENT AT NEWARK AND BRIDGEPORT

In the early days of the jitney it was fondly believed that liability bonds, taxation and other imposts would make continuance of such operation impossible. As a matter of fact, the small touring type jitney has largely disappeared, but it has been replaced by the more formidable jitney bus. So long as such buses are individually operated and run only on choice routes and during choice hours their owners can show enough above actual costs to keep in the business. When investigation discloses that the same men have stuck to the game for two or three years it is time to give up watchful waiting or passive resistance as good policy.

Probably no city offers a better example of the jitney bus's tenacity than Newark, N. J. From 171 vehicles in June, 1916, to 402 buses in December, 1919, is one record; from 8,195,591 passengers in 1917 to 36,895,010 passengers in 1919 is another. These figures are derived

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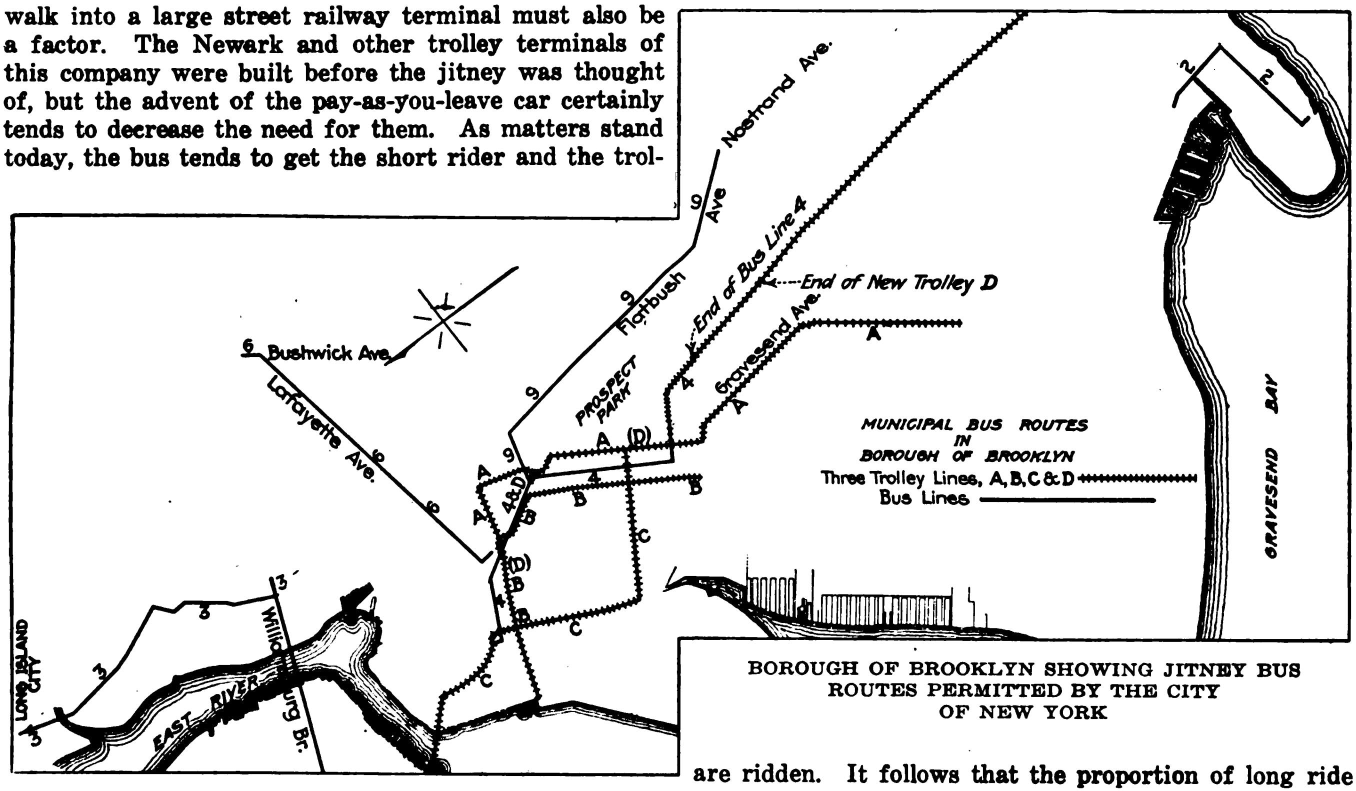
(NOTE—Reference to the Staten Island (Borough of Richmond) municipal bus service which replaced the abandoned lines of the Midland Rapid Transit Company has been omitted, inasmuch as this situation was exhaustively discussed in the ELECTRIC RAILWAY JOURNAL for Feb. 28, 1920.)

from the reports made by the jitney operators to the City Treasurer when they pay monthly 5 per cent of their gross earnings, exactly as the railway does. As the city has no means for checking these reports, it may be guessed that the actual jitney traffic is many millions in excess of that reported.

When this competitor entered the field the fare of the Public Service Railway was 5 cents and transfers were free. Both the flat and zone fare increases, as against the continuing 5-cent no-transfer fare on the buses, have accelerated the increase of jitney business. There are some fourteen routes in all emanating from Newark, most of which appear to range from 3.5 to 4 miles or more in length. Greater frequency of service, higher speed and antagonistic public sentiment are among the causes for this frightful draft on the railway revenues. The convenience of a curb-loading vehicle against the walk into a large street railway terminal must also be a factor. The Newark and other trolley terminals of this company were built before the jitney was thought of, but the advent of the pay-as-you-leave car certainly tends to decrease the need for them. As matters stand today, the bus tends to get the short rider and the trolley the long rider, a condition which would hold true even with equal fares.



BOROUGH OF BROOKLYN SHOWING JITNEY BUS ROUTES PERMITTED BY THE CITY OF NEW YORK

Bridgeport, Conn., with a population of 180,000, is another city where the jitney bus and the flivver have prospered exceedingly at the cost of the railway. It is still more favorable territory than Newark, because the intermingling of factory and residential sections with the business district between gives a remarkable amount of two-way loading and because the jitney drivers wisely confine themselves to those fat routes which are within 4 miles length over all Bridgeport is such a wonderful riding town that the daily riding index is almost unity; that is to say, there is 1 ride per diem per inhabitant. Thus during November and December, 1919, the number of bus patrons was placed at 75,000 to 80,000 a day. The precise number of car riders is not available, but it was probably 90 per cent as large as the number of bus riders. This estimate is based partly upon observations and partly upon a table submitted July 21, 1919, by L. S. Storrs, president of the Connecticut Company before the Federal Electric Railways Commission. In this table (see page 185, ELECTRIC RAILWAY JOURNAL for July 26, 1919) Mr. Storrs brought out the startling fact that the jitney got 50 per cent of all people riding within 1¼ miles of the city center, 68 per cent of all within 2 miles, 44 per cent of all within 2¾ miles and 56 per cent of all traffic whatsoever. Not all the jitney business is stolen business. The 1, 2 and 3-minute headways introduced by the jitneys surely have helped to create traffic.

Unlike the Public Service Railway, the Connecticut Company has begun to eat into the jitney bus traffic through the medium of increased service with safety cars. If safety cars alone do not wipe out the ever-narrowing margin of the 5-cent jitneur, a reduction of the base fare to 5 cents ought to turn the trick and speed up the schedules as well. At present the trolley fare is 6 or 8 cents, according to whether two or three zones are ridden. It follows that the proportion of long ride and transfer to total passengers is higher than it would be if the two-zone rate were 5 cents.

Up to the end of 1919 there were almost as many touring car jitneys at Bridgeport as buses. The new liability bond, however, is so great an overhead charge on the small car that the tendency toward the thirteen to sixteen-seat bus has been greatly accelerated.

DE LUXE MOTOR BUS SERVICES

Up to the coming of the municipal bus 5-cent routes the only other bus operation in New York (Borough of Manhattan) was the 10-cent service of the Fifth Avenue Coach Company. For reasons dilated upon later, this company had no competitors to hamper its growth. In spite of its monopoly of Fifth Avenue, the finest thoroughfare in America, and of an exceptionally high proportion of short riders, this pioneer company has not been consistently prosperous, as will be brought out in the article in this series relating to costs. At present, however, we are chiefly concerned with the exceptional character of the patronage of this company.

The original organization was the Fifth Avenue Transportation Company, Ltd., which filed its certificate of incorporation with the Secretary of State on Nov. 28, 1885, and which was authorized by the State Legislature during the following year to operate horse-drawn buses at a 5-cent fare on Fifth Avenue between Washington Square (Bleecker Street) and Eighty-ninth Street, a route length of 5.37 miles, following the consent of a majority of the abutting property owners. Upon securing further franchises for downtown extensions from the Legislature in 1889, the company sought the necessary permission from the Commissioners of the Sinking Fund of New York City to charge a 10-cent fare. This was refused. The Sinking Fund Commissioners imposed also certain schedule requirements, transfer interchange with street railways, a $20 license fee and a 2.5 per cent share of the yearly gross receipts. There is no record of the company's acceptance of these terms. On Oct. 17, 1895, its rights and property were sold under foreclosure and on Nov. 3, 1897, were transferred to the Fifth Avenue Coach Company, which had been incorporated July 25, 1896, for that purpose.

The successor company made no effort to secure additional routes until 1900, when a section (Chapter 657) was added to the transportation corporations law whereby a company already in business for five years could apply for extensions to existing routes through the New York State Board of Railroad Commissioners without securing the consent of abutting property owners, of the Mayor and the Common Council, as called for in the Greater New York Charter of 1897. As there was but one company already in business five years, the Fifth Avenue Coach Company was able to shut out all competition. Between Aug. 2, 1900, and Feb. 6, 1912, this company obtained approvals from the board and its successor, the Public Service Commission, for certain extensions which brought its theoretical route mileage up to 21 miles. Actually, it gave service up to 1913 on but 9.84 miles.* By 1916, however, the company reported a total of 19.19 miles of route. With the further permits, not franchises, obtained later the company is now serving a total of 25 miles of route, as shown on the map on page 1090.

Through these extensions the Fifth Avenue Coach Company has greatly enlarged its traffic, but it has probably also increased the average length of haul over the days when its operations were confined to a show street like Fifth Avenue. Then the short-haul, residential district rider must have constituted a bigger proportion of the traffic than now. The out-of-town visitor, who knows that the bus offers the cheapest way to see New York's best, now can get beautiful Riverside Drive in addition to Fifth Avenue. The northern end of the bus routes is in a high-grade, skyscraper apartment house section with tenants who are able to pay 10 cents for the short ride to the nearest rapid transit connection. On the whole, however, the traffic of this company retains its distinctive de luxe character. So little is this service affected by other transit developments that one of the largest increases in its history occurred during the year that saw the opening of the paralleling Lexington Avenue subway, which is but 0.3 mile distant. What does affect the traffic of this company most adversely is raw, cold or rainy weather. One could readily determine the weather conditions in each fiscal year by noting the feverish fluctuations in traffic. This is due, naturally, to the operation of buses with open tops. So long as the American is used to overheated houses, so long will he seek cover under conditions that would leave a Londoner positively indifferent. Several efforts have been and are being made to overcome this waste of seating by providing a light roofing. The dilemma is that a roofed bus is less attractive to the large proportion of people who use it for sightseeing and for the cooling, terminal-to-terminal rides so popular with New Yorkers in the summer. The fact that the splendid traffic territory of the Fifth Avenue Coach Company ranges from but 3.5 to 4.5 passengers per bus-mile on a forty-four-seat vehicle throughout the four seasons is a sufficient comment on the "outdoorness" of the American in the climate of New York, even after making due allowance for the "no standing" rule of this service.

So much popular ignorance exists as to bus schedule speeds that it may be well to point out that the schedules of the Fifth Avenue Coach Company are not perceptibly bettered by the ability of a bus to leave the beaten track. Between such intersections as Twenty-third Street and Forty-second Street along Fifth Avenue the bus is glad to be allowed to crawl along at 4 to 6 m.p.h., although Fifth Avenue is 55 ft. wide. This indicates that it is perfectly useless to argue about flexibility, when the entire current of traffic is under what is practically a block-to-block control. It is only the small, nimble private vehicle that can gain a few blocks per mile over the larger vehicles (whether on tires or on track) that must stop at practically every corner for the interchange of passengers. On the freer runs the Fifth Avenue buses are handicapped because of the double-deck feature and the slower rate of acceleration. Hence it is not so surprising to find that the average schedule speed for the year ended June 30, 1919, was but 8.2 m.p.h. It is only the single-deck sixteen-seat bus that can show its heels to the trolley car of three times the seating capacity, and this superiority is due almost wholly to the simple fact that a sixteen-seat vehicle makes fewer passenger-interchange stops than a forty-eight-seat car. In fact, thirty-two-seat safety cars have been found by the writer to be just as fast as a sixteen-seat bus, the flexibility of the bus in the congested section being more than offset by the shorter stopping time and quicker running of a front-entrance car equipped with automatic devices throughout.

If the bus confined itself to short cuts, non-stop through runs and the relief of congested trackways it would naturally show marked superiority in speed to the vehicle on a fixed roadway. However, such operation need never be expected from any independent operator, who seeks developed routes as a plain matter of business. Only the electric railway itself has anything to gain by using the bus on by-streets as a genuine means of traffic relief.

DOUBLE-DECK BUS OPERATION IN CHICAGO AND ST. LOUIS

The favorable effect on schedule speeds of long free runs is illustrated by the experience of the Chicago Motor Bus Company. This operator reaches a schedule speed ranging from 9 to 10.7 m.p.h. with a fifty-one-seat double-deck bus because the greater portion of the run is through Lincoln Park and along the Lake Shore

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*Report of Bureau of Franchises of the Board of Estimate and Apportionment of the city of New York, 1913, prepared by John A. McCollum, assistant engineer, from which a portion of the preceding data has been derived.

Drive, which are free from intersecting streets. It is significant that this company is now inclosing the upper deck of its buses. Like New York, the routes cover a combination of shopping and sightseeing district, but the density of traffic is much lower. The company's franchise for operation on the north side was granted in June, 1916. The desired south side rights were granted to the rival Chicago Stage Company Jan. 20, 1920. The term of the North Side franchise is for twenty years and the fare is 10 cents. The latest type of bus made by the bankrupt Motor Bus company is to have fifty-nine seats, a capacity from which no satisfactory schedule speed can be expected for purely city operation.

A still larger double-deck bus, a sixty-one-seater, has been put on by the Missouri Motor Bus Company, which began a 10-cent fare service in St. Louis with nine buses on Feb. 10, 1920.

These three installations comprise the only de luxe city buses regularly in operation on a public utility basis, although plans are under way to install 10-cent bus services in several other cities. The cost analyses presented in a later article will enable the reader to judge whether the profits of these independent enterprises are likely to be as large and as certain as the promoters promise.

In the following, or fifth, article the writer will discuss the legal status of the motor bus, its obligations, if any, and so forth.

Convention at Galveston

Southwestern Electrical & Gas Association Holds Meeting on May 13-15—Railway Matters of Interest Discussed

THE fifteenth annual convention of the Southwestern Electrical & Gas Association was held at the Hotel Galvez, Galveston, Tex., on May 13-15. Some 300 delegates were present. The interest was so keen in the various topics presented to the association that it was not possible fully to carry out the program as originally drafted, although all sessions began promptly and ended late. Without exception, however, the full business program was carried out item by item and every question in the question box was discussed.

One of the most interesting features of the session was an address by G. L. Burr, manager of the bond department of the Guaranty Trust Company of New York, on "Successful Financing of Public Utility Needs." In his address Mr. Burr referred to the general feeling among investors "that many public utility companies have not had the support which is due to them as honestly and ably managed public servants and that the problems of these companies and the just deserts of their owners and creditors have not been appreciated by the public bodies." It was not necessary, he said, for such securities to be judged by the same characteristics as are demanded from industrial investments. If the investor, he said, should be shown that a public utility obligation offers the prevailing rate of return and will be paid, principal and interest, and that there will continue to be a good market for it, he will buy it, but he has taken many heavy losses in this type of investment and has very properly grown to be a discriminating person. At present the gates to new capital are virtually closed to public utility companies, whose customers and the public in the territories which they serve do not take an intelligent and effective interest in them. In Mr. Burr's opinion it is most desirable that a part of the community served should make a sufficiently large investment in its local utility to assure outside investors that the company will receive the same consideration as other home industries.

Other addresses which were of general interest to all sections of the association and attracted wide attention were made by B. J. Mullaney of the Illinois Committee on Public Utility Information on the work and its results of that committee; W. H. Blood, Jr., on insurance and kindred matters affecting the public utility industry; J. F. Owens of the Oklahoma Gas & Electric Company, on public utility association work; Dr. E. P. Schoch, head of the department of chemistry of the University of Texas, on the possibilities of the use of Texas lignite, and H. C. Abel, treasurer of the N. E. L. A., urging the formation of a southwestern geographic section by the associations of Texas, Louisiana, Oklahoma and Arkansas. The convention was also addressed by representatives of the Mississippi Electrical Association as to that association being admitted into the Southwestern Geographic Section, and this matter will be taken under advisement. Favorable action was taken by the association with reference to the formation of a Southwestern Section for the N. E. L. A. A committee of eleven operating and technical members of the association was appointed to investigate immediately the matter of Texas lignite and report to the executive committee of the association.

Sessions of the railway members were held on the mornings of May 14 and 15. The topics considered at the first meeting were safety cars, collection and registering of fares, traffic ordinances, flagging steam railroad crossings and selections from the question box. At the second meeting the topics were training of transportation employees, power-saving devices, track welding and grinding and selections from the question box.

The entertainment features of the convention for the attendants-at-large were a get-together and get-acquainted ball at the Hotel Galvez, given by the Supply Section of the association, and a banquet joviation, given by the association. A special committee of Galveston ladies entertained the visiting ladies, fifty in number, with luncheon, dinner, automobile ride and boat ride.

A. Hardgrave of Dallas was elected as president to serve for the coming year. With him on the roster of new officers are the following:

First vice-president, C. E. Calder, Dallas; second vice-president, Alba H. Warren, El Paso; third vice-president, S. R. Bertron, Jr., Houston; secretary, H. S. Cooper, Dallas; treasurer, J. B. Walker, Dallas.

Executive Committee—A. Hardgrave, C. E. Calder, Alba H. Warren, S. R. Bertron, Jr., Burr Martin, W. B. Tuttle, G. H. Clifford, A. F. Townsend, C. H. Courser, Howard Smith, H. C. Morris, Charles W. Davis and F. D. Murphy.

Advisory Committee—H. O. Clarke, K. L. Simons, F. L. Weisser, H. E. Danner, B. F. Cherry, J. C. Kennedy, W. E. Wood, James P. Griffin, Theodore Dienst, W. A. Darter, V. W. Berry, John W. Carpenter, H. E. Borton, P. A. Rogers, P. W. Campbell, H. F. Cameron, L. L. Stephenson, A. Patterson, H. B. Hearn, Nelson H. Brown, R. W. Van Valkenburgh, H. E. Hobson, F. G. Kune, Charles A. Newning and Mac F. Sterett.

Finance Committee—J. E. Van Horn, R. G. Soper and C. H. Dickey.

Pulverized Fuel for Peak Loads*

The Author Shows How the Burning of Coal in This Form Is Economical in the Railway Power Plant

By O. M. Rau
Power Specialist Philadelphia Rapid Transit Company

PULVERIZED fuel has aroused renewed interest due to the increasing cost of coal and to some extent the irregular quality of the coal. Ordinary methods of firing and any individual designs of grates or mechanical stoker allow but slight variation in fuel without impairing efficiency or capacity. These conditions have, therefore, called attention to a method of firing which is less dependent on the quality of fuel obtainable and without attendant decrease of efficiency.

The Philadelphia Rapid Transit Company in its power studies has found that by purchasing high-load-factor power and generating only peak-load power the lowest combined costs result. Traction companies should study power generation carefully before adding to present facilities or constructing new plants. Power costs are only about 10 per cent of the operating expenses of an electrical transportation system as against 90 per cent of an electrical power company and are, therefore, rarely given the consideration accorded by the latter.

Comparing power production for a traction load only with power production for a combined load of traction and electric light and power (less the peaks of the former) shows up to the disadvantage of producing for traction load alone.

In the interest of conserving coal, aside from any monetary saving, this point should be considered, for with few exceptions railway power plants operate at not less than 2¼ lb. of coal per kilowatt-hour compared with 1½ lb. per kilowatt-hour for large central stations, particularly when they carry a combined traction and power load. This leads to the logical conclusion, if the power companies will recognize the fact, that most traction power will ultimately be purchased from large stations, leaving existing railway plants to be used as peak-load stations and as standby capacity.

The Philadelphia Rapid Transit Company has applied this principle and has found that even then a large amount of coal is used in banking and in addition there is a large time element in getting the plant on the lines. This naturally suggested a change in firing and oil was suggested as a fuel, but the present cost of oil prohibits it from consideration and attention was turned to the possibilities of pulverized fuel. This has the advantages of oil and is independent of a selected grade of coal.

Powdered coal has been successfully applied for many years in various industries, but prior to the high price of coal has not been considered much by utilities. It is doubtful if it can be burned any more efficiently than high-grade bituminous. With efficient equipment and under pre-war conditions there were no particular advantages to offset the additional cost of pulverizing the coal, but with the increasing cost and variable quality of coal public utilities must consider it.

Particular attention is called to the distinction between pulverized fuel and powdered coal. The latter has no interest to steam power producers, as such fuel is recognized at present, its successful application in the plants now using pulverized coal depending on the highest quality of coal being powdered.

Broadly speaking, the use of pulverized coal is a solution of the coal problem for public utilities, particularly traction. The work now in progress by the Rapid Transit Company consists of equipping its Mount Vernon power plant, which has a rated capacity of 10,000 kw., with a complete milling and burning installation.[1] This plant is a peak-load plant. It has at present 20 hand-fired B. & W. boilers of 375 hp. each, five 1,500-kw., with a complete milling and burning installation.[1] engines, and two 800-kw. direct-current Curtis exhaust steam turbines. The plant now uses anthracite coal, which in former times cost $3 per ton delivered. The cost per kilowatt-hour, considering transmission and conversion losses and investment and substation, made the cost from this plant compare favorably with power from any other source. With increasing cost of material and labor conditions this was changed. Automatic stokers were contemplated, but, as coal increased, even this was not a solution. It then became evident that the most efficient use of the plant would be for peak-load service three to four hours morning and evening. Pulverized fuel seemed to be the solution.

The installation will consist of a 6-ton per hour milling plant installed in duplicate, a weighing and conveying system and a furnace equipment of feeders and burners. "River coal," culm or anthracite may be burned, and of the first the company controls a supply of 2,000,000 tons. When river coal is used it will be dried in a 100-ton bin, then conveyed to dry coal bins above the pulverizers, thence by screw feeders to two high side Raymond mills, capable of reducing 3 tons of dried coal per hour to powder of a fineness of 95 per cent through a 150 mesh sieve. These mills are of the air separation type and convey fuel as fast as pulverized to the elevated fuel bins, from which it feeds by gravity to the conveying tank. This tank is on a scale and equipped with a compressed air conveying system by which it is conveyed in any quantity up to the capacity of the tank to the boiler hoppers.

Feeding and burning equipment consists of two screw feeders attached to the bottom of each boiler hopper. From the feeder it is conveyed into the burners, where it mixes with the required amount of primary air to carry it into the mixing chamber, where the necessary auxiliary air for proper combustion is added as the fuel enters the furnace.

This installation will allow of the use of any of the cheaper grades of coal. Labor cost will be below that required for automatic stokers and the maintenance expense of the burning equipment low. The principal items will be in the milling plant, which, however, should be charged directly to fuel. The installation will not be complete until in July, but the total savings which will be effected by it are estimated to be sufficient to pay for the improvements within two years.

Cost of fuel delivered in the boiler room..........	$3.50 per ton
Cost during 1919 under present conditions..........	$5.40 per ton
Saving of fuel during banking periods........	3,000 tons per year

Variation of steam pressure during a twenty-four-hour shutdown using pulverized fuel, 5 per cent.

Pending the completion of this installation, when accurate data as to performance will be available, it is well for traction companies requiring additional power facilities to consider carefully the purchase of the high-load-factor block of their power and utilize existing facilities for peak service, using pulverized fuel.

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*Abstract of paper presented before the Pennsylvania Street Railway Association, Harrisburg, Pa., May 27-28.

[1] Description of the method to be employed in this plant was given in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 14, 1920, page 343.

The Library as a Business Asset*

A Clearing House for Transportation Data Will Reduce Memory Strain and Save Money by Preventing Duplication of Effort

BY H. B. MEGARGEE
Secretary to the Vice-President American Railways Company, Philadelphia

TO MOST of us the word "library" immediately calls to mind a place of many shelves, a storehouse of books in overwhelming numbers. We hesitate to call the modest array of books which constitute the source of printed information for the average member of this association by such name. Here we have each department head collecting in his office a more or less homogeneous mass of pamphlets, periodicals and other matter bearing on his particular problems.

Modern business of all kinds grows more and more highly specialized, and it is only by keeping in touch with the most advanced thought in the industry that an executive may hope to produce the best results. By constantly following up the literature which affects his business, whether it be manufacturing airplanes or selling transportation, he avoids the mistakes and takes advantage of the ideas of others.

Edward Hungerford, in a recent publication, describes how the head of a public library in a big steel-making community in western Pennsylvania met the chief chemist of a great steel concern one day a short time ago. The librarian is fairly expert himself in the theory of making steel and to him the chemist confided the details of an important new experiment that he had just finished.

"It must have cost the firm something to put through that experiment," ventured the librarian.

"A pretty penny," was the prompt reply. "In fairly exact figures, something in excess of $10,000."

The librarian laughed. "The entire experiment was made four years ago and with practically the same results," said he. "The whole thing down to the fine details is on the shelves of our library."

Public utilities maintain libraries for two general purposes—welfare of employees and executive information. The former usually are connected with recreation rooms for the men, where they may go and read for profit or pleasure in the evening or while waiting for their runs. But it is with the latter that we are concerned in this instance.

The ideal arrangement is to have a central organization in charge of a librarian, whose duty it is to collect information on all matters pertaining to the various branches of the business; to mobilize data so that they may be readily available for reference and research, and in addition to see that all articles of interest are brought to the attention of department heads. The librarian should be an expert in his subject and the material he is handling, who will forecast areas of interest in the industry and be prepared beforehand for inquiry from the executive.

One large traction company in the state has in connection with its executive offices a library which is primarily a bureau of current intelligence. Here a librarian with assistants and clerks daily makes clippings from some forty newspapers. Newspaper descriptions of valuable reports are followed up and copies obtained, if possible. In all cases an effort is made to get at the original source of the matter described. Periodicals received—I believe there are sixty or more of them—are scanned and articles of special interest are listed on a route sheet which is attached to the magazine, so that it reaches the members of the organization interested. Special services are performed, such as making photostats of copies of data not otherwise obtainable.

MAKE A CARD CATALOG LIBRARY

Such a system is desirable, and, to a great corporation, imperative, but for most of us it is not possible and we content ourselves with the more or less limited amount of information which comes to our personal attention. But even this may be collected into a library of incalculable value if we systematically accumulate matter in our own special field. You read an article dealing with a certain subject and are impressed with its excellence; months later this very subject comes up and it would be highly advantageous to refer to the article. You cannot remember in just what periodical it appeared—was it *Aera*, the ELECTRIC RAILWAY JOURNAL, or some other technical journal? You search through your files and after much wasted time you may locate it or give up the search, with a vague regret that your memory is not better. Had you not depended on the overworked memory the time would have been saved and the worry spared.

And it is very easy to devise an accurate substitute—a card index topically arranged. The only plant required is the index and a filing cabinet. Whenever you happen upon a subject which seems to have possibilities make a note of it and have your stenographer make up a subject filing card. The card should indicate the subject heading, a brief description of the field covered and a suitable reference to the periodical. In this way you will accumulate a ready reference library which will be most useful and accessible.

In addition to this, you will have your own shelves of books, and it is not possible to go into a discussion of their contents, as each individual's problem differs. There should be, however, in every street railway office copies of the proceedings of the American Association, public utilities reports annotated, pamphlet laws of the states, files of *Aera* and the ELECTRIC RAILWAY JOURNAL, department reports of Pennsylvania and the monthly bulletins of the United States Department of Labor.

Having established your own special library, which is necessarily very limited, you will have occasion from time to time to examine other areas. The average public library will not supply the information desired, and even if it does, it takes work to "dig it out." Some few cities have established branch libraries to render such service, but they are rare. A pioneer in the field is Mr. Dana of Newark. Desiring to render the utmost possible service and finding that the business men did not come to his library, which was somewhat out of the way, he reached out and placed a strictly business branch in the heart of the business district. Here is to be found a skilled staff for finding or abstracting material. Men engaged in business call for chemical formulæ, the transport facilities in foreign countries, the history and standing of corporations, farming conditions in Western states and a thousand such queries, most of which the library is equipped to answer.

But Newark is the exception, and the need for some clearing house of special information has been so keenly felt that it has resulted in the formation of the Special Libraries Association. In most large cities we have today branches of the national association, having access to the majority of special libraries in the district. The object is to bring together all these sources into one reservoir, and this is done by indexing the subjects covered by the special libraries of the members, so that if a member desires information outside of the sphere of his activities he can find it in the library of some other who makes a specialty of that particular thing, and at the same time he stands ready to perform similar service when called upon.

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*Abstract of paper presented before the Pennsylvania Street Railway Association, Harrisburg, Pa., May 27-28.

With such an organization standing ready to supply information on any subject and our own special library for our own particular problems we should be able to meet any contingency which may arise, and, as there is nothing new under the sun, there should be a key to every question in one or the other of them.

A Reasonable Rate of Return on Investments*

Under Present Conditions of Individual Extravagance, Restricted Production and Currency Inflation Not Less Than 10 Per Cent Is a Reasonable Return

By C. L. S. Tingley

Vice-President American Railways Company, Philadelphia

PRESENTED arguments tend to show that 9 per cent or 10 per cent should be the minimum equitable rate of return on investments in public utilities. In answering the question what is a "fair return" to be allowed, the commissions and courts have frequently gone astray. They have either found the answer in a negative, for example, holding that a 6 per cent return is not confiscatory, or else have traditionally failed to recognize the fact that capital is a commodity. The New York Public Service Commission, First District, recognized this principle in the Queensboro Gas & Electric case, June 23, 1911, when it said:

> Various standards have been suggested for determining the fair rate of return. The one which in our opinion is properly applicable is that the rate should be such that investors would be induced to provide the funds with which to construct and extend a utility. If the State were to fix a rate below this standard capital could not be secured. If investment were made before the State acted the original capital might be forced to remain, but additional capital could not be secured unless necessary to protect the first outlay.

It seems necessary to start from elementary principles, mostly well known, but which should not be forgotten. All capital is the product of work—physical, mental, or financial—and may be represented either by tangible property or that medium of exchange which we call money, either in the form of currency in our pockets or credit in the bank. When primitive man acquired more meat and skins than necessary he became the first capitalist; when he traded his surplus to some other caveman for a stone hatchet he became the first merchant.

But barter of commodities is inconvenient. The Greeks used oxen as currency; the Abyssinians used salt; shells were used in India; dried cods in Newfoundland, and tobacco in old Virginia. Commodities such as these could not be divided without loss, and a man seeking to exchange a whole ox for salt was forced to buy more than he needed. From this came the demand for some universal medium of exchange.

From the foregoing it is evident that that which gives value to money is labor or its product and the real value of a coin is that for which it can be exchanged. Adam Smith in his "Wealth of Nations" says:

> Thus, if a guinea be the weekly pension of a particular person, he can in the course of the week purchase with it a certain quantity of sustenance, conveniences and amusements. In proportion as the quantity is great or small, so are his real riches—his real weekly revenue. . . . A guinea may be considered a bill for a certain quantity of necessaries and conveniences upon all the tradesmen in the neighborhood. The revenue of the person to whom it is paid does not so properly consist in the piece of gold as in what he can get for it and what he can exchange it for.

The potent cause of the present price of money to the private borrower is the present extent of tax-free governmental securities. More than $34,500,000,000 in securities now outstanding are exempt from normal income taxes. About $16,700,000,000 are exempt from all taxes except estate and inheritance; about $14,000,000,000 of these are municipal bonds, $342,000,000 farm loans and $2,350,000,000 liberty loan bonds. If held in proper proportions, an individual can hold $160,000 of liberty and victory loans exempt from all taxation. Now the entire capital in street railways in the United States in 1917 was $5,532,000,000. Compare this with the huge sum of $34,000,000,000 removed from the realms of private enterprise. In addition last year the government collected in income, excess profits and surtaxes $6,000,000,000 more. So that $40,000,000,000 was withdrawn from the market for productive enterprise.

Banks are closing their doors to loans to public utilities. One banker states:

> Where under ordinary conditions expansion could be financed out of working capital, today it is in many cases impossible without asking the bank to become practically a partner in the business.

A further factor in increasing the cost of money is our faulty system of taxation. On this subject attention is called to recent pamphlet by Otto H. Kahn on "Two Years of Faulty Taxation," which shows the manner in which present taxation with its extremely high rates upon large incomes forces large investors into tax-free securities or into demanding higher rates of return. This is further corroborated by L. C. Leffingwell, Assistant Secretary of the Treasury, who stated in a recent address that

> the Treasury always asserted that the excess profits tax discourages initiative and enterprise, rewards overcapitalization and discourages conservatism in capitalization. . . . and adds to the cost of living. . . . Excessive surtaxes do not produce revenue, but drive capital into the billions of exempt securities.
>
> You can fix the price of capital, but you cannot make it work for that price. You can fix the price of labor, but you cannot make it work for that price. By holding down rates for the shippers, the railroads have been kept so poor that neither capital nor labor will work for them. The shipper has cheap rates, but he cannot get transportation.

Money is a commodity and those who desire it must pay for it, as well as for labor and materials. To show this several standard investment bonds of 1914 are listed, these having sold in 1914 to yield an average of 4.2 per cent. At the present time these same bonds are selling on an average of 5.47 per cent. Thus if 7 per cent, the favorite rate of return of most of the commissions, was a fair return in 1914, 9 per cent should be a fair return today. Seven per cent represents more nearly the open market price for money, and, in addition to citing the recent large ten-year loan of the Pennsylvania Railroad Company at a cost of 7½ per cent to the company, a large number of bonds are listed which can be bought in the open market to yield approximately 7 per cent.

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*Abstract of paper presented before the Pennsylvania Street Railway Association, Harrisburg, Pa., May 27-28.

This condition leaves the street railways so that from January 1 to April 16, 1920, for example, forty-four issues were quoted with a mean average of 49.1 per cent. A study of all street railway bonds, as well as a first-hand knowledge on the part of the writer of those of his own company, leads to the conclusion that at the present time an electric railway could not place a considerable amount at a higher price to the public than 80 per cent. Deducting banker's commission and other expense—say 5 per cent—the company would net 75 per cent, which leaves the company in this shape:

Cost of property	$1,000,000
Bond issue	800,000
Bond yield at 75	600,000
Capital stock to supply the remainder	400,000
Total capitalization	1,200,000
Ten per cent return on $1,000,000	100,000
Bond interest at 7 per cent	56,000
Amortization of $200,000 discount (thirty years)	6,666
Total fixed charge	62,666
Return on stock	37,334
Rate of return on stock	9⅓%

But the bonds cannot be sold unless they show approximately double the interest charges, which in this case would require $112,000.

There is another factor in the present high cost of money for public utilities. This is the comparatively modern notion that it is a fraud on the public to use surplus earnings for capital account. Before 1906 it was considered good practice, as it still is in other business, to put back into property a portion of the net earnings or else provide a sinking fund for debt reduction. Then the doctrine was enunciated that a public utility should earn only a fair return upon its value, and that fair return was generally construed to be the legal rate of interest or a little more. The logical result is that the margin of safety has shrunk to the vanishing point. Low rate bonds have been issued to increase rate of return on stock, but, there being no margin for stock, little was issued, a greater amount of bonds being the result. Thus fixed charges increased and the financial structure was distorted. The owners of the property no longer have a substantial interest therein. It is merely the result of another futile effort to override economic law by statute law.

The capital structure should be properly proportioned, the borrowed money should be not more than 60 per cent of the total cost, and the allowed rate of return should provide an attractive dividend and a sinking fund of at least one dollar for every two paid in dividends. Comparing with the former illustration on such a basis:

Interest on bonds and discount amortization	$62,666
Eight per cent on $400,000 stock	32,000
One dollar margin per two dollar dividend	16,000
Total return	110,666

This more nearly equals the bond sales requirement of $112,000.

While not exactly under the title, perhaps, there are some corollary causes of the high cost of money which should be mentioned under the following heads:

First, the increase in expenditure for public purposes.

Second, the wild orgy of public and private extravagance.

Third, the curtailment of production by labor.

Fourth, the unsound fiscal policy which has almost doubled our currency.

Until we begin, both as individuals and governmental agencies, to practice old fashioned rigid economy, increase production and return to a sound fiscal policy, there is no apparent hope of a return of a money price to a point where less than 10 per cent will produce funds necessary to develop and maintain the electric railway industry.

Bus Fares Too Low for Profit on Pacific Electric System

IN 1917 the Pacific Electric Railway bought out the private motor bus line with which it had been competing for two years between San Bernardino, Highland and Patton. The bus route and trolley line operated between competitive terminal points did not each serve the same intermediate territory, but outside of the terminals there was very little traffic as the country was very sparsely settled. When the Pacific Electric took over the bus route the bus schedules were so arranged that they did not conflict with the trolley schedules, but provided alternate service on the two routes, with the result that the trolley car mileage was very materially reduced.

For the bus service four cars were required. These were of special construction. The power plant was a 40-hp. Case engine, which was mounted on a tractor truck with the passenger body as a trailer. The power unit was specially designed and cut off immediately back of the front seat and made for a greatly shortened chassis. Pneumatic tires were used on the trailer and on the front wheels of the engine tractor, while solid tires were used on the rear wheels of the engine tractor truck. A picture of this bus will be found in the ELECTRIC RAILWAY JOURNAL for Sept. 29, 1917, page 589.

Bus operators are paid the same scale of wages as one-man car operators on the electric lines, and fares are the same as on the trolleys. The rates per mile are: One-way fare, 3 cents per mile; round trip, 2.5 cents; ten-ride individual ticket with a ten-day limit, 2 cents; thirty-ride family ticket with ninety-day limit, 1.5 cents, and sixty-ride individual ticket with forty-day limit, 1 cent.

This bus line, the only one operated by the Pacific Electric Railway, has not been a financial success. The principal reason is that the fares are too low. The company concludes that auto bus service cannot be operated with commutation rates at 2 cents per mile or less and says that it is a mistake for any corporation to put in such fares on a bus route. Another reason put forth is that the type of bus is not as satisfactory as some others.

Super-Power Investigation Appropriation

A COMMITTEE of Engineering Council made up of W. S. Murray, Prof. L. P. Breckenridge, Prof. D. C. Jackson and M. O. Leighton appeared before the House committee on appropriations in Washington recently in support of the appropriation of $250,000 asked by the Secretary of the Interior for investigating the possibilities of the Boston-Washington super-power project. The work would be undertaken by the United States Geological Survey and would cover water, steam, electric and oil power production and distribution in relation to the industries within the territory surveyed. On May 11 the House passed the sundry civil bill carrying an item of $125,000 for this purpose.

Iowa Railway Men in Conference

Two-Day Session of State Association Devoted to Discussion of Publicity, Labor Relations, Safety Cars and Legislative Matters

DISCUSSIONS on the proposed formation of an Iowa committee on public utility information, on the design and application of safety cars and on labor relations and legislative matters occupied the attention of the sixteenth annual convention of the Iowa Electric Railway Association at the Fontenelle Hotel, Omaha, May 20 and 21. This was the managers' meeting of the association, the mid-year meeting in the fall being arranged primarily for the operating men. The attendance at this Omaha meeting was therefore rather small and the three sessions were devoted to informal discussions of various policy matters. While there were no papers presented and no prepared discussions, certain timely topics had been scheduled for consideration and the interchange of thought and experience proved of great value to those present. The meetings were presided over by the vice-president, F. J. Hanlon, Mason City, Iowa, the president, J. P. Ingle, having resigned because of moving without the state during the year.

Almost the entire morning session of May 20 was devoted to the consideration of whether the association should organize an Iowa committee for disseminating public utility information, similar to the pioneer Illinois committee, and how extensive a plan of publicity should be undertaken. This subject was brought up through the report of H. E. Weeks, Davenport, as chairman of a committee to which had been assigned the task of looking into the advisability of extending the Illinois plan to Iowa. This committee reported that it seemed desirable that some publicity work should be undertaken by the Iowa association sooner or later, but that it did not seem feasible now, mainly on account of the limited resources of the association. In the discussion which followed it developed that several of the managers were doubtful as to the value of an organized publicity effort in behalf of the utilities. R. A. Leussler, Omaha, Neb., said that the matter had been considered by the Nebraska utilities and they had decided not to go into the proposition. He was of the opinion that a centralized bureau for circulating publicity matter was open to the accusation that it was for the purpose of twisting the public mind rather than setting it straight, and that the matter emanating from such a bureau was therefore subject to attack from a vicious newspaper and consequent failure. Mr. Leussler thought that the objection to this plan could be overcome by resorting to a very loose organization of the men handling publicity matters on the various railway properties, whereby they would keep in touch with one another, but issue all publicity matter in the name of the individual companies.

Several other railway men argued that the matter put out by a centralized bureau was very likely to be taken by the public or by the newspaper editors as undesirable propaganda, while O. H. Simonds, Dubuque; Rex H. Fowler, assistant secretary of the association, and others endeavored to explain how the publicity matter sent out could be made of such character that it would not be open to the criticism named. They cited the great success attending the effort of the Illinois committee, which has been free from any propaganda accusation. Various substitutes for the plan were suggested, including one whereby the individual companies would make as much use as possible of the matter emanating from the publicity bureau of the American Electric Railway Association and one proposed by C. D. Cass, Waterloo, for having publicity material worked up by the Iowa association, but distributed over the names of the individual companies. This last suggestion gained favorable comment from a number of the delegates, but the whole matter was finally referred to a committee which reported back the following day, recommending that the matter be held in abeyance until it could be taken up by the Iowa Electric Light Association, and that the board of directors of the railway association be authorized to take whatever steps seemed desirable in conjunction with the electric light and gas associations. The convention approved this recommendation.

SAFETY CAR DESIGN AND APPLICATION

T. C. Roderick, Davenport; Nic LeGrand, Safety Car Devices & Equipment Company, St. Louis, Mo.; C. E. Fahrney, Ottumwa; Mr. Hanlon, Mr. Leussler, Mr. Cass and others contributed to a good discussion of the safety car, which brought to light the fact that several of the Iowa managers are very strongly in favor of a double-door opening, or a separate entrance and exit for safety cars. Mr. Hanlon said he had one line equipped with safety cars built with double openings which made a schedule speed of 11 m.p.h., and that he had found it impossible to maintain this schedule speed with safety cars having the single-door openings. Some one accused Mr. Hanlon of favoring a 60-in. double-door opening so he could personally get on and off the cars, he being a near 300-pounder, but he retorted with the information that his cars had two 25-in. door openings. While it was admitted by the proponents of the single opening that a separate entrance and exit would decrease the standing time slightly, they argued that the double doors resulted in a longer platform and fewer seats and made it impossible for the operator to police the car as well as he could with the single-file loading and unloading. But these points did not seem to lessen the enthusiasm of several of the railway men for the double-door car.

Another interesting point brought out by one of the speakers was a plan for decreasing the shop time and the expense of reconstructing the safety car vestibule when damaged in collision by making use of a detachable vestibule. This would be so arranged that a damaged vestibule could be readily removed and a new one, all made up, set in its place and simply fastened by bolting. It was understood that some of the manufacturers are about to inaugurate this construction improvement, for it is undesirable to strengthen the vestibule construction materially because that would tend in collisions to carry the blow to the more important body structure, which now usually escapes damage.

Mr. Roderick expressed the opinion that safety cars could be operated on all the lines in Davenport, Iowa, and Rock Island and Moline, Ill., with resulting better returns, and he made the further comment that there are few lines on which they could not be satisfactorily operated. He said it was the plan of the Tri-City company to use double-truck cars for extras during the rush-hour service after safety cars had been installed, but that in following out this plan the company would sell its best double-truck cars, since they would bring the most money, and retain the older, less valuable cars for its own use.

In his talk Mr. LeGrand endeavored to answer the criticism that safety cars are flimsily constructed by pointing out that the safety cars built today are much stronger and somewhat heavier than the original designs. He spoke of the importance of a careful publicity campaign as a preparatory step to the installation of safety cars and expressed the belief that the best way to go about this problem was to go direct to the editors of the papers and convince them that the small cars will result in a real improvement of service. He said that safety cars are not applicable everywhere, but that there is not a company that does not have some lines where safety cars should be used. He admonished the managers not to install them, however, on a car for car basis, but on a plan which would insure a decided increase in frequency of service. Mr. Weeks told how he had taken the Mayors of Davenport, Rock Island and Moline to Terre Haute to see the safety cars in operation and how these magistrates had been completely sold on their desirability for the Tri-City lines. Mr. Fahrney told of the installation of seventeen safety cars in Ottumwa to replace fourteen two-man cars, this providing a 100 per cent installation for the city. These seventeen cars give a ten-minute service on all lines except one. None of the trainmen lost their positions because of the installation of safety cars, the natural turnover having taken care of the shrinkage. A new wage scale of 54, 56 and 58 cents an hour became effective with the safety car installation, and Mr. Fahrney reported that the men now liked the cars.

A. Jenks, General Electric Company, spoke of the tendency of big companies to put safety cars on some little stub-end line where few people saw them and where they had little opportunity to demonstrate their real worth. He said that the best way to sell the safety cars to the public is to put them on the best line where there will be an opportunity for them to show what improved service will do.

W. D. Brooks, Westinghouse Electric & Manufacturing Company, urged the railway operators to spend more money in snow-fighting equipment and in keeping the tracks clear and therefore lessen damage to motor equipment. He thought it was more profitable to spend money in snow fighting than in the maintenance of crippled equipment, for the former plan made for continuity of full service, while the latter might cause service reduction and delay.

Mr. Cass gave some personal experiences in explaining the grief through which his company has had to go in the plan adopted about four years ago to convert the cars in Waterloo for one-man operation. Bad weather, heavy increases in traffic, hand brakes, manually operated doors, absence of safety devices contributed to the difficulties encountered.

A discussion of service-at-cost franchises was included in the program, but it developed that there were not many enthusiasts for this type of franchise in Iowa. Those who were working in this direction to solve their local situation were doing so on the theory that while it was not particularly desirable, it seemed to be the best arrangement that could be secured. Greater interest was manifest for the fare situation throughout the State. As Iowa has no public utilities commission, the matter of rates is in the hands of the local Councils, and there is question as to whether a municipality can force a company to continue service on a 5-cent fare when this is specified in the franchise. The Supreme Court of the State reached a decision in connection with Ottumwa that the municipality has authority in this connection, but it consented to a rehearing of the case. The contention of the company in this case has been that the municipality does not have the right to contract as to the rate of fare unless this right is specifically given by the Legislature. The court is expected to reach a decision on the rehearing about June 20. This has a vital bearing on the general situation in Iowa and is awaited with great interest.

Mr. Simonds was requested to tell the convention about the recent Circuit Court decision which authorized a higher rate of fare in Dubuque. He pointed out that unfortunately this was an agreed-upon decree and could not be taken as a precedent for other Iowa companies. The full details of this decree were published in the May 22 issue of the ELECTRIC RAILWAY JOURNAL.

Mr. Cass said that the franchise which his company has in Waterloo is the only one in Iowa which provides for a change in the rate of fare. A fixed rate is the general provision of Iowa franchises, and up to the present no court has said that this was not a contract and hence the rate of fare could be changed. He said that he believed the whole subject of street railway rates was purely an economic matter and that it was coming to be so considered by most cities. He referred to the good feeling in this connection which seemed to prevail in the hearings now taking place before the city Council at Waterloo. While the franchise there provides for an increased fare, 5 cents is still the prevailing rate. This came about primarily because just one week after the franchise became effective in 1918 the government took over the Waterloo, Cedar Falls & Northern Railway and did not seem to have much concern about the rate of fare.

KEEP CLEAR OF THE CLOSED SHOP

At the final session of the association Alvin Johnson, an Omaha attorney, made a very able plea for the principle of the open shop. He said that the real significance of the labor movement, the real issue, is whether or not a fraction of the people organized into groups, controlled by a handful of men, shall be permitted to control American industry and even dominate American government. He expressed the belief that the people are no longer sympathetic with the acts of unionism in promoting the closed shop principle. In proof of this he quoted Henry Sterling, chairman of the legislative committee of the American Federation of Labor, appearing before a Senate sub-committee to oppose the Poindexter anti-strike bill for railroads, as saying: "Did it ever occur to you that the public does not give a d—— for the man who works? The public is the one great sinner in the industrial field. It makes all the bad conditions. It is positively criminal in its indifference. The only party considered in the conflict is this so-called innocent third party, while as soon as we who work take some action for our own welfare, they only want to put us in jail."

Mr. Johnson then emphasized the duty of employers to take definite steps to see that all employees understand the policies and principles of the company; that they have the point of view of the employer on vital problems and know something about his obligations, and that they are advised as to the facts to counteract the destructive propaganda which is being circulated so freely among laboring people. There is too much waiting on the part of the employers for some national movement to correct the situation, but the problem is one with which every employer should concern himself actively. The speaker referred to the sweep of the open shop principle in the South and West and commented that Hoover and Poindexter are the only Presidential candidates who have come out definitely for the open shop. He explained at some length how the open shop is guaranteed by the Constitution and characterized the closed shop as industrial slavery and the open shop as industrial freedom. He spoke of how the American Federation of Labor has carried the closed shop principle to public office through its resolution directing all union men not to give their political support to any man unless he carried a union card or was avowedly favorable to unionism. Mr. Johnson asserted that it was the duty of every American to discourage the closed shop and do all in his power against it, and not only to believe in the open shop but to practice it. He said that whenever a railway manager enters into a contract with a union, even though that contract may contain an open shop clause, he is really acknowledging the closed shop, because that is what the union stands for, that is one of its major planks.

Mr. Johnson said that every employer should make a survey once in a while to determine whether there were conditions unfavorable to labor and then correct them voluntarily, thus anticipating the business agent and making the union unnecessary to the best interests of the employee. Mr. Cass further emphasized this thought, in the discussion which followed the talk by Mr. Johnson, by urging the managers not to overlook the spirit of fair play in their dealings with workmen. He said it was the absence of this spirit which had been largely responsible for the development of the American Federation of Labor and that it would be only that which would undo the radical tendencies of unionism. He said organizing and collective bargaining of the men cannot be prevented unless a substitute is provided whereby labor will know it is receiving fair play.

CLOSING BUSINESS OF THE ASSOCIATION

The next meeting of the association, it was decided, will be at Omaha, Sept. 16 and 17. This meeting will be arranged primarily for the heads of the departments or operating men, and the managers will "not be urged" to attend. John Sutherland, Davenport, chairman of the program committee for this meeting, made a report which indicated that the meeting will be an exceedingly valuable and enjoyable one to the operating men.

Mr. Fahrney and Mr. Weeks were nominated for directors of the association for a term of three years by the nominating committee, of which T. C. Roderick, Davenport, was chairman. The convention approved a motion electing them. Later at a meeting of the board of directors the following officers were chosen: President, H. E. Weeks, vice-president Tri-City Railway & Light Company, Davenport, Iowa; vice-president, R. A. Leussler, general manager Omaha & Council Bluffs Street Railway, Omaha, Neb.; secretary-treasurer, C. E. Fahrney, general manager Ottumwa (Iowa) Railway & Light Company; assistant secretary, Rex H. Fowler, 510 Crocker Building, Des Moines, Iowa.

The delegates to the convention were entertained Thursday evening with vaudeville at the Orpheum Theater. Friday noon a special car took them to Manawa Lake, a few miles from Council Bluffs, where they were the guests of R. A. Leussler at a fine dinner, followed by a boat ride and other amusements in the park maintained by the Omaha & Council Bluffs Street Railway. A brief visit en route from the lake was paid the company's automatic substation in Council Bluffs.

Data regarding this substation were printed in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 4, 1919, page 54. It was then under construction.

Changes in Living Costs

THE following tables show the cost of living in several industrial centers in the United States in December, 1919, as compared to the same month in 1918 and 1917. The information contained in these tables was prepared and issued by the United States Department of Labor, Bureau of Labor Statistics, Washington. Weighted averages were attained by the same method of calculation as heretofore.

PERCENTAGE OF TOTAL EXPENDITURES DECEMBER, 1919

	Food	Clothing Male	Clothing Female	Total Clothing	Housing	Fuel and Light	Furniture and furnishings	Miscellaneous	Total
Atlanta, Ga.	38.5	....	....	18.6	10.4	5.6	5.6	21.4	....
Birmingham, Ala.	38.1	....	....	16.5	12.2	4.6	5.3	23.3	....
Cincinnati, Ohio	40.6	....	....	15.2	14.4	4.1	5.2	20.3	....
Denver, Col.	38.3	....	....	16.2	12.0	5.7	5.5	22.4	....
Indianapolis, Ind.	37.0	....	....	15.8	13.1	5.9	5.9	22.2	....
Kansas City, Mo.	38.7	....	....	15.2	13.6	5.7	4.9	21.8	....
Memphis, Tenn.	36.2	....	....	16.3	13.5	5.1	4.5	24.4	....
Minneapolis, Minn.	35.4	....	....	15.5	16.8	6.8	4.8	20.5	....
New Orleans, La.	42.6	....	....	15.0	12.0	4.8	3.9	21.8	....
Pittsburgh, Pa.	40.2	....	....	17.8	14.5	3.2	5.4	18.9	....
Richmond, Va.	41.6	....	....	15.9	10.5	5.6	4.8	21.5	....
St. Louis, Mo.	38.5	....	....	15.0	13.4	4.9	5.6	22.6	....
Scranton, Pa.	42.6	....	....	18.4	10.9	4.6	4.9	18.5	....
PERCENTAGE INCREASE DECEMBER, 1919, OVER DECEMBER, 1917									
Atlanta, Ga.	27.9	88.0	56.7	66.9	32.6	30.8	49.9	31.7	37.9
Birmingham, Ala.	26.5	70.6	49.2	57.6	34.9	39.8	45.1	26.8	34.3
Cincinnati, Ohio	22.9	85.6	82.8	84.2	12.8	11.0	51.1	40.3	35.2
Denver, Col.	26.0	87.2	79.3	82.1	33.5	19.6	46.3	32.3	38.2
Indianapolis, Ind.	28.2	75.3	72.7	75.8	11.6	27.3	48.4	38.1	36.5
Kansas City, Mo.	24.5	79.0	94.3	89.9	26.0	27.5	61.8	31.4	38.2
Memphis, Tenn.	28.4	64.6	66.9	66.2	23.1	34.1	53.1	28.3	35.2
Minneapolis, Minn.	34.1	66.6	67.4	8.0	22.4	45.6	25.4	25.4	32.7
New Orleans, La.	21.1	91.8	77.1	83.2	10.8	24.7	57.6	35.1	33.9
Pittsburgh, Pa.	25.1	84.1	82.4	82.8	15.5	9.8	63.1	28.2	36.2
Richmond, Va.	23.1	85.0	73.6	78.6	9.8	18.7	55.9	23.9	32.0
St. Louis, Mo.	26.2	64.6	89.7	78.1	16.8	8.2	52.9	30.3	34.2
Scranton, Pa.	26.9	69.1	86.8	82.1	2.4	31.5	48.9	34.7	37.1
PERCENTAGE INCREASE DECEMBER, 1918, OVER DECEMBER, 1917									
Atlanta, Ga.	18.9	43.3	22.3	29.0	14.0	17.0	24.9	14.8	19.7
Birmingham, Ala.	17.7	30.7	19.3	23.8	8.1	22.8	19.4	13.8	17.0
Cincinnati, Ohio	15.3	41.7	28.8	33.8	0.2	10.0	25.7	20.4	17.3
Denver, Col.	20.0	46.3	36.9	40.1	12.8	8.1	22.6	14.8	20.7
Indianapolis, Ind.	17.8	38.4	28.1	32.4	1.6	19.7	18.7	21.9	19.1
Kansas City, Mo.	17.3	42.9	39.1	40.7	5.3	18.0	31.1	15.6	19.6
Memphis, Tenn.	20.3	32.9	25.2	27.7	**	26.8	25.4	16.1	18.6
Minneapolis, Minn.	17.7	30.6	35.4	33.5	*0.1	14.7	18.1	12.3	15.8
New Orleans, La.	16.6	44.4	31.4	36.7	**	19.7	23.7	15.8	17.9
Pittsburgh, Pa.	18.8	41.3	33.0	35.9	7.6	9.2	26.3	16.2	19.8
Richmond, Va.	20.5	43.4	27.2	33.8	1.0	11.8	26.3	9.0	17.9
St. Louis, Mo.	18.0	29.9	34.9	32.4	2.7	4.8	21.8	14.5	16.7
Scranton, Pa.	21.3	37.0	32.6	34.4	0.5	24.7	27.0	21.4	21.9

* Decrease. ** No change or practically so.

Since 1911 the number of persons transported per accident by the Philadelphia Rapid Transit Company has increased from 18,640 to 50,043, equivalent to a gain in "safety efficiency" of 18.8 per cent per year.

Electric Operation on the B., A. & P.[*]

During Seven Years of Heavy Freight and Passenger Service the Butte, Anaconda & Pacific Railway Electrification Has Increased in Capacity and Effectiveness—Locomotive Maintenance Costs Are Low

BY F. W. BELLINGER
Electrical Superintendent Butte, Anaconda & Pacific Railway, Butte, Mont.

THE Butte, Anaconda & Pacific Railway was built in 1892, principally for transfer service between the ore mines in Butte and the Washoe Smelter at Anaconda. Between the two cities the tracks are about 26 miles long. The railway was electrified in 1912 and 1913, the present total electrified mileage of single track being 120, which includes the main line, yards and sidings.

WHAT THE ELECTRIFICATION ACCOMPLISHED

To illustrate how the 2,400-volt direct-current system was able to meet the unusual conditions on this railway a few concrete examples will be given:

On the Smelter Hill line, 7 miles long with a 1.1 per cent grade, twenty-five ore cars, averaging 70 tons each, were hauled, as compared with sixteen cars hauled by a steam engine. With the electric locomotive the round trip is made in an hour, thus rendering it possible, unless there are unusual delays, to make eight round trips per day, or to deliver 200 cars in ten hours, as compared with six round trips and ninety-six cars per day with steam. Thus there is an increase of more than 108 per cent in this particular service, using the same crew and working the same hours.

In our main-line freight service between East Anaconda and Rooker, 20.1 miles, the standard westbound train formerly handled consisted of fifty cars, aggregating 3,500 tons in weight, and the average running time, with no stops, was about an hour and a half. This corresponds to 13.4 m.p.h. At first the electric locomotive took only the standard train, making the trip without stops in an hour, or at 20 m.p.h. The ruling gradient on the westward trip is 0.3 per cent and with a fifty-five car train the steam engine made approximately 7 m.p.h. The electric locomotive with a similar train made 16 m.p.h. on the same grade. The weight of train on this run has been gradually increased up to sixty-five loaded ore cars, averaging about 71 tons each, a trailing load of 4,620 tons. Adding 160 tons for the locomotives and 20 tons for the caboose gives a gross train weight of approximately 4,800 tons.

A comparison of June, 1913, under steam operation with June, 1914, under electrical operation shows that with a slight increase in the total tons of ore handled the average tonnage per train was increased from 1,761 to 2,378, or 35 per cent. The decrease in average time per trip was 27½ per cent. There was also a decrease of 75 per cent in the time lost through delays from all causes.

The trackage in and about the mines runs on many different levels, thus necessitating heavy grades and curves. It is safe to say that in approximately 25 miles of electrified track enough tangent track could not be picked out to equal 5 miles. Thus the overhead system has been built up to meet unusual conditions.

The original overhead installation was somewhat experimental in so far as the support structure was concerned. Subsequent to the first year of operation under electric power we found it possible to make a considerable reduction in the cost of overhead construction due to a more general use of brackets in place of the two-pole spans. On curve construction, up to and including four tracks with four degrees of curvature, we trim the pull-off points to a substantial backbone. Five tracks or more are trimmed in the usual manner, except that the backbone is done away with and a pole is substituted at each pull-off point. This change in construction was found necessary to reduce maintenance cost.

Three linemen are employed to maintain the overhead lines and feeders, with headquarters at Anaconda. One box car with a wood tower is kept for heavy line work and construction jobs. A Federal 1½-ton truck, equipped with car wheels and a Trenton tower, provides a convenient car for all general line work. The Trenton tower, as well as the movable table on top, is well insulated, so that it is possible to work on the contact wire under all weather conditions.

The average cost of maintenance of overhead system per mile per year for the past four years is $137.57. Table I shows the several items of cost for 1918.

TABLE I—COST OF OVERHEAD MAINTENANCE,
B., A. & P. RAILWAY, 1918.

Poles and fixtures, labor	$3,261.52
Poles and fixtures, material	687.46
Feeders, labor	554.10
Feeders, material	87.77
Trolley, labor	3,889.79
Trolley, material	1,168.86
Bonding, labor	1,410.96
Bonding, material	1,980.23
Total of above	13,040.69
Motor car	1,119.65
Work train	2,290.04
Total maintenance expense	$16,451.08
Number of miles operated	120.27
Cost per mile per year	$136.78

The greatest wear, of course, comes at rigid points, such as pull-offs and rigid hangers. We use the roller pantographs, one to each locomotive, with a 2,400-volt bus line when two locomotives are connected in series. This bus line insures continuous current supply to both locomotives while passing under wood section insulators or in the event of arcing at rigid points. Currents up to 400 amp. per engine are collected, and we believe that better operating conditions are obtainable from the use of two pantographs.

Pantograph rollers give an average life of 20,000 to 40,000 miles. Each roller is mounted on a pair of Hyatt roller bearings, which wear out as many as three roller tubes. These bearings are greased twice each week with semi-hard grease. The contact pressure is main-

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[*] Abstract of contribution to discussion of report of committee on electrification of steam railroads, F. M. Kerr, chairman, to N.E.L.A. at Pasadena Convention, May 21, 1920.

TABLE II—MAINTENANCE AND OPERATING DATA, BUTTE, ANACONDA & PACIFIC RAILWAY, 1914-1919.
(Road Electrified 1912-1913)

	1914	1915	1916	1917	1918	1919
Number of electric locomotives	17	18	21	24	28	28
Average locomotive weight, tons	80	..	..	..	..	
Miles single track basis	90	90	114	114	120	122
Cost of repairs	$27,811	$35,253	$49,811	$55,846	$54,167	$35,264
Freight revenue miles	321,946	317,595	505,162	412,509	413,519	226,851
Passenger revenue miles	65,428	87,625	100,290	94,659	80,020	90,805
Switch revenue miles	136,892	161,871	404,356	367,690	324,322	197,838
Mixed and special revenue miles	......	......	616	456	......	......
Total revenue miles	524,266	567,091	1,011,424	875,314	817,861	515,474
Non-revenue miles	......	5,507	2,477	10,796	2,957	1,142
Total locomotive miles	524,266	572,598	1,013,901	886,110	820,808	516,616
Maintenance per locomotive-mile in cents (not including depreciation)	5.3	6.16	4.91	6.3	6.4	6.8

tained at approximately 30 lb. and is adjusted by means of a hand spring-balance. All adjustments of this kind are made on a special track, wired but not energized.

Three electrical workers are employed at the machine shop to make such repairs as are necessary on electric locomotives, shop lights and power, coach heating and lighting, as well as to assist in the maintenance of block signals and dispatchers' telephones.

The equipment which must be maintained comprises twenty-eight electric locomotives, weighing 82 tons each, and equipped with four GE-229 motors with type M control. There are also two steam engines which have been retained for service on the Georgetown branch and on a sand-pit job not electrified.

The cost of the maintenance work on the locomotives, together with the data which are necessary in order to permit comparisons to be made, are given in Table II.

For comparison with the data in Table II, it is interesting to note that during 1909 the maintenance cost for steam locomotive operation per locomotive-mile, not including depreciation, was 16.1 cent. Wages and material have increased greatly in cost since 1909, so that the real saving is not shown by the data in Table II.

Taking up some of the details of maintenance work, attention may first be directed to tire wear. On account of the character of the track on this road, it is necessary to turn the tires every year. Tire wear is most noticeable at the flange. Our principal haul is "infested" with curves of 8, 10 and 20 deg. In all there is a total curvature of 13,342 deg. between the mines at Butte and the Washoe Smelter at Anaconda.

The average time for each locomtive in the shop per year is ten days, while the shortest is four days. During this time a general overhauling is given to the mechanical and electrical equipment. The time for electrical inspection and repairs varies with the class of service. In general, the electrical work is completed in less than two days. Poor rheostat connections and tight contactor pins give the only causes for electrical work in the cab. Regarding rheostats, ours have stood the test beyond any expectations. The first year or two of electrical operation developed a weakness which was soon overcome by replacing the jumpers between the rheostat boxes.

Our electric locomotives are inspected approximately every forty days. Engines working at Butte or on Butte Hill have no care except oiling and renewal of brake shoes. The maximum number of days which a locomotive has been away from the shop is seventy, during which it was working two ten-hour shifts per day. Monthly inspections, as we call our forty-day periods, are made over a cinder pit, summer and winter. Two electrical men inspect a double unit in twenty minutes to an hour, making all necessary repairs and adjustments. One machinist inspects the mechanical parts in the same time.

Seven machinists, two machinist apprentices, four helpers, two drill press men, one wiper, one oiler, one boilermaker and his helper, three blacksmiths and three helpers, who work on steel cars principally; a pipefitter and helper and a carpenter form the machine-shop crew.

One of the first questions asked by all visitors is: "How do your commutators wear?" In reply, it can be said that to date we have not turned a single commutator on account of wear. We have turned a few due to injuries received when inspection plates were allowed to fall on the commutators. The wear is now just appreciable. The color could not be improved, and there is no evidence of burning or flashovers. We are using an electro-graphitic brush, which gives very good mileage and very little breakage.

TABLE III—OPERATING DATA, B., A. & P. RY.

	April, 1917	April, 1918
Number of cars handled during month	31,282	25,980
Average cars per day	1,042.7	866.0
Total tonnage for month	1,337,911	1,137,498
Average tons per day	44,597	37,917
Number of main-line trains east per month	190	154
Total tonnage east per month	275,327	240,217
Average tons per train east per month	1,449	1,560
Number of main-line trains west per month	190	155
Tonnage of trains west per month	787,634	716,925
Average tons per train west for month	4,198	4,625
Average tons per train east and west	2,797	3,098

Like all electric roads, we have had some armature trouble. However, this amounts to so little that we keep but one man as an armature winder and his time is spent principally on equipment other than armatures. Recently we went one year and eleven months without an armature failure.

In order to give an idea of the amount of traffic handled the figures for April, 1917, and April, 1918. may be taken as representing average conditions. These are given in Table III.

Accountants Needed by I. C. C.

THE Interstate Commerce Commission is in need of a large number of examiners of accounts of common carriers, at salaries ranging from $1,800 to $3,000 a year, with the addition of the bonus of $20 a month granted by Congress. The United States Civil Service Commission is receiving applications for these positions.

The commission states that the positions afford an unusual opportunity to qualified persons; that under recent legislation returning the railroads to private control the duties of the Interstate Commerce Commission are greatly increased, and that those who enter the service as examiners of accounts will receive invaluable training in their chosen profession and at the same time will have a part in a public work of first importance. Applicants for these positions will not be given written tests in an examination room, but will be rated solely upon their education, training and experience.

Notes on the C., M. & St. P. Electrification*

Experience with Electrification of 645 Route-Miles of Track Shows the Reliability and Economy of Electrical Operation

BY R. BEEUWKES
Electrical Engineer Chicago, Milwaukee & St. Paul Railway

THE electrification of the C., M. & St. P. Railway now extends from Harlowton, Mont., to Avery, Idaho, and from Othello to Tacoma, Wash., a total distance of 645 route-miles, or of about one-third more track-miles. The following general notes regarding some of the items of a list suggested as representing matters of particular interest in connection with electrification work are based on experience with this installation:

The electrification work on the Rocky Mountain and Missoula divisions was carried on during the years from 1914 to 1916, when labor and material conditions were comparatively stable and arrangements for the supply of both could be made in such a way as to avoid the delays to which the work west of Othello, carried on largely during the war, was more or less subject. Costs for the former work are therefore believed to be more capable of application of the necessary corrective factors corresponding to present and other assumed pipe standards and approximate figures are given in Table I.

TABLE I—COSTS AND OTHER DATA

	Average Cost per Route-Mile	Various Average Unit Costs	Per Cent Item Cost to Total, Excluding Locomotives
Trolley system complete	$8,390		47.7
Transmission system complete	2,360		13.3
Per mile of transmission line		$2,835.00	
Substation layout complete	6,050		34.4
Per station		189,400.00	
Per kilowatt		45.00	
Substation building and grounds:			
Per station		38,400.00	
Per kilowatt		9.50	
Operators' dwellings, etc.:			
Per station		6,100.00	
Per kilowatt		1.50	
Substation apparatus:			
Per station		144,900.00	
Per kilowatt		34.00	
Miscellaneous, including right-of-way, changes in telegraph and telephone lines to clear transmission and trolley, store-houses, minor apparatus at shops and round houses, etc.	265		1.7
Engineering and administration, except that for drafting and inspection for substations, charged direct	514		2.9
Locomotives, including transportation, messenger and miscellaneous charges:			
Per road locomotive		122,500.00	
Per switching locomotive		37,700.00	
Total per route-mile, excluding locomotives	17,579		100.00
Route-miles			438
Actual mileage transmission line			364
Total kilowatt capacity of substations			59,500

Number of locomotives—Twelve passenger, thirty freight and two switching locomotives.

Number of substations, fourteen. Two operators' buildings at each station.

Automatic signals—Existing battery fed track circuit and semaphore signals were replaced with alternating-current light signals fed from a 4,400-volt primary circuit connected to substations: costs not included.

The figures in Table I are given mainly to furnish an approximate idea of the relative importance, from a cost standpoint, of the different items involved.

Table II indicates the relative magnitude of the more important items of freight operating expense, as between the electrified Rocky Mountain and Missoula divisions and the adjacent steam-operated divisions. The items are those which are affected by the type of motive power employed, cost of the Missoula division being taken as unity. The figures apply for the last six months of 1918, data for which were readily available.

TABLE II—COMPARATIVE OPERATING EXPENSE

	Columbia Division	Idaho Division	Missoula Division	Rocky Mountain Division	Musselshell Division
Steam or electric locomotive repairs	$1.97	$2.34	$1.00	$0.86	$2.26
Train conductors and brakemen	2.78	3.05	1.00	1.46	1.61
Train enginemen and motormen	1.84	2.17	1.00	1.30	1.21
Train locomotive fuel or power	2.05	2.34	1.00	1.04	1.38
Enginehouse expense, train	3.15	2.50	1.00	0.80	3.71
Total yard service*	0.78	1.12	1.00	0.99	0.71
Total of items of expense affected by type of motive power†	1.67	1.90	1.00	1.11	1.33

*In 1918 a considerable portion of the switching was still done by steam, sufficient electric switching locomotives not having yet been received.

†Includes superintendence, maintenance of substations, transmission and trolley systems, water and fuel stations, shops and engine houses, also locomotive and train supplies, in addition to the items for which individual comparison is given in the tabulation.

In considering the data in Table II, it should be noted that the Musselshell division is of low grade, maximum being 0.4 per cent, while the Rocky Mountain, crossing both the Belt and Rocky Mountain ranges, and formerly, under steam operation, constituting the "neck of the bottle" as far as operation was concerned, has long mountain grades of 1.7 and 2 per cent. The Missoula division, crossing the Bitter Root Mountain, with long 1.7 per cent grades, might not appear to involve as difficult operating problems as the Columbia division, with its long 2.2 per cent grades on the east slope of the Saddle Mountain and its comparatively long 1.6 per cent grade on the west slope. However, the much more unfavorable weather and topographical conditions existing on the Missoula division more than offset the difference in grades.

Some of the more important reasons for the advantageous results secured under electrical operation are as follows:

The cost of engine repairs per 1,000 ton-miles is much decreased, due to the fact that not only is the cost of repairs per engine-mile of the electric locomotive much less than that of the average steam locomotive replaced, but the number of engine-miles per 1,000 ton-miles is, on account of the greater capacity of the electric locomotive, much less. The engine-miles per 1,000 ton-miles for the Missoula division under electric operation in the 1918 period taken above were only about 55 per cent of that of the latter half of 1915 under steam operation.

Train conductor and brakemen expense per 1,000 ton-miles is reduced under electrical operation due to increased ton-miles per train-mile and increased train speed. This item for the Missoula division for the 1918 period was about 9 or 10 per cent less than that of the 1915 steam period, while on the Idaho and Columbia divisions, still operated by steam, the expense per 1,000 ton-miles more than doubled.

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*Abstract of contribution to discussion of report of committee on electrification of steam railroads, F. M. Kerr, chairman, to N.E.L.A. at Pasadena Convention, May 21, 1920.

Enginemen's expense decreases under electrical operation, due to the same causes which decrease trainmen's expense. For the Missoula division this item increased only a few per cent for the 1918 period as compared with the 1915 period, while for the Idaho and Columbia divisions it practically doubled.

Regarding the items of train locomotive fuel, it should be stated that the factors given are not based on the actual cost of fuel for the particular divisions involved, but on the average fuel price for the system. Cost of fuel haul is not taken into account.

The question of the relative reliability of steam and electrical operation is one that is frequently raised. The data given in Table III will be of interest in this connection. This recapitulation gives the delays to passenger trains on basis of miles of line operated for the several railway divisions of the Milwaukee west of Mobridge. Similar information is not conveniently available for freight train performance, but delays to freight service would naturally be reflected in the passenger train performance.

TABLE III—RECAPITULATION OF PASSENGER TRAIN PERFORMANCE, SHOWING DELAYS TO TRAINS ON THE BASIS OF MILES OF LINE OPERATED; LINES WEST OF MOBRIDGE; MONTHS OCTOBER, NOVEMBER AND DECEMBER, 1919, AND JANUARY, FEBRUARY AND MARCH, 1920

Item		Mobridge to Marmouth Steam 190 Miles	Marmouth to Harlowton Steam 340 Miles	Harlowton to Avery Electricity 437 Miles	Avery to Cle Elum Steam* 325 Miles	Cle Elum to Seattle Steam* 90 Miles
1. Meeting and blocked behind passenger		18.33	11.33	15.15	10.33	12.60
2. Meeting and blocked behind freight		14.03	5.88	6.49	1.98	2.89
3. Extra cars		1.33	0.58	0.02	2.35	1.37
4. Excess time switching		1.35	2.69	2.16	1.54	4.51
5. Electric block signals		0	0.13	9.52	4.07	10.62
6. Slow orders		4.54	1.37	1.29	0.33	5.38
7. Bad weather and poor coal		109.2	13.59	3.53	3.48	4.91
8. Engine condition		20.92	25.20	11.43	9.39	10.54
9. Accidents and derailments due to engine		2.63	2.25	0.15	3.85	2.05
10. Trolley and substation		0	0	3.93	0.03	0
11. Total of items 1 to 10 inclusive, which are affected by the type of motive power used		172.65	62.95	52.73	35.34	54.93
12. Average of items 1 to 10 inclusive, for the four steam divisions	74.75					
13. Awaiting connections		0	1.16	0.02	1.82	1.94
14. Handling extra heavy bag mail and express		6.79	3.26	2.09	1.20	0.97
15. Extra stops for passengers and railway crossings		0.92	0.97	1.99	0.22	1.13
16. Car conditions		8.63	18.05	9.75	6.87	6.10
17. Accidents and derailments not due to engine		27.69	12.51	17.75	14.63	30.49
18. Slides, earth, rock and snow		2.53	0	3.64	3.86	13.80
19. All other causes		11.30	1.78	11.03	4.91	9.95
20. Total of items 13 to 19 inclusive, which are not affected by the type of motive power		57.80	37.85	46.30	33.86	103.69
21. Average of items 13 to 19 inclusive, for the four steam divisions	46.77					
22. Total of all items		230.45	100.80	99.03	69.20	158.62
23. Average of items 13 to 19 inclusive for the four steam divisions	121.52					
24. Minutes lost on schedule running time per mile of line operated		205.5	69.7	8.94	0.00	162.2
25. Minutes made up per mile of line operated		46.6	35.6	100.00	81.00	11.54

*Electrical operation commenced in March.

It will be noted from item 11 that the electrically operated territory shows less time of trains delayed than any of the steam operated divisions except that between Avery and Cle Elum, a district particularly favored as regards its freedom from climatic, topographical and other conditions which tend to cause delays. Attention is also called to the favorable showing for electricity in items 24 and 25.

In concluding, I believe it may be said that in no respect have the results of the electrification failed to equal the expectations of the railway organizations, and in most respects these expectations have been far exceeded. We have found by experience and estimates that items of operating expense depending upon whether steam or electricity is used as the motive power are so reduced and the benefits indirectly obtained are so great as to render justifiable, even with the increased investment charges, the serious consideration of indefinite extension of electrification even for lighter grades.

California Officials Meet

Convention in San Francisco Devoted Largely to Discussion with State Commissioners of Ways to Improve Conditions and Service

AT THE annual meeting of the California Electric Railway Association, held in San Francisco on May 25 with over 90 per cent of California's electric railways represented, comprehensive plans were made for active co-operation this year on common problems. Consideration was given primarily to means of securing much needed relief from paving and tax burdens and illegitimate bus competition. A three-hour conference was also held with four of the five State railroad commissioners and was pronounced one of the greatest strides ever made by California electric railways in that it enabled the companies to show the commission just what present conditions mean and enlisted the commission's aid and advice in planning relief. The seriousness of the situation which the railways are facing and conditions in urgent need of remedy were explained by W. R. Alberger, vice-president San Francisco-Oakland Terminal Railways; Paul Shoup, president, and Frank Karr, chief counsel Pacific Electric Railway; W. E. Dunn, vice-president Los Angeles Railway; William Von Phul, president United Railroads of San Francisco, and others. E. O. Edgerton, president of the commission, spoke optimistically of the future prospects for the electric railways because of the essential service they render, and he advised showing the public that the electric railways cannot go on without relief. Emphasis, he said, should be placed not so much on protecting investment as on the importance of public service. Showing the real need of service, which only electric railways can render economically, should be the ground on which to urge the passage of bills at the coming session of the Legislature. The railways should adopt an affirmative, aggressive policy, not a program of defense.

It was agreed that a small committee of the association would meet with the Railroad Commission and work on details of plans for improving conditions affecting electric railway operation, particularly needed legislation. All officers of the association were re-elected.

Number of One-Man Cars Increases 15-Fold

Approximately 300 in 1916, the Number Has Grown So That There Are Now More Than 5,000 in Operation and on Order

THE accompanying table has been compiled at the request of a number of readers of this paper and gives a list, so far as it is possible to obtain it, of all electric railway companies that own or have on order one-man cars. The number of cars is subdivided as between safety cars, that is, cars equipped with automatic safety devices, and cars having only ordinary control and door mechanisms.

Attention is called to the various geographical divisions, which indicate that the highest percentage of one-man cars operated is by 126 companies in the territory west of the Mississippi River. The second largest group is south of the Ohio and east of the Mississippi, where forty-three companies operate 9 per cent of the cars with one man. The largest number of cars in any state is in New York, where 2.5 per cent of the cars owned by 19.8 per cent of the companies are one-man cars. The States of Texas, Washington, Massachusetts and New Jersey follow in the order named. The State having the largest percentage of one-man cars is Kansas, with 34.6. Mississippi, Montana, Washington and Texas follow in sequence.

Every attempt has been made in the preparation of this table to avoid duplications and to eliminate the cancellations of orders as well as the transfer of cars already built between several systems. The information has been compiled largely from the rolling stock columns of the ELECTRIC RAILWAY JOURNAL and checked with available tabulations that have been compiled by others.

It may be that errors will still be found to exist and it is hoped that all such will be reported promptly in order that at some later day a corrected list can be published.

Number of One-Man Cars Owned or on Order as of May 15, 1920

Name of Company	Safety Cars		Other Types
	New	Rebuilt	
New England States			
Connecticut			
Bristol & Plainville Trmy	1	....	....
Connecticut Co. (The)	132	....	5
Danbury & Bethel St. Ry	8	....	....
Total — 3	141	....	5
Maine			
Androscoggin & Kennebec Railway	12	....	....
Bangor Ry. & Elec. Co	15	....	....
Biddeford & Saco R.R.	8	....	....
Knox County Electric Co	3	....	....
Portland R. R.	15	4	....
Total — 5	53	4	....
Massachusetts			
Berkshire St. Ry	17	....	....
Boston Elevated Ry	31	....	....
Brockton & Plymouth St. Ry.	4	....	....
Concord, Maynard & Hudson St. Ry	1	....	....
Connecticut Vy. St. Ry	..	1	....
Eastern Mass. St. Ry	201	1	....
Medway & Dedham St. Ry	4	....	....
Middlesex & Boston St. Ry	2	4	....
Milford, Attleboro & Woonsocket St. Ry	....	2	....
Norton & Taunton St. Ry	....	2	....
Springfield St. Ry	10	....	....
Worcester & Warren St. Ry.	1	....	1
Worcester Consolidated St. Railway	10	....	....
Total — 13	301	10	1
New Hampshire			
Concord & Manchester Elec. Br	4	....	....
Laconia St. Ry	2	....	....
Nashua St. Ry	4	....	....
Total—3	10	....	....
Rhode Island			
Newport & Providence Ry	3	3	....
Vermont			
Rutland Ry. & Light Co	1	....	....
Total — 26	509	17	16
North of the Ohio and east of the Mississippi River			
Illinois			
Alton, Granite & St. Louis Trac. Co	....	(a)	(a)
Aurora, Elgin & Chicago R.R.	40	....	....
Cairo Ry. & Lt. Co	....	....	11
Central Illinois Pub. Service	10	....	14
Centralia & Central City Trac. Co	2	....	....
Centralia Trac. Co	2	....	....
Chicago & Joliet Elec. Ry	....	7	....
Chicago, No. Shore & Milwaukee R. R.	10	....	....
Chicago, Ottawa & Peoria Ry	1	....	1
Decatur Ry. & Lt. Co	20	....	13
E. St. Louis & Suburban Ry.	1	....	7
E. St. Louis Ry	2	....	....
Galesburg & Kewanee Elec. Railway	....	....	5
Galesburg Ry. & Ltg. Co	20	....	....
Freeport Ry. & Lt. Co	3	1	7
Jacksonville Ry. & Lt. Co	....	....	7
Kankakee Elec. Co	....	....	10
Northern Illinois Lt. & Trac. Company	....	....	6
North Kankakee Elec. Lt. & Railway	....	....	2
Pekin Municipal Ry	3	....	2
Peoria Ry	20	....	....
Quincy Ry	30	1	5
Rockford & Interurban Ry	12	....	....
Springfield Consolidated Ry.	17	7	....
Sterling, Dixon & Eastern Elec. Ry	....	....	7
St. Louis & E. St. Louis Elec. Railway	....	2	....
Urbana & Champaign Ry. Gas & Elec. Co	6	....	2
Total — 27	199	18	99
Indiana			
Beech Grove Trac. Co	6	....	....
Central Indiana Ltg. Co	5	....	3
Chicago, So. Bend & No. Indiana Trac. Co	20	....	....
Evansville & Ohio Valley Ry. Co	3	....	..
Gary & Hobart Trac. Co	....	2	....
Gary St. Ry	10	....	....
Indiana Ry. & Lt. Co	10	....	2
Indiana Service Corp	....	....	65
Louisville & Northern Ry. & Lighting Co	....	....	(a)
Louisville & Southern Indiana Ry	10	....	....
Public Utilities Co	8	6	3
Terre Haute Trac. & Lt. Co.	66	....	16
Union Traction Co. of Indiana	....	....	13
Vincennes Traction Co	7	....	....
Washington St. Ry	3	....	....
Total — 15	148	8	102
(a) Details not available.			
Maryland			
Hagerstown & Frederick Ry.	3	....	....
Towson & Cockeysville Elec. Railway	....	....	1
United Rys. & Electric Co. of Baltimore	33	....	9
Total — 3	36	....	10
Michigan			
Adrian St. Ry	....	....	4
Benton Harbor-St. Joe Ry. & Lt. Co	4	....	....
Detroit United Ry	10	....	38
Escanaba Trac. Co	....	....	1
Grand Rapids Ry	19	....	....
Houghton County Trac. Co.	....	2	....
Ironwood & Bessemer Ry	....	....	8
Manistee Railway	....	....	4
Menominee & Marinette Lt. & Trac. Co	....	....	23
Michigan Railways	20	....	....
Saginaw-Bay City Ry	20	63	....
Total — 11	73	65	78
New Jersey			
Jersey Central Trac. Co	....	....	3
Morris County Trac. Co	14	....	....
Penn. & N. J. Trac. Co	11	....	2
Public Service Ry	200	....	7
Salem & Penns Grove Trac. Company	6	....	....
Trenton & Mercer County Trac. Corp	60	....	....
Total — 6	291	....	12
New York			
Batavia Trac. Co	....	....	(a)
Binghamton Ry	....	16	....
Brooklyn City Ry	98	....	....
Brooklyn Rapid Transit Co.	108	....	....
Buffalo & Lake Erie Trac. Co	....	....	2
Corning & Painted Post St. Railway	....	....	4
Elmira Water, Lt. & R. R. Co.	7	....	....
Empire State R. R	6	....	8
Geneva, Seneca Falls & Auburn R. R	2	....	....
International Ry	....	....	8
New York & Stamford Ry	7	....	....
Ogdensburg St. Ry	....	....	7
Orange County Trac. Co	3	2	....
Peekskill Ltg. & R. R. Co	4	....	4
Putnam & Westchester Trac. Company	....	....	2
Third Ave. Ry. System	....	75	50
Westchester St. Ry	6	....	....
Total — 17	241	93	85
(a) Details not available.			
Ohio			
Ashtabula Rapid Transit Co.	....	3	....
Chillicothe Elec. R.R. & Light Co	....	4	....
Cincinnati, Milford & Blanchester Trac. Co	3	....	....
Cleveland, Southwestern & Columbus Ry	2	....	....
Columbus, Delaware & Marion Elec. Co	....	....	(a)
Columbus Ry., Lt. & Pwr. Co.	....	....	5
Lake Shore Elec. Ry	16	....	....
Northern Ohio Trac. & Light Co	25	....	....
Penn. & Ohio Electric Co	32	....	10
Richland Public Service Co	7	....	....
Toledo, Bowling Green & So. Trac. Co	5	....	....
Total — 11	90	7	15

Name of Company	—Safety Cars—		Other
	New	Rebuilt	Types
Pennsylvania			
Altoona & Logan Valley Elec. Ry	....	(a)	(a)
Beaver Valley Trac. Co	....	....	1
Butler Railways	7	....	2
Chambersburg & Shippensburg Ry	2	....	....
Citizens Traction Co	10	....	....
Coatesville Trolley Co	2	....	....
Lancaster & York Furnace Street Ry	1	....	....
Lehigh Valley Transit Co	....	....	(a)
Montgomery Transit Co	....	....	3
Northwestern Pennsylvania Traction Co	6	....	4
Philadelphia Rapid Transit Company	25	....	....
Reading Tr. & Lt. Co	12	3	....
Susquehanna Traction Co	5	....	....
Tarentum, Brackenridge & Butler St. Ry	....	....	1
Trenton, Bristol & Philadelphia Trac. Co	6	....	....
Warren St. Ry	9	....	....
West Penn Railways	....	2	....
Woodlawn & Southern St. Railway	4	....	....
Total — 18	89	5	11
Wisconsin			
Beloit Traction Co	6	....	....
Eastern Wis. Electric Co	15	....	20
Janesville Trac. Co	5	....	4
LaCrosse & Onalaska St. Ry	....	....	1
Madison Railways	13	4	....
Milwaukee Electric Ry. & Light Co	20	....	5
Wisconsin Public Service Co	16	....	....
Wisconsin Ry. Lt. & Pwr. Co	....	11	....
Wisconsin Trac. Light, Heat & Power Co	3	....	....
Wisconsin Valley Elec. Co	3	4	8
Total — 10	81	19	38
(a) Details not available.			
(b) No details for 6 companies			
Group Total — 118 (b)	1248	215	450
South of the Ohio and east of the Mississippi River			
Alabama			
Alabama Power Co	6	....	2
Birmingham Ry. Lt. & Power Co	35	....	....
Mobile Lt. & R. R. Co	12	....	....
Montgomery Lt. & Trac. Co	10	....	....
Selma Trac. Co	....	....	7
Total — 5	63	....	9
Florida			
Miami Beach Elec. Co	10	....	....
Miami Trac. Co	3	....	....
Pensacola Elec. Co	....	....	(a)
St. Petersburg Municipal Ry	6	....	....
Tampa Elec. Co	47	....	1
Total — 5	66	....	1
Georgia			
Albany Transit Co	....	....	1
Athens Ry. & Elec. Co	....	....	10
City & Suburban Ry	....	....	7
Columbus R.R	17	....	12
Rome Ry. & Lt. Co	....	....	14
Savannah Elec. Co	....	....	(a)
Total — 6	17	....	44
Kentucky			
Henderson Trac. Co	....	....	7
Kentucky Trac. & Ter. Co	....	....	(a)
Louisville Ry. Co	....	....	11
Owensboro City R.R	....	....	12
Paducah Trac. Co	....	....	(a)
Total — 5	....	....	30
North Carolina			
Carolina Pwr. & Lt. Co	10	....	....
Fayetteville Trac. Co	5	....	....
Durham Traction Co	....	....	11
North Carolina Public Service Company	15	....	6
Piedmont & Northern Ry	....	....	1
Piedmont Pwr. & Lt. Co	....	....	2
Southern Public Utilities Co	18	....	8
Tidewater Power Co	....	....	2
Total — 8	48	....	30
South Carolina			
Charleston Consol. Ry. & Lighting Co	10	....	5
(a) Details not available.			
Tennessee			
Citizens Railway	....	....	2
Jackson Ry. & Lt. Co	3	....	18
Knoxville Ry. & Lt. Co	....	....	(a)
Nashville Ry. & Lt. Co	11	....	3
Tennessee Coal & Iron Co	4	....	....
Total — 5	18	....	23
Virginia			
Blue Ridge Lt. & Pwr. Co	4	....	....
Charlottesville & Albemarle Ry	....	....	7
Virginia Ry. & Pwr. Co	80	....	....
Total — 3	84	....	7
West Virginia			
Charleston-Dunbar Trac. Co	4	....	....
Monongahela Vy. Trac. Co.	8	....	....
Ohio Valley Elec. Ry	....	....	(a)
Princeton Power Co	....	....	1
West Virginia Trac. & Elec. Company	3	....	....
Total — 5	15	....	1
Group Total — 43 (b)	321	....	150
(b) 6 companies—Details not available			
West of the Mississippi River			
Arizona			
Douglas Trac. & Lt. Co	1	....	6
Tucson Rapid Transit Co	....	....	4
Total — 2	1	....	10
Arkansas			
Ft. Smith Lt. & Trac. Co	9	....	....
Hot Springs St. Ry	7	....	24
Little Rock Ry. & Elec. Co	....	....	5
Pine Bluff Co., (The)	....	....	12
Southwestern Gas & Elec. Co.	4	....	8
Total — 5	20	....	49
California			
Central California Trac. Co.	....	....	4
Glendale-Montrose Ry	3	....	....
Fresno Traction Co	5	....	3
Humbolt Transit Co	....	....	5
Los Angeles Ry. Corp	45	....	....
Pacific Electric Ry	20	....	8
Pacific Gas & Electric Co	4	....	....
Sacramento Northern Elec. Railroad	2	....	....
San Diego Elec. Ry. Co	....	....	14
San Francisco-Oakland Ter. Railways	25	....	....
San Jose Railroads	5	....	13
Stockton Elec. R. R	5	....	....
Union Traction Co	....	5	....
Total — 13	114	5	47
Colorado			
Arkansas Valley Ry. Light & Power Co	....	....	(a)
Colorado Springs & Interurban Ry	35	....	1
Denver & So. Platte Ry	2	....	....
Grand River Valley Ry	....	....	(a)
Greeley & Denver R. R	....	....	3
Ft. Collins Municipal Ry	4	....	....
Trinidad Elec. Trans. Ry. & Gas Co	....	....	8
Western Lt. & Power Co	....	....	4
Total — 8	41	....	16
Iowa			
Cedar Rapids & Marion City Railway	13	....	25
Charles City-Western Ry	....	....	2
Clinton, Davenport & Muscatine Ry	....	....	20
Clinton St. Ry	....	....	21
Duquesne Elec. Co	....	....	8
Ft. Dodge, Des Moines & So. R. R	....	....	1
Iowa Ry. & Lt. Co	6	....	14
Iowa Southern Utilities Co	....	....	(a)
Keokuk Elec. Co	....	5	....
Mason City & Clear Lake Railway	5	2	....
Mississippi Vy. Elec. Co	2	....	9
Oskaloosa Trac. & Lt. Co	1	....	6
Ottumwa Ry. & Lt. Co	21	....	....
Peoples Gas & Elec. Co	6	....	....
Sioux City Service Co	25	....	7
Waterloo, Cedar Falls & Northern Ry	....	....	27
Total — 16	79	7	140
(a) Details not available.			
Kansas			
Arkansas Valley Int. Ry	1	....	....
Atchinson Ry., Light & Power Co	3	....	8
Hutchinson Interurban Ry	5	....	3
Kansas City-Western Ry	....	....	6
Kansas Elec. Utilities Co	....	....	14
Manhattan City & Interurban Ry	....	....	5
Salina St. Ry	....	....	5
Topeka Ry. Co	8	....	38
Wichita R. R. & Lt. Co	31	....	....
Total — 9	48	....	79
Louisiana			
Alexandria Munic. St. Ry	3	....	....
Baton Rouge Elec. Co	8	....	6
Monroe St. Ry	....	....	3
New Orleans Ry. & Lt. Co	40	....	....
Shreveport Rys	....	9	....
Total — 5	51	9	9
Minnesota			
Duluth St. Ry	6	....	2
St. Cloud Public Service Co.	2	....	6
Total — 2	8	....	8
Missouri			
Cape Girardeau-Jackson Interurban Ry	....	....	6
City Light & Trac. Co	8	....	....
Jefferson City Bridge & Transit Co	....	....	6
Kansas City Rys. Co	105	....	....
St. Joseph Ry., Light & Power Co	12	....	8
St. Louis Water Works Ry	2	....	....
Springfield Traction Co	20	....	4
Union Depot-Bridge & Terminal Co	8	....	....
Total — 8	155	....	24
Mississippi			
Delta Elec. Light., Power & Mfg. Co	....	....	7
Hattiesburg Traction Co	....	....	7
Jackson Lt. & Trac. Co	....	....	10
Meriden Light & Ry. Co	....	....	15
Vicksburg Lt. & Trac. Co	4	....	5
Total — 5	4	....	44
Montana			
Great Falls St. Ry	....	....	23
Helena Lt. & Ry	7	....	....
Missoula St. Ry	....	13	....
Total — 3	7	13	23
Nebraska			
Lincoln Traction Co	25	....	2
Omaha & Council Bluffs St. Railway	5	....	....
Omaha, Lincoln & Beatrice Railway	3	....	1
Total — 3	33	....	3
New Mexico			
City Electric Co	....	....	7
North Dakota			
Grand Forks St. Ry	6	....	....
Oklahoma			
Bartlesville Interurban Ry	...	....	5
Enid City Ry	.. .	....	10
Oklahoma Railway	....	10	....
Oklahoma Union Ry	11	....	....
Pittsburgh County Ry	6	....	....
Tulsa St. Ry	6	6	9
Total — 6	23	16	24
Oregon			
Portland Ry. Lt. & Pwr. Co.	25	....	11
South Dakota			
Aberdeen Railroad	4	....	12
Sioux Falls Trac. Systems	6	....	1
Total — 2	10	....	13
Texas			
Amarillo St. Ry	....	....	5
Austin St. Ry	10	....	16
Beaumont Trac. Co	15	10	....
Corpus Christi Ry. & Lt. Co.	....	....	10
Dallas Railway Co	16	....	....
Eastern Texas Elec. Co	11	....	14
El Paso Elec. Co	42	....	....
Galveston Elec. Co	20	....	....
Greenville Ry. & Lt. Co	....	....	7
Houston Elec. Co	31	24	....
Marshall Trac. Co	2	....	....
Northern Texas Elec. Co	75	15	....
Northern Texas Trac. Co	10	....	....
Paris Transit Co	....	....	8
Port Arthur Traction Co	4	....	....
San Antonio Pub. Serv. Co	....	....	13
South Western Trac. Co	....	....	(a)
Texas Elec. Ry. Co	14	10	....
Texas City St. Ry	....	....	2
Wichita Falls Trac. Co	9	....	....
Total — 20	259	59	75
Utah			
Salt Lake & Utah R. R	....	....	1
Utah-Idaho Central R. R	16	....	....
Total — 2	16	....	1
Washington			
Gray's Harbor Ry. & Lt. Co.	6	....	....
Lewiston-Clarkson Transit Company	3	....	....
North Coast Power Co	3	1	(a)
Olympia Light & Power Co	....	7	....
Pacific Power & Light Co	3	....	5
Puget Sound International Railway & Power Co	18	....	4
Puget Sound Traction, Light & Power Co	16	....	8
Seattle & Rainier Vy. Ry. Co	1	....	....
Seattle Municipal Ry	66	29	....
Spokane & Inland Empire Railroad	....	....	8
Tacoma Ry. & Power Co	66	6	....
Walla Walla Vy. Ry. Co	....	....	5
Washington Wtr. Pwr. Co	....	....	85
Western Washington Pwr. Co.	15	....	(a)
Yakima Vy. & Transp. Co	....	....	8
Total — 15	197	43	123
Group Total — 127	1097	152	706

CANADA

Name of Company	Safety Cars New	Safety Cars Rebuilt	Other Types
Brandon Municipal Ry	7	....	....
Calgary Municipal Ry. (*b*)	....	....	66
Cape Breton Elec. Co., Ltd.	2	11	....
Edmonton Municipal St. Ry	....	....	(*a*)
Hydro-Electric Pwr. Com.	2	....	....
Lethbridge Municipal Ry.	9	....	4
Levis County Ry.	14	2	4
Moncton Tramways, Electric & Gas Co., Ltd	....	....	5
Nova Scotia Tramway & Power Co., Ltd.	24	....	....
Peterboro Radial Ry.	2	....	....
Quebec Ry. Lt. & Pwr. Co.	....	....	2
Sherbrooke Ry. & Pwr. Co.	1	....	8
Three Rivers Trac. Co.	9	....	9
Total — 13	70	13	98

MEXICO and CUBA

Name of Company	Safety Cars New	Safety Cars Rebuilt	Other Types
Mexico Tramways Co.	6	....	....
Matanzas (Cuba) Elec. Ry.	15	....	....

(*a*) Details not available. (*b*) McCauley type.

RECAPITULATION OF ONE-MAN CARS

			Safety Cars			
		Companies	New	Rebuilt	Other Types	Cars
New England		26	509	17	16	542
North of Ohio and East of Mississippi River (*b*)	(*b*)	118	1,248	215	450	1,913
South of Ohio and East of Mississippi River	(*b*)	43	321	...	150	471
West of Mississippi River	(*c*)	126	1,097	152	706	1,955
Total United States		313	3,175	384	1,222	4,881
Canada	(*a*)	13	70	13	98	181
Mexico and Cuba		2	21	...	....	21
Grand total		328	3,266	397	1,320	5,083

(*a*) Details not available for 1 company.
(*b*) Details not available for 6 companies.
(*c*) Details not available for 4 companies.

A. S. M. E. Meets at St. Louis

Mechanical Engineers at Spring Gathering Discuss Valuation, Flying, Power-Plant Topics, etc.—Visit Keokuk and Tulsa

THE spring meeting of the American Society of Mechanical Engineers was held at the Hotel Statler, St. Louis, Mo., May 24 to 27. The program comprised a wide range of topics, including aëronautics, appraisal and valuation, industrial housing, river transportation, foundry practice, power and combustion, including stokers; pulverized fuel, feed-water heaters and feed water treatment, and miscellaneous topics. In addition there was a visit to the hydraulic power plant of the Mississippi River Power company, at Keokuk, Iowa, and another following the meeting to the oil fields at Tulsa, Okla. A varied series of entertainments was also provided.

The feature of the meeting on Monday was a symposium of papers on appraisal and valuation, briefly summarized below. Brief abstracts of other papers and discussions will be given in a later issue of this paper.

In a paper entitled "Appraisal and Valuation Method" David H. Ray, Pasadena, Cal., urged the need of the engineer entering the appraisal field in the full capacity which his training and experience warrant. The engineer, being more familiar with cost and value of materials, machines and structures than the lawyer or accountant, has the duty to develop, guide and control method and procedure. Procedure and report must necessarily depend in part upon the purpose of the valuation, and appraisals may be classified in two general groups, private and public. Most of this paper is devoted to industrial valuation.

In discussing the "Fundamental Principles of Rational Valuation," James R. Bibbins, Chicago, Ill., appraises the seriousness of the present situation brought about by the lamentable failure of engineers to agree upon a certification of definitions, methods and practices in valuation procedure, especially when ultimate decisions must rest upon the shoulders of court commissions or non-technical bodies. He urges a policy of open-minded co-operation, research and education along fundamental lines of economics rather than a continuance of purely partisan methods of thought and action.

Analyzing and listing all of the admissible facts and the contestable factors, he emphasizes the breadth of view which a complete valuation should hold. Instead of attempting to close the door of the past in today's proceedings, it should be remembered that very large and definite equities are sometimes shown to exist which would be completely obscured without the necessary economic research of the past history. Mr. Bibbins calls attention to a specific problem which he had outlined in previous addresses and which he had described in the ELECTRIC RAILWAY JOURNAL for Sept. 20, 1919, page 570. Advanced industrial executives seem, he said, to be more generally awake to the facts and needs of the economic situation than any other class, especially in their understanding and care of depreciation. Dean M. E. Cooley presented an analysis on the "Data on the Cost of Organizing and Financing a Public Utility Project," prepared by the late F. H. B. Paine. From Mr. Paine's experience, it is shown quite clearly that there are certain preliminary steps which must be taken before a project can be said to have been finally launched, such as the development of the project, the securing of sufficient capital funds for preliminary outlays and for the actual construction. All of these steps involve money expenditure, and as a result of considerable experience in this line the conclusion is reached that the proper percentages of these are as follows: Development of the project 2½ per cent, cost of money 5 per cent and promoters' remuneration 5 per cent.

Prof. H. C. Anderson of Ann Arbor, Mich., discussed, under the title of "The Construction Period," the proper allowances to be made for interest and taxes during the period of construction. He concludes that the proper interest charges can only be determined by a thorough study of the particular property under consideration, with a view of determining (1) the magnitude of the property; (2) the method used in finding the reproduction cost; (3) the proper construction period, and (4) knowing the construction period, what is the proper method to use. The author is of the opinion that the proper amount depends on (1) the length of the construction period, (2) the percentage of the construction cost which the official will find, and (3) the tax rates.

The last paper of this symposium dwelt on "Price Levels and Values." It was by Cecil F. Elmes, of the engineering staff of Sanderson & Porter, Chicago. Ill. The author traces the changes that have taken place in prices and wages both in this country and in England since 1600 and shows how these have been influenced by contemporary history. The general trend of the paper is to indicate that the general law of economics applies to public utilities just as much as to other lines of commerce, and every procedure and decision based upon the theory that economic laws applies to everything else except the public utilities is essentially unsound and vicious.

Furthermore, the word "dollar" should not be used so as to mean two different things, a high figure to one party and a low figure to the other party in one and the same controversy.

Letters to the Editors

An Appeal from Hungary

BUDAPEST, April 30, 1920.

To the Editors:

The American Relief Administration has established American relief warehouses in Hungary, from which food can be drawn on presentation of United States American Relief warehouse food drafts. There is great need for food in Hungary, and this is the simplest as well as the surest method by which Americans can supply food in Hungary to those in need. It has been suggested that those in our country who have no relatives in America might possibly look for assistance to those in your country who are in the same occupation or employment. As an employee of the largest electric railway in Hungary, Budapesti Egyesitett Varosi Vasut (Budapest Consolidated Street Railway) I am taking this opportunity of bringing this matter to the attention of the electric railway men in America.

TOTH TIVADAR.

Energy Concentration in Electrical Short Circuits

GENERAL ELECTRIC COMPANY
SCHENECTADY, N. Y., May 21, 1920.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for May 8 you reviewed my discussion of the problems in the design of a super-power plant, delivered before the Washington section of the A. I. E. E.

You properly make it clear that one of the great problems in the design of such a station is the limitation of the concentration of power that may occur in case of a short circuit. But the nature of this problem is not made clear. It is not a case of limiting the concentration of energy to an amount that can be interrupted by available oil switches, for that is but a challenge to build a larger switch which the engineer would be glad to accept. It is a case of expediency.

In the case under consideration the major portion of distribution was to be underground, at 60,000 volts, with the neutral point solidly grounded, giving 35,000 volts from conductor to ground. Single-conductor lead-covered cables would be used of size sufficient to give 45,000 kva. in capacity per three-phase feeder. The first step was to decide the concentration energy that it would be expedient to allow at a point on the cable system in case of a short circuit. A severe short circuit is liable to do damage to adjoining conductors; if of large energy it may also damage the conduit system, necessitating excavation of the street before the injured cable can be withdrawn and a new one installed. However, it should be possible so to construct an underground system that any trouble will be confined to the cable on which it originates. It is then a question of how much it is expedient or economical to spend in extra-heavy underground construction to permit occurrence of faults without damage to anything other than the faulty cable.

Conditions were quite favorable in this case, due to the single-conductor cable. In case of failure of such cable the fault should be confined to a single conductor and a single phase to neutral, whereas with a three-conductor cable a fault is very likely to involve all three conductors and all three phases. It was therefore decided that the short-circuit concentration on which station design should be based could be allowed to be unusually high, and the figure of 500,000 kva. was adopted for instantaneous balanced three-phase value.

After the limit has been determined, as far as the underground system is concerned, the same balancing of costs can be applied to the station apparatus, oil switches, reactors, etc. In the case in question the latter balance did not change the decision. It was decided to be best to use a regular oil switch which was capable of interrupting satisfactorily 580,000 kva.

The point is that oil-switch rupturing capacity, in many cases, and in this one in particular, is not the limiting condition, but the effect of short circuits on the whole system must be considered.

H. GOODWIN, JR.,
Power and Mining Engineering Department.

Association News

A. E. R. A. Committee on Exhibits Holds Meeting

THE committee on exhibits appointed by President Pardee of the American Electric Railway Association to have charge of the exhibit in connection with the convention at Atlantic City, N. J., October 11 to 15, held a meeting in the Association offices on Friday, May 21, to outline a program of work and to approve certain tentative arrangements already entered into with various contractors. The contracts discussed and approved were those offered by C. M. Koury & Company for furniture, rugs, etc.; J. J. Habermehl & Sons for floral decorations, and Eldredge Express and Storage Warehouse Company for hauling. There was also taken up some minor changes in the space diagram and some additions to the regulations for exhibitors which were recommended as necessary by last year's exhibit committee. The contract offered by the Pier Company was also considered. The personnel of the committee is as follows: Frank H. Gale, chairman, Schenectady; Fred C. J. Dell, National Railway Appliance Co., New York; J. C. McQuiston, Westinghouse Electric and Manufacturing Company, East Pittsburgh; A. M. Robinson, J. G. Brill Company, Philadelphia; John Benham, International Register Company, Chicago; S. D. Hutchins, Westinghouse Traction Brake Company, Columbus; Edwin B. Meissner, St. Louis Car Company, St. Louis; J. Fort Flowers, Differential Car Company, New York; John B. Kilburn, Hale & Kilburn Company, Inc., Philadelphia; Charles E. Woodbridge, Texas Company, Whitehall Building, New York.

The first spring conference of the engineering section of the National Safety Council was held in New York City on April 27. It was attended by about 100 men representing the national engineering societies, the universities, the inspection departments of insurance companies and the men in charge of accident prevention in the industries. Papers were read on the inculcation of safety principles in the minds of technical students, on safety standards and on related topics.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Construction to Proceed

Detroit Railway in Courts in Interest of the City—Contends Its Rights Are Irrevocable

Four suits are now pending in the courts involving the city of Detroit and the Detroit United Railway. The fourth suit was filed by the railway in the federal court. The company seeks to enjoin the city from interfering with the railway in the construction of tracks on Harper Avenue, where activities were stopped by the police on May 6.

According to the bill, which was signed by President Frank W. Brooks, the Rapid Railway, a subsidiary of the Detroit United Railway, has a perpetual franchise to build a track on the north side of Harper Avenue. On June 26, 1917, the Council passed a resolution ordering the railway to remove its single track and replace it with a double track in the center of the street. These instructions were carried out in part.

The Detroit United Railway now maintains that there exists an irrevocable grant to the company for laying of tracks on Harper Avenue between Frontenac Boulevard and Gratiot Avenue, by virtue of the original franchise agreement with the township of Hamtramck, the construction of tracks, the Council resolution of 1917, and also by the moving of tracks from the north side to the middle of Harper Avenue.

City Bond Issue Attacked

The legality of the public utility bonds authorized by the voters on April 5 is attacked by the Detroit United Railway. The court is petitioned permanently to enjoin the city from selling any of the public utility bonds. Mayor Couzens, the Corporation Counsel, the City Treasurer, the Commissioner of Public Works, the City Comptroller and the three members of the Street Railway Commission have been subpœnaed in connection with the suit instituted by E. J. Burdick, assistant general manager, which charges that the ballots in the recent election were exposed. A motion has been made to have the ballots used in the recent election preserved.

In commenting on the city's action with regard to the Harper and St. Jean lines, where the police forcibly stopped work, officials of the Detroit United Railway refer to their answer to the city's inquiry relative to the company's policy in the matter of railway extensions. At that time the company answered that all authorized extensions would be put in operation as soon as construction could be carried to completion. No objection having been offered by the public authorities, the company began the work of completing the double tracking, with paving between the tracks, of Harper Avenue, the continuation of the so-called St. Jean route and the completion of the Twelfth Street extension, the major portion of which was put in before the coming of winter put an end to the work last season. When some progress had been made on these three undertakings, and after considerable expenditure of money had been made, the Council adopted resolutions rescinding the permits granted, and work on the Harper and St. Jean routes was forcibly stopped. It is also pointed out that the Mayor's statement to the effect that no matter what the necessity for service may be the Detroit United Railway would not be allowed to provide it emphasizes a policy of destruction.

In the meantime the company reiterates its desire and willingness to improve and enlarge the transportation facilities and hopes the civic authorities may not make it impossible for the company to obtain the several hundred additional cars contracted for. The company is not fighting and will not fight the city of Detroit, it maintains, but, as it considers its duty, will endeavor to protect in all legal ways its property and investments.

Commissioner Declines Post on Wage Arbitration Board

Chairman Charles B. Hill of the Public Service Commission for the Second District of New York will not serve as a member of the board of arbitration to settle the wage question and other differences between the International Railway, Buffalo, N. Y., and its employees. He has also informed the company he does not believe that any other member of the commission will care to serve.

Chairman Hill's announcement came as the result of a suggestion made by Herbert G. Tulley, president of the International Railway, that Mr. Hill serve as a member of the board because if higher wages are allowed the men the company will need a higher rate of fare. Chairman Hill says that by acting as umpire on the board he would be placed in an embarrassing situation.

President Tulley has been in Philadelphia conferring with Thomas E. Mitten, a member of the International Railway bondholders' committee and a big factor in the management and operation of the International's lines, regarding the question of raising money to pay for relaying of tracks.

Service-at-Cost Suggested

Engineers at Work in Syracuse on Valuation Preparatory to Arranging New Operating Agreement

Henry C. Allen, city engineer of Syracuse, N. Y., in an interview with a representative of the ELECTRIC RAILWAY JOURNAL recently, stated that a railway commission of nine men has been appointed to ascertain the fare that it will be necessary for the people of the city to pay in order that the New York State Railways may obtain a fair return on its investment. Two weeks ago engineers of Ford, Bacon & Davis, New York City, were contracted with to make an extensive investigation of railway conditions and also to appraise the property of the traction lines there and ascertain the correct valuation. Arrangements for proceeding with this work have already been made.

Six Per Cent Return

Mr. Allen stated that the service-at-cost plan is contemplated in Syracuse. The administration, should it adopt the service-at-cost policy of dealing with the railway, would see to it that the company receives a return of 6 per cent upon the investment. The engineers will report on the actual value of the property of the railways as found by them and agreed to by the city.

Railway service in Syracuse at the present time is not such that it meets with the approval of the residents. The railway contends that it cannot operate at a profit on a 6-cent fare and therefore must to a slight extent curtail the service. The railway is not opposed to any investigation of its affairs. On the contrary, it welcomes the proposed inquiry because it feels that now the stockholders are in a fair way to be dealt with on the basis of the value of the service which the railway performs.

Local Public Service Commissioner

Should the service-at-cost system be put in operation in Syracuse it would probably provide, like other measures of the kind, for the appointment of an administration employee empowered to direct the activities of the railway and to give the public the service that is demanded.

The New York State Railways and Syracuse & Suburban Railway operate in Syracuse. It is their plants and equipment that will be investigated at this time.

Rochester, in which the New York Railways also operates, has a service-at-cost proposal under consideration.

Toledo Ordinances Ready for Council

Final Effort Being Made to Put Settlement Matter Before Voters by July 1

Cost-of-service and municipal ownership ordinances will be submitted to the Council at Toledo this week if the present plans of the commissions go through. In the sessions of the commissions and Henry L. Doherty, held on May 25 and 26, it looked as though they would not agree on the final terms of valuation and several other important questions. Mr. Doherty offered his lowest figure of $9,000,000 as valuation of the property to be contingent upon the agreeable settling of all other disputed points.

JUDGE JOHN M. KILLITS of the federal court left Toledo to attend the Methodist Episcopal conference at Des Moines until June 1. Before leaving he sent word to the two commissions appointed by him to draft ordinances looking to permanent settlement of the railway troubles of Toledo that he would not alter their work before presenting it to the Council. He said if it was finished before he returned to the city that the proposed ordinances should be sent to the Council for immediate action. In his letter to the Mayor and Council he says:

> I have followed the activities of each commission sufficiently to be thoroughly convinced that the members of each body have been devoted to the work of preparing from their respective standpoints the best settlement of the railway problem which the circumstances afford, having regard to the interests of the community and to justice to the owners of the property.
>
> It was not intended in appointing these commissions to interfere in the slightest degree with the legislative power of the city, but the ambition was to bring to the solution of the problem the efforts of patriotic and thoughtful men whose work might be received by the city as advice from competent quarters.

Mr. Doherty agreed on a provision allowing the securities of the company to be sold at as much as 10 per cent below par to secure cash funds for betterments and extensions, provided they should come together on all other points now in dispute. He said he feared this measure would only tax the car riders as they might have to pay interest on an inflated value.

FINANCING DIFFICULT NOW

The difficulty which has come up over the section which the commission is trying to put into the ordinance providing for the cost of power to a "rate comparable with that of other cities of similar size and based upon cost of production in a modern and up-to-date power plant," may not be compromised. Mr. Doherty contends that his companies come under the control of the State Public Utilities Commission and therefore the provision is entirely unnecessary and that, as it stands, it interferes with the rulings of the commission. He has indicated that he will not yield on this question.

He has also told the commissioners that the new rules laid down by the Federal Reserve System regarding financing may make it impossible to secure the $2,000,000 he is pledged to bring into Toledo for betterments and improvements. He offered to get the $500,000 initial payment to these funds and then if the $1,500,000 couldn't be secured later make a forfeiture of $150,000 to insure good faith.

The commission at its last settlement approached Mr. Doherty's figures on valuation up to $8,000,000. It first stood firm for the Goodwillie-Riggs valuation of $7,100,000, but later raised this to $7,500,000 and then jumped another $500,000 to try to get an agreement. Mr. Doherty has come down from $16,000,000.

A new angle was developed in the sessions when Mr. Doherty brought up the matter of bus competition. He insisted that the commissioners include a provision in the ordinance which would not allow the city to demand service on any car lines in excess of that of any competing line, such as buses. He takes the stand that the car riders would be forced to pay higher fares for the service and the earnings of the company might be jeopardized if unfair competition were permitted to exist parallel with any of the car lines.

Mr. Doherty also asked for a provision in the contract to be made so that the city and company would agree that whatever capital value is arrived at in the cost-of-service plan should become the pleading of the city in any condemnation suit. The company would agree to admit the same valuation in such a course of action.

The mooted questions may be passed on to the Council for final settlement before submission to the voters. The Council has twice voted to throw the company off the streets so that favorable action to the company in any negotiations with that body is practically precluded.

The Municipal Ownership Commission has its draft ready for the Council, but will withhold its presentation till the cost-of-service measure is submitted. The commissioners feel that to send it on its way alone might subject it to too much criticism and too much fire from all quarters. It is designed to give the voters an alternative to the cost-of-service plan.

It is understood that the plan has been drawn so as merely to create a large bond issue for a transportation system. This leaves the kind of system, routing and problem of street cars or buses up for settlement upon the basis of later developments.

The commission has placed itself on record as opposing the purchase of the railway properties as a whole. Certain lines may be bought through condemnation and then auxiliary bus service added to the system.

Both measures will probably be submitted to the people of Toledo by July 1.

Receivership May Close Bus Controversy

Chicago Motor Bus Company and Chicago Stage Company Have Fought for South Side Franchise Since 1916

The Chicago Motor Bus Company is in receivership. This fact has been noted before in the ELECTRIC RAILWAY JOURNAL. The real significance of this move, however, is that the receivership may bring to an end the controversy which has been waged since 1916 between the company and the Chicago Stage Company for the right to operate a bus line on the south side of Chicago. The receivership was brought about as a result of the request of the holders of the four-month 6 per cent notes, amounting to $128,000, which fell due on Jan. 16, 1920. These were not paid at maturity and the holders demanded their principal.

IN 1914 the Illinois Public Utility Commission granted a certificate of convenience and necessity to the Chicago Motor Bus Company for the operation of a bus line on the north side. After long delay buses were placed in operation during 1917 and they have continued to operate since that time. The fare charged is 10 cents. In 1916 the bus company applied for a certificate of convenience and necessity for the operation of a bus line on the south side. It was this appeal which precipitated the contest between the Chicago Motor Bus Company and the Chicago Stage Company, for the stage company promptly filed an intervening petition opposing the application of the bus company and seeking a certificate of convenience and necessity in its own behalf. The grant which the Chicago Stage Company sought would have authorized it to operate a bus line over practically the same route covered in the application of the bus company. After a protracted hearing of the case by the Public Utilities Commission an order was made Jan. 8, 1918, granting the application of the stage company and denying that of the bus company. The commission gave as its principal reason for the order that the stage company through prior experience and the technical skill of its officers and directors and by reason of its financial ability, was in a position adequately to serve the public need for motor bus transportation.

The bus company promptly appealed from the decision of the commission to the Circuit Court of Sangamon County. This court affirmed the decision of the commission. From this court the bus company then appealed to the Supreme

Court, which in turn handed down a decision on Feb. 20, 1919, wherein it reversed the Circuit Court's decision and set aside the orders and decisions of the commission.

The bus company then made formal application for a certificate based upon the decision of the Supreme Court, setting up the claim that this decision left nothing for the commission to do but grant the application. However, the commission interpreted the Supreme Court's decision as meaning that it should give the case further hearing, since the court did not question the jurisdiction of the commission, but rather set aside its orders for the reason that these orders seemed unreasonable.

Also, there was no positive direction in the decision of the Supreme Court to grant the certificate to the bus company.

So the whole controversy was reopened before the commission and the cases of the bus company and the stage company were consolidated. At the conclusion of another long hearing the Public Utilities Commission again reached the decision, on Jan. 20, 1920, that the certificate of convenience and necessity should be granted to the stage company and denied the bus company. In drawing up its order this time the commission went to some length to explain its reason for this decision.

In the first place it declared the type of equipment used by the bus company to be new and experimental and of such character that the maintenance cost would always be so large as to forestall the possibility of reasonable earnings. In this connection it compared the maintenance cost of the bus company, which ran from 10.21 cents to 11.92 cents per bus mile, with the similar cost of the Fifth Avenue Stage Company, New York, which was stated to be 3.96 cents per bus-mile but for a larger number of buses. In this connection the commission summed up its opinion in the words:

> It is impossible to escape the conclusion that the type of motor bus in use in Chicago by the bus company is largely responsible for the unquestioned inability of the bus company successfully to operate it from a business and financial viewpoint.

The commission said that it was forced to conclude that the only element of value behind the $25,000,000 of authorized capital stock of the National Motor Bus Corporation was the $1,000,000 of capital stock of the Chicago Motor Bus Company. This, it pointed out, had an extremely doubtful value in view of the result of operation during the past two years and because of the fact that the commission had authorized the execution of a mortgage of $200,000 against all the real estate and tangible property of the bus company.

The commission found that the bus company had not been successful financially and was not the proper corporation to be entrusted with a certificate of convenience and necessity.

On the other hand, the commission determined that by reason of the long experience and technical skill of its officers and directors and its sound financial backing the stage company was in a better position properly to serve the public and that it proposed to use a type of bus which had proved itself in New York to be thoroughly satisfactory and economical.

Within thirty days after the order of the commission favoring the stage company the bus company again appealed the case to the Circuit Court of Sangamon County. However, it is thought that the appointment of the Central Trust Company of Illinois as the receiver on March 18 may influence the withdrawal of the case from the court. It is understood that the Chicago Stage Company stands ready as soon as the litigation is cleared away to begin at once the establishment of a motor bus line on the south side.

An operating statement is presented of the bus company for the six months ended Dec. 31, 1918, and for the three months ended March 31, 1919.

STATEMENT OF OPERATION OF CHICAGO MOTOR BUS COMPANY

	Six Months Ended Dec. 31, 1918		Three Months Ended March 31, 1919	
Gross Earnings	Amount	Per Bus-Mile in Cents	Amount	Per Bus-Mile in Cents
Revenue from transportation	$244,495	35.79	$92,119.80	30.54
Special bus revenue	385	.06	78	.03
Advertising revenue	4,175	.61	....	.....
Total transportation revenue	$249,055	36.46	$92,197.80	30.57
Non-operating revenue	562	.08	426.60	.14
Total revenue	$249,618	36.54	$92,624.40	30.71
Operating Expenses				
Maintenance of way and structures	124	.03	60	.02
Maintenance of equipment	72,439	10.60	30,795	10.21
Depreciation reserve	22,131	3.23	9,886	3.28
Gasoline expense	29,856	4.37	12,464	4.13
Conducting transportation	84,083	12.31	35,362	11.72
Traffic expenses	2,125	.31	367	.12
General and miscellaneous expenses	30,186	4.42	14,981	4.97
Taxes	8,952	1.31	3,885	1.29
Total operating expenses	$249,901	36.58	$107,800	35.74
Net earnings (loss)	283	.04	15,175	5.03
Fixed Charges				
Interest on funded debt	5,491	.80	3,165	1.05
Interest on unfunded debt	983	.15	158	.05
Discount on funded debt	3,650	.53	2,156	.72
Total fixed charges	$10,125	1.48	$5,479	1.82
Net income (loss)	10,408	1.52	20,654	6.85
Revenue bus-miles	683,209	....	301,620	.....

Michigan Men Want Increase

Jackson, Battle Creek, Kalamazoo and Lansing, Mich., are threatened with a suspension of electric railway service on June 1, when the wage agreement between its employees and the Michigan Railway expires. The men in these cities have asked for 75 and 80 cents an hour on city cars and for 85 and 90 cents an hour on the interurban lines, with a further demand of double pay for all overtime and double time for Sundays and holidays and for any time in excess of six consecutive days. James F. Collins, vice-president and general manager of the company, protests that the company cannot earn the money under present rates to pay the increase.

As far as Jackson is concerned, the City Commission there takes the stand that so long as patrons of the company in Kalamazoo ride for a 5-cent fare, Jackson should not impose an increase over the present 6-cent fare on its people. Mayor Bennett of Jackson has proposed that representatives of the people of the four cities, the company and the employees talk matters over. A 6-cent fare was granted to the Michigan Railway in Jackson two years ago. The Council at Kalamazoo refused to increase the fares at the time they were increased in Jackson, but later submitted the question to a referendum. The proposal secured a majority vote, but not a two-thirds vote, which is said to be required in Kalamazoo. The company has been inclined to question the need for a two-thirds vote, but attorneys for the city have insisted that such a vote is necessary.

In Battle Creek the Michigan Railway is collecting a 6-cent cash fare with tickets at the rate of five for 27 cents authorized by the City Commission on Sept. 22, 1919. It is understood that in Battle Creek the 6-cent fare has proved inadequate and that the company is now operating there at a loss. Mr. Collins in a communication to the City Commission of Battle Creek characterized the situation as extremely serious. He said that a material increase in fares was absolutely necessary in order that railway service in Battle Creek may be continued. In June, 1919, a 6-cent fare was granted in Lansing.

Strike Threatened in Salt Lake

Demands for wage increases and changes in working conditions which, according to the company, would aggregate an addition of more than $376,000 to the annual operating expense of the Utah Light & Traction Company, Salt Lake City, were formerly presented to the management of the company by a committee representing the men in a series of conferences which terminated recently. The conferences were arranged for the purpose of formulating a working agreement to replace the present one, which expired May 1. The company met the demands of the men with a proposal to arbitrate the principal points at issue.

Mayor's Committee Reports

Radical Recommendations Made in Philadelphia—Corporate Changes Suggested—Higher Fare Possible

The special committee of eleven members appointed by Mayor Moore last month to investigate the transportation situation in Philadelphia rendered a report on May 25. The most striking recommendation, probably, is a rearrangement of the corporate structure of the Philadelphia Rapid Transit Company, by which a new company would be organized "owning outright, as well as operating, all of the facilities of the present separate companies"

PRESENT SERVICE UNSATISFACTORY

The committee in its report deplores the present inadequate transit service and limited trackage in Philadelphia, but admits that the existing company is handicapped in many ways and particularly by its present leases. Multiplicity of companies, it says, results in federal excess profits taxes which the underlying companies have succeeded in imposing on the operating company to the injury of its resources for service, and the separate interests of the several companies prevents a unification of operation based solely on the convenience of the public.

The report then recommends among other things: (1) A valuation by the Public Service Commission, (2) consideration of the practicability of the organization of a new company that would "own outright as well as operate all of the facilities of the present separate companies" with duty to increase trackage, (3) the creation of a financial plan providing for proper development of the new company, (4) the operation of a city's high-speed lines in conjunction with the surface system, (5) a study of the city's transportation needs by experts, to be made at once so that if legislation is needed application can be made to the next Legislature for permissive legislation.

FARE INCREASES FORECAST

In conclusion, the committee makes a number of interesting financial observations. To the general public the most vital is a suggestion that raising fares would be the only way to help out the company in its present financial condition. But before such fares are raised the committee believes the city should insist the stockholders of the operating company should forego their dividends; further, that the city should recognize the existing rentals and interest obligations as a first charge against the net revenues, and the company, from the surplus income, should pay a sum at least equal to the interest upon the city's investment in the Frankford elevated and other facilities to be leased by the city to the company.

The immediate recommendations include the rerouting of cars, the better control of vehicular traffic, limitations upon parking privileges and the creation of traffic thoroughfares.

On the question of competing bus lines the committee shows no enthusiasm. The question of the proper sphere of bus operation should be studied by the experts, the committee adds, at a later time.

Franchise Referred to Committee

The City Council of Lima, Ohio, has voted to refer the proposed franchise with the Ohio Electric Railway to the franchise and light committee, the city solicitor and attorneys of the citizens' committee, who are to confer with officials of the railway and report back to the Council. The representatives of the company are urged in their conference with the railway men to come to an agreement (1) as to the return agreeable on the investment, (2) the valuation of property and (3) the rates under the light franchise. They are further urged to make recommendations to the Council.

Ten Per Cent Wage Increase in Kansas City

Philip J. Kealy, president of the Kansas City (Mo.) Railways, called in a committee of the employees of the company on May 17 and announced an increase in wages amounting to about 10 per cent, effective on June 1, applying to all the company's employees. Mr. Kealy said the new average wage of trainmen would range from $120 to $180. The increase was voluntary. Mr. Kealy said:

> From August, 1917, to December, 1918, the employees of the company were under the domination of union agitators, and continual disturbance and lack of harmony resulted.
>
> The total increases in wages in that period and by such methods was about 8 cents an hour. Since January, 1919, there has been no dictation by professional agitators and this is the fourth increase in wages in a year.

Under the present scale a trainman receives 45 cents an hour the first three months, gradually acquiring 50 cents an hour after three years. Under the increased scale, Mr. Kealy said, a new trainman would receive 50 cents an hour the first three months and after three years would get 55 cents an hour.

Administrative Engineering Course at Sheffield

A course in administrative engineering, leading to the degree of Bachelor of Science, has been added to the undergraduate courses of instruction offered by the Sheffield Scientific School.

The object of this course is to prepare men for executive and managerial positions for which a knowledge of engineering principles and methods is requisite. The course is not intended for students who expect to become professional engineers in the field of design and construction, or for students who expect to fill executive positions in which a knowledge of engineering is required equivalent to that ordinarily gained in any one of the regular engineering courses.

The work of the first year is a general preparation for the special work of the last three years of the course.

People Held Responsible

Federal Court Sets Aside Des Moines Wage Award—Future Moves Problematical

Responsibility for the present railway condition in Des Moines, Ia., was placed squarely upon the people of that city in a decision rendered by Judge Martin J. Wade of the federal court in which he set aside the findings of the arbitration board which recently granted the employees of the Des Moines City Railway an increase to a maximum wage of 70 cents per hour.

WAGE AWARD REDUCED

Judge Wade further set 60 cents as a fair maximum wage to be paid as long as the revenues of the company will permit it. Any unexpected revenues are to be applied as wages over the 60-cent rate. The present maximum is 57 cents. In rendering the decision Judge Wade said:

> If a just wage cannot be paid to the men the people of Des Moines are to blame. If they do not get proper service it is because they refuse to pay for proper service. If conditions develop so that all street car service must stop no one will be responsible except the people of Des Moines.
>
> The condition of the Des Moines City Railway and of the receivers for the Des Moines City Railway is fully known to the people of Des Moines and to the employees of the company. There is no dispute so far as the matter before the court is concerned. Neither the city of Des Moines nor the employees can make any claim that the company is earning enough money to pay the wage award, and to pay other operating expenses, and fixed charges provided in the franchise ordinance.
>
> There are four parties before the court, the city of Des Moines, the employees, the Des Moines City Railway and the mortgagees and creditors. The company is insolvent. It was insolvent when the franchise was granted in 1916. The people of Des Moines then knew it was insolvent, and in the franchise expressly provided for the payment of interest upon the mortgage and general indebtedness. At the time when the franchise was granted the mortgaged indebtedness of the company was $2,725,000 and the general indebtedness was $1.287,719.
>
> The people who voted for the franchise had full knowledge of this indebtedness because it was fully discussed in the press and at public meetings, I am advised. The people of Des Moines also provided in the franchise for further indebtedness for extensions to meet the demands of the public.
>
> #### THERE CAN BE NO CONFISCATION
>
> This corporation and the stockholders of this corporation have never received any dividend or profit since this franchise was granted in 1916, nor for a long time before; nor are the stockholders demanding dividends now.
>
> I have held several times that I have no power to take the interest due upon the indebtedness and apply it upon the wages of the men, because in that event the mortgage would be foreclosed and the owner of the property would be deprived of every dollar of investment therein. The court has no power to deprive a man or a corporation of his property in that way.

Just what turn the trouble will now take is problematical. Ben Wiley, business agent for the men, says for the time at least there will be no strike and that regardless of Judge Wade's ruling the men will consider that they have earned the additional 10 cents from the date of the arbitration board's decision.

As explained in the Electric Railway Journal for May 22 the umpire in the wage arbitration, while admitting the right of the men to more money, stated the revenues were insufficient to permit the pay increase he suggested.

Pittsburgh Labor Situation Very Threatening

Men Refuse to Submit to Arbitration—Receivers Cite Men's Obligation to Exhaust Peaceable Methods

Several conferences have been held by Charles A. Fagan, S. L. Tone and W. D. George, receivers of the Pittsburgh (Pa.) Railways, with the wage committee of the motormen and conductors looking to a settlement of the demands of the men in so far as the working conditions are concerned. These involved an eight-hour day, one day off in seven, free transportation, more straight runs and elimination of all swing runs; time and one-half for Sundays and holidays, extra allowances for time when no transportation work was being performed, etc. The purpose of this effort was to clear up all questions at issue except those of wages. The men have refused thus far to discuss any of their demands until the wage rate is settled.

INASMUCH as the recent decision of the Public Service Commission, together with the budget of expenditures for the years 1920, 1921, 1922 and 1923, prepared by the valuation board, representing the commission, city and company, results practically in a service at (less than) cost by the company, the city authorities requested financial statements from the receivers of all expenditures prepared for 1920. On receipt of these an effort was made to eliminate an amount sufficient to create a balance to be made available for increased wages.

Owing to decreased maintenance during the war, resulting in pressing necessities therefore during the present year, the company's management has been compelled to refuse to acquiesce in the city's suggestion for a material curtailment in the program for maintenance and repairs for the current year.

MEN REFUSE ARBITRATION

The present attitude of the city is one more of temporary expediency and a complete reversal of its continued, insistent and frequent complaints for the past three years for more expenditures on maintenance, facilities and service and that regardless of the critical times and shortage in materials, labor and funds.

The disposition of the public officials is evidently similar to that in other cities in wage adjustments where the officials freely co-operate for higher wages in case the funds therefor are provided from a source other than the city treasury. As it was impossible in the present situation to lend any funds available, the municipal officers had no recommendations to make.

The receivers then called another conference with the wage committee. They offered the men a wage scale of 59, 63 and 65 cents (this is an increase of 5 cents an hour). It was suggested by the receivers that if this was not accepted all questions at issue be arbitrated in accordance with the by-laws of the men's organization. The receivers named S. E. Duff as their arbitrator. Mr. Duff is a consulting engineer of Pittsburgh and past president of the Engineers' Society of Western Pennsylvania.

The men have refused arbitration.

Whether there will be a strike on June 1 depends upon the attitude taken by William B. Fitzgerald, vice-president of the Amalgamated Association, who is on his way to Pittsburgh. It was Mr. Fitzgerald who requested the men to return to work last year after they had been on strike for more than a week; he told them on that occasion that "it is either a case of your returning to work or forfeiting your charter in the international association."

The present contract of the employees expired at midnight on May 1. They voted to strike on that date when the receivers told them they were unable to grant the demands or add to the present wage scale. Mayor Babcock and the City Council promised the men that if they would postpone strike action, the city authorities "will see that you get a material increase in wages." The men agreed to postpone the strike. The thirty day postponement expires at midnight next Monday, May 30.

The receivers, when they called the attention of the men to the fact that they must, in compliance with the laws of their own constitution, submit to arbitration, replied through their wage committee that they construed the activities of the Mayor and the City Council as "arbitration." There the case stands.

The letter of the wage committee to the receivers follows except for the introduction:

> At a meeting of our executive board on May 24 we gave careful consideration to your letter of May 22, in which you embodied your ultimatum of 59, 63 and 65 cents an hour as the wage to be paid motormen and conductors from May 1, 1920, to May 1, 1921, with the working conditions remaining the same as they now are.
>
> We note that in your letter of May 22 you state that the 10 per cent increase given the men April 1 had marked the limit of your ability to grant a further increase without being compelled to increase the fares. In looking over the figures presented by you in your budget to the Mayor and the City Council we feel that you have greatly overestimated your liabilities, as has been shown by men holding prominent city positions.
>
> We therefore feel that you are in position to pay the motormen and conductors a higher rate of wage than you have as yet offered, and we, therefore, must advise you that we regard the wage offered by you as being insufficient and not acceptable as it does not come anywhere near what the men are contending for.
>
> As to your proposal that in case the motormen and conductors refuse the above wage, you are willing to submit all wages in dispute to a board of arbitration, we wish to state that, in agreeing to the postponement of our wage controversy for thirty days, this was arbitration and we so advised our men at our meetings held on April 27 and 28.

The receivers, quoting from the constitution of the Amalgamated Association, replied that "the offer of the receivers to increase the wages of the conductors and motormen to 59, 63 and 65 cents an hour having been eliminated from the situation through its rejection by you in your letter of this date, we stand upon our offer of arbitration. That offer of arbitration was first made by us, orally, at one of our conferences in April and was renewed in our letter of May 22. It is based upon Sections 111 and 112 of the Constitution and General Laws of the Amalgamated Association." The receivers then quoted from the official Amalgamated constitution.

Wage Matter Awaits Fare Action

Final action by the Detroit (Mich.) United Railway and the city is being awaited by the motormen and conductors on their request for increased wages. The joint agreement committee representing the men advised that this be done so as to learn the outcome of the company's efforts to obtain an increase in city fares.

E. J. Burdick, assistant general manager, has asked the Council for permission to charge a 6-cent fare. This, it was maintained, must be collected to enable the company to pay its employees the wage scale that it was intended to offer. The company has offered to permit an accountant employed by the city to have access to the company's books. A statement of the company's present finances was presented to substantiate the company's claim.

The matter was taken under consideration by the Council, but no definite action resulted beyond telling Mr. Burdick that the matter could not be considered until a formal application for fare increases was placed before it. The opinion was voiced informally by one Councilman that the matter was one for the courts instead of the Council to settle. Officials of the company contend, however, that the fare increase can be made by the Council's assumption of power to fix fares in the Kronk ordinance. This measure was passed by the Council to restrain the railway from increasing fares. Although still in force this ordinance is held to be invalid by Corporation Counsel Wilcox, of the city.

According to the figures presented by Mr. Burdick an increase of 1 cent in city fares would increase the company's revenue by about $3,300,000, while the increased scale of wages would cost the company approximately $2,600,000. The balance, it was indicated, should go to the company to help pay the usual 8 per cent dividends, considered necessary to maintain the company's financial integrity.

The scale of wages which the Detroit car men voted to accept calls for 70 cents an hour for the first three months service, 73 cents during the next nine months and 75 cents for men employed one year or more.

News Notes

Trenton Men Defer Strike.—The employees of the Trenton & Mercer County Traction Corporation, Trenton, N. J., who presented demands for an increase in wages and were turned down by the company, have decided to continue working at the old rate and not go on strike. The company informed the men that no raise of any size could be granted this year.

Wage Increase in Dallas.—The Dallas (Tex.) Railway has announced an increase of 4 cents an hour to all conductors and motormen in its employ. The increase will take effect immediately. The wage for motormen and conductors will be the same. The new rates follow: First three months, 46 cents an hour; next nine months, 48 cents an hour; after first year, 50 cents an hour.

Wages Will Be Arbitrated.—The union men employed by the Eastern Massachusetts Street Railway, Boston, Mass., have accepted and ratified the working conditions section of their desired new agreement and have voted to place in arbitration the demands for a maximum wage rate of 75 cents an hour, the eight-hour day, time and a half for overtime, Sundays and holidays and one day off in fifteen days, with pay.

Connecticut Men Want Increase.—Members of the Amalgamated unions on the Connecticut Company, New Haven, Conn., through the State Conference Board, have requested a new contract, beginning June 1, which calls for a 75-cent flat hourly rate of wages, the eight-hour day and regulations as to running the one-man cars. The present schedule is a 50 cents an hour maximum, a ten-hour day and varying regulations, according to local conditions.

Municipalization Urged for Staten Island.—A request for the municipalization of the electric railway, electric lighting and power service in the Borough of Richmond, New York, N. Y., has been made in the form of a petition from citizens of Staten Island to the Board of Estimate. Immediate and favorable action on the plan of Commissioner Grover A. Whalen was urged on the ground that the situation at present on Staten Island constitutes a grave public emergency. Both electric railways on the island suspended service, but one of them has resumed under an increase in fare and protection by the court from interference by the city with its service.

Cities Urge Utility Legislation.—Legislation providing for state control of public utilities, through a regularly constituted Public Utilities Commission, was urged by the League of Texas Municipalities, which has just closed its annual convention in Dallas. Resolutions were adopted asking the Legislature to enact such legislation at the earliest date possible and outlining legislation desired, which will include electric railways and other utilities.

Improvement Program Approved.—The directors of the Cleveland (Ohio) Railway Company, at a recent meeting, approved the improvement program calling for the expenditure of $1,000,000 which was passed by Council several months ago. The operating report for March shows that 38,617,647 passengers were carried, an increase of almost 20 per cent over the corresponding month last year. The interest fund now amounts to $584,706. It must reach $700,000 before a reduction can be made in fare.

Berkshire Men Want More.—Demands for a new wage scale which will bring the pay of motormen and conductors on the lines of the Berkshire Street Railway, Pittsfield, Mass., to a figure in excess of $5 a day are now in the hands of C. Q. Richmond, the general manager. The demands are incorporated in a new working agreement which is to become effective when the present one expires June 1. After Mr. Richmond's answer has been received a conference will be held for the purpose of considering the matter further.

Unable to Agree on Third Arbitrator.—Unable to agree upon a third member of a committee to arbitrate the demands of conductors and motormen by the East St. Louis & Suburban Railway, East St. Louis, Ill., the two members chosen, C. E. Smith, consulting engineer of St. Louis, representing the company, and David Walsh, chosen to represent the employees, voted recently to adjourn sine die. The 1919-20 agreement between the employees and the company expired on May 1. At the date of expiration it was agreed to arbitrate through the committee of three, officials electing one member, the union a second and the two to choose a third.

Another Company for the Open Shop.—The Grand Forks (N. D.) Street Railway has served notice on its employees that after June 1 the company will operate its property on the open-shop policy. The present contract expires on the date mentioned. In a statement to its employees the company said: "The company contends that the open shop is based on one of the principles upon which American freedom rests—the right of every man to work as he will, without interference or intimidation, so long as he obeys the laws of his country. We have had to refuse local applicants employment due to their unwillingness to become members of the association. We are not antagonistic to labor unions and differ with them only when they seek to deny the constitutional rights of others in this land of equal opportunity."

Programs of Meetings

New England Street Railway Club

The annual outing of the New England Street Railway Club will be held this year at Montreal. The plan is to take the train from Boston on the evening of June 28, spending June 29 and 30 at Montreal, and return from Montreal on the evening of June 30. The program of these two days is to be announced at the meeting of the club on May 27.

American Institute of Electrical Engineers

The thirty-sixth annual convention of the American Institute of Electrical Engineers will be held at the Greenbrier, White Sulphur Springs, W. Va., June 29 to July 2, 1920. Seven technical sessions are scheduled. Opportunity has been provided for recreation and entertainment by leaving the afternoons open for the many entertainment features which are being arranged by the convention committee, including dancing, teas, card parties and other special functions for the ladies, and the usual golf and tennis tournaments, baseball and other special events.

American Railroad Association, Mechanical Section

The second annual meeting of Section 3, Mechanical, American Railroad Association, will be held at Atlantic City, N. J., June 9 to 16, inclusive. The sessions will be convened in the Greek Temple on Young's Million Dollar Pier. The headquarters of the association will be at the Marlborough-Blenheim Hotel. The program of reports or papers for the six sessions of the convention has been arranged as follows:

June 9. General committee, including nominations, mechanical stokers, stationary boiler plants.

June 10. Fuel economy and smoke prevention, auxiliary or safety connections between engine and tender, electric rolling stock, scheduling and routing systems for locomotive repair shops, superheater locomotives, snow-fighting apparatus.

June 11. Locomotive headlights and classification lamps, feed water heaters for locomotives, locomotives as a big investment, locomotive boilers, engine terminals, train resistance and tonnage rating.

June 14. Autogenous and electric welding, specifications and tests for materials, standard and recommended practice, repair shop layouts, amalgamation, standard blocking for cradles of car dumping machines, packing of journal boxes, co-operative research bureau.

June 15. Passenger car rules of interchange, prices for labor and materials, depreciation for freight cars, arbitration, tank cars, brake shoe and brake beam equipment.

June 16. Couplers and draft gear, car wheels, car construction, safety appliances, loading rules, train brake and signal equipment, train lighting and equipment, subjects.

Financial and Corporate

Deposit Time Extended

Satisfactory Progress Being Made Toward Reorganization of San Francisco-Oakland Railways

Howard Throckmorton, who has been acting in behalf of the reorganization committee having in charge the affairs of the San Francisco-Oakland Terminal Railways, Oakland, Cal., in the securing of deposits of subsidiary securities of that system in assent to the proposed plan for the reorganization of the company, announced on May 6 that already 60 per cent of these were in the hands of the committee's depositaries.

MANY HOLDERS ASSENT

There are outstanding in all $20,500,000 of notes and bonds of the company, and of these there had actually been deposited $9,200,000, of which $200,000 were notes. The others pledged would bring up the amount to the 60 per cent mentioned. Mr. Throckmorton stated that he had everywhere met with a disposition on the part of the security holders to co-operate with the reorganization committee, but the securities are widely held and much time is necessary to reach them all. For that reason the time was extended by the committee for receipt of securities under the plan from April 15 to June 15.

The reorganization now under way was undertaken at the instance of the California Railroad Commission and by virtue of an enabling act passed at the last session of the Legislature. Appraisal was provided for, and the appraiser appointed has been working for some time back fixing the values of the properties as of some date in 1918, all improvements actually made and money spent on such since to be added to the appraised value. This report is promised within sixty days, when a long step will be made toward reorganization. There are other matters to be taken up, such as the securing from the east bay cities of an indeterminate franchise.

NOTES HAVE MATURED

The notes outstanding are of two kinds, one that is known as the Halsey loan of $2,500,000 and the Tidewater loan of $1,500,000. There is also due and gradually being paid off interest on the company's obligations of $1,750,000. The Halsey and Tidewater loans have already matured. Other maturities are the Oakland Traction 6 per cent bonds, which were due in 1918, amounting to $1,121,000; an issue of equipment notes of the San Francisco-Oakland Terminal Railways of $120,000, and an issue of $95,000 of notes of the Oakland Traction Company.

There are 262 miles of standard gage city, suburban and interurban lines included in the San Francisco-Oakland System.

Housing Corporation Will Dispose of Its Richmond Property

The Richmond & Seven Pines Railway, the only road owned by the United States Housing Corporation, is about to be sold under the rules requiring the termination of the Housing Corporation. The corporation built more than 100 houses at Seven Pines and acquired the railway so as to supply the needed transportation to Richmond, some 8 miles away. The residents of Seven Pines are mostly commuters who go to Richmond for business, but there is also in Seven Pines a government shell filling plant, now used for storage but to be sold for factory or other use.

The physical property of the railway at the time of its purchase was appraised at $134,441, and while operated by the Virginia Railway & Power Company earned in nineteen months, gross, $115,150. All of the bids but one so far have been for the railway as scrap property. One bidder wants to take over the line as a going concern aand hopes to buy the houses, land and other development. This plan is preferred by the Housing Corporation.

Referendum on Dividend Matter

Common Pleas Judge David H. Thomas, on May 19, refused an injunction against the referendum on the increase in dividends of the Cleveland (Ohio) Railway from 6 to 7 per cent. Attorneys for the company stated that the case will be appealed. It will depend upon the decision of the higher courts as to whether the ordinance, providing for the increase, will be submitted to a decision of the voters on Aug. 10, 1920. In rendering his decision Judge Thomas, among other things, said:

> While the court is not dealing with the construction of the state constitution, it is dealing with the fundamental law of the city of Cleveland, and it is the court's judgment that this law should be liberally interpreted to the end that the manifest purpose of the city charter may be realized.
>
> The commissioners who framed the charter might readily have foreseen that a clerk through inadvertence, fraudulent purpose, or error in judgment, would wrongfully certify a petition as sufficient, which was in fact insufficient, and that the jurisdiction of the court would be invoked to make the correction.
>
> Was it ever the thought or intent of the commissioners who wrote the charter, or the electors who adopted it, that the operation of so important and zealously guarded a feature as the referendum should be subject to the hazard of absolute accuracy of a single official, in the performance of a ministerial duty? Can it be contended that a greater right follows from the inconclusive decision of the inferior official, the clerk, than from the conclusive decision of the superior and appellate official — the court? We do not think so.

Prospects Very Uncertain

Disintegration of Rhode Island Properties Likely Unless Unfair Competition Is Curbed

Bondholders of the United Traction & Electric Company, included in the system of the Rhode Island Company, Providence, R. I., are reported to have adopted the view that there will be no reorganization of the Rhode Island Company under the charter of the United Electric Railways, until jitneys and buses are regulated. It will be recalled that at the recent session of the Legislature of Rhode Island the program of bills looking toward the reorganization of the company and the granting of relief failed in part. Among other things the Legislature did not provide for jitney regulation, as had been asked by the company.

BONDHOLDERS IN AGREEMENT

The view of the situation as expressed by the bondholders of the United Traction & Electric Company has been ratified by bondholders of the Rhode Island Suburban Railway. The matter now goes before the stockholders of the United Traction & Electric Company. It is understood that the resolutions which have been adopted by the security holders call for the reorganization of the Rhode Island Company under the five acts passed by the General Assembly when jitneys and buses have been brought under proper supervision.

Despite the trend which these events indicate, it may be finally decided to proceed with the reorganization and continue the agitation for jitney regulation.

Justification for such a course, if adopted, would lie largely in the fact that the legislation already passed is estimated to eliminate $400,000 in charges against the railway.

The situation confronting the Rhode Island Company was reviewed at the fifth annual convention of the Rhode Island Bankers' Association on May 19. Walter F. Angell and Richard B. Comstock explained the conditions in the way of a successful reorganization of the company. They appealed to the bankers for assistance in bringing the competitors of the railway under public supervision.

MINORITY RULE FLAYED

Mr. Comstock is reported to have gone so far as to predict that unless the jitneys were brought under proper supervision, the electric railway properties would have to be taken over by the State or be scrapped. Mr. Angell declared that government in this country is being directed by the organized minorities. He cited the case of the railway legislation before the last session of the General Assembly. In this connection he said that 350 licensed jitney men thoroughly organized had succeeded in scaring the Legislature and had prevented the passage of the bill to place the jitneys and buses under regulation.

Thousands of Home Investors

During the last three years the Milwaukee Electric Railway & Light Company and Wisconsin Gas & Electric Company, Milwaukee, Wis., have sold their new securities to nearly 7,000 Wisconsin men and women. A surprisingly large percentage of these investors paid for their securities with money which they kept in hiding; in several such instances the sums thus brought out of hiding and put into circulation ran into thousands of dollars.

This year and next these companies have to raise several million dollars to finance urgently needed additions to their properties. The Wisconsin Gas & Electric Company is now selling $500,000 of five-year, 7 per cent convertible gold notes and $500,000 of 7 per cent participating preferred stock. The Milwaukee Electric Railway & Light Company needs $7,000,000 to $8,000,000 this year and next to meet increased demands upon its plants. The companies, so far as possible, wish to get this new capital at home. The reasons they give are as follows:

1. Large investors generally throughout the country, because of the high federal income taxes, have withdrawn from the market for public utility securities, preferring to invest in tax-free securities.
2. This fact has shifted the logical market for public utility securities to the field of small investors, with relatively small incomes subject to federal taxation.
3. Taken together, the two above facts make it necessary for a utility security issue to find at least ten times as many buyers as heretofore.
4. Clean, strong companies, with good earning and property records, like these, can reach a large number of small potential investors at least cost in their home territory. Indeed, the cost of reaching the necessary large number over a larger area by direct advertising would be prohibitive.
5. These companies have learned by experience that by using this method, within their own State, they can get new capital as needed at a cost which the Wisconsin Railroad Commission, regulating their service and their financing, is willing to approve as in the public interest.
6. By this method every dollar of selling cost is expended in Wisconsin and every dollar of interest and principal earned by the securities sold is paid out in Wisconsin.
7. The enlisting of several thousand new home investors in large Wisconsin business enterprises tends to stabilize the position not only of those enterprises but of all business investments against social and industrial unrest. These companies have become convinced that the surest way to protect the existing order of business is to open the way for a majority of the industrious and thrifty men and women of the State to share in the earnings of the larger corporations.

Birmingham Notes Extended

The committee representing the holders of the 6 per cent two-year gold notes of the Birmingham Railway, Light & Power Company, Birmingham, Ala., which came due on April 1, has entered into arrangements with persons interested in the company for the extension of these notes for two years from April 1, 1919, to April 1, 1921, at 7 per cent interest, together with interest on the overdue coupons at 6 per cent. The April 1, 1919, coupon will therefore be paid at 6 per cent and the Oct. 1, 1919, and April 1, 1920, coupons at 7 per cent, together with interest on these overdue payments at 6 per cent.

Thomas J. Walsh, chairman of the committee, explains the situation as follows:

> We were especially fortunate in the Birmingham situation in that the difficulties were due merely to local complications, and we are advised that for the past six or eight months all criticism of the company on the part of the city officials has been removed and the company seems to have been restored to its former excellent standing. The court has, however, continued the receivership. Negotiations, we are informed, are now pending between the company and the city looking to some modification of the fixed fare clauses of the franchise, whereby the company may be enabled to earn a fair rate of return on its investment at all times in the future.
>
> The company is showing very satisfactory improvement in earnings both gross and net compared with a year ago, and for the twelve months ended March 31 the increase in net earnings over the corresponding period in 1919 was more than $250,000.
>
> The interest on these notes is to be advanced by the protective committee representing the American Cities five-six per cent collateral trust bonds, under which collateral mortgage the stock of the Birmingham Company is pledged, it being necessary to do it in this way as the court would not allow the company to pay the interest on account of other payments ranking equal or prior to this interest charge. The American Cities Company purchases the coupons for its own account, thus safeguarding the equity which it now owns in the property and which was jeopardized so long as there existed any default on these notes.
>
> New coupon sheets will be attached to the deposited notes, and it is believed to be for the best interest of the owners of the notes that they remain on deposit with the committee until satisfactory arrangements have been made for the payment of the principal thereof, or, in any event, until the receivership has been terminated.

Steps Taken Toward Condemnation

Definite steps were taken by the City Council of Seattle, Wash., for the purchase of the Seattle & Rainier Valley Railway when the Council recently instructed Corporation Counsel Walter F. Meier to prepare an ordinance for condemnation of the property. An appraisal of the property by members of the Council and engineers of the city utilities placed the approximate value at $900,000. The company is demanding $1,668,000. As there seemed no chance to compromise, the Council decided to let the courts fix the price.

Mr. Richey to Value Knoxville Property

Albert S. Richey will value the entire property of the Knoxville Railway & Light Company, Knoxville, Tenn., for the Railroad & Public Utility Commission of that State. J. H. Perkins, Birmingham, Ala., will represent the company. Mr. Perkins also acted for the Memphis Street Railway in the valuation of that property. Both the Knoxville and the Memphis properties are controlled by the American Cities Company. In the Knoxville valuation the city has the right to appoint an appraiser at its own expense to represent it. The representative of the city will have equal rights with those of the company representative. The city has not yet announced its representative. The valuation is being conducted to ascertain the base upon which rates for both light and power and for fares shall be based.

Two Roads Show Surplus in 1918

The eleventh annual report of the Nebraska State Railway Commission contains financial statistics for the year ended Dec. 31, 1918, pertaining to the six operating electric railways. These six companies own 201 miles of single track and lease 14.67 from lessor non-operating companies. The total equivalent single-track mileage open bed is 15.75.

Only two of these companies had a surplus at the end of the year, although three paid partial dividends on either their common or preferred stock, or both. The average dividend rate, however, for the State was less than 2 per cent on an outstanding capitalization of $12,489,000.

Further details as to operating revenues and expenses and other statistics of operation, including traffic statistics, car-mile statistics, etc., are included in the following table:

Year Ended Dec. 31, 1918	
Number of companies	6
Stocks and Bonds:	
Capital stock issued and outstanding:	
Common	$12,039,500
Preferred	$6,244,500
Bonds issued and outstanding	$11,750,000
Number of shares authorized	226,000
Number of stockholders	875
Authorized capital stock	$22,600,000
Assets:	
Structures and roadway	$16,724,406
Equipment	5,789,352
Lands, buildings, fixtures, etc	883,622
Material supplies on hand	408,182
Cash and current assets	755,397
All other assets	2,961,892
Total assets	$27,621,598
Liabilities:	
Capital stock issued	$12,489,000
Bonds outstanding	11,369,000
Loans and notes payable	131,799
Audited vouchers and accounts payable	213,104
Taxes and interest accured and not yet paid	88,408
All other liabilities	3,330,287
Total liabilities	$27,621,598
Earnings:	
Passenger revenue	$3,723,854
Other revenue	457,396
Gross earnings from operation	$4,181,250
Expenses:	
Way and structures	$442,167
Equipment	245,257
Traffic	6,793
Transportation	2,017,210
General and miscellaneous	378,149
Total operating expense	$3,089,576
Net operating revenue	1,091,674
Non-operating income	27,329
Gross income	$1,119,003
Deductions from gross income:	
Interest paid	$740,698
Taxes paid	370,217
Dividends	237,119
Reserved for depreciation	10,616
Additions and betterments for year	53,623
Total deductions	$1,412,273
Deficit at end of year	$293,270
Traffic statistics:	
Revenue passengers	73,510,318
Non-paying passengers	19,865,685
Total passengers	93,376,003
Revenue car-miles run	13,487,504
Car-mile statistics:	
Operating revenue (cents)	31.04
Operating expenses (cents)	22.92
Net income (cents)	*0.09
Passenger traffic (total)	6.93
Car-miles per revenue passenger	0.183
Miles of track owned	201.085
Leased track operated	14.669
Total trackage in state	215.754
Total single-track mileage operated	206.564
Total number of motors owned	1,214
Total number of all other cars	44

Seattle Is Economizing

Ticket Warrants Suggested as a Means of Future Financing—Economies Being Worked

A new method to finance the Seattle (Wash.) Municipal Railway has been suggested to Mayor H. Caldwell by city Comptroller Harry W. Carroll. He plans "bargain sales" of street car tickets in blocks of not less than 100 5-cent tickets at a discount representing the 5 per cent interest which the banks would charge for handling railway, warrants. In that way the interest would be paid to those who ride on the cars. This could be done, Mr. Carroll said, by selling blocks of $5 worth of tickets redeemable in a year for $4.75 and $5 blocks redeemable in two years for $4.50.

Mr. Carroll says the suggestion is based upon the representation of the superintendent of municipal railways that certain economies in the operation of the railway will result in a decided reduction of expenses and will eventually enable the railway to maintain itself in a solvent condition. Mayor Caldwell will present the suggestion to the City Council.

D. W. Henderson, superintendent of the municipal railway, in a recent letter to Mayor Caldwell, protested against the suggestion of City Treasurer E. L. Terry that the department be placed on a warrant basis on June 10. Mr. Henderson submitted a statement showing that the railway deficit during April was $37,000 less than in March. He states that, with other economies being initiated, it is expected the deficit for the month of May will be materially reduced. Mr. Henderson reports that the department has been able to reduce car-hours so as to effect a saving of $8,000 monthly. The operation of the jitney regulation ordinance is also expected to increase the returns of the railway.

Eastern Massachusetts Abandons Twelve More Miles

The trustees of the Eastern Massachusetts Street Railway announced on May 18 that, beginning June 1, the following lines of the system would be discontinued: Melrose Highlands to Saugus Center, Linden to Saugus Center, Malden Square to Linden, Linden to Revere and the Park Avenue line in Revere. The trustees stated that the operating loss was further aggravated by the necessity of large expenditures for rehabilitation in the near future.

Fred A. Cummings for the company said that the residents of Saugus, Malden and Melrose have been informed that notices of discontinuance will be posted in the cars to take effect June 1. Mr. Cummings said:

> The 12 miles comprising the several lines have been under observation for some time, and it was soon discovered that the volume of traffic did not meet the bare operating expense. In other words the cost has been greater than the revenue.
>
> All the lines are in the Chelsea district, in which there has been a large deficit for some time. The trustees feel that the only way to avert the deficit is to discontinue such lines. Of course, in this section a number of persons will be seriously inconvenienced. The public officials of Malden have asked for a conference with the road officials Thursday afternoon in the hope that something may be done to continue the lines.

Evidence Presented in Foreclosure Case

The presentation of evidence in the foreclosure suit against the Chattanooga Railway & Light Company, Chattanooga, Tenn., was completed on May 8. The court announced that the final argument would be heard the following morning. E. D. Reed, general superintendent of the company, occupied the stand for most of the day. He reviewed the history of his connection with the company since 1909. Much of his testimony had to do with the operating agreements between the railway and light departments of the company for the joint use of property.

It was brought out that the light and power department has been a much better paying investment than the railway department. While the net revenue of the railway department in 1910 was considerably more than that for the light and power departments, in 1913 the net revenue of the light and power department was greater than that of the railway department for the same year. After the use of the hydro-electric power had begun in 1913, 18 per cent of the power received to the company's transforming stations was used for railway operations and the remaining 82 per cent for light and commercial power purposes. Mr. Reed stated that the depreciation of the railway property since 1914 had been $800,000 to $1,000,000. In addition to the mortgage involved in the present suit, the company has been paying interest on approximately $1,700,000. The aggregate of interest paid in the past six years was $1,500,000. The court has under consideration various applications of the receivers with respect to the appropriation of moneys for the payment of taxes, tolls, etc.

Financial News Notes

Seek to Use Renewal and Replacement Funds.—The Memphis (Tenn.) Street Railway has asked permission from the State Utilities Commission to invest its renewal and replacement funds for new construction at the rate of $5.000 a month without applying to the City Council for that privilege.

Long Island Road Suspends.—The Babylon Railroad suspended service on May 15. The road extends from the Long Island Railroad at Amityville to the steamboat dock at the foot of Fire Island, Babylon. There are 8 miles of standard gage track, with catenary trolley.

Suburban Bonds to Be Paid.—The $1,000,000 of first mortgage bonds of the Detroit, Rochester, Romeo & Lake Orion Railway, included in the Detroit (Mich.) United Railway system, which mature on June 1, will be taken up from the present holders upon presentation at the office of the Central Union Trust Company, New York.

Shore Line Electric Railway Has Deficit.—Robert W. Perkins, receiver of the Shore Line Electric Railway, Norwich, Conn., has filed with the clerk of the Superior Court a list of the claims given to him against the company, as its receiver. They aggregate $4,798,133. The receiver also filed a statement showing that a deficit of $78,506 resulted during the six months' period ended April 1.

Receiver's Certificate to Be Refunded.—Judge Foster of the United States District Court has authorized J. D. O'Keefe, receiver of the New Orleans Railway & Light Company, New Orleans, La., to issue $750,000 of receiver's certificates. The receiver has stated that the certificates can be disposed of at par and interest. The proceeds will be used to take up a like amount of certificates which fell due May 15.

Manila Company to Issue Preferred Stock.—The New York Stock Exchange has been notified that the Manila Electric Railroad & Lighting Corporation, Manila, P. I., proposes to increase the authorized preferred stock from $2,000,000 to $3,000,000 and to change the dividend rate on the present authorized stock from 7 per cent to 8 per cent. The company has no outstanding preferred stock at present, although $2,000,000 of such stock was authorized by its charter.

Abandonments Sought in Trinidad.—Abandonment of railway service on Pine Street between Arizona and San Juan Streets and the removal of the railway tracks from Pine Street between State and San Juan Streets, is contemplated by the Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Col. In the application which it has made to the Public Utilities Commission, the company asserts there is practically no revenue derived from the operation of the lines.

Abandonments and Relocations Proposed.—The Quincy (Ill.) Railway, included in the Illinois Traction System, has applied to the City Council of Quincy for permission to take up its tracks on Broadway between Third and Fourth Streets and on Front Street between Broadway and Main Street. The company desires to discontinue service entirely on these lines. It has further applied for permission to take up one track of the present double-track system on Third Street between Spring and Oak Streets and to relocate the remaining single track in the center of Third Street between Spring and Oak Streets and to operate the same as a single-track line. The petition was referred to the railroad committee of the Council without discussion.

Traffic and Transportation

Interurban Pleas Heard

Indiana Companies Present Case for 3-Cent Rate—Large Increase in Costs Shown

Petitions of the Indianapolis & Cincinnati Traction Company, the Union Traction Company of Indiana and other interurbans operating within the State of Indiana came before the State Public Service Commission at hearings on May 18 and 19. The roads had applied for a general increase in fares to a basic rate of 3 cents a mile. The present basis is 2¾ cents a mile.

The case of the Indianapolis & Cincinnati Traction Company was presented by C. L. Henry, president of the company. Mr. Henry called attention to the tabulation of figures of six national banks in Indianapolis which showed that from September until May the bank loans increased from $49,981,000 to $64,156,000, while the deposits had practically remained at a standstill.

Mr. Henry said he did not believe that any Indiana interurban would be taken into the groups for which the Interstate Commerce Commission is to fix rates under the Esch-Cummins law. He pointed out that the groups are to be considered as a whole and that single lines are to receive no consideration, outside of loans and rentals, if they are unable to operate under the rates to be fixed by the federal commission.

COAL PRICE ADVANCE SHOWN

Summarizing the operating cost increases, Mr. Henry showed that his company now is paying 45 cents a ton more than contract price for its coal; that after Sept. 1 coal will cost $1 a ton more, "if we can get it at all"; that coke for the heating of cars will cost $1 a ton more and that general expenses will amount to approximately 25 per cent more than three months ago. He said that the company now is earning only a little more than one-third of what it is entitled to earn on a reasonable per cent basis of return on an $8,000,000 investment. He said that if the company could obtain barely enough money to squeeze through "the present financial storm" it would be satisfied.

Arthur W. Brady, president of the Union Traction Company of Indiana, presented the case for that system. Mr. Brady declared that under the plan the company proposes the fare would be only 2.85 cents a mile when tickets are purchased. This would be a 4 per cent increase over the present fare. Cash fares would be computed at the rate of 3 cents a mile, but each passenger would be given a rebate check, redeemable at any of the company's ticket offices, which would bring the fare down to 2.85 cents a mile.

The company is now charging at the rate of 1½ cents a mile for commutation tickets. It seeks to have the commutation books put on a basis of forty rides for twenty-five one-way full fares. At the 2.85-cent rate this would increase the commutation rate to 1.78 cents a mile, Mr. Brady said. During Mr. Brady's testimony he brought out the fact that the company would like to build a new power plant, purchase new steel cars, eliminate sharp curves and install additional block systems, but that it could command no capital with which to do so.

In reply to a question by Commissioner Paul P. Haynes, as to what would be the general effect if one of the larger interurban systems were to fail, Mr. Brady said that he did not like to talk panic, but that if one of the large tractions should fail now it would be taken as further signs of financial stress, and that if the people should become alarmed, "No one could tell what would happen." He asserted that it would be a very serious thing for Indiana.

Dallas Must Have More

Company Asks City Commission for 6-Cent Fare—Can Obtain No Credit Without Increase

Responding to a request of the municipal authorities of Dallas, Tex., for a statement of the needs of the Dallas Railway, Richard Meriwether, vice-president and general manager of the company, has submitted to the City Commission a petition for a 6-cent cash fare on the company's lines. Mr. Meriwether asks a charge of 1 cent for each transfer and of 3 cents for each school ticket. This action follows a letter recently sent by Mr. Meriwether to the commission, going into detail regarding the company's revenues and explaining that additional revenue was necessary for continued operation.

IN asking for a fare increase Mr. Meriwether declared that the records showed that the company had been able to earn less than 4.6 per cent annually on its approved property value since the beginning of operation under the present franchise. Reports of the company covering 1919 show that if a 6-cent fare had been in effect its earnings would have exceeded the 8 per cent authorized return on the invested capital. Cash fares numbered 42,011,571. At 1 cent each this number amounts to $420,115. The company made $462,000 or approximately 4.5 per cent during 1919.

Mr. Meriwether declared that the company had not been able to furnish the necessary additional equipment to keep pace with the growth of Dallas and "were it not for the splendid and broad-minded attitude of the citizenship of Dallas, it already would have resulted in such demonstrations from the people as would be hard for those responsible to the public to withstand." The letter declared the company had not been able to meet its responsibilities to its employees in the wage matter. It also cited the fact that records show an appalling increase in the number of accidents.

CREDIT UNOBTAINABLE

Referring to the company's inability to obtain credit, Mr. Meriwether said:

> The financial history of the company is such that it is without credit and, therefore, is now and will be unable to meet the demands for additional equipment and extended service until the company's credit has been established, through its ability to show a fair return on its property value.
>
> We have employed in the train service, as motormen and conductors, about 300 new men since Jan. 1, where ordinarily in years past we employed approximately 200 new men during an entire year. This enormous labor turnover can be traced to the fact that the company has been unable to earn a sufficient amount to permit of paying our employees the wages which we know and feel they are justly entitled to, the result being continual unrest and change in the personnel of our forces.

In his first letter notifying the commission that the company was in need of additional revenue Mr. Meriwether pointed out that the company was without funds for needed extensions and improvements. He said in part:

> The economic and financial situation has changed so materially since this company began to operate under its present franchise on Oct. 1, 1917, that it has been a struggle to perform our obligations under such franchise, which limits the maximum fare to 5 cents, with twenty-two tickets for $1. Because of this situation the Dallas Railway has not been able to meet the constantly mounting costs of operation (due to large increase in prices of labor and material) and to earn such a fair return on the investment as to make it possible for this company to refinance its maturing obligations. This situation has continued, until now we find ourselves entirely without the credit necessary to refinance early-maturing obligations, or to secure the money needed for improvements and extensions.
>
> As the records in the office of the supervisor of public utilities will show, the Dallas Railway has earned on its approved property value for the thirty months beginning Oct. 1, 1917, and ending March 31, 1920, a return of less than 4.6 per cent. We have earned during this period $501.357 less than we are permitted to earn under the existing franchise.
>
> Every economy possible has been practiced in operating the property, consistent with the rendering of good service and the maintaining of the physical property in good condition. Every suggestion of the city has been followed and no stone left unturned to try to accommodate our facilities to the unusual demands made upon them, due to the rapidity of the city's growth and activity in the last three years.
>
> The very material increase in the volume of our business (resulting, of course, in greater gross receipts) has been more than offset by the market increase in cost of material and labor. As an indication of just what this increase has been, our average cost of operation per car mile for the first three months under the existing franchise (October, November and December, 1917) was 14.9 cents per car mile and our maintenance charges 2.4 cents per car mile. For the three months of January, February and March, 1920, our average operating costs were 24.8 cents per car mile and our maintenance charges 3.8 cents per

> car mile, or an increase of 66 per cent in operating costs per car mile and 50 per cent in maintenance costs per car mile.
>
> The volume of traffic handled by our present facilities has about reached the limit, if we are to keep up the standard of service now being given. This traffic is increasing constantly, and even now the service is not all that we would like it to be. In fact, we are losing business, due to the shortage of equipment, and the patience of our patrons is often taxed on account of the inadequacy of the service, especially during the rush hours.
>
> It is our belief that it will require the expenditure of not less than $2,000,000 within the next three or four years for the purposes enumerated above, if we are to keep pace with the growing demands of the city for transportation and if we are to be able to furnish to the citizenship the transportation service to which they are justly entitled.
>
> We have maturing on June 15, 1920, $1,000,000 of 7 per cent notes. We shall do our very best, but the refunding of these notes under conditions now existing in the financial world and in view of this company's failure to earn a fair return upon its investment now appears impossible.
>
> The present plight of this company is not different from that existing in all parts of the country, with reference to street railway properties.
>
> With these facts before you we feel that you will recognize the importance of something being done at once, looking to the placing of the company in that position necessary for it to re-establish its credit and in order that it may survive and give the character of service required by the city of Dallas.

Statistics of fare increases and of abandonments were included in the letter.

Two Cents a Mile on D. U. R.

Fares on the interurban lines of the Detroit (Mich.) United Railway have been raised to 2 cents a mile. The increase affects the Pontiac, Orchard Lake and Flint divisions and the Rapid Railway and the Jackson & Chicago Railway. Fares on the Detroit, Monroe & Toledo Short Line Railway, which were raised some time ago, are not subject to the general increase which was recently announced.

The advance in rates was made under the provisions of the so-called Smith act, passed at the 1919 session of the Michigan Legislature. This measure gives to the railways earning less than $8,000 a mile authority to charge 2½ cents a mile on their interurban lines. The Michigan Supreme Court recently upheld the statute's constitutionality. The court has granted the plea that was made by Attorney-General Groesbeck for permission to argue for a rehearing of the case.

Would Continue 7-Cent Fare

The period for the charging of 7-cent cash fares on the Buffalo, N. Y., lines of the International Railway will expire on June 1, under a decision of the Public Service Commission for the Second District. If the higher rate is to continue the commission must make a new order. This will be opposed by the municipal authorities, who contend the income to the company under a 5-cent fare would now be sufficient to pay operating expenses and a fair return on the investment because the International Traction Company has been eliminated as the holding company for the International Railway.

Herbert G. Tulley, president of the International, believes the company needs a higher fare than 7 cents because the increase of 12 cents an hour granted all employees has absorbed the increase obtained when the fare was raised 2 cents. It is also pointed out by President Tulley that few passengers are paying 7 cents, since nearly all the car riders are buying tickets at the rate of four for 25 cents or 6¼ cents a ride, with free transfers. The company has announced that it will continue to collect the 7-cent fare after June 1 unless stopped by law.

One-Man Cars Indorsed

Indorsement of the one-man car on New Jersey lines has been given by Philander Betts, chief inspector of the Board of Public Utility Commissioners in a report to the commission on this type of car. The report was made following a complaint lodged with the commission by the International Brotherhood of Blacksmiths, Drop Forgers and Helpers of Trenton. The report is of particular interest to all communities in which the Public Service Railway operates, as this company proposes to install cars of this type.

The report carries two important recommendations. The first is that whenever these cars, fitted generally with cross seats and a seating capacity of from thirty to thirty-five persons, are operated in New Jersey the maximum number of adult persons to be carried in each car at one time shall not exceed fifty. Another recommendation is that after July 15 all these cars shall be provided with a removable guard rail, so located as to prevent passengers from being crowded against the operator of the car and also to prevent the occupation by passengers on the car of at least a portion of the front platform.

The labor men who protested against the cars being operated in Trenton declared them a "deadly menace to the lives and limbs of the community" and that too much responsibility was placed upon the one man who operates each car.

Fare Case Goes to Higher Court

In the application of Corporation Counsel O'Brien for a writ of prohibition to prevent the Brooklyn (N. Y.) Rapid Transit Company from raising its 5-cent fare to 8 cents, which was to have been argued on May 20 before Justice Tierney of the Supreme Court, all the interested and contending parties agreed to have the matter go to the Court of Appeals, the highest tribunal in the State.

Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, called attention to the fact that Public Service Commissioner Nixon had written a letter to Mayor Hylan assuring him that the commissioner would not attempt to grant the company's request for an increase of fare until after the proper courts had passed upon the matter.

Corporation Counsel O'Brien said that although the commissioner's letter was an evidence of good faith he would prefer to have a court order granting the prohibition, which would stay an increase of fare pending action by the highest court. Then Mr. Garrison, on behalf of the company, and Terence Farley, counsel for the Public Service Commission, both said they had no objection to the court entering an order granting the city a writ of prohibition against the proposed increase of fare. That, they said, would be about the quickest way of getting the matter before the Court of Appeals. Justice Tierney reserved decision.

Six Cents in Fort Worth

A 6-cent fare was placed in effect on the city lines of the Northern Texas Traction Company, Fort Worth, Tex., on May 19. In announcing the advance in rates, George Clifford, general manager, stated that the company had decided upon a program of improvements and betterments in service that would entail an expenditure of fully $1,000,000. Mr. Clifford recently appeared before the City Commission, declaring that additional revenue was imperative if the company was to continue its present service and to make needed improvements and extensions.

Under the city charter of Fort Worth the company is authorized to charge whatever fare may be just and reasonable. The city cannot inaugurate new fares, but after the fares have been put into effect it may decide if they are reasonable, and if found unreasonable it may take action to compel a reduction.

In outlining the program of improvements Mr. Clifford explained that these had already been considered by the Boston office of Stone & Webster and had been approved. The improvements to be undertaken include the extension of several lines and the double-tracking of others; the building of many additional sidings and extensions to carhouses, and the building of new carhouses on the North Side. It is also planned to increase the number of cars in service 32 per cent before Dec. 1. Congestion on Main and Houston Streets will be relieved by the diversion of a large amount of traffic to Throckmorton Street.

Ten Cents on Municipal Line

The Board of Public Utility Commissioners of New Jersey has allowed the Ocean City Electric Railroad to increase fares from 7 cents to 10 cents. The increase was granted, the board says, to relieve the residents of Ocean City from the financial burden of a deficit through operation of the system. The new rate went into effect on May 28.

The Ocean City line is the only municipally-operated electric railway in New Jersey. It was taken over by that city when the company announced that it was unable to run the road any longer at a profit.

In the order allowing the increase the commission says that while the new rate is exceptionally high and under normal conditions might tend to discourage travel to an extent which would defeat its purpose, it is probable that during the season of operation, when Ocean City is filled with summer visitors, it will not greatly deter those who would be inclined to use the road. It is also pointed out that if the road were operated at a deficit the expense would have to be defrayed by a comparatively small number of taxpayers. No protests were made against the increased fare.

Transportation News Notes

Will Grant 7-Cent Fare.—The City Councils of Menominee, Mich., and Marinette, Wis., in a joint session recently decided to allow the Menominee & Marinette Light & Traction Company, Menominee, to charge 7-cent cash fares. Ten tickets will be sold for 50 cents and ten children's tickets for 30 cents.

Sanctions One-Man Cars.—The City Council of Wilmington, N. C., has approved the use of one-man safety cars on the lines of the Tidewater Power Company. An ordinance barring the operation of such cars within city limits has been rescinded. The company plans to purchase a number of "safeties" in the near future.

Ten Cents on City-Owned Line.—Fares on the lines of the Norton, Taunton & Attleboro Street Railway, Norton, Mass., have been raised to 10 cents. Tickets good for fourteen rides each are sold for $1 each. The road was taken over some time ago by the municipalities of Norton, Taunton and Attleboro. The fare was formerly 7 cents.

Rides Cost More in Rome.—Car fares in Rome, Italy, which were originally 2 cents and were lately raised to 3 and then to 4 cents, have been raised to 6 cents from 8 o'clock in the morning until 10 o'clock at night, after which they will be 8 cents. Those who, going to their work before 8 a.m., used to pay 1 cent, will pay 3 cents henceforth. Cabmen have also doubled their prices.

Denies Knoxville 7-Cent Fare.—The Tennessee Railroad & Public Utilities Commission has denied the application of the Knoxville Railway & Light Company for an increase in fare from 5 cents to 7 cents. The company's petition for authority to charge 2 cents for each transfer was also refused. The commission has ordered an appraisal of the company's property.

Canadian Company Wants Increase.—The Hamilton (Ont.) Street Railway, which at present sells eight tickets for a quarter good during workingmen's hours, has announced that it cannot make any improvements in the service at the present rates of fare. Unless it is allowed to charge a straight 5-cent fare at all hours it is financially unable to do any of the things the city asks.

Will Raise Ticket Rate.—A revised tariff schedule has been filed with the State Department of Public Utilities by the Massachusetts Northeastern Street Railway, Haverhill, Mass., under which the ticket rate will be raised from 6 cents to 8⅓ cents. All reduced rate tickets will be discontinued. The cash fare will remain at 10 cents. It is proposed to put the new schedule into effect on June 15.

Protection Asked for Buses.—An ordinance designed to give the same safety zone protection to auto buses by police as is given to electric cars has been introduced in the City Council of Toledo, Ohio. Bus drivers had reported to the Council that they had been ordered by police not to stop within 120 feet of a street intersection. The ordinance committee will investigate conditions before making any report on the proposed measure.

Wants 8 Cents in Muskogee.—The Muskogee (Okla.) Electric Traction Company has filed an application with the State Corporation Commission in Oklahoma City for authority to increase fares. The present fare in the city proper is 5 cents. The company asks an increase to 8 cents, with 4 cents for half-fares. Fares to points outside the city, which now have a higher fare than 5 cents, would also be increased in proportion.

Railway Runs Jitneys.—The Eastern Massachusetts Street Railway, Boston, Mass., has been obliged to go into the jitney bus business to take care of the people who live in Squantum. Electric car service to and from Squantum was suspended a year ago last January and transportation since that time has been maintained by means of jitney service supplied by an individual. On May 22 the jitney service was stopped for some unknown reason.

Wants Postmen Carried Free.—City Solicitor Ralph Levinson, of Steubenville, Ohio, has brought suit in the Common Pleas Court against the Steubenville, East Liverpool & Beaver Valley Traction Company for an injunction restraining the company from charging uniformed mail carriers fares in alleged violation of its franchise. A temporary retraining order has been issued by Judge Carl H. Smith. The plaintiff charges that charging mail carriers fare will cause citizens in general to suffer from delay and confusion.

Traffic Increasing in Louisville.—The Louisville (Ky.) Railway is handling a large volume of business at the present time due largely to the spring racing season and the opening of the parks. Forty-five thousand people attended the Kentucky Derby on May 8. Opening of the parks on May 9 has also increased night travel, while the attendance at both amateur and professional games is very large. The new boxing law goes into effect in June. There will probably be many big nights, as Louisville was for many years an important boxing center.

Seven Cents in Atlantic City.—A. J. Purinton, receiver of the Atlantic City & Shore Railroad, Atlantic City, has announced that the 6-cent fare will be increased to 7 cents on June 11, that fares on the crosstown line will be raised from 5 to 7 cents, that the price of 100 strip tickets to Longport will be raised from $6.50 to $7.50, and that transfers will cost 3 cents each. A year ago the company was given the right to raise the fare from 5 to 6 cents. The receiver states that the increased cost of operation this year aggregates $103,893.

Compromise One-Man Car Fight.—One-man cars will be withdrawn from service on the Main Street line in Richmond, Va., by the Virginia Railway & Power Company. Large double-truck cars of the old pattern will be substituted in an endeavor to improve traffic conditions, officials of the company stated after a lengthy conference with the committee on streets of the City Council. Although the company remonstrated, arguing that the change in service will not help the situation, the committee prevailed upon the officials to try the plan of removing the "safeties" for the present.

High Water Delays Traffic.—Interurban roads in Texas have suffered much from recent high water. The Northern Texas Traction Company's line between Dallas and Fort Worth suffered two washouts and traffic was stopped for nearly two days. The Tarrant County Traction Company, Fort Worth, reported a washout between Fort Worth and Cleburne which put that line out of commission for some time. The Waco branch of the Texas Electric Railway, Dallas, reported a slide on its line near Ferris which delayed traffic for some time. All lines are now in commission and traffic is moving as usual.

Six Cents in Shreveport. — The Shreveport (La.) Traction Company has been authorized to raise its fares in Shreveport on June 1 from 5 cents to 6 cents, the new rate to remain in effect to Dec. 31, 1923. This action was approved by the voters of the city at a recent referendum election, the proposition being carried by a majority of 42 votes out of a total of 1,824 cast. Coincident with the putting into effect of the increased fare, the company is pledged to increase wages of employees from a maximum of 40 cents an hour to a maximum of 60 cents an hour and also to operate more cars and otherwise to improve the service.

New Jitney Rules for Rockland.—The board of selectmen of Rockland (Mass.) have adopted new rules for the operation of jitneys in that town. The regulations provide that no license shall be issued to any person who is not a citizen of the United States. The jitneys must also be run on regular schedules filed with the selectmen and a bond of $500 shall be deposited for motor vehicles having a capacity of five people and $100 for each passenger in excess of five. The rules forbid the operators of the jitneys to allow more people to ride in the jitneys than the number designated on the bond, or allow any to stand or sit on any running board, step or fender.

Temporary Resumption on Staten Island.—Partial service was restored on the lines of the Staten Island Midland Railroad, Richmond Borough, New York, N. Y., on May 21. The cars were operated for a few hours only, the purpose of service resumption being to avoid forfeiture of the franchise. The five lines of the company ceased operation last January, when permission to charge a 7-cent fare was refused. The company went into bankruptcy, and until May 21 not a car traveled its route. At 11:01 p.m. the ninety-day limit fixed in the franchise would have expired, and if no cars had been run up to that time failure to do so would have nullified the franchise.

Opposes Atlanta Increase.—In a message to the City Council of Atlanta, Ga., on May 16, Mayor James L. Key opposed the plea of the Georgia Railway & Power Company for increased passenger fares and recommended that the city attorney and the assistant city attorney be instructed to appear before the State Railroad Commission, where the company's plea now is pending, "and oppose all increases asked for," by bringing to the attention of the commission matters dealt with by the Mayor in his message, "and such other facts as are relevant to the case." Mayor Key contended that a further increase in fares was not justified by the increase in operating costs.

Carmen Informed on Accidents.—In the trainmen's room at the carhouse of the Tampa (Fla.) Electric Company, J. M. Bird, superintendent, has posted a chart showing by days the accumulated number of accidents for the month. On this chart appears the similar curve for the corresponding month of 1919. This places a picture before the men of the trend of accidents, and it is believed that it serves to stimulate care in operating cars so as to keep the curve for the current month underneath that for the previous year. The chart also carries another curve showing the accumulated number of derailments by days and a third showing the number of trolley breaks.

Seven Cents on Penn Line.—The Lehigh Valley Transit Company, Allentown, Pa., operating between Allentown and Philadelphia, has received permission from the State Public Service Commission to raise its fares from 6 to 7 cents per zone with an advance of 1 cent per zone on commutation tickets and of 5 cents on Allentown-Emaus round-trip tickets. The commission changes the schedule it made last October and says the company established necessity of more money to maintain its officiency as a public utility. The operation during the calendar year of 1919 resulted in a deficit of $51,115 and even under the increased rates there may be a deficit this year to the amount of $96,000.

Seeks Immediate Relief.—According to a recent statement of Theodore H. Bruener, attorney for the Grays Harbor Light & Power Company, Aberdeen, Wash., the earnings of the corporation have been inadequate for the past seven years. The taxes paid by the company in the period 1913-1919, both years inclusive, have been more than the net earnings. Mr. Bruener has asked the State Public Service Commission to ignore the protests of the municipality of Hoquiam against the proposed increase in fares in Aberdeen, Hoquiam and Cosmopolis and to allow the company to put the new rate into effect at once. The tariff under dispute would raise the rates from 5 cents to 6 cents in the three cities and from 10 cents to 12 cents on two interurban lines.

May Raise Youngstown Rate. — Youngstown, Ohio, is facing a 9-cent fare under the operation-at-cost and municipal-supervision plan adopted some time ago for the Youngstown Municipal Railway. Recently the management of the municipal lines made a request for an increased allowance for both operation and maintenance. After a conference between officials of the company and members of the street railway committee of the City Council it was reported that the company had asked for an increase of 2 cents per car-mile in the maintenance allowance, while it was shown that an increase of more than 4 cents per mile in the operating allowance would have to be made to cover the recent advance made in the wages of employees. Records showed, it was said, that the maintenance and operating costs exceed the total revenue by a little more than 3 cents per car-mile. During the month of April there was a large deficit which reduced the amount in the stabilizing fund below 100 per cent.

Will Raise Grand Rapids Fare.—A 7-cent cash fare with sixteen tickets for $1 will become effective in Grand Rapids, Mich., on June 20, as the result of an agreement between the special railway committee of the City Council and the officials of the Grand Rapids Railway. Coincident with the increase in rates the company will make a number of changes in car routing. The changes in service and fare would have gone into effect June 1 except for a ruling made by City Attorney Ganson Taggart that the change would have to be made by ordinance. In accepting the new fare the company agrees to keep a separate account of all money expended for new equipment and betterments and subtract this amount less a reasonable depreciation from the valuation to be decided upon when negotiations for a new franchise get under way. General Manager Louis J. De Lamarter told members of the committee the company operated at a loss of more than $20,000 during April and that the loss for the first four months of the present year exceeds the loss for the previous twelve months.

Six-Cent Fare in Little Rock.—An ordinance has been passed by the City Council of Little Rock, Ark., granting to the Little Rock Railway & Electric Company permission to raise its fare from 5 cents to 6 cents. An ordinance previously passed by the Council and providing for a similar increase was recently rejected by the company. The new ordinance grants the company the right to collect a 6-cent fare for one year, providing the granting and accepting of the ordinance shall not be taken as a renunciation of the company's right to surrender its franchise under the laws of the State. It is provided that the ordinance shall not affect any of the conditions, terms or obligations of the franchise, except as expressly set forth in the measure. It is provided that at the expiration of the year all the provisions of the original ordinance granting the company its charter, in regard to rates to be collected, shall be automatically in force and effect; provided the company may at any time apply to the Council for a further adjustment as its conditions may require. The company is given thirty days in which to accept the ordinance, which becomes immediately effective upon its acceptance by the company.

Will Raise Cincinnati Fares.—W. C. Culkins, Street Railroad Director of Cincinnati, Ohio, on May 18 notified the City Council that fares on the lines of the Cincinnati Traction Company would advance from 7 cents to 7½ cents on June 1. In his letter to the Council, Mr. Culkins said that for the months of March and April the gross receipts lacked $64,099 of being sufficient to provide for the cost of service. Under these circumstances the company is required to increase the fares. In Mr. Culkins' opinion three elements contributed to bring about this condition: The switchmen's strike, which necessitated the purchase of coal at prices 100 per cent in advance of contract prices; increased wages and cost of material used in the maintenance of way and equipment, and excess in wages of trainmen over the budget allowance due to needed additions in service and development and physical obstacles which delayed the operation of double-truck cars on certain lines which could have reduced expenses and increased service. Following the reading of Mr. Culkins' letter, Councilman John H. Sheehan asked the Council to take action to prevent the company from increasing its fares. Mr. Sheehan alleged that the company had discriminated in its dealings with the public.

Personal Mention

Foreign Post for Mr. Clapp

Vice-President East St. Louis & Suburban Made Chairman of the Victorian Railway Commission

Harold W. Clapp, vice-president of the East St. Louis & Suburban Railway, East St. Louis, Ill., and vice-president of the E. W. Clark & Company Management Corporation, has been tendered and has accepted the position of chairman of the Victorian Railway Commission, Victoria, Australia. Mr. Clapp has set no definite date for his sailing, but he expects to wind up his affairs in this country so that he can sail with his family in time to undertake his new duties about Sept. 1.

The position offered Mr. Clapp in Australia is generally conceded to be a most attractive and desirable one. The Railway Commission, composed of three members, has full charge of the executive, operating and engineering problems connected with all of the railways in the State of Victoria. The Victorian Railways are government-owned and comprise more than 4,000 miles of track, with a gross revenue of approximately $50,000,000. Some 250 miles of suburban track in and around Melbourne are electrified, but the major portion of the system is steam, with further electrification plans pending.

H. W. CLAPP

Mr. Clapp is admirably fitted to meet the responsibilities involved in his prospective work. Although a United States citizen, he is a native of Australia, where his father was managing director of the Melbourne Tramways & Omnibus Company. For four years the younger Mr. Clapp was superintendent of motive power of the Brisbane Tramways. With the operating experience thus gained he came to America nineteen years ago. His first position in this country was with the General Electric Company, with which he remained for about six years, during which period he represented the company in connection with its interests in the Interborough Rapid Transit Company, the Hudson tubes and the New York Central System, as well as in several other large operating companies. During this period he also had charge of the equipment of the West Jersey & Seashore branch of the Pennsylvania Railroad.

STEAM RAILROAD EXPERIENCE

After leaving the General Electric Company he was employed for five years by the Southern Pacific Company, for which he had charge of the reconstruction of the Oakland, Alameda and Berkeley division. His experience with both the General Electric Company and the Southern Pacific System took him at times out of the electrical field and into the steam railroad field. This steam railroad experience will now serve him in good stead.

Following his association with the Southern Pacific he served as manager and later as vice-president of the Columbus Railway, Power & Light Company, Columbus, Ohio. In this position he established a most enviable reputation as an operating executive. His load dispatching arrangements, store-room system and car inspection methods were important features which attracted wide and commendable attention from other executives. Since resigning from the Columbus properties in January, 1919, he has been associated with E. W. Clark & Company, paying particular attention to the East St. Louis group of properties, and directing the solution of many of the intricate problems which in the last few years have confronted all public utility properties.

F. D. Burpee, superintendent of the Ottawa (Ont.) Electric Railway, has been appointed manager of the company.

A. D. McPherson, assistant auditor for the receivers of the Pittsburgh (Pa.) Railways, has been promoted to auditor to succeed J. A. Mead, resigned.

A. J. Tobin has been appointed superintendent of the Ottawa (Ont.) Electric Railway. Prior to his new appointment Mr. Tobin served as chief inspector of the system.

O. M. Sewell, president and general manager of the Porto Rico Railway, Light & Power Company, San Juan, Porto Rico, has resigned. Mr. Sewell has returned to his home in Atlanta, Ga., and will engage in private business. He has had charge of the affairs of the company for the past eight years.

W. S. Finlay Leaves I. R. T.

Superintendent of Motive Power Joins American Waterworks & Electric Company as Vice-President

W. S. Finlay, Jr., superintendent of motive power of the Interborough Rapid Transit Company, New York, N. Y., has resigned. Mr. Finlay has been elected a vice-president of the American Waterworks & Electric Company, New York. The latter company, of which H. Hobart Porter, general manager of the Brooklyn City Railroad, is president, operates a number of waterworks, power stations and other public utilities.

Mr. Finlay was born in Hoboken, N. J., in 1882. He received his early education in the public schools of Brooklyn, and was graduated from Cornell University in 1904, with the degree of mechanical engineer. Shortly after graduation he entered the employ of the Interborough Rapid Transit Company as an assistant on the staff of the late H. G. Stott. Mr. Finlay's first work with the company was identified with the construction of the Fifty-ninth Street power station. He later assisted Mr. Stott in doing experimental and research work in connection with schemes for that station's development and the promotion of its efficiency. In 1907 he was placed in charge of construction work involved in increasing plant load.

W. S. FINLAY, JR.

In 1909 Mr. Finlay left the Interborough to go into engineering work with the New England Engineering Company. Subsequently he became associated with his father, W. S. Finlay, Sr., in commercial work, returning to the Interborough in 1915 to take charge of the installation of turbines and auxiliary mechanical equipment necessitated by the extensions to the subway and elevated systems. Upon the death of Mr. Stott, Mr. Finlay was appointed his successor as superintendent of motive power. In that capacity he, in addition to supervising operation of the power-generating system of the company, has had charge of the engineering and construction work coming within the scope and control of the department.

Mr. Day in Control

Engineer Heads Ohio Electric Railway Under Reorganization Plan—New Directors Chosen

A reorganization of the official personnel and the board of directors of the Ohio Electric Railway, Springfield, Ohio, and subsidiary companies was announced on May 18. Under the reorganization plan Charles Day, of Day & Zimmerman, Philadelphia, Pa., becomes president of the system. J. Harvey McClure, recently elected vice-president, continues in that capacity. H. V. Gilpin remains as general manager, while F. A. Healy, secretary-treasurer, and J. A. Pogue, assistant secretary-treasurer and purchasing agent, continue in those positions.

The old board of directors has resigned and the following men have been elected members of the board: Charles Day, John E. Zimmerman, Philadelphia; George J. Roberts, East Orange, N. J.; J. H. McClure, Lima, and Paul C. Martin, H. V. Gilpin and F. A. Healy, Springfield. Members of the old board replaced are: W. Kesley Schoepf, Walter A. Draper, A. Benham, H. Sanders, Cincinnati, and Marshall Morgan, Philadelphia.

Charles Day, who becomes president of the company, is senior member of the firm of Day & Zimmerman, Philadelphia, which took over the management of the system on April 1 last. Mr. Day was born at Philadelphia on May 15, 1879. Shortly after his graduation from the University of Pennsylvania, in 1899, with a degree of mechanical engineer, he entered engineering work in Philadelphia, becoming a member of the engineering firm of Dodge & Day two years later. During 1901 he was assistant superintendent and engineer of works for the Link Belt Engineering Company. Later he installed cableways at the Gatun Dam of the Panama Canal. During the past few years he has devoted himself especially to the construction and equipment and to the management of industrial plants, electric light plants, railroads and other public utilities. During the war he served as a member of the production committee of the Emergency Fleet Corporation at Philadelphia.

J. Harvey McClure became connected with the Ohio Electric Railway when the system was taken over by Day & Zimmerman. At that time he was given the title of vice-president in charge of operation. Mr. McClure was formerly general manager of the Citizens' Traction Company, Oil City, Pa., where he achieved a notable record as an efficient operator. A biography of Mr. McClure was published in the ELECTRIC RAILWAY JOURNAL, for April 10, 1920.

Paul R. Goldy of Mount Holly, N. J., has been appointed general manager of the Burlington County Transit Company, Hainesport, N. J., to succeed Edwin C. Davis. This is the second time that Mr. Goldy has been made general manager of that company. He was the first to hold that position, having been with the company when the road was built. Later he was with the Riverside Traction Company before it was taken over by the Public Service Railway. Still later he was employed by the Emergency Fleet Corporation in Philadelphia. Maurice B. Comfort of Moorestown, N. J., one of the directors of the company, has been acting as general manager since the resignation of Mr. Davis.

J. A. Meade Enters Business

Auditor for the Receivers, Pittsburgh Railways, Made Vice-President of Fruit Exchange

John A. Meade, auditor for the receivers of the Pittsburgh (Pa.) Railways, has resigned to become vice-president of the Northwestern Fruit Exchange, with headquarters in Seattle, Wash. Mr. Meade has been succeeded at Pittsburgh by A. D. McPherson, heretofore assistant auditor, Before leaving for Seattle Mr. Meade was tendered a dinner by the officers and employees of the Pittsburgh Railways.

J. A. MEADE

Through the study and the practical application of business principles Mr. Meade has made himself an authority on economic, financial and corporate matters. In addition to handling the complex details of the auditing department of one of the largest electric railway systems in the country, he has served on a number of occasions as a consultant on accounting and tax questions for several concerns engaged in manufacturing and mercantile enterprises. These varied activities, broadening in their influence, have well fitted him to undertake his new work of extending the fruit industry of the Northwest.

Mr. Meade, who has devoted most of his career to the service of the Pittsburgh traction system, was appointed auditor for the receivers in April, 1918. His work as auditor had to do with the accounting and financial functions of a system operating 600 miles of track and carrying over 250,000,000 passengers annually. The Pittsburgh Railways is made up of some 200 separately incorporated companies, many of which maintain their corporate existence.

Following the receivership several inquiries were begun involving rates of fare, wages, cost of service, return on capital and valuation. A historical appraisal dating back to the incorporation of all the underlying companies was continued for almost two years. Mr. Meade was called upon to compile much of the information asked for by the appraisers. He spent many days testifying and explaining the data. His clear grasp of the many questions involved and his opinions and advice as to the complex financial problems won the commendation of the various commissions.

Mr. Meade was born in Pittsburgh in 1879. At the age of sixteen he entered the employ of the Pittsburgh, Allegheny & Manchester Traction Company as a water boy. In 1897 he became a clerk in the office of the division superintendent of the United Traction Company. When in 1902 the United Traction was absorbed by the Pittsburgh Railways he was made general bookkeeper of the consolidated lines. Two years later he was made auditor of disbursements of the group of properties controlled by the Philadelphia Company.

Obituary

Ralph G. Hemingray, president of the Hemingray Glass Company, Muncie, Ind., died in Covington, Ky., on May 11.

Thomas N. Ashford, former superintendent of the Lockport (N.Y.) Street Railway, before the lines were taken over by the International Railway, Buffalo, N.Y., is dead. He was seventy-eight years old.

John S. Brewer, died recently at his home in East Orange, N. J., after an illness of several weeks. Mr. Brewer lived for sixty years in Chicago, Ill., where for many years he was in the railway supply business. He retired ten years ago.

George S. Starbird, inspector of railroad appliances for the Interstate Commerce Commission in Illinois and Indiana, died on April 27 at his home in Urbana, Ill. He was sixty-three years of age and for fifteen years had been in the service of the Government, being well known to railway and interurban officials in Illinois and Indiana.

Charles W. Johnson, assistant director of engineering for the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., died recently after a short illness. Mr. Johnson was born in 1874. He entered the employ of the Westinghouse Company in 1907. He was appointed assistant director of engineering on Jan. 1, 1920.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Federal Relief from Railroad Tie-Up

Interstate Commerce Commission Acts to End Freight Congestion by Suspending Car Service Rules

In an effort to relieve the nationwide freight congestion and car shortage, the Interstate Commerce Commission on May 20 issued to the railroads of the country three orders relating to the handling of freight.

Service order No. 1 suspends all rules and regulations as to car service and directs the carriers to forward traffic by the most available routes without regard to the routing made by shippers or by carriers or to the ownership of cars.

Service order No. 2 suspends all car service rules and orders the relocation of open-top cars from Western territory to Eastern territory, naming the number of cars which each carrier must send East each day. This order relates to the roads operating west of Chicago.

Service order No. 3 is similar to order No. 2, except that it applies to Eastern roads and orders the relocation of box cars from Eastern and Southeastern territory to Western territory. The order stipulates the number of cars daily that must be moved.

Order No. 1 also provides for the charging of the rate of freight applicable over the route indicated in the bill of lading or shipping instructions, regardless of the fact that a higher or lower rate may be applicable via the route over which the shipment actually moves.

Coal Output Decreases

Car Shortage and Labor Troubles on Railroads Largely Responsible

Electric railways are obtaining sufficient coal only with great difficulty. The reserve stock of most electric railway companies which have been fortunate enough to accumulate any at all, is rapidly dwindling.

Production of coal for the week of May 15 decreased 319,000 tons as compared with the previous week, according to the United States Geological Survey figures, indicating that production was the smallest since the week of April 24.

Car shortage at the mines is one of the causes, and this has been brought about by labor trouble on the railroads.

The long-continued condition of lack of transportation has so increased costs that prices of bituminous coal have generally been raised from 25 to 50 cents per ton, but problems of price are of secondary consideration. It is reported that none of the large Eastern coal companies has been able to keep up contract shipments, with the result that buyers have offered fabulous prices for mine-run coal.

Reports from various electric railways are to the effect that a few cars of coal, usually amounting to a one or two-day supply, are being received occasionally, but in every case the coal has been in transit or held up at nearby points. The situation will continue to be serious until steam railroad labor troubles have been smoothed out and conditions brought back as close to normal as is possible. Foremost in the minds of electric railway executives is the difficult problem of accumulating during the next ninety days enough reserve for use during the winter in addition to keeping enough coal on hand for operation throughout the summer season. Drastic measures are now being taken by the Interstate Commerce Commission which authorities in the coal industry believe will bring much-needed relief to electric railways and utilities.

Longer Deliveries on Power Auxiliaries

Material Shortages Handicap Manufacturers of Power Plant Auxiliary Equipment

Manufacturers of power plant auxiliary equipment, like many others, are trying to get out production in the face of material shortages beyond their control. Cast iron, steel and pig iron are especially hard to obtain in some plants in the East, although efforts are being made to improve the situation. One maker of feed-water heaters has a good stock of steel shells on hand, but is very low on castings. A manufacturer of small turbines for pump driving, small generator service, etc., has been able to establish a nominal stock of prime movers for lighting work on a small scale; but in general, stocks are very low. Deliveries on small turbo-sets for auxiliary work quote six to seven months and on feed-water heaters for power plant service, about four months. The smaller-sized heaters required for supplying service water to car houses, shops and industrial plants can be had in some cases in less than a fortnight. Special equipment, of course, runs into much longer figures.

Very few inquiries or purchases of new equipment of the auxiliary class are being handled for electric railways at present. One reason for this is the marked tendency of operating companies of small and medium size to enter into contracts for the purchase of their electrical supply from central station or transmission systems. Industrial plants, electric utilities and marine buyers are providing the makers of steam plant auxiliary apparatus with a diversified business, but a slight falling off has been noted in demand during the past month or so. Notwithstanding the fact that many plants are several months behind on orders, there is a disposition to welcome new business at present, and in some lines no prospect of price reduction appears sufficiently evident to justify postponement of inquiries. It is not expected that auxiliary turbo-pump or turbo-exciter prices will go lower at present. If the price of copper should decline, the price of heaters would probably reflect the movement.

In both heaters and turbo-auxiliaries prices have advanced this spring as a partial offset to the drop which came last year. Wage increases and higher raw material costs have been met without so far being obliged to return to the war-time maximum. No serious labor shortage exists in typical plants visited by the representative of the ELECTRIC RAILWAY JOURNAL. Some plants complain of under-production. Others find labor conditions much less disturbing than the shortage of pig iron and castings. One manufacturer stated that while he labors under a rather high turnover, he is more concerned at the moment about transportation conditions than about employee relations. In one shop tool-makers were cited as a class of men receiving wages in excess of the value of their production, but by and large, conditions are far from bad compared with the cost and annoyance of inadequate transportation. Boat shipments are a great help in the seaboard and river manufacturing centers. Replacement orders are being handled well.

Equipment Wanted in Ecuador

The manager of the Compañia Nacional de Tranvias of Quito, Ecuador, South America, writes under date of April 24 that that company is considering the construction of an electric railway line 30 km. in length and would like to get in touch with manufacturers of grooved girder rail and other electric railway equipment. The company may be addressed at Casilla de Correo No. 248, Quito, Ecuador.

Battery Cars for Export

Demand Increasing in Latin-American Countries—Deliveries Hold Up Business

Prospects are bright for doing a considerable amount of business in the Latin-American countries with electric storage battery cars. Although business has been poor during the war years, inquiries are now being received and much business is expected to result during the year. At present in the smaller cities in the Latin-American countries, mules are used for hauling cars, and according to reports the high cost of feeding and maintaining mules is largely responsible for the installations of electric storage battery cars which have been made.

In a typical case, it is intended to replace cars of the mule-power type by storage battery cars and thereby save a considerable amount per day.

Westinghouse Net Earnings Increase

Sales Billed Decrease—Unfilled Orders April 1, 1920, More Than $71,000,000

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., in its annual report, issued May 22, for the year ended March 31, 1920, shows a slight increase in net earnings.

Gross sales billed for the year amounted to $136,052 092, as compared with $160,379,943 for the year ended March 31, 1919, a decrease of $24,327,841.

Net income available after deducting all expenditures, depreciatoin, taxes and other charges amounted to $15,206,341, as compared with $15,059,008 for the previous year. For the year ended March 31, 1920, this is equivalent to $10.16 a share earned on the combined preferred and common stock outstanding of $74,812,650 as compared with $10.05 for the previous year.

Following is a condensed comparative statement of operations for the past two years:

YEAR ENDED MARCH 31

	1920	1919
Gross earnings — sales billed	$136,052,092	$160,379,943
Cost of sales — cost of manufacture, including depreciations of property and plant and all selling, administration and general expenses and all taxes	120,972,262	144,667,402
Net manufacturing profit	$15,079,830	$15,712,541
Other income	1,721,334	1,623,262
Gross income from all sources	$16,801,164	$17,335,803
Interest charges	1,594,823	2,276,795
Net income available for dividends and other purposes	$15,206,341	$15,059,008

The property and plant account, representing real estate, buildings, equipment, etc., shows a reduction as compared with the previous year due in part to the sale of certain plants which were engaged mainly in the manufacture of munitions. The negotiations for the sale of certain investments in foreign companies, referred to in the previous report, were completed.

The development and extension of the business together with the increased costs of operation due to higher wages and higher prices for raw materials have required a large amount of additional capital. These requirements were met in part by the sale of certain investments in other companies, principally foreign holdings, and in part from surplus earnings retained in the business.

Current demand for the products of the company is in excess of its present plant capacity and a continuation of this demand will make necessary further additional facilities and still larger working capital. The value of unfilled orders on April 1, 1920, was $71,156,732.

Metal Market Situation

With the virtual halt in rail freight traffic of many of the raw materials, the copper market is a bit softer than a week ago. While the larger producers are unwilling to shade 19 cents for so-called May delivery, some of the smaller producers have been interested in prices as much as ¼ cent under 19 cents for small tonnage for nearby use. The demand is not very active, but some electrical manufacturers have availed themselves of the relatively low price offered by the outside market and have taken some for immediate delivery, where transportation has been at hand, at 18.62½ cents delivered. Small amounts of the metal have been offered as low as 18.35 cents at refinery.

The labor situation at the copper mines is very unsatisfactory, one mine having closed this week. Others are badly curtailed in their output.

In zinc the market is steady under little demand. It is not expected that the present stock will last the manufacturers long, although because of curtailed output, it is dragging out pretty well. Prompt is quoted at 7.90 cents.

Lead shows little activity, especially for June and July. Leading prices are 8.50 cents, New York, with the outside market asking 8.80 cents.

British Tramway Orders Power-Saving Recorders

The Arthur Power Saving Recorder Company, New Haven, Conn., has received an order for its recorders from the London Metropolitan Electric Tramways, Ltd., which is to be completely equipped with this device. This tramway is part of the general system administered by Lord Ashfield (formerly Sir Albert Stanley). A committee of three officials from the properties were in this country last winter for several months to study American methods and apparatus in connection with electric and street railways. The committee consisted of D. J. Spencer, general manager, London Metropolitan Tramways; A. R. MacCallum, chief mechanical engineer, London Underground Railways, and C. J. Shave, chief engineer, London Omnibus Company.

Rolling Stock

Montreal Tramways, Montreal, Que., Canada, on May 22 is reported to have lost eighty old cars in a fire which destroyed a carhouse valued at $5,000. The damage to the cars is estimated at $45,000. None of the cars had been in operation for more than ten years.

Track and Roadway

Dayton & Western Traction Company, Dayton, Ohio.—Valentine Winters, president of the Dayton & Western Traction Company, has informed the Montgomery County Commissioners that improvements will be made on his road to cost about $500,000 as soon as it is possible to purchase the steel. Other improvements are also needed and will be made if the commissioners grant an extension to the franchise, which expires in 1922. An application for a fifty-year extension was made some time ago, but action was deferred. President Winters asserted that the road would have to be abandoned if it is not improved.

Central Texas Electric Railway, Waco, Tex.—E. H. Prescher of Clifton, Tex., has been added to the board of directors of the Central Texas Electric Railway, which will build and operate an electric interurban line from Waco to Temple. Mr. Prescher is a large landholder in Bosque County.

Androscoggin & Kennebec Railway, Lewiston, Maine.—The Androscoggin & Kennebec Railway, formerly the Lewiston, Augusta & Waterville Street Railway, contemplates improvements to the roadbed of its Bath division to cost $25,000. Alfred J. Sweeney, general manager, announced the improvement program after an inspection trip over the division. The company will lay new 80-lb. steel rails and will alter the curve on its main line on North Street. The material has already been ordered. The company will shortly place several new cars in service.

Northern Texas Traction Company, Fort Worth, Tex.—George Clifford, general manager of the Northern Texas Traction Company, has announced that the company will make improvements and extensions to its system to cost $1,000,000. The company's program includes the double-tracking of the Hemphill Street line from Magnolia Avenue to Hawthorne Street, double-tracking Polytechnic line from Tyler's branch to the city limits, extension of single track on Commerce, from Sixth to Weatherford; on Railroad, from Hemphill to Wheeler, and on Wheeler to Daggett; on Throckmorton, from Eighth to Tenth; on Monroe, from Eighth to Tenth, and on Texas, from Monroe to Jennings; discontinuance of the use of Ninth Street; building of many additional sidings and extensions to car houses; double-tracking one-half mile of Summit Avenue line, south of Texas Street.

Lynchburg Traction & Light Company, Lynchburg, Va.—It is proposed to extend the Jefferson Street line of the Lynchburg Traction & Light Company to Ninth Street.

Power Houses, Shops and Buildings

British Columbia Electric Railway, Vancouver, B. C.—The British Columbia Electric Railway will start work shortly on a new station at Marpole, on the Lulu Island interurban branch, and also on a new transformer station which it will erect at Powell and Rogers Streets for the British Columbia Sugar Refining Company. The two structures will cost about $15,000.

Georgia Railway & Power Company, Atlanta, Ga.—The Georgia Railway & Power Company will install a fifty-mile transmission line between Lindale, Ga., and Gadsden, Ala., to connect with the transmission lines of the Alabama Power Company.

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—The Bloomington & Normal Railway & Light Company is erecting a large storage tank on land recently purchased on South Lee Street across from the power plant. The tank is to be used by the company for cooling water and reconverting it for the use of the large boilers at the power plant.

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway is negotiating with a view to the purchase of a tract of land in Forest Hills between Hyde Park Avenue and the New Haven tracks, on which to erect a repair shop.

Brooklyn Rapid Transit Company, Brooklyn, N. Y. is in the market for a 5-ton and for a 15-ton overhead crane.

Northern Texas Traction Company, Fort Worth, Tex. — The Northern Texas Traction Company will erect new carhouses at North Side, Fort Worth, as a part of its $1,000,000 improvement program.

Trade Notes

Toledo Bridge & Crane Company, Toledo, Ohio, announces the removal of its New York office from 52 to 29 Broadway. Arthur Appleton, district manager, is in charge.

Arnold Electric Tool Company, New Haven, Conn., announces that J. N. La Point has been elected president of the company, succeeding Frederic Levere, who recently resigned.

United States Copper Products Corporation, Cleveland, Ohio, manufacturer of seamless brass and copper tubes, has opened an office at 1123 Broadway, New York City.

Hanff-Metzger, Inc., New York, N. Y., general advertising agents, announces that Francis Juraschek, formerly of the advertising staff of this paper, is now in charge of the technical department of this company's advertising work.

Page Steel & Wire Company, New York, N. Y., on May 15 removed its offices to suite 1054 Grand Central Terminal. This is the office of the American Chain Company, with which the former company has been consolidated.

Ernest C. Van Winkle, formerly assistant engineer, construction department of the Chile Exploration Company, New York, has become connected with the Ford, Bacon & Davis Company, New York, in the capacity of valuation engineer.

Mack Molding Company, Newark, N. J., was recently organized by Frank M. Kirkner, formerly sales engineer of the Condensite Company of America, and Kenneth W. Macksey. The company has established a factory at Little Falls, N. J., where it will manufacture custom molding from condensite, bakelite and redmanol.

The Hygrade Lamp Company, Salem, Mass., has consolidated its shipping and sales departments. G. F. Gibney, formerly Salem manager of the American Express Company, has been placed in charge of stock of shipments. He will also be responsible for all finished lamp stock inventories and as the business of the company expands will perform the duties of traffic manager.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that John C. Jones, manager of the Salt Lake City (Utah) office of the company in that city. Mr. Jones has been in the Salt Lake office of the Westinghouse company for nine years. W. A. Mosher, formerly sales engineer for the company in Salt Lake City, will succeed Mr. Jones as manager of the Salt Lake office.

Roller-Smith Company, 233 Broadway, New York, N. Y., has appointed F. R. Ryan as district manager of its Chicago office, located at 739 Monadnock Block. Mr. Ryan has been connected with the company's Chicago office since January, 1919, in the capacity of sales engineer. He graduated from Notre Dame in 1913 and also attended the University of Illinois. In the past he has served the Commonwealth Edison Company as electrical testing engineer, the Sanitary District of Chicago as electrical engineer, the Krehbeil Company of Chicago and also the Signal Corps of the United States Army. Mr. Frankel, assistant sales manager of the Roller-Smith Company, will continue to have his headquarters at the Chicago office.

Material-Handling Machinery Manufacturers' Association, New York, N. Y., at a special meeting of the board of governors held on May 3 in New York appointed twelve committees. With F. W. Hall, commercial manager Sprague Electric Works, as chairman, the main engineering committee will be composed of the chairman and one additional member of each of the six sub-committees which are to be representative of the six divisions of the material-handling industry, as follows: Cranes, hoists and winches, gravity and power conveyors, elevators, industrial trucks, bulk-handling machinery, and miscellaneous equipment. The association announces that the chairmen of the remaining eleven committees are as follows: E. Logan Hill; Lucian C. Brown; Charles A. Rohr; James A. Shepard; J. B. Flynn; C. A. Luster; Francis L. Stuart; F. S. Chacannes; W. B. Clarke; Calvin Tomkins and A. J. Barnes.

Walter E. Hinmon, as announced briefly in ELECTRIC RAILWAY JOURNAL for May 15, has resigned his connection with the National Railway Appliance Company and with Holden & White, Inc., to become sales manager of the L. J. Risk Real Estate Company, Detroit, Mich. Mr. Hinmon dates his connection with the electric railway field back to 1897, when he became superintendent of the Dayton & Western Railway, Dayton, Ohio. He resigned in 1900 to become a salesman for the Ohmer Fare Register Company, continuing in this work for a number of years. Subsequent changes in his connections brought him into the field as salesman for the Cooper Heater Company and the Peter Smith Heater Company. After this he formed a partnership with O. E. Quinton and went into the railway supply business to handle the street-car heaters manufactured by the Jewel Stove Company, Detroit. Hinmon, Quinton & Company was later consolidated with Holden & White, Inc., of which Mr. Hinmon became vice-president. Then when this company was purchased by the National Railway Appliance Company Mr. Hinmon continued his active sales work in the railway field and served also as a director of the holding company as well as vice-president of the subsidiary. Mr. Hinmon leaves an almost universal acquaintance among railway operating men to take up his new activities.

New Advertising Literature

Air Reduction Sales Company, New York, N. Y.: Bulletins describing welding torches, regulators and gages.

L. Best & Company, New York, N. Y.: Catalog of grinding machinery, abrasive dies and cloth and grinding wheel dressers.

Midas Trademark Bureau, Chicago, Ill.: A booklet, "Chasing Trademark Rainbows," consisting of fingertip facts on originating trademarks and on how to protect them.

Underfeed Stoker Company of America, Detroit, Mich.: Bulletin on design and operation of heating furnaces by Nelson G. Phelps, M. E., dealing with combustion of coal, waste heat boilers, furnace design and stoker application.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors   HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor   N. A. BOWERS, Pacific Coast Editor   H. S. KNOWLTON, New England Editor   C. W. SQUIER, Associate Editor   C. W. STOCKS, Associate Editor
L. C. PAUL, Editorial Representative   GEORGE BUSHFIELD, Editorial Representative   G. J. MACMURRAY, News Editor   W. R. ANDERSON, Asst. News Editor

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That Same Old Stitch in Time Still Saves the Nine

WHAT appears to us to be the correct attitude on the part of a railway management toward the recommendations of the engineering department is illustrated by this incident. A company was recently complimented by the chairman of the state commission, who credited it with the best conditioned track of any company in that state. The engineer responsible for this condition disclaimed all credit. He says the entire credit belongs to the management, which is far sighted enough to allow him all the maintenance tools and equipment which he needs.

It isn't a question of method, always, but a habit of eternal vigilance and keeping at the job, coupled with the possession of sufficient materials and tools to work effectively.

Steam Railroad Men to Discuss Electrification Past and Future

THE annual meeting of the mechanical section of the American Railroad Association, formerly the Master Mechanics' and Master Car Builders' Associations, will be held at Atlantic City next week. The subject of electrification will come in for a share of attention, an excellent symposium contributed by operating men being a feature of the program. In this issue of the ELECTRIC RAILWAY JOURNAL, which will be distributed at the convention, several articles are published which are of a nature to be helpful in connection with the discussion. At the same time they have broad application in the electric transportation field generally.

In the planning of this and the next following issue the heavy multiple-unit car has been made the focus of interest The electric locomotive has been in the limelight a great deal lately, and deservedly so, for wonderful progress has been made with the several types of this machine. However, the bulk of the transportation of passengers on steam roads has been handled by multiple-unit cars and trailers, which are admirably adapted to supplying suburban service on steam railroads; in fact, locomotives are used in such service only where absolutely necessary in bringing steam trains into a terminal, in general through tunnels where steam locomotive smoke and gases are offensive and otherwise objectionable to the railroad's patrons and employees.

Multiple-unit cars have been in use under heavy traction conditions for so long and in such numbers that a valuable body of experience in regard to operation and maintenance has been accumulated. While practice here can hardly as yet be considered standardized, it is tending in that direction. This fact stands out as one reads, in the articles of this issue, of the way in which the Long Island and other railroads have solved their maintenance problems. Considering the carrying capacity of these units and the severe service which is required of them multiple-unit cars are being maintained at very reasonable cost. The present group of articles, all of which are based on first-hand information, will help in the control of this cost by rendering available full information as to the what, why and how of the subject.

It Pays to Provide Rapid, Safe and Reliable Transportation

FIFTEEN years ago the Long Island Railroad launched a comprehensive plan of electrification. To provide for the growth in traffic that was foreseen, due to its ability to reach all parts of Long Island and give transportation to a vast rural population, it was evident that rapid, safe and reliable transportation with clean, well-heated and well-lighted cars was necessary. The policy adopted was first to electrify the lines leading to its two great passenger terminals at Flatbush Avenue, Brooklyn, and the Pennsylvania station in New York, and so to provide the flexibility necessary for speed, safety and reliability. Between 1905 and 1919 the company expended approximately $60,000,000 for electrification, new equipment, elimination of grade crossings and additional trucks, yards and stations.

What has been the result? The number of passengers handled per year has increased from 18,199,000 to 64,067,000 and the road now carries a daily average of 175,000 people. In addition to this great passenger service, the Long Island Railroad has developed a large business in distributing fuel, building material, food supplies and all classes of freight. This service has hastened the development of hundreds of factories all over the boroughs of Brooklyn and Queens and the amount of freight handled has increased from 2,745,000 tons to 5,912,000 per year.

This large increase has been realized in spite of the fact that during this period five rapid transit lines have been built into the territory served by the railroad, and in several cases parallel to it, which carry passengers to New York at a flat rate of 5 cents. It is evident, then, that the rate of fare is not the most essential factor in obtaining increase in passengers, but rather rapid transportation, with the assurance of promptness in arriving at business or home. Roads with few stops are in the best position to give this service, and by electrifying its road the Long Island Railroad has demonstrated that it can not only compete with other cheaper rates of transportation but also build up a large increase in traffic as well.

Passengers want to feel that the cars they ride in are well maintained and safe and that the employees who handle them are competent. The methods used by the Long Island Railroad in maintaining its cars are described in another part of this issue. It is evident that the thorough and systematic manner in which the electric rolling stock is cared for has contributed largely to the success of its electrification.

Steps in Single-Phase Motor Evolution

FROM the technical standpoint one of the most fascinating pieces of electrical apparatus is the single-phase motor of the series type. While the success of high-voltage direct-current equipment has removed some of the *raisons d'être* of the single-phase motor, nevertheless it is still undergoing steady improvement in design and construction. The recent motors are substantial and capable of easy maintenance and the older ones have been largely rehabilitated to reduce maintenance costs, which were undoubtedly large in the early days.

The design difficulties in the way of producing a durable single-phase motor at reasonable cost have been considerable. There is such a tangle of electric circuits and magnetic fields in an electric motor that the mere forcing of alternating current through it is a problem, to say nothing of producing torque at high power factor. The difficulties have, however, been conquered, first by rather crude and later by refined methods, so that today the series a.-c. motor is a machine which compares favorably from the operating standpoint with its direct-current rival.

It will be remembered that the early-built motors have resistance inserted between the commutator bars and the winding to limit the current in the coils short-circuited by the brushes. An ingenious system of magnetic balancing now permits the omission of this resistance, with consequent increase in capacity due to the removal of this heat-producing element. The starting properties of the motor have also been improved by the adoption of the repulsion principle for low-speed operation. In an early issue we shall publish an article telling of some of the latest and best things in the design and control of the single-phase motor as worked out for and on one of our most important railroad systems.

It would be idle to predict as to the ultimate economic fate of the single-phase motor, for it is economics that will determine its fate in the long run. Technically it is still on the map and in process of improvement.

Telephone and Trolley Loads Are Not Always Parallel

IN THESE days of kaleidoscopic changes in rates of fare every factor that helps to explain whether the changes in traffic had or had not anything to do with the increase in fare is entitled to consideration. Epidemics, long spells of bad weather, layoffs by large employers and the bunching of winter holidays are among the obvious causes of losses in traffic. A study of the bank clearings of a community is a well-recognized measure of general industrial fluctuations which one may reasonably expect to see paralleled in the patronage of the electric railway.

Another gage to general industrial conditions is afforded by the telephone load. Offhand one would be inclined to assume that the telephone and trolley loads would run in parallel, for each is very sensitive to the industrial and social circulation of a community. Generally speaking this is so, but before using the rule we must familiarize ourselves with the exceptions that prove it true. In the first place, the telephone is somewhat slower in reflecting a decline than is the trolley, because telephone contracts are made by the month or year and trolley contracts are made, one might say, by the day. Hence, a workman's family might continue to use the telephone for some time after unemployment had decreased their riding. In the second place, it must be clear that weather, which is the bane of the trolley, is the boon of the telephone. When it is too muddy or icy to ride to merchant or friend, the telephone gets the benefit. In the third place, it is well to bear in mind that the influenza scourge, while cutting so deeply into car riding, resulted in a terrific strain on the telephone. In part this was due directly to the plague, because of the calls for aid and the inquiries of anxious friends, and in part it was the result of the use of the telephone for the transaction of business that would otherwise have been handled man to man.

Doubtless, other factors in addition to those noted will occur to the reader, but enough have been presented to prove the desirability of going "behind the returns" of both the telephone and the trolley loads if one is to be used to interpret the other.

One-Way Versus Two-Way Trailers

WHERE a street railway is equipped with double-end type motor cars the question of whether one-way or two-way center-entrance trailers should be adopted for the inauguration of trailer operation has recently been a live topic in several parts of the country. In our opinion there is not a great deal to be said in behalf of the two-way trailer, but there are many considerations favoring the one-way type. As soon as a car without motors or control equipment is attached to a motor car the train thus formed becomes inherently a one-direction unit. So long as the two cars remain coupled together it continues to be a one-way unit. With a two-sided trailer it is true that by uncoupling the motor and trailer the cars can be jockeyed about at a crossover for operation in the opposite direction, but the complications in this process involve a time delay which largely offsets the advantage. But even if this ability to turn at a crossover were an important advantage, the opinion of most of the operators of wide experience in the operation of one-way equipment is that the need to switch back at a crossover, or, as an alternative, to back one-way units long distances to a wying point, is of such rare occurrence as to be worthy of little consideration.

To make use of two-way trailers for what slight advantage there may be a company must make the sacrifice of adding nearly $1,000 to the initial cost of the trailer, plus the continuing expense of hauling around from 1,500 to 2,000 lb. additional weight, and of maintaining two sets of doors and door engines and control valves instead of one.

It goes almost without saying that because of the mono-direction characteristic of the motor-trailer train it is essential to have either a loop or wye at the terminus of every line. Hence it may be assumed that the building of loops or wyes is an essential part of the preparation for trailer operation whether the type of trailer adopted is one-way or two-way. This leads to the thought that the cost of constructing loops and wyes could be eliminated and the full advantages of the two-way single-car units retained by doing what has been done at Milwaukee to a limited extent—move the rear controller from the motor car to the rear end of the trailer. With this done, we can see a real advantage in the double-sided trailer, as this plan would add only the additional weight to the train of the power cables on the trailer, with the added cost of only the small amount involved in the cables and labor of running them under the car. With the trailer thus equipped, it could be successfully contended that greater flexibility of operation was secured. But without the controller we do not believe that the two-way trailer improves the flexibility of operation enough to be a controlling factor in the problem.

Higher Fares and Simpler Financial Structure Proposed for Philadelphia

THE two outstanding events of the last few days in Philadelphia are the report of the Mayor's committee and the publication by the Philadelphia Rapid Transit Company of its intention to apply to the Public Service Commission for higher fares.

The plea of the company for higher fares contains a strong argument for making the extra charge one for transfers. The 5-cent initial fare, it believes, should be retained first to attract and then to retain the profitable short ride business. Many of the free transfer passengers ride only because they can do so without charge, and the company points out that with the transfer charge the car capacity, thus in part wasted, could be used by passengers who must depend on the cars for their necessary rides. Discontinuance of all transfers in the delivery district would still further conserve the car capacity there for terminal purposes, and with the $3,000,000 additional earnings thus obtainable it is hoped to provide sufficient funds to meet such improvement costs as are chargeable to earnings under the commission rulings and also to take care of the company's increased operating expenses.

The report of the Mayor's committee indorses the need for increased facilities, and for a permanent remedy recommends the now standard formula of a valuation of the property by the State Public Service Commission, rates sufficient to pay a fair return on this valuation and the necessary expansion of the system through the credit thereby established. The report calls attention, however, in the corporate organization of the present company to the large number of underlying companies whose individual interests do not always lie along identical lines with that of the public or that of the operating company. It is obviously much simpler for the public to deal with an organization which owns all or the greater part of the system which it operates than with one having leasehold only of much of its operating property.

The remedy for this condition recommended in the report is a radical one, but is justified, according to the committee, on the ground of the public nature of the service rendered. It is no less than the exercise by the State of the right of revision of the contracts made with the underlying companies under the principle of eminent domain if the results sought are not reached by mutual agreement between the companies involved. In that case the roads would not be taken over for operation by the city, but merely to bring about the "one big company" idea, which is properly considered to be more conducive to good transportation than a number of separated undertakings.

This is recommended as a permanent remedy. Pending the completion of the valuation of the property by the State, the committee recommends an increased fare provided the company discontinues its dividends and puts the surplus after paying fixed charges and rentals into a rental of the city's Frankford Elevated Railway at a sum at least equal to interest on the city's investment and then to other improvements and extensions of the service.

We sincerely hope that the proposed charge for transfers will add sufficiently to the company's receipts, so as to encourage other companies to proportion their fares at least in some degree to the service rendered. The principle of a simple corporate structure for a transportation company is also worth a serious effort. Altogether, Philadelphia promises to be the scene of much electric railway interest during the next year.

The Place of the Multiple-Unit Car in Heavy Transportation

WHEN Frank J. Sprague invented his plan for controlling the motors on several cars of a train from one point, applying the principle first on a large scale in the electrification of a steam road, the South Side Elevated Railway in Chicago, he paved the way for an important element in steam railroad electrification. Such electrification comprises two varieties, the handling of heavy freight and passenger trains on trunk lines and the caring for suburban traffic, usually of very large volume. The electric locomotive and the passenger motor car equipped with multiple-unit control are respectively fitted for these services. On several large railways both kinds of equipment are in use, on others only the latter.

The multiple-unit car as used on electrified steam roads is essentially the same as that which operates on subway and elevated railways in several large cities, and on many interurban lines. In fact no hard and fast line can be drawn between these classes of service. Thus in electrifying a terminal for suburban service a railroad management is undertaking nothing new or experimental as far as rolling stock and contact system are concerned.

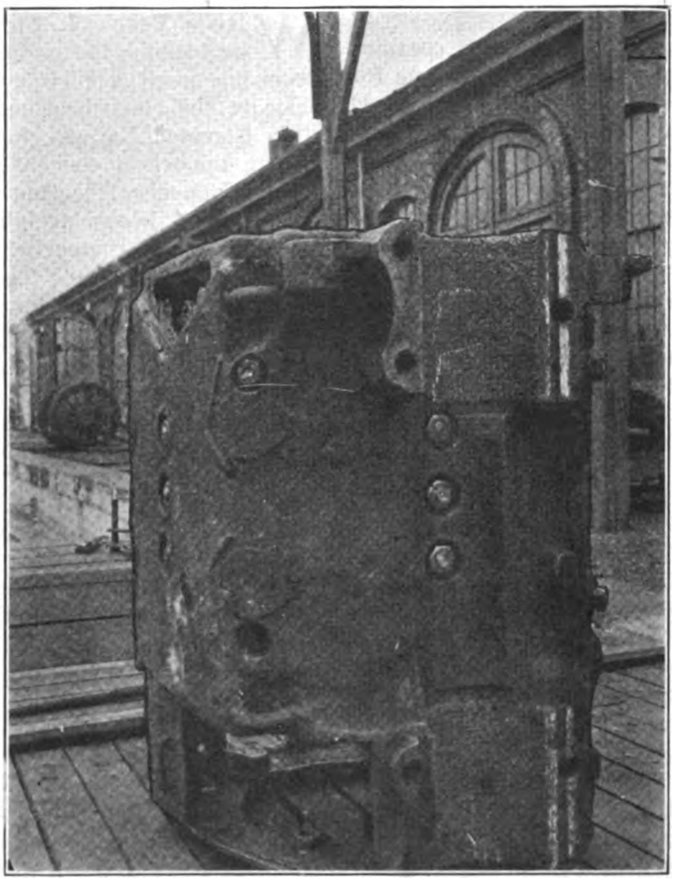
The multiple-unit car is an ideal transportation unit for this purpose. It is reversible, hence facilitates terminal switching, the ruling consideration in the case of the Broad Street station terminal in Philadelphia. It permits large motor capacity, thus providing for rapid acceleration and consequent high schedule speed even with frequent stops. It permits train length and motor capacity to be adjusted to requirements. As compared with steam equipment it furnishes cleanly transportation. Furthermore, it permits all of the space in the train to be occupied by revenue-producing load, which is a particularly important item when the trains are short; in fact, a 1-car "train" would be impracticable with steam operation.

One of the large railways operating multiple-unit equipment had a recent experience with a temporary return to steam operation when it became necessary to shut down a power plant for some essential repairs. The steam engines went back to their task as of yore, but the schedules dragged badly as compared with multiple-unit electric operation. It isn't a bad idea to go back to the old régime now and then so that the public will realize what the electric motor can do for them in the line of transportation. They will demand more of the modern type of rolling stock and, presumably, will be willing to pay reasonably for electric service.

Multiple-Unit Car Maintenance on Electrified Steam Railroads

Notes on Inspection Procedure and Shop Practice on Two Roads Having Comparable Equipment but of A.-C. and D.-C. Types Respectively

WITH a view to securing information as to the present practice in maintaining heavy, multiple-unit equipment on electrified sections of steam railroads, the editors of this paper have within the past few months studied this practice by visits to many of the principal shops and discussions with the master mechanics. The results are given in this and succeeding articles. In this article the methods of two important roads are discussed, one of which employs 600-volt direct current with third rail, the other 11,000 volts alternating current with overhead contact. As the information relates solely to the maintenance practice, without reference to the general features of the electrified sections of these roads as wholes, no reference to the names of the roads or of the individuals entitled to credit for the practices will be given. The roads will be referred to as the direct-current and alternating-current roads, respectively.



AXLE BEARING HOUSINGS BUILT UP BY ELECTRIC WELDING

(Deposited metal is carried well out at ends to provide material for fillet).

As the multiple-unit car is the ideal transportation unit for electrification of steam railroad terminals for the handling of local passenger traffic, it is important that maintenance procedure be systematized and simplified early. The experience of these and other roads will help toward that end.

The direct-current road was electrified in 1906. The value of the maintenance methods adopted early is demonstrated by the fact that a number of their features have been retained, although the progress that has been made in general in maintenance procedure has enabled many labor and materials saving improvements to be made. This is particularly true with regard to progress in electric and gas welding and cutting, improved methods of installation, development of standardization, etc. The road has now 107 multiple-unit cars in use, all motor cars, ninety-one being of wood construction and sixteen of steel construction. The steel coaches are standard steam railroad type, as were the wooden ones when first assigned to this division.

The multiple-unit cars are provided each with a motor truck and a trailer truck, the two motors on the older cars being of the GE—67 type, 225 hp. capacity, while the newer cars have interpole motors, type GE—212F, also of 225 hp.

On the first-mentioned road the inspection is done at the terminal carhouse, which contains three tracks, with a capacity of three cars each. All of these tracks are provided with pits. Here all but "class" or major repairs are made, the class repairs being taken care of at the general shops. At the latter, at present, quite a little work is being done also on steam locomotives, including thermit welding of frames, etc.

The maintenance shops are of old construction, having been in service during the entire electrification period of about fifteen years and dating back long before that era. While the buildings are old, the equipment is being constantly improved to permit the making of motor and other equipment repairs and a high degree of efficiency has been obtained.

At present the mileage of multiple-unit cars being made on this road is about 450,000 car-miles per month in winter and 650,000 or more in summer. The cars are inspected on a mileage basis, which, on account of the present excellent maintenance results, was raised to 1,500 miles per inspection on March 15 of this year. The cars receive a general overhauling about every 100,000 miles, or, roughly, once in two years.

The 107 cars already mentioned comprise ninety coaches, four passenger and baggage cars, nine full baggage cars and four combination mail-and-baggage cars. Inspection and maintenance work on these cars at the terminal requires a day force of forty men, who work from 7 a.m. to 3.30 p.m., and a night force of nine men, who work from 3.30 p.m. to 11.30 p.m.

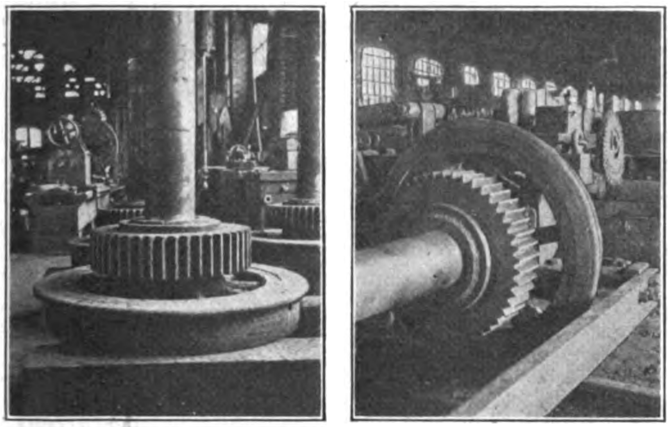
There are usually about two cars in the shop for light repairs in addition to those in for general inspection. With the eight-hour day now in force, it is possible to inspect eleven cars on the new 1,500-mile basis. In addition to the routine maintenance and emergency repair work there has been going on for the past year and a half a general rehabilitation process in connection with the motors, which, after fifteen years of service, have become rather well worn out. Some features of this will be taken up later.

MAINTENANCE WORK IS SPECIALIZED

The maintenance work is done by a force of thirteen men and a gang foreman. This force is divided up as follows: Two men on contactors, one man on motors, one on controllers, one on poles and retrievers (used to supplement the third rail shoes at certain points) and lighting, two men on third rail shoes, three on brakes, one on armature oiling, one on journal oiling and one on axles. The work of these men is, of course, supplemented by the more casual inspection made at stations, according to the plan used by all steam railroads.

While the duties of the members of the section gang are almost self-evident, a few notes regarding their duties may be of interest: For example, the controller man is responsible also for rheostats, the circuit breakers, the main fuse box, the bus fuses and some other details. The third rail shoe man applies and gages the third rail fuses, changes and repairs the third rail fuse boxes when these are injured and looks after all fuses on the car. The motor inspector examines the brushes, sees that the brushholders are in first-class condition, tests the armature clearance to see that the armatures are not rubbing on the poles and cleans the main and compressor motors. The man assigned to brake duty applies brake shoes, of which from thirty to forty are required daily, and insures the keeping of the piston travel under 6 in. The control man, in addition to adjusting fingers and changing them and arc deflectors if necessary, looks after the lighting circuits, cleans switchboards and inspects current-limit relays and all switches. Two men on the inspection force tighten up axle-cap bolts and change axle bearings, which is done every 15,000 miles regardless of condition.

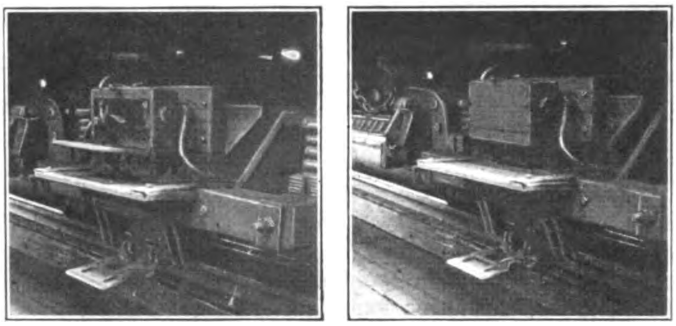
The night force is, of course, not large enough to make the elaborate inspection made by the day force, but the night men make a casual inspection and also continue work on light repairs. They are available especially for emergency work.



ATTACHING HUB LINER BY ELECTRIC WELDING
(At left, liner in two sections laid loosely in place. At right, liner welded securely to hub.)

All inspectors are furnished with copies of a standard printed instruction book provided by the railroad system which shows all equipment and its method of operation, both air and electric.

Among the record forms used in the electrical maintenance shop one is a car inspection card, which is carried in a detachable metal holder on the car while it is in the shop. The holder is returned to rack when the car leaves the shop, from which the card is removed by a clerk. This inspection card is initialed by the man performing the operation mentioned. A daily report of cars inspected is made up from the car cards and a daily mileage report is made up on the records of the transportation department. The shop foreman keeps a book in which the continuous inspection records for each car are maintained, with the mileages between inspections.



SUMMER THIRD RAIL SHOE, WITH PROTECTING SHELF AND FUSE BOX ABOVE
(At left, fuse box open. At right, fuse box closed.)

REHABILITATION OF THE OLDER TYPE MOTORS

As mentioned earlier, the older type motors are being largely rebuilt. Wear in these motors has been excessive due to the fact that they are used on unballasted track, through a very sandy country and at high speed. In fact, the service given by the cars on this road is performed under steam road conditions in every particular.

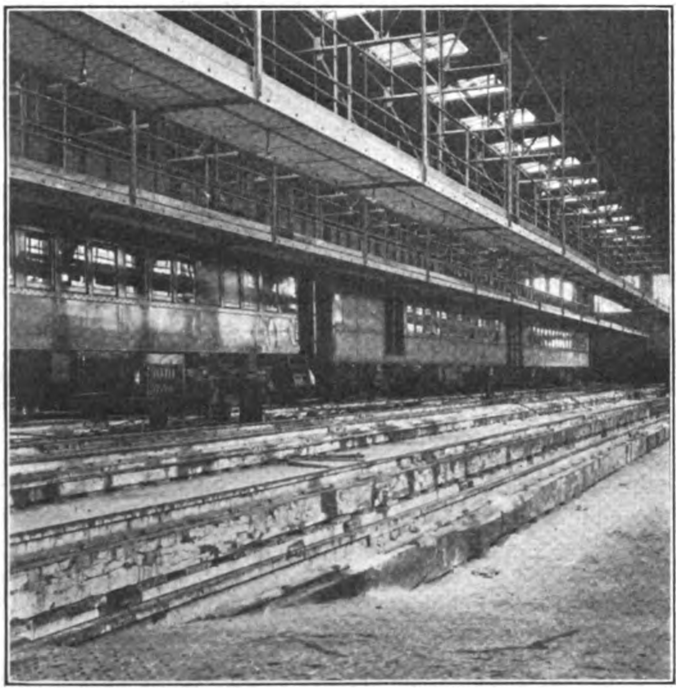
The effect of the sand is seen particularly in the wear of axle bearings and axles. When wear has occurred the resultant vibration causes loosening of the caps and extra wear due to chafing of surfaces in contact. To offset the result of this action the axle bearings are being partially restored to their original diameter by means of electric welding. In one of the shops is an alternating-current outfit, by means of which a layer of iron about 3/16 in. deep is deposited on the inside surface of the bearing housing, which is afterward bored out to a diameter about ¼ in. greater than the original. It is not considered necessary to build up the housing so as to reduce it to the original diameter, because future motors purchased will not be of the same type and there is no necessity for conforming to the manufacturers' standards. For the convenience of the welder the motor shell is mounted in the welding room on a dummy shaft, passed through the armature bearings, this shaft in turn being supported on a frame at a height convenient for the welder. By this means the welder can rotate the motor shell so that, in building up the part of the bearing forming a part of the shell, he can deposit the welding metal to the best advantage.

What the local people consider a most important item in the rebuilding of the motors is the keying of the axle-bearing cap to its seat. Looseness of the axle-bearing cap has been one of the principal maintenance difficulties during the past. By planing a keyway in the cap seat and mounting a steel key in a keyway planed in the cap, the key being electrically welded in place, proper registration of the cap in position is insured and vibration is prevented. In addition, a stud bolt is used in place of the cap bolt formerly employed, the stud being pinned in place to prevent loosening. As an extra insurance against loosening, castle nuts and cotter pins are used in clamping down the cap, and, as previously mentioned, at each inspection special attention is given to tightening up these bearings.

In passing, it may be said that formerly vibration of the caps caused considerable wear of the bolts, which were the main dependence for holding the caps in place. The keying eliminated all wear on the bolts.

GOOD USE MADE OF ELECTRIC WELDING

Another practice which has produced wonderful results is the welding of hub liners on the wheel hubs inside the gear seat, to limit end play of the motors. The grinding effect of the sand causes excessive clearance and difficulty has been experienced in controlling this. At first the attempt was made to screw the hub liners in place, and later to spot-weld them, but both without great success. Now the steel liner, of the necessary thickness, usually about ½ in. and made in two sections so that it can be placed without removal of a wheel, is welded around the edge by means of the electric arc. Two illustrations are reproduced to show the process and the result.



SUSPENDED PLATFORM FOR WORK ON PANTOGRAPHS, ETC.

Mention has been made of axle wear. The axle bearings cut into the axle and in time form shoulders which wear the end of the bearings and prevent normal end play. This tends to aggravate the wear on both bearing and axle. To prevent the formation of the shoulder, the centers of the axles are being cut down below the minimum to which the parts within the bearing are allowed to wear. The result has been the elimination of a very troublesome item in maintenance.

In addition to rehabilitation of motors, a program of improvement of car details is also under way. This is being done as a matter of maintenance procedure in the interest of economy. One item is the replacing on several cars of the wooden ends by steel ends, conforming to the railroad standards. This tends to uniformity in appearance and reduction of maintenance expense because the steel ends are injured less in minor collisions than the wooden ones. This replacement is made whenever a car is damaged sufficiently to warrant the replacement of the vestibules.

A more important item is the relocation of the third rail fuse boxes in a vertical position above the shoe. This arrangement with the fuse box cover closed and open is illustrated from photographs. The hinged cover is made to open downward for convenience in inspecting and replacing fuses.

Attention is also being given to the third rail shoes themselves. The shoes have been standardized, so that now only two types are used, the one illustrated being the summer shoe. The shoe, especially designed for conditions on this road, is light and has excellent wearing qualities. In winter a sleet-cutting shoe, differing from this one in that it has open spaces in it to facilitate the removal of the sleet, is used. The company is considering abandoning the summer shoe and using the winter one altogether in the interest of simplicity.

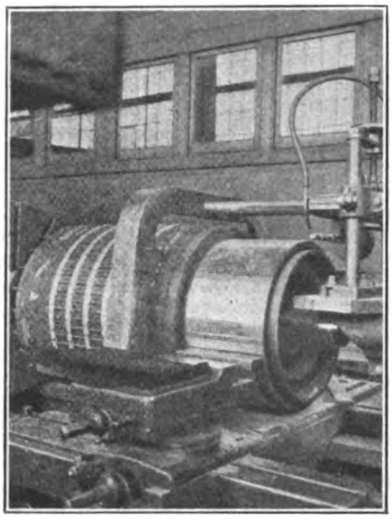
The reclaiming of resistance grids is another important item. There has been considerable burning of the contact surfaces of the grids, rendering them unfit for use. A special grinding machine has been put in for the purpose of surfacing off the contact surfaces. Where they can be smoothed up by grinding nothing more is done except to replace the lost metal by washers when the grids are assembled. When the surfaces are badly pitted they are built up by means of electric welding, followed by grinding. In all cases after the grids have been assembled they are joined by welding to prevent vibration and improve electrical contact.

Among the minor maintenance troubles here, as elsewhere, has been the abuse and loss of jumpers. On this system the Sprague-General Electric type M control is used, with line voltage on the control circuit. The insulation of the jumpers and jumper sockets is therefore an important item. A No. 000 bus line is also carried through each train to insure contact while a third rail break is being passed. The bus-line jumper is, of course, rather heavy and is apt to become detached from the car when it is out of service or when trains are being made up. On this system the trains are not kept made up, but are assembled as required. To simplify the work with the jumpers, it is now planned to clamp one end of each in its socket by means of clamping bolts secured to the socket covers. This will not prevent the ready removal of the jumper, but will prevent its accidental detachment.

MAINTENANCE PROCEDURE ON THE A.C. ROAD

On the alternating-current electrification mentioned 115 multiple-unit cars are operated. They are equipped with Westinghouse single-phase alternating-current motors. All maintenance work on the multiple-unit cars is done at one shop. While, of course, the 225-hp. motors and control are somewhat more complicated than those used in direct-current heavy traction, it is gratifying to note that the design and maintenance procedure have been brought to such a degree of perfection that the whole equipment is easily kept in excellent running condition with a moderate force of men. For the entire 115 cars it is necessary only to employ 234 motors, four being "spares," and there are but one or two cars out for running repairs at any one time, ordinarily, and three are out for overhauling. The schedule permits five cars to be out of commission for painting at any one time. As it is the number of cars in the shop that is the test of design and operating efficiency, it is obvious that this alternating-current electrification is giving a good account of itself. These remarks are made because some of the readers of the JOURNAL, like the writer, may have had the impression that alternating equipment was difficult to keep in good condition.

The maintenance shop is, roughly, 100 ft. x 290 ft. in dimension, and adjoining it is a small service building. There are five tracks, all equipped with pits, and along one side of the building are the machine tools, dipping and baking facilities, offices, etc. The building is divided into two bays, one served by a 25-ton electric crane with a 10-ton car hoist. The other contains two suspended platforms for use in working upon the pantographs and roofs of the cars. This crane, by the way, is equipped with a "dead-man" control feature, in that the brake is applied if the operator's foot is removed from the pedals which control the operation of the brake.



A HEAVY YOKE WHICH PREVENTS VIBRATION OF SLOTTER GUIDES

Important items of shop equipment, in addition to the crane, are three lathes of, respectively, 20-in., 16-in. and 12⅞-in. throw, a heavy drill press, a sensitive drill, a large water-cooled emery wheel, a shaper, a motor-driven hammer, a babbitt furnace with pots, a universal armature machine, a dipping and baking outfit, a blacksmith's forge and miscellaneous minor apparatus. The cars are overhauled in detail after making 100,000 miles, or approximately every two years, although theoretically they are scheduled for attention in the railroad paint shop (located at another point) every year.

The painting work is done in accordance with the railroad's regular plan, the work to be done depending upon the condition, which is classified as follows: All exteriors are classified as "Class 1," "Class 2" and "Class 3," respectively "very bad," "medium" and "needing touching up only." The interior is rated as "A," "B," "C" or "D," the graduations covering the same extremes as the exterior. Where a complete removal of the paint is required, varnish remover is employed in getting it off. The coaches are painted the standard color of the road, the color being brought out and the surface protected by varnish.

The general shop overhauling process involves putting the whole equipment in practically new condition, including dipping and baking of armatures and fields.

There are, in addition, less thorough overhauling and inspection, beginning with the casual "once over" given by the usual inspector located at terminals. They are given a more thorough inspection on a mileage basis, from 1,200 to 1,500 miles, the standard for multiple-unit equipment on the system. The schedule calls for inspecting nine cars a day, which can be readily done.

In this 1,500-mile inspection a man and helper are assigned to the air equipment, a man and helper to the control equipment, a man each to motors, blowing motors, trucks, oiling and pantograph, while two go over the entire car interior.

Pantograph shoes are changed about every 6,000 miles, and every five inspections, say, 6,000 to 7,500 miles, the cars are gone over in somewhat more detail, especially with a view to repairing any parts that have given trouble. The cable in the switch group is given special attention, the switch-group cover being removed, magnet valves are cleaned, etc.

A still more thorough inspection is given every 14,000 or 15,000 miles, when the motors are given special attention and any minor improvements that are in process of installation are taken care of.

REMOVING SLEET FROM PANTOGRAPH FRAMES

As in every other shop, certain problems have arisen in this one which required special solution, partly due to the nature of the equipment. One interesting example, which is really more an operating problem than a maintenance one, is the removal of sleet from pantograph frames. The pantograph shoe is pressed upward with a force of 18 lb., hence it does not take a very heavy accumulation of sleet to counterbalance this force. After various experiments, the steam jet arrangement at present in use was devised in the shop. A nozzle was made from pipe, the orifice being thin and curved to conform to the curvature of the tubing making up the pantograph frame. This nozzle is moved along the frame close to it and the sleet is melted off with economy of steam and effort. To protect the hands of the operator a piece of air brake hose is slipped over the nozzle, effectively heat-insulating it.

The steam jet is operated from a platform in the yard, the floor of which is at the level of the car roof.

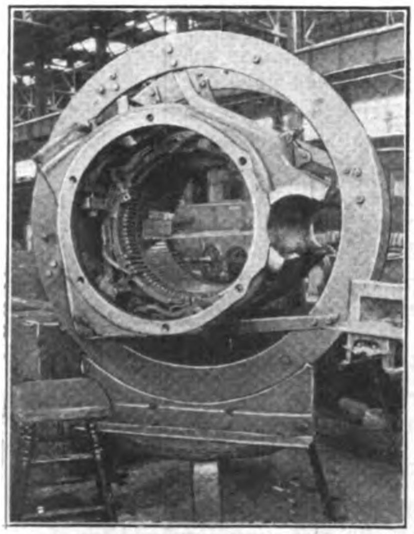
OTHER SPECIAL DEVICES

Among the novel devices in the shop one of the most interesting is a revolving frame for holding the motor shell or stator while work is being done upon the field and compensating winding. Several photographs have been reproduced to show the details of this device. It consists of a frame made of two flat steel rings spaced about 18 in. apart by means of bolts. This rests on four rollers mounted on a turntable frame. Straps are bolted to the rings in such positions that the motor shell can be held with its axis coincident with that of the frame by means of wedges. This arrangement permits the winder to adjust the shell to suit the requirements of winding or soldering.

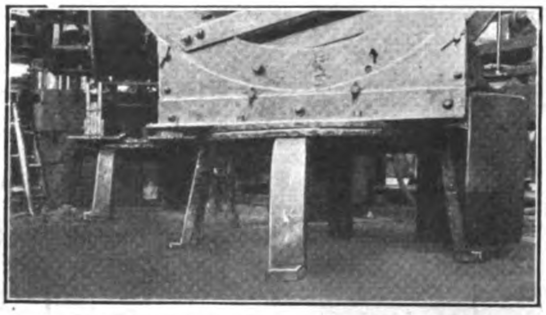
The turntable consists of a circular flat steel plate, mounted above a duplicate plate supported on legs made of steel strap and separated from the latter plate about ¼ in. by means of washers. The turntable can thus be rocked slightly and is tilted by means of wedges when it is desired to give a slight incline to the winding to facilitate the flowing of solder.

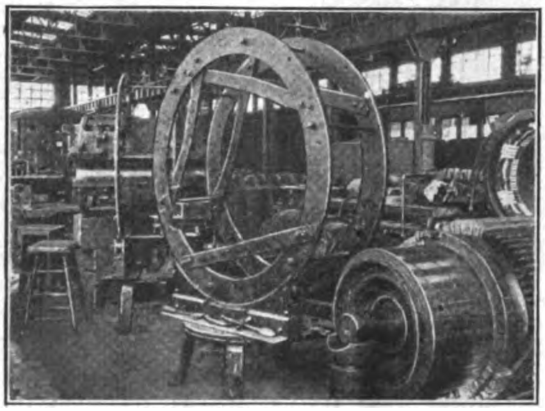
Another device which attracts attention, also illustrated herewith, is a heavy steel yoke, mounted on the traveling carriage of the lathe used for slotting work, and used to brace the guide of the slotting saw. As the commutator bars are long, it was found that this bracing was necessary in order to prevent vibration and secure a uniform depth for the undercutting.

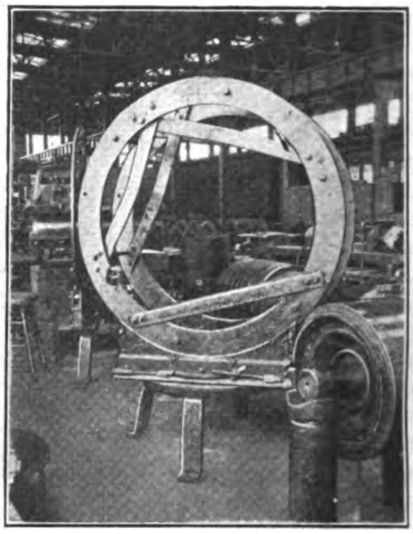
But most important of all the new practices in the shop is that now used for changing wheels. This operation formerly required five men for an entire day when the truck was removed from under the car and the wheels removed in the manner usual with direct-current motors. As there are several heavy cables to be disconnected and reconnected with alternating-current motors, it was decided to follow a plan for removing the wheels without disconnecting the motors. The result is that three men can now replace a pair of wheels in two hours by the following method: The truck is first placed with the center of the axle carrying the wheels to be removed directly above the center of the drop-pit ram. The axle caps are removed and set to one side and a yoke is then fastened to the head of the ram, the yoke being simply a heavy piece of flat steel with the ends bent up. The yoke is then raised by hydraulic pressure so that the extreme ends, which have V-shaped notches in them lined with babbitt, engage with the axle between the motor housing and the wheel hub in the space left by the removal of the axle bearings. This space is approximately 1⅛ in. wide. The pedestal castings are next removed and the helical springs are compressed. The removable sections of the tracks are then swung outward and the wheels are lowered by means of the control of the hydraulic pump, while the hydraulic ram is brought up through a section of the small wheel truck which travels in a cross-pit which spans two tracks. As the ram is lowered it permits the yoke and the removed wheels to rest on this truck, the ram disappearing and going to a point underneath the truck.



A DEVICE FOR SUPPORTING AN ALTERNATING-CURRENT MOTOR FIELD FRAME OR STATOR







This apparatus permits rotation about the motor axis, or the turntable axis, and may be tilted to facilitate soldering.

The wheel truck is equipped with roller bearings, which, by the way, were developed in the shop, and it rolls so easily that one man can push it along the transverse pit to a point underneath the crane where the wheels can be taken from the truck or the truck and wheels can be placed over the hydraulic jack on the adjoining track. This in turn can raise the wheels to the rail and another pair of wheels can be substituted. The wheels can then be replaced in the car by reversing the procedure described.

On account of the shape of the motor housing it is impossible to drop the wheels directly out of the cavity in the motor housing which accommodates the axle bearings. It is therefore necessary to lower the motor 4 in. on the axle-bearing side, thus permitting it to swing through an arc and displacing the motor casting far enough so that the axle will clear it as the latter is being lowered.

It is interesting to note that the drop pit here consists of a transverse track taking in a pair of tracks and pits as stated and reaching out to a point 12 ft. from the side of the car. Normally the pit is covered with plank floor to prevent accidents. When this flooring is removed chains are stretched across the passage so that no one will be injured by falling into the pit. In this pit is a three-cylinder hydraulic pump, having a capacity of about 1,200 lb. per square inch, with suitable high-pressure connections to control valves and the jacks. Each jack consists of a heavy steel cylinder, with the stuffing box, packing and gland at one end and suitable pipe connections, with a solid steel piston having a 72-in. run-out. This was necessarily designed for rugged service, as it is not always possible to centralize the wheels accurately; there had to be, therefore, a certain amount of "give and take" in the jack arrangement. A set of head, yokes and brackets has been developed so that any piece of apparatus that comes in line with the drop pit can be removed from the car.

As would be expected, the crane plays an important part in maintenance operation in this shop. As the motors are of large size, the crane is almost a necessity in handling them. It is also useful in removing trucks from under the cars. In this operation a crane yoke is hooked under one end of the body and the body is thus easily raised. Special iron horses with rollers are used for supporting the car bodies when the trucks are out.

Electric welding is, of course, used here as elsewhere. A one-man a.c.-d.c. outfit, using about 100 amp., is found to be sufficient for the work.

While the shop described above is unusually well equipped for its work, one of its best features is the excellent natural lighting provided. As will be seen in the photographs on this and the preceding pages there are ample windows and skylights, which greatly facilitate inspection work.

Solving Track Problems at St. Joseph

Thermit Welding Has Been Used Quite Extensively to Eliminate Bolted Joints and Rail Bending

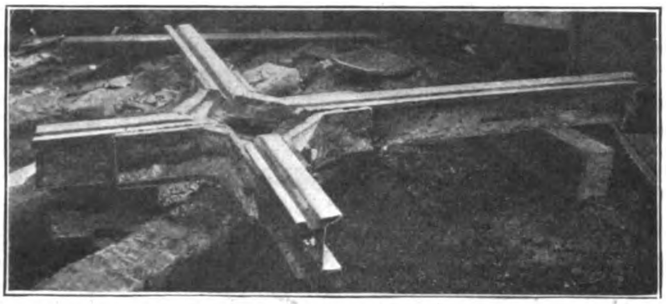
By H. L. Chaffee
St. Joseph Railway, Light, Heat & Power Company,
St. Joseph, Mo.

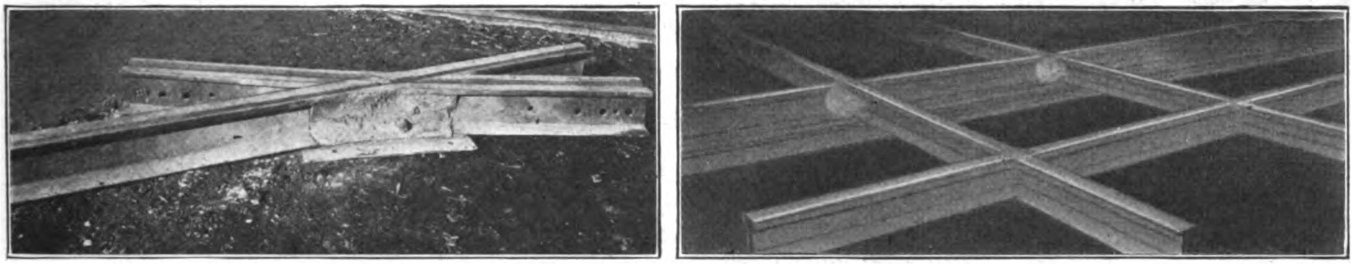
ONE of the most important questions facing a street railway property today is the proper bonding of the rails in the return system. Experience has shown that great loss of power results from broken and imperfect bonds. The method generally used employs the expanded copper bond, but we have obtained excellent results with the thermit weld, thus eliminating the necessity for using a copper bond. The cost of the thermit weld as compared with the bolted joint is also favorable to the former when the cost of maintenance is taken into consideration. The necessary material for making the thermit insert weld can be obtained at a cost not exceeding $8.50, depending on the size and type of rail, and if labor is included the weld costs from $10 to $11. The thermit-welded joint reinforces not only the web of the rail but the ball as well, there being a continuous reinforcement directly under one side of the ball, down the side of the web, around and under the flange, up to and under the other side of the ball. The rails themselves are thoroughly welded into a single homogenous mass, with every vestige of the joint eliminated. By the elimination of the joint at least two years of life is added to the rail and a saving is made in the return current, as well as in the cost of maintenance. Also by eliminating the joint the possibility of cupping is practically removed, due to the fact that the vibration set up by the wheels is transmitted along the rail as if no joint were present.

This vibration can be transferred only through a complete union of the metal of the rails at the joint. This is not theory, but is a fact that has been proved often in actual practice. For instance, it has been found that if a slight hack-saw cut is made in the head of a rail, the rail will cup, due to the fact that the wave of vibration is not transmitted along the top fibers of the rail where the cut is made, even though the remainder of the rail is solid and continuous. This illustrates the desirability of thoroughly welding the head of the rail as well as welding the base and flange.

In building special work by welding together short lengths of rail large savings can be effected by using the thermit process. The average crossing can be built in this way at about one-half the cost of the purchased variety and will outlast the latter by a good many years. In addition to this the thermit-welded crossing will cut down the cost of maintenance by eliminating straps and bolts. The accompanying illustrations show two of the many pieces we have built and are building in St. Joseph, as well as a section of a manganese inlaid crossing which we replaced with a thermit-welded crossing built of 91-lb. rail at a cost of $75, not including the rail.

One of the illustrations shows a crossover which replaced a cast manganese insert, also located in the loop district. This is used by our heavy city cars in turning the corner, and is also located where both interurban lines pass over it. It was built out of 7-in. girder rail at a cost of $90, not including the rail. The old crossover was broken through the cast, which seems to be our main trouble here with this style of crossovers and frogs. Another illustration shows a crossing built of 100-lb. rail to replace one located where our tracks cross a branch of the Burlington Railroad. This was built at a cost of $221, exclusive of rail. So far as known, this is the first case where thermit-welded rails have been installed at an intersection of steam railroad and electric railway tracks.

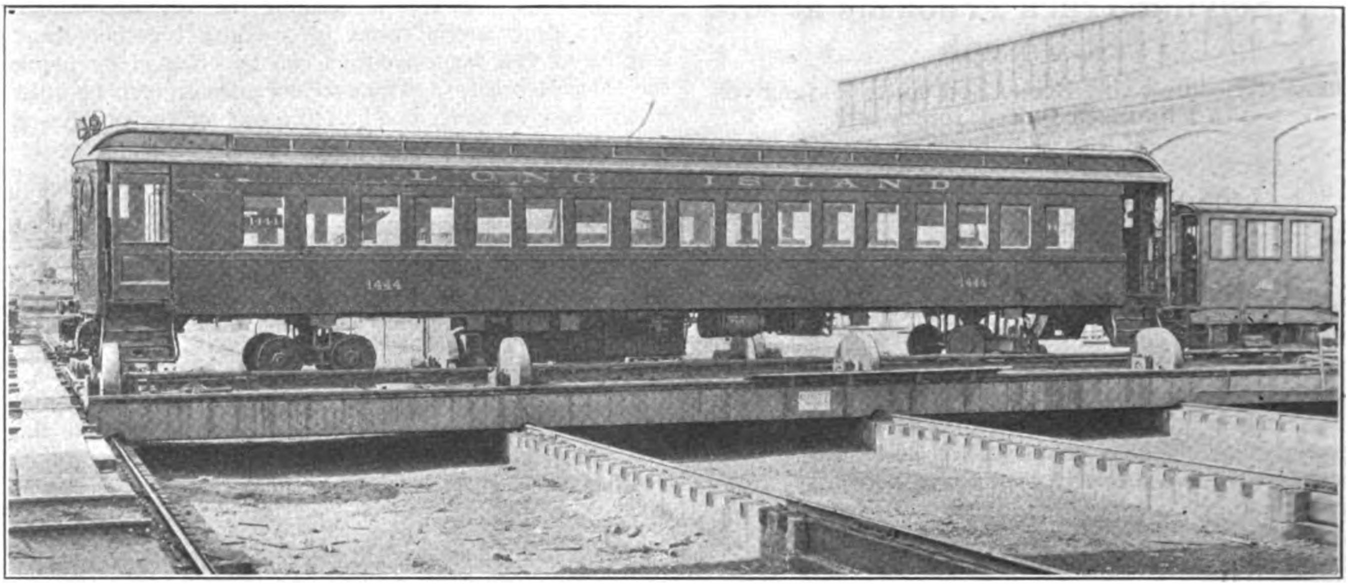




AT TOP, MANGANESE INLAID CROSSING REPLACED WITH THERMIT WELDED CROSSING. AT LEFT, THERMIT WELDED CROSSOVER WHICH REPLACED CAST MANGANESE INSERT AT ST. JOSEPH. AT RIGHT, THERMIT WELDED CROSSING FOR INTERSECTION WITH STEAM RAILROAD.

Aside from track use, thermit welding has many other advantages which the street railway can utilize. For instance, every property is more or less troubled with broken truck frames, car axles, motor cases, power-house machinery, shop machinery, and very often valuable castings and forgings are consigned to the junk pile or sent out to be welded when the welding could just as well be done on the premises. It is a general rule on electric railways that when an axle is broken it is either scrapped or cut up and put to other uses. We find here that by taking the old axles and cutting them so that our weld will come in the middle, thus getting it away from the old bearing which might be crystallized, we have the stock for a new axle at a cost not exceeding $10.50 on a 6-in. axle, which includes labor and materials.

The average truck frame can be repaired at a cost of $12, not including machine work.


TRANSFER TABLE TAKES LONG CAR AND TRACTOR AT SAME TIME

Equipment Repairs on Long Island Railroad

Fifteen Years' Experience in the Maintenance of Heavy Electric Railway Rolling Stock Has Brought About Many Improvements in Methods and Organization

THE Long Island Railroad substituted electric traction for steam on the first of its lines fifteen years ago. Since that time the mileage of its electrified lines has been gradually increased and the volume of commuter traffic now exceeds all early expectations. Electric operation has proved a successful venture for this road and one of the factors which has contributed largely to its success is the thorough and systematic inspection and repair of car equipment which have been carried out. In an article in the ELECTRIC RAILWAY JOURNAL for June 10, 1911, the inspection and maintenance organization and methods then in use at the Morris Park shops of the company were described. Since that time 164 steel multiple-unit motor cars and ninety steel trailer cars have been added to the passenger rolling stock. These cars were all equipped at the Morris Park shops, which also handle repairs to many industrial motors as well as car equipments.

Additional shop equipment has been found necessary to carry on the work. New methods have also been introduced which materially shorten the time and decrease the labor necessary for doing much of the work. A subsequent article, published in the ELECTRIC RAILWAY JOURNAL for March 20, 1915, page 566, dealt particularly with repairs to all-steel cars, and in this article some details were given of the late types of steel passenger cars which had been purchased.

An accompanying table gives a list of the rolling stock which the Long Island Railroad now has in service on its electrified divisions. For convenience in making reports and for general reference the different types of cars have been divided into classes and each class is given a specific designating number. This consists of letters followed by a numeral; thus the MP-54 class includes motor passenger cars, 54 ft. long; the MPB-54 class covers motor passenger and baggage cars, 54 ft. long, and the MPBM-54 includes motor passenger, baggage and mail cars, 54 ft. long.

The organization in charge of maintenance repairs is headed by G. C. Bishop, superintendent of motive power. Reporting to him and in direct supervision of all electrical repairs and inspection is R. W. Brodmann, general foreman of electrical equipment. All repair and inspection shop foremen report to the general foreman.

ALL-STEEL ROLLING STOCK ADDED

For the electrified service which was inaugurated in 1905, 134 MP-41 and five MB-45 cars were ordered. This number of cars soon became inadequate to handle the traffic and in 1908 it was found necessary to place another order for cars. These cars were of entirely different design, conforming to the M. C. B. standard and equipped with automatic drawheads and automatic air couplers, whereas on the first cars ordered the drawheads and heights did not conform with M. C. B. standards. It is possible, however, to couple up the two types of equipment with a compromise coupler between drawheads. One of these compromise couplers is carried in each of the first 134 cars, and compromise train line jumpers, which are also necessary, are located at all terminals. It is also necessary to use a compromise air coupler for the air brake lines. It is seldom found necessary to couple up the two dissimilar types of cars, however, as the MP-41 class are used principally on the

TABLE OF LONG ISLAND ELECTRIC ROLLING STOCK

Number of Cars	Class	Motor Equipment
133	M P-41	West. 113
5	M B-45	West. 113
10	M B-62	West. 308
47	M P B-54	West. 308
3	M P B M-54	West. 308
276	M P-54	West. 308
90	T-54	

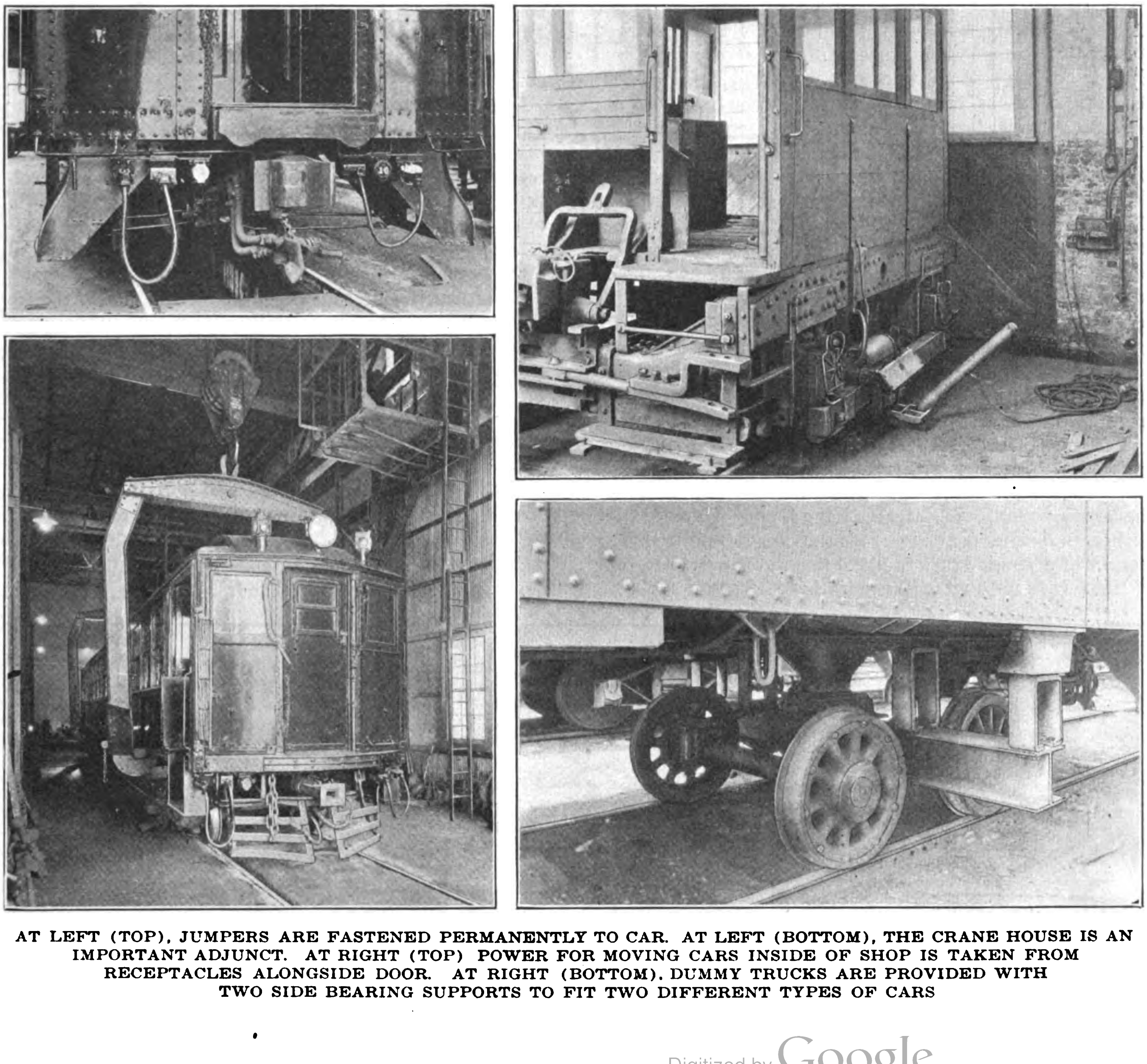
Flatbush-Rockaway Beach and Atlantic Avenue divisions in local service.

The drawheads of the MP-41 cars were of the Van Dorn type. These drawheads and the anchorage are now becoming worn to such an extent that the company is replacing them with the form 8 Tomlinson couplers which have air connections in the drawheads. The height and design of this coupler does not correspond with M. C. B. standards, so that in order to couple up these cars with the larger equipment it will still be necessary to use the arrangement already explained.

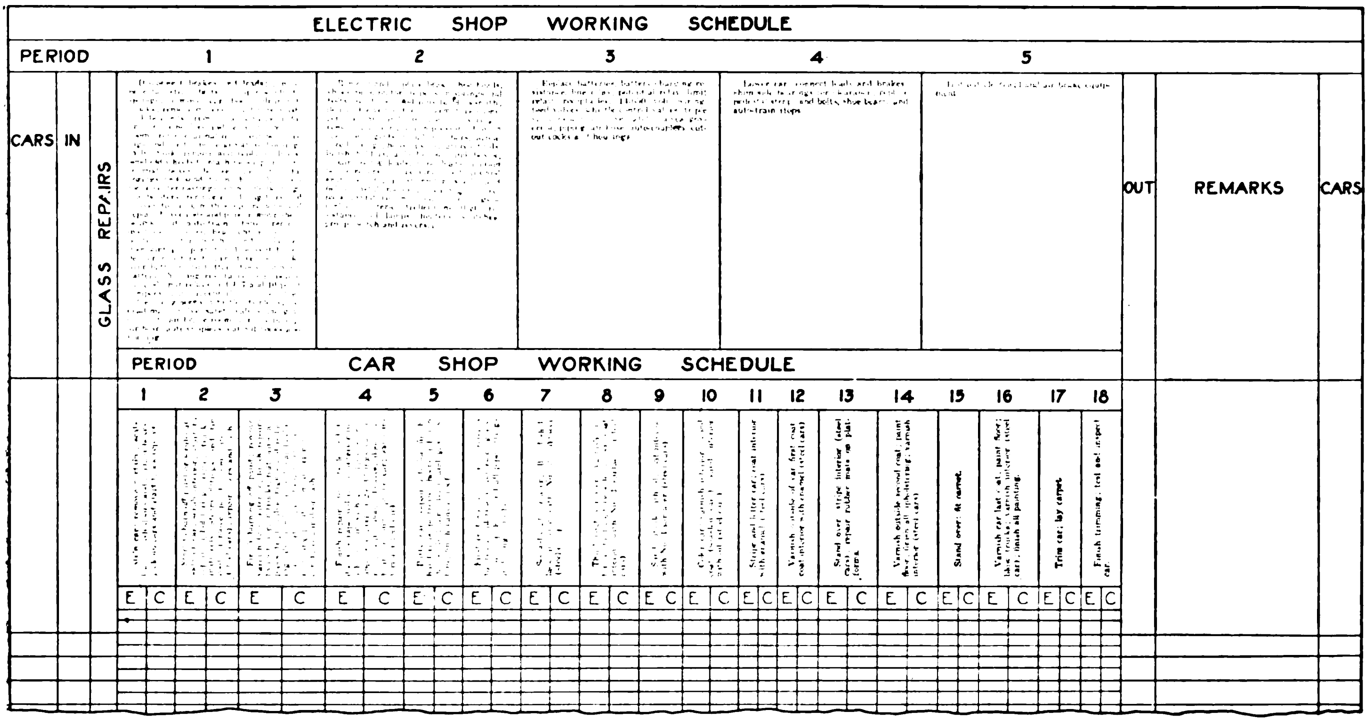
The latest addition to the electric equipment of this road was three orders for steel trailer cars, known as T-54 cars. Ninety of this class of trailer are now in service. This is a very light car and was ordered principally to replace wooden trailers previously used between MP-41 cars, which had to be retired, due to the fact that all motor cars are of steel, excepting five MP-45 baggage cars, and they are used through tunnels to the Pennsylvania station, New York, and to the Flatbush Avenue station, Brooklyn.

These trailer cars in class T-54 are single-sheet, arched roof, unlined cars, but are designed to protect passengers in case of a collision or accident. A box girder, built of two 9-in. channels, 15 lb. to the foot, with plates riveted to the lips of the channels, extends from the back end of the draft gear past the body bolster to the first cantilever. These girders terminate at each end in a large steel casting which forms the center portion of the platform bumper. Two 12-in. I-beams are fastened to the same casting at their lower ends and the upper ends fastened to the roof and to the roof supports. These form openings for outside, center vestibule doors. A 7/16-in. x 3½-in. x 5-in. angle-iron runs along each side of the car and is riveted to the end of the cantilevers. This is supported at the box girders and the body bolsters by a 5-in. channel. The ends of these angles are riveted to a special casting which forms the main body end sill. These angle-irons support the floors and the outside sheathing is riveted to the 5-in. side of the angle. The general design of the underframe of the trailer cars is almost identical with that in the MP-54 motor cars. The box girder protects the ends from collision and the vertical I-beams prevent telescoping. These cars conform with M. C. B. rules and also with those of the United States Safety Appliances. They have automatic couplers and automatic air couplers and can be used in steam service as well as in electric service.

These trailer cars were originally intended for sum-



AT LEFT (TOP), JUMPERS ARE FASTENED PERMANENTLY TO CAR. AT LEFT (BOTTOM), THE CRANE HOUSE IS AN IMPORTANT ADJUNCT. AT RIGHT (TOP) POWER FOR MOVING CARS INSIDE OF SHOP IS TAKEN FROM RECEPTACLES ALONGSIDE DOOR. AT RIGHT (BOTTOM), DUMMY TRUCKS ARE PROVIDED WITH TWO SIDE BEARING SUPPORTS TO FIT TWO DIFFERENT TYPES OF CARS



ELECTRIC SHOP WORKING SCHEDULE

PERIOD 1 2 3 4 5

CARS IN GLASS REPAIRS OUT REMARKS CARS

PERIOD CAR SHOP WORKING SCHEDULE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

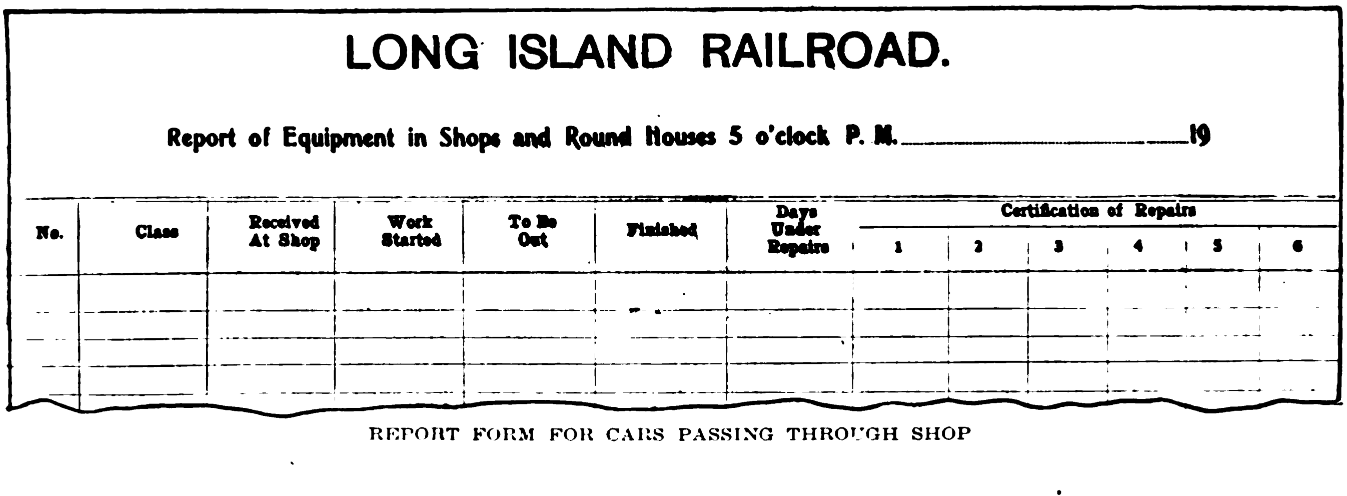
E C E C E C E C E C E C E C E C E C E C E C E C E C E C E C E C E C E C

ELECTRIC SHOP AND CAR SHOP WORKING SCHEDULE

mer service only, but when the United States declared war with Germany two large cantonment camps, Camp Upton and Camp Mills, were established on Long Island. As both of these camps were used principally as debarkation camps large movements of troops and numerous visitors had to be handled. These trailer cars were then used in steam service and in order to heat them it was necessary to put steam heat in forty-five of them. After the close of the war the scarcity of housing accommodations for the people in New York city forced large numbers to live in the suburbs and at the various seaside resorts during the winter. This increased the number of commuters on the electric lines of the Long Island Railroad, and in order to give sufficient train service it was necessary to use fifty of the trailers in this service. Thus lining of the cars and installation of electric heaters became necessary.

The trucks under these T-54 cars are of the non-equalizing bar type with 33-in. rolled steel wheels and 6-ft. 4-in. wheelbase. Swing-motion hangers support the spring plank, elliptical springs and truck bolster with two brake beams per truck, inside hung. The weight of a single truck is 9,400 lb., and the total weight of these cars without passengers is 63,100 lb.

In the previous article describing the inspection and overhauling practice of the Long Island Railroad, as published in the ELECTRIC RAILWAY JOURNAL for June 10, 1911, two inspection sheds were mentioned. These were located at Dunton and Rockaway Park. Since that time inspection of multiple-unit cars has been discontinued at the Rockaway Park shed, where now only trolley cars of the Ocean Electric Railway are handled, and a new inspection shed has been established in the Carlton Avenue yard, at the Flatbush Avenue terminal in Brooklyn. This yard is below the street surface and practically on a level with the Atlantic Avenue tunnel, and it is separated from this tunnel by a concrete retaining wall. During off-peak hours from 100 to 125 electric cars are now laid up in this yard, so that it forms a very desirable point for an inspection shed. The enclosure used for this inspection work is 515 ft. long by 37 ft. 6 in. wide and is provided with two tracks with 16 ft. between centers. A pit is provided in each track, 49 in. deep and 455 ft. long. The pits are lined with concrete and the rails are located 9 in. above the concrete floor of the shed to facilitate work. The openings at the ends of the buildings are provided with wooden swing doors.



LONG ISLAND RAILROAD.

Report of Equipment in Shops and Round Houses 5 o'clock P. M.________________19

No.	Class	Received At Shop	Work Started	To Be Out	Finished	Days Under Repairs	Certification of Repairs 1	2	3	4	5	6

REPORT FORM FOR CARS PASSING THROUGH SHOP

On one side, close to the entrance to the tunnel, the concrete reinforcing wall between posts was extended up to the bottom of the girders supporting the street and an additional wall with windows and doors opening into the car barn was constructed. This provided a space 20 ft. long by 12 ft. wide, which is used for a heating plant and boiler. Adjoining this there is a brick wall on the opposite side from the reinforcing wall, which provides space for coal storage. A balcony is suspended on hangers from the roof of the tunnel on one side and the other end rests on the tunnel retaining wall. The balcony is provided with wash basins and toilets. Both this inspection shed and the one at Dunton are provided with compressed-air plants for blowing out the equipment. In the Carlton Avenue shed there is a mono-rail hoisting tramway of 2½-tons capacity, which runs the full length of the pits. This is electrically operated, using 220-volt, 25-cycle alternating current, and is controlled from the ground. This is used to handle heavy materials, such as compressors, or for distributing brake shoes, contact shoes, etc., as required.

During the war period great difficulty was experienced in obtaining mileage records, so that the inspection work, which was previously done on a mileage basis, was changed to a time basis. This system has been working so satisfactorily that it is still being continued. All car records are kept in the general foreman's office at Morris Park and cars are ordered in for inspection from that office daily. The overhauling periods are also computed there and car numbers are given to the inspection sheds for shopping. This work was formerly done by each inspection shop force, but was changed to avoid duplication of records, etc. The following instructions for carrying on this work, issued by G. C. Bishop, superintendent of motive power, show the latest practice for the maintenance of electric rolling stock:

Long Island Railroad Company

Motor Passenger Car Maintenance Instructions

INSPECTION PERIODS

1. Multiple-unit cars shall be inspected at inspection sheds every ten days, this period being known as a "regular inspection."

2. Every fifth regular inspection shall be termed a "semi-general inspection," at which time certain work shall be done which is not included in a regular inspection as given below.

3. Every tenth regular inspection or second semi-general inspection shall be termed a "general inspection."

4. Every tenth general inspection, or every 100,000 miles, cars will be taken to the shops for class repairs.

REGULAR INSPECTION

1. *Motors:* Motors are to be cleaned and blown out with compressed air; brushes removed, brushholders, commutators, armature clearance and motor leads inspected; brushes cleaned and returned; brushholder shunts, hammers and springs examined. Tension on brushes to be minimum 6 lb. per square inch, maximum 8 lb.

2. *Switch Group:* To be blown out and cleaned; all worn parts replaced; interlock fingers examined for tension and contact; switch group operated for sluggish switches or leaking valves.

3. *Line Switch:* Same as switch group.

4. *Reverser:* Same as switch group.

5. *Switchboard:* To be blown out with compressed air and all switches and other apparatus examined and wiped off; heater circuits tested, light circuits tested; battery charging relay on MP-41 cars inspected.

6. *Rheostats:* All rheostats to be inspected for broken grids and leads and jumpers for loose or broken connections; also all insulated bolts to be inspected for defective insulation.

7. *Conductor's Electro-Pneumatic Signal Switch:* To be examined and tested.

8. *Automatic Heat Regulators:* Thermostats, thermometers and regulating switch and relays to be inspected and tested.

9. *Coasting Time Recorders:* Clocks to be inspected and paper tape and keys replaced if necessary.

10. *Emergency Light Relays:* To be inspected, tested and cleaned and worn parts to be replaced.

11. *Master Controller:* To be inspected for worn or loose contact fingers; fingers and drum to be cleaned and examined for loose wire terminals.

12. *Main, Bus and Shoe Fuse Boxes:* To be inspected for blown fuses and defective boxes.

13. *Lights:* To be replaced when burnt out (this includes headlight lamps, car lamps and emergency lamps). Defective sockets and resistances to be replaced.

14. *Heaters* (during heating season only): Broken coils and porcelain tubes to be replaced. This includes cab heaters.

15. *Control Circuit* (including control jumpers): To be inspected for mechanical defects and all parts found defective to be repaired or renewed.

16. *Bus Wiring* (including bus jumpers): Same as No. 15.

17. *Control Batteries:* To be inspected and tested for grounds and charge.

18. *Trucks:* Shoe fuses, shoe fuse boxes, shoe beams and contact shoes to be inspected, broken and blown fuses replaced and contact shoes gaged. Journal brasses to be inspected for loose or broken babbitt and broken brasses. Worn brake shoes replaced and brake rigging readjusted; side bearings and center plates oiled; swing motion hangers, equalizer bars, safety hangers to be inspected for defects. All truck bolts to be inspected and tightened, brake rigging and chafing plates to be oiled. Wheels gaged, tires and flanges inspected. If axle bearings are worn to exceed ⅛ in. they are to be replaced.

19. *Airbrake:* Compressor motor to be blown out, cleaned and inspected; armature clearance gaged; brushes removed, brushholders examined and cleaned, and tension readjusted if necessary, brushes cleaned and replaced. Commutator cleaned if necessary. Compressor bearings and crank chamber oiled; air strainer inspected and cleaned. Piston travel and slack adjuster examined and set; main reservoirs drained; control reservoirs drained; conductor's valve, motorman's brake valve, feed and reducing valves tested; whistle tested; air hose and automatic couplers inspected; hand brakes inspected and tested. Air gages compared for accuracy and piping tested for leaks. Master governor and pneumatic pump switch inspected and auto train stop tested.

20. *Car Bodies:* All bolts to be inspected and tightened; drawbars, pilots, trap doors, windows, seats, sliding doors, end doors, safety tread, flooring, bells, bell cords, gates, chains, sliding door devices, roofs, ventilators, etc., to be inspected.

21. *Lubrication:* Armature bearings to be oiled. Oil wells are first gaged then replenished with oil to a depth of 3½ in., commutator end, and 4 in. pinion end. Axle bearings gaged and replenished with free oil to a depth of 2½ in. Waste pushed back and one gill of oil added in journal boxes.

21. *Fire Extinguishers:* (a) To be examined as to quantity of liquid contained; replaced if necessary.

(b) J. M. Fyro type to be tested as to pressure, if below 90-lb. recharge.

(c) Pyrene type to be tested as to operation of pump, replace any found defective.

22. *Operation Test:* After all work is completed each car is operated from both ends in both forward and reverse directions with line switch out. Train is made up and entire train operated from both ends, operating switch groups and reverser; circuit breaker tripped and reset; automatic emergency train brake tried and airbrakes tested; storage batteries tested for charge.

SEMI-GENERAL INSPECTION

23. In addition to the work outlined for regular inspection, the apparatus shall be given the attention outlined.

24. *Line Switches:* Covers removed and terminals inspected.

25. *Control Batteries:* Flushed with distilled water.

26. *Feed Valves:* Removed and placed on test rack for vibration test.

27. *Air Strainers:* Removed and cleaned.

28. *Lubrication:* (a) Waste removed, teased and replaced in axle bearings.

(b) Gears greased with 2½-lb. compound per gear.

GENERAL INSPECTION

29. In addition to the work outlined for regular inspection and semi-general inspection, the apparatus shall be given the attention outlined below.

30. Packing to be removed from all boxes; waste teased and boxes repacked with same waste if in good condition; free oil in armature and axle boxes to be brought up to proper level; supplied with 2½ lb. of gear grease per motor; car wiring to be examined and tested; junction boxes, switch group, reverser, line switch and other apparatus to be examined as to general condition of wiring and wire terminals and connection blocks. Switch groups, line switch, reverser and rheostat frames and batteries to be tested for grounds; all insulated bolts, washers and pipe insulators to be cleaned and shellacked; plug to be removed from switch group air chamber and air chamber blown out; all power connections in switch group and line switch to be examined and tightened; pistons of air cylinders in switch group to be oiled when necessary, pin valves on all electro-pneumatic switches to be removed and cleaned. Airbrake valves, feed valves, pneumatic pump switches, pilot governors, check valves and other air brake apparatus to be cleaned, oiled and adjusted. Line relay, battery charging relay and potential relays to be cleaned and adjusted. Cars to be cut for inspection of automatic air and car couplers.

SPECIALS

31. *Brake Cylinders:* To be cleaned and lubricated every six months.

32. *Control Batteries:* To be removed and sent to battery house for cleaning every eighteen months.

33. *Motor Compressors:* To be removed and sent to air brake room for overhauling every eighteen months.

TRAILER CARS OPERATED IN MULTIPLE-UNIT TRAINS

34. *Regular Inspection:* Every thirty days. All apparatus on these cars of a similar nature to that on motor cars is given the same attention.

35. *Electro-Pneumatic Door Engines:* Air piping system to be drained. Push buttons to be examined. Engine mechanism to be inspected, oiled and adjusted.

36. *General Inspection:* Every fourth regular inspection. Same as general inspection of motor cars as far as journals and air brake apparatus are concerned.

37. *Class Repairs:* Cars will be taken to shops for class repairs on plant schedule.

LUBRICATION TABLE

Materials	*Where used*
Special long strand waste	Armature bearings
Special long strand waste	Axle bearings and journals
Texas car oil	All bearings
Texas Crater compound	Gears
Car oil	Side bearings, pedestals, etc.
Texas Merak oil	Compressor, control cylinder

Regular Inspection

Part Lubricated	*Quantity of Lubricant*
Armature bearings, commutator end	Fill well to free oil depth of 3½ in.
Armature bearings, pinion end	Fill well to free oil depth of 4 in.
Axle bearings	2 in.
Journals	1 gill

General Inspection

Part Lubricated	*Quantity of Lubricant*
Armature bearings, commutator end	Fill well to free oil depth of 3½ in.
Armature bearings, pinion end	Fill well to free oil depth of 4 in.
Axle bearings	2 in.
Journals	1 gill in each box
Sector bars, circular bars, brake rigging	Thick paste made of gear grease and old oil
Side bearings, center castings, pedestals	Waste oil
Chafing plate on truck	Greased or oiled as necessary
Gears	2½ lb. grease on each gear
Motor compressor	Compressor oil to top of plug holes
Switch group, line switch, reverser	Compressor oil

ALL EQUIPMENT OVERHAULING DONE AT MORRIS PARK

Overhauling of cars and equipment is done on a mileage basis. The period between general overhaulings has now been increased from 60,000 miles to 100,000 miles. Whenever a car has completed this mileage it is taken into the general overhauling shop at Morris Park for class repairs and a careful general overhauling. At the time that electric operation was begun, in 1905, this car repair shop had been in operation for a considerable time for taking care of the steam railway equipment. Additions were built and new shops were constructed in order to provide facilities for handling the repairs to the electric cars. The structural features of these shops were described in the STREET RAILWAY JOURNAL for August 18, 1906. Increased facilities and new apparatus for handling the equipment, as well as more modern methods, have altered somewhat the procedure followed in general overhauling from that previously described in connection with the article in the June 10, 1911, issue of the ELECTRIC RAILWAY JOURNAL. In describing this a special effort has been made to eliminate work which was previously described.

When cars are brought in for equipment repairs or general overhauling they are placed on storage tracks at the north end of the electric overhauling shop. From this location they are placed on overhauling tracks by means of a transfer table which is electrically operated and equipped with third rail to facilitate the movement of cars onto and off the table. Outside the overhauling shop are five short tracks which are served by the transfer table. Each of these tracks is of sufficient length to accommodate two cars, and these tracks are usually filled up from the transfer table and the cars are then moved from this location to the overhauling pit as required. In handling a car when it is necessary to remove the car body from the truck it is first run off the transfer table into the crane house. For placing the cars in the different locations the Long Island Railroad has built the electric tractor described in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 9, 1916, page 1209. As soon as the car is placed in the crane house various measurements are taken to determine the adjustments that will be necessary before it is again ready for service and to detect any weak springs or defective parts that need attention. Dimensions are marked with chalk on the lower portion of the truck side-bearing supports which is toward the north end of the room. By having a definite location for these dimensions much time is saved in looking for them.

The brake rigging and motor leads are next disconnected. In order to disconnect the brake rigging it is only necessary to remove two pins at each end and after the motor leads are disconnected the body is released from the truck. For lifting the car body from the trucks two 40-ton electric cranes are used. These are fitted with special rigging for making the connection underneath the car body. The rigging consists of a yoke with two supporting arms that extend down along the side of the car and have projections at the bottom ends which extend underneath the car body cantilever. These projections have each a raised lip which fits into a recess in the car body cantilever so that when once applied there is no danger of slipping or changing position. As soon as the car body has been lifted the trucks are drawn onto the transfer table by hooking a rope to the rear truck so that both trucks can be pulled from beneath the car by means of a drum which is driven through a clutch by the main driving motor on the transfer table. The electric tractor is then coupled to the trucks and they are either placed in the overhauling shop or on adjoining tracks for any repairs that are necessary. Dummy trucks are next placed underneath the car body and the tractor then takes the car and places it in the electric car shop for any repairs to the car body and car equipment.

Previous to the building and equipping of this crane room, the car bodies were jacked up from the trucks. A great saving in time has been effected by this improved method and a car can be placed in the crane room, have the trucks removed and the car body and trucks placed on tracks for overhauling in from a half hour to forty minutes and with absolute safety.

The overhauling shop is not equipped with third rail and, to provide for operating the tractor inside the shop, a standard bus line receptacle is located between alternate tracks just inside the door openings of the shop. This is connected to the 600-volt supply through a circuit breaker, so that when the contact shoe on the tractor leaves the third rail on the transfer table a short jumper with a standard bus-line head on one end and with a fork on the other can be used to furnish power for operation.

PREARRANGED SCHEDULE OF REPAIRS CHECKS PRODUCTION

A schedule of repairs is laid out when cars are brought to the shops and dates are established for beginning and finishing the work. These dates must be met to insure the necessary output. As soon as a car is received in the crane room the fact is entered on the repair schedule. The repairs which are carried out in this department are divided into five classes, and as soon as the trucks and car body are placed in position ready for work the head inspector, who has charge of following up the working schedule, reports to the general foreman, confers with the foremen in charge of the several classes of repairs and obtains an estimate as to the length of time necessary to complete the work. The inspector can thus determine how long the car must remain in the shop and when it will again be available for service. This information is entered in the electric shop working schedule form shown in an accompanying illustration. The several dates at which the work is to be completed are checked up closely by the department foremen, and every Monday a report is made out in the office of the general foreman of electrical equipment, which is sent to the superintendent of motive power, with copies to the foremen interested. This form of report is also shown in an accompanying illustration. It gives the car number, the class of the car, the date it was received at the shop and the dates when work was started and is to be completed. Whenever repairs are not completed in the estimated time, or within twenty-four hours thereafter, a special letter of explanation must be written by the foreman responsible, giving reasons. Also, in case a car has the work completed in a shorter time than that estimated, the foreman must give a written explanation as to why the time necessary was not correctly calculated. This method of following up the various operations necessary for repairing the car and making certain that they all dovetail together so that the car can be returned to service in the least possible time has worked out very satisfactorily on this system.

Two tracks in the overhauling shops which are served by two 10-ton Niles traveling cranes are used for truck and motor overhauling. As soon as a truck, with its equipment, is placed on one of these tracks by the shop tractor the motors are removed from the trucks and the armatures are taken out of the motor shells and thoroughly blown off and cleaned. After this they are sent to the armature room for further testing and repairs. This electric shop, where all armatures, fields, controllers and other electrical equipment are repaired, is at the south side of the shop used for truck overhauling. The various pieces of equipment are handled inside this room on a runway which leads to a door opening into the truck repair shop. Other portions of the floor are used for impregnating tanks, wheel lathes, brass lathes and one large turret lathe for machining and finishing bearings.

Any defects found in armatures are repaired, loose bands are replaced and special attention is given to see that commutators are undercut to a depth of about $\frac{3}{64}$ in. After the armature repairs have been completed the armature is tested for grounds and short and open circuits, and it is then given a high-voltage test of 1,500 volts between the windings and ground. If any field coils are found to be defective they are also removed and sent to the armature shop for repairs and are replaced with new ones. If the fields test out "O.K." they are cleaned carefully and tightened up firmly. Brushholders are removed from the shell and sent to the repair shop, where they are dipped and repaired, after which they are reinstalled in the motor shell and the brushes are replaced if not excessively worn. Brush tension is set at from 5 to 6 lb. per brush.

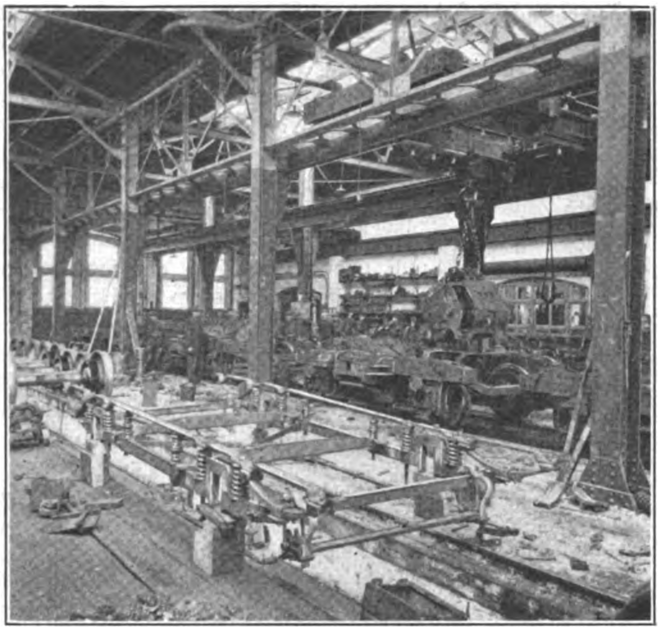
All wiring inside the motor frame is inspected to make certain that it is well cleated and that there are no loose connections. All motor-frame bolts are tightened and all commutator covers are inspected to make certain they fit tightly so as to exclude dirt, snow and water. Gear cases are cleaned and examined for cracks and defects and if found defective are replaced with new ones. After this inspection and the repairs have been completed the inside of the motor shell is given a coat of insulating paint.

Armature bearing housings are put into a lye pot and boiled out thoroughly, after which they are cleaned and painted inside to prevent rusting. Oil wells are thoroughly inspected to make certain that there are no leaks and the opening between the free oil well and the waste pocket is cleaned. When a car is sent to the shop for having hot armature bearings and the cause is not at once evident the housing is removed and filled with kerosene and set over white cardboard or paper to detect leaks.

The connections to knuckle-joint connectors, which are used on all motor leads, are inspected to make certain that none of the strands of wire are broken and that the soldering is in good repair. The insulation on the motor leads and the armor, which consists of brass wire spirally wound around the leads, is inspected. All motor parts are then reassembled and the motor is ready for reinstallation on the truck.

OVERHAULING OF OTHER TRUCK PARTS

All parts of the truck brake rigging are gone over carefully and badly worn hangers, pins, bolts, chafing plates, truck brake levers and brake heads are either repaired or replaced. Wheels are measured for diameter and flange wear and if any turning or repair is neces-



TRAVELING CRANES ARE IMPORTANT FOR HEAVY TRUCK OVERHAULING

sary they are removed and sent to the wheel room. Blueprint tables showing the limits of wear are furnished for the guidance of the shop men in making replacements. Some of the old tired wheels are still in service on the MP-41 type of cars, but these are being replaced with rolled steel wheels or with Davis cast steel wheels, and a considerable number of Davis wheels are now in service. In case it is not necessary to remove the wheels for turning, the brasses and keepers are removed so as to allow ready inspection of the journals. All axles and journals are tested for taper and examined for excessive wear. Blueprint tables are also furnished for the guidance of the men in deciding the limit of wear.

If the flange of a wheel shows excessive wear the truck frame is checked up carefully for square and is trued up where necessary. Pairs of wheels are kept within $\frac{1}{32}$ in. of the same diameter when turned to prevent crowding one rail or the other, with a consequent destruction of flanges and an increased wear to the tread. All wheels are carefully gaged by the man who does the turning and are "O.K.'d" by the foreman of the truck department before they are installed in the trucks. A double check is thus provided by two separate departments so as to make certain that no wheels will be installed until they are brought to the required dimensions.

GEARS SHOW VERY LITTLE WEAR

The original gears furnished with the MP-41 and MB-45 equipments were cast steel solid gears. These were replaced with cast-steel center-rim type and these latter are now being replaced by solid steel heat-treated gears. The gears now being replaced are not excessively worn, but careful inspection has disclosed fatigue cracks at the base of the teeth. A few teeth have broken off and it is evident that they have outlived their useful life, so rather than take a chance of their breaking in service they are being replaced. Excellent service is being obtained from all heat-treated gears. Helical gearing is now being tried and has been specified for the new cars on order.

Before the pinions are reinstalled on the armature shaft they are heated in a lye pot in boiling water and are put on hot. This makes installation very easy and the boiling of the pinions in the lye pot cleans as well as heats them. New brake shoes are installed as found necessary and where irregular wear is occurring on a brake shoe they are reversed to obtain additional service.

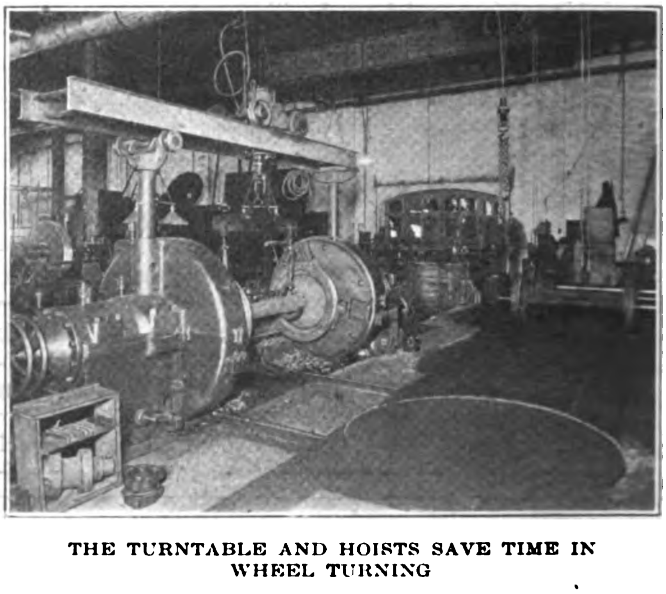
CONTACT SHOES AND BEAMS ARE CAREFULLY TESTED

Third rail shoes are of a hinged slipper type and are supported on wooden beams. These contact-shoe beams are fastened to lips which are cast on the bottom of the journal boxes. Vertical adjustment is provided by the use of a grooved plate with slotted holes. This is set up against the shoe beam and fulcrum casting. Two bolts pass through the shoe beam and the adjusting plate and hold it firmly in place. The slipper or contact part of the shoes is made of cast iron, with the weakest part close up to the fulcrum pin, so that if an obstruction is hit the shoe will be broken off close to the beam and the remaining part is sure to clear the third rail and insulators. Each shoe has two spiral springs, one on each side of the fulcrum pin between the inside of the fulcrum casting and the outside of the contact slipper lug. These provide a pressure of 17 lb. per shoe against the third rail. In order to provide additional pressure during sleet and snow storms two additional springs with a cam arrangement are applied to the contact shoes during the winter season. By the use of this cam arrangement an additional 100 lb. pressure is obtained on each shoe. These cams are thrown to their pressure position by a socket wrench whenever occasion demands the additional pressure.

On overhauling, all parts are carefully examined and excessively worn parts are replaced. Shoe fuses are removed and the hand screws are turned back and forth to make certain they work easily. After all parts are put in proper condition the shoes and wiring on the trucks are tested with 2,500 volts to ground.

ORIGINAL TRUCKS STILL IN GOOD CONDITION

The motor and trailer trucks under the MP-41 and MB-45 class of cars are still in good condition and practically no changes have been made from the original design. Of course parts have become worn and have been replaced from time to time and a considerable number of transom channels have been replaced, due to



THE TURNTABLE AND HOISTS SAVE TIME IN WHEEL TURNING cracking. Some equalizers have been changed on both motor and trailer trucks due to their becoming chafed by the truck frame and journal box pedestals.

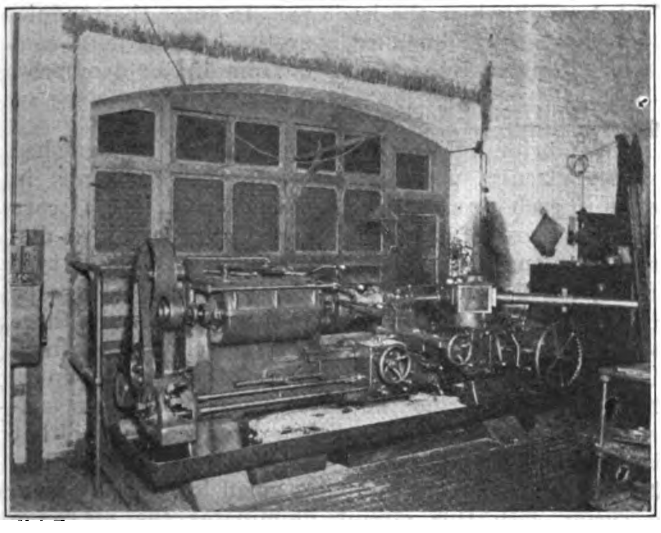
On fifty of the motor passenger-baggage cars there are riveted to the front and back crossbar of trailer trucks two U-shaped iron pieces with suitable holes for mounting a 6-in. x 6-in. x 8-ft. 4-in. wooden beam, which carries a snow flanger on each end. The lower edge of this flanger is 17 in. wide and is set 2¼ in. above the running rail and extends outside so that the flanger clears the third rail and protection board. These flangers clean the snow from between the third rail and running rail and are put on each fall, when the pilots are removed to permit their installation.

EQUIPMENT OF CAR BODY IS OVERHAULED AT SAME TIME AS TRUCKS

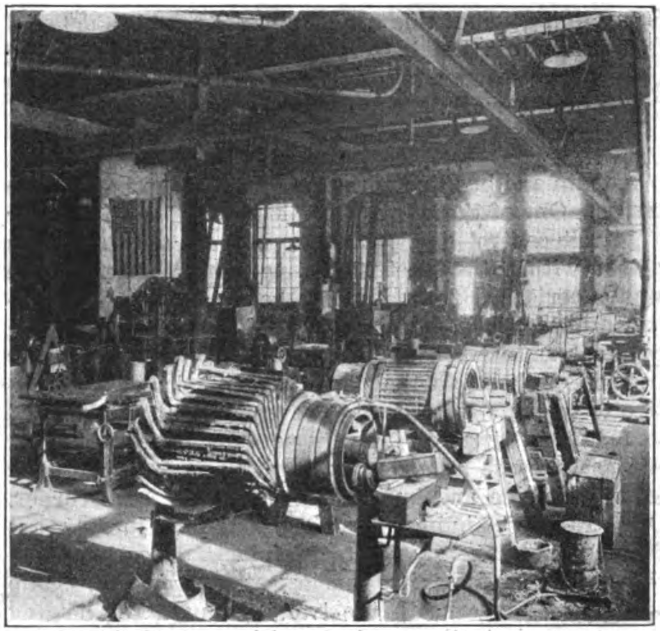
The switch groups used on all Long Island cars are Westinghouse type 250, which are electro-pneumatic. The magnet valves are energized from a 14-volt storage battery.

In overhauling the control switch group the frames are not removed from the car body, but all parts are dismantled so that they can be more readily cleaned and repaired. The pistons for the air cylinders are taken out and cleaned and all piston packing leathers are renewed. Cylinder-head paper gaskets are replaced and the insulating joints in the piston arms are cleaned off and washed with gasoline, after which they are given a high-voltage test. All arcing tips are removed, cleaned and dipped and, if not excessively worn, filed to insure proper contact and reinstalled. Arcing boxes are removed, thoroughly cleaned and scraped and any that are thin or have holes burned in them are changed. Contact shunts are carefully examined and the arcing horns are renewed when necessary. Blowout-coil connections are carefully examined and bolts are tightened up carefully. Any blowout coils which are defective are replaced. The top of the switch group containing the wiring and connections is carefuly cleaned with compressed air and all connections are examined and carefully tightened.

All low-voltage interlocks, fingers and finger blocks are cleaned and smoothed up with emery paper. Blocks are cleaned and shellacked and parts found defective are replaced. Magnet valves are removed from their mountings and the armatures, pin valves and pin valve springs are removed and thoroughly cleaned. New paper gaskets are installed and when the magnets are again assembled proper adjustments are made so that they will operate at the required speed. After all parts of the switch group have again been reassembled all 600-volt contacts and wiring are given a high-voltage test between the frame and ground of 1,500 volts and between the contacts and the frame of 2,000 volts. All 14-volt wiring and contacts are tested with 1,000 volts. Similar overhauling and repairs are carried on the reverser line switches.



FINISHING AXLE BEARINGS IN A TURRET LATHE WITH SPECIAL TOOLS



ARMATURES IN ALL STAGES OF WINDING ARE FOUND IN THE ARMATURE ROOM

All master controller drums are removed and the contacts dressed up and replaced where necessary. Connections are inspected and tested and all bearings are properly lubricated.

14-VOLT 50-AMP. STORAGE BATTERIES ARE USED

Each multiple-unit motor car is provided with two trays of seven storage battery cells. Each battery is rated at 50 amp. at 14 volts. These batteries furnish power for energizing the control circuits and emergency lights and are charged through the compressor circuit, as was described in the previous article dealing with the maintenance of this equipment. In regular operation all batteries are tested every ten days, as already described under the heading of "Inspection Methods." When a car is shopped for overhauling the batteries are examined carefully and if any defective plates or cells are found they are removed and sent to the battery house for overhauling and a new set is installed. Battery overhauling methods are similar to those which have been in use on roads operating this type of equipment for a number of years. The Morris Park shops are provided with a very complete equipment for their battery house and all car-lighting equipment for their steam coaches is overhauled and tested here in addition to the battery work on multiple-unit cars. A plant for distilling water occupies one room of the building; other rooms contain washing tanks, acid mixing tanks and overhauling and testing tables. Batteries are charged from a low-voltage, motor-driven generator.

Space limitation of this article will not permit a detailed description of this battery house and the equipment used; a subsequent article, however, will take up this phase of the work.

JUMPERS ARE FASTENED PERMANENTLY TO CARS

A train and bus line with jumpers run throughout the trains. One of these is a 600-volt bus line and the other a 14-volt control line. As cars are laid up at various points within the electrified zone considerable trouble was experienced from jumpers being stolen. The bus-line jumpers are made of 200,000-circ.mil cable with copper terminal heads. There is nearly 6 lb. of copper in each of these, so that they were particularly attractive to thieves. In order to prevent loss, it was decided to fasten all types of jumpers permanently to the cars. All electric cars have four receptacles on each end, that is, a train line and bus line receptacle at each corner. One train-line jumper and one bus-line jumper are fastened permanently to its receptacle on each end of the car. This fastening consists of a strap iron clamp that passes underneath the two bolts used for holding the receptacle to the car body. The end of this clamp turns down and fits over a raised portion on the jumper head, so that after the bolts are securely fastened the jumper cannot be removed from its receptacle. Two dummy receptacles are installed on each end of the car to carry the ends of the jumpers while not in use. The train-line and bus-line jumpers are installed on diagonally opposite ends of the car. The train line for the MP-41 cars consists of seven wires, so that a 7-point jumper is used for connecting two of these cars. On the MP-54 cars a 10-point train line is used, so that a 10-point jumper is required. All class T-54 trailer cars have jumpers attached, but instead of a standard jumper and receptacle, with the clamping arrangement just described, a piece of standard jumper cable is used with a regular jumper head fastened to one end. This cable is left loose to form the jumpers and is clamped to the car bodies by hardwood blocks. From this fastening the cable is carried through conduit to a junction box, located under the ends of the car. The officials of the Long Island Railroad have found that while the installing of permanent jumpers involved a higher first cost than otherwise, eventually money is saved in labor and material that is necessary to repair the jumpers, theft is prevented and many annoying train delays are avoided, as the jumpers are always in place, ready for making connection, while with the use of loose jumpers it sometimes happens that the man making up the train does not have jumpers at hand.

In the overhauling of jumpers at the shop they are removed by loosening the supporting bolts of the receptacle and are examined for damaged insulation or broken strands in the conductors. After they are reinstalled on the cars they are given a high-voltage test, 2,000 volts being used for the testing of bus-line jumpers and 1,000 volts for the low-voltage jumpers.

The original control equipment of all cars had Westinghouse type 222-D line switches, but these are now being replaced with a new type, No. 267; approximately 300 cars now have this later type. For general overhauling both the line switches and the current-limit switches are removed from the car body and a careful inspection with necessary repairs and replacements is made at the bench. When the parts are reassembled both line switches and limit switches are calibrated and set by means of a water rheostat to regulate the current and an ammeter and voltmeter to give necessary readings.

Grid resistors are thoroughly cleaned of all dust and dirt with compressed air, after which all cracked or broken grids are replaced, and the nuts on all bolts holding the frame together and supporting the frames are tightened to make certain they will not work loose in service. All terminals and connections are carefully examined and put in proper condition. If any grids are found broken or other extensive repairs are necessary the complete frame is removed from the car body and sent to the repair shop and another frame of resistors is installed in its place. After all repairs are made the resistors receive a high-voltage test between the grids and frame and also between the frame and ground.

After the overhauling of the entire control equipment is completed it is given a careful operation test. The control equipment is operated from each master controller and from each receptacle through a jumper with a portable master controller. All switches are observed for proper sequence and the main motors are tested for direction. After this test the control is arranged to operate automatically and the equipment is then allowed to operate for from 1 to 1½ hours in this manner to insure that all new parts are properly worked in and to disclose any defects which might develop shortly after the car is returned to service.

POWER CIRCUITS ARE BELOW CAR FLOOR

The only 600-volt power circuit that goes above the floor of the car is a tap-off from the bus line leading to the main switchboard panels. There is a three-blade, single-pole, single-throw quick-break knife switch inserted in this circuit to cut off current from the line switch. Other switches control the auxiliary circuits for lighting and heating. The limit switch is also located on the main switchboard of the car and two wires come up to the limit switch so that its pick-up coil is in series with No. 1 motor.

The power circuits on all types of cars are run in conduit. The motor leads are brought from the motor to a wooden cleat on top of the motors, then through brass armor to a wooden cleat on the car body. Knuckle-joint connectors are used for connecting the motor leads to the car-body leads. These are located between the first wooden cleat on the car body and a second wooden cleat through which the leads pass to enter the conduit. Rubber tubing is installed over the knuckle-joint connectors to prevent short circuits from dirt or dampness.

LIGHTING INSPECTION AND MAINTENANCE

The interior lighting of passenger cars is furnished by five circuits with five 36-watt 130-volt lamps in series in each circuit. On the older type of MP-41 cars the lamps are of the single-socket type and are distributed along each side of the car. On the later type of car, MP-54, five electroliers are installed along the center headlining. In addition to these five circuits there is another circuit of five 20-watt 130-volt lamps, which supply the markers, vestibule lights and one lamp in the headlining inside the car. These lights are controlled by a three-point snap switch so that either marker or vestibule lights can be used as desired. When the marker lights are lighted a small low-voltage lamp in series with this circuit illuminates the air gage for the motorman. Headlights contain a 36-watt 130-volt lamp with resistance in series. All circuits are controlled from the main switchboard located in the vestibule in a steel compartment. A single-throw knife switch cuts in all lights and there is a 3-amp. fuse in each circuit. Emergency lamps are also provided which are energized from the storage battery.

On overhauling all lighting switch blades are removed and dipped, together with all fuse clips. The remaining parts are carefully cleaned and blown out with compressed air. All wiring connections and terminals are carefully tested and inspected and any worn or defective parts are replaced. All receptacles for lamps are carefully gone over and any found defective are repaired or replaced.

Electric heaters are installed in all passenger cars and are controlled from the main switchboard. Cab heaters are installed in the motorman's cab. The cab heater switch is so designed that when it is desired to cut in a cab heater a plug on one side of the switch is pushed. When a motorman leaves the cab the closing of the outside vestibule door to cover up the controller and brake valve hits a knob on the switch and cuts it out. These cab heater switches are entirely inclosed except the two knobs that cut them in and out. Whenever a car is in for general overhauling all heater coils are carefully inspected and any found defective are replaced, after which the circuits are tested to determine that the proper amount of current is used as necessary. All heaters are carefully cleaned and blown out with compressed air. Fifty of the MP-54 and MPB-54 cars are equipped with automatic heat regulators. These are set to cut in at 58 deg. F. and out at 61 deg.

The fifty large baggage cars are each equipped with costing recorders. As each train operated has one of these cars, this installation takes care of the service.

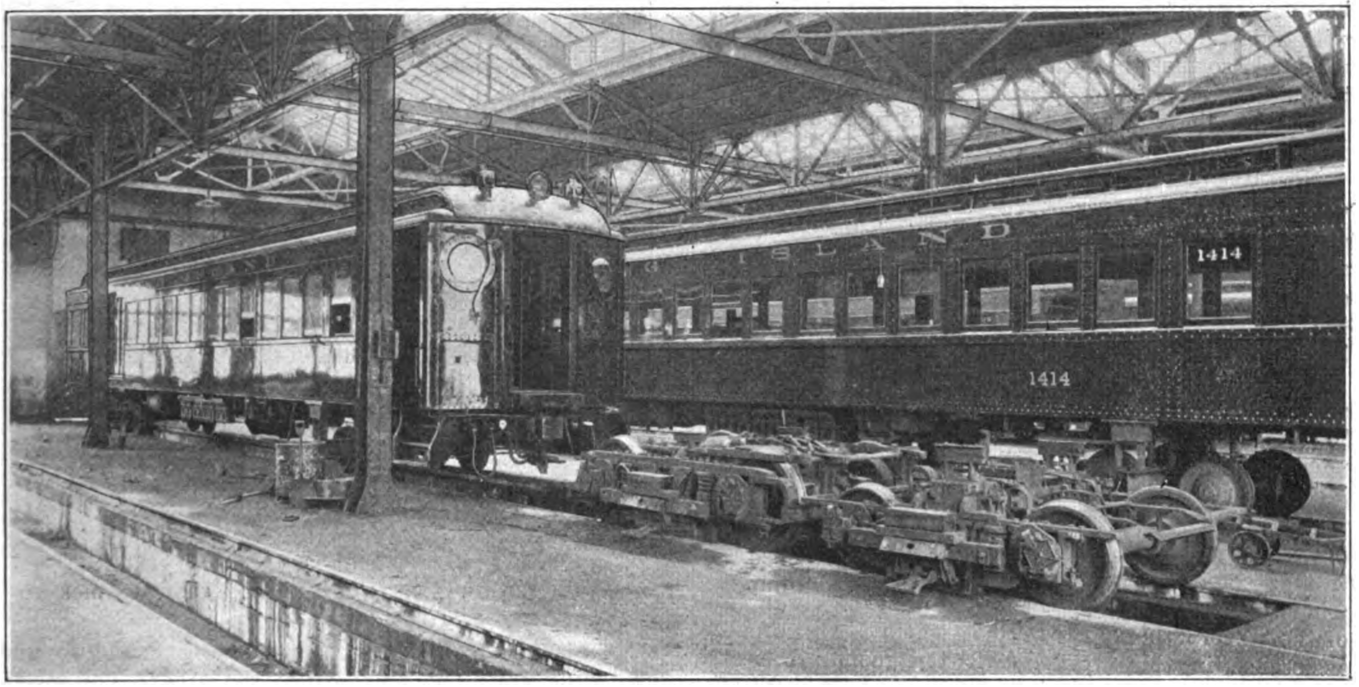
OVERHAULING OF AIR BRAKE EQUIPMENT

Compressors are overhauled on a time basis and they may not be due for overhauling at the time the car is stopped. Air compressors which are due for overhauling are removed from the car body and sent to the air brake room, where they are dismantled and thoroughly cleaned. The armatures and field coils are removed and sent to the armature room for cleaning, repairing and testing. Piston rings, connecting rods, crankshafts and bearings are all carefully examined and all necessary repairs are made.

Other parts of the air brake equipment, consisting of the brake valves, feed valves, safety valves, governors, triple valves, air gages and "dead-man's" control relay valve, are also removed from the cars and sent to the air brake room for any necessary repairs. Automatic train stops are installed on the MP-54 type of cars which operate in connection with the signals in the East River tunnel.

Brake cylinders and all air piping are tested for leakage and the automatic air couplers are tested for leakage and gaged for height and clearance. All air reservoirs are blown out and the cocks are inspected and any leaky ones are replaced and the old ones sent to the air brake room for repairs.

All brake rigging is carefully overhauled and all worn pins are replaced and holes bushed. When the air brake equipment is again connected up the piston travel is adjusted to 4½ in. for the small cars and from 6½ to 7 in. for large cars.



PIT TRACKS ACCOMMODATE A CAR AND TWO TRUCKS AT THE SAME TIME

ALL MACHINE WORK ON BEARINGS IS DONE IN COMPANY'S SHOP

Brass axle bearings are used on the two types of motors which constitute the Long Island Company's equipment. These are purchased in rough form from brass foundries, which make the bearings according to the drawings and specifications of the railway company. All machine work is done at the Morris Park shops. For machining these bearings a Warner & Swasey turret lathe with special tool equipment is used. An accompanying illustration shows this lathe set up for rough boring of the inside and smooth finishing of the outside of a split axle bearing at one operation. The turret of this lathe is fitted with three boring bars for rough boring and finishing the inside of the bearing. The tool post turret also carries turning, facing-off and fillet tools. The rough boring bar carries a ring, so that as soon as ⅜ in. has been turned off the end furthest away from the chuck this ring is pushed off the bar and placed over the bearing, so that it is thus clamped together and the inside can be rough-bored at the same time that the outside is finished. The final finishing of bearings is done in a pot chuck, where they are finished to the exact size of the axle they are to fit. To insure that the bearing faces are finished so that when installed there will be a standard clearance of 1/32 in. between the inside of the gear and wheel hubs and the ends of the bearings a special extended micrometer is used. This consists of a steel rod with a gage point at one end and the other fitted with a micrometer. The measurement between the gear and wheel hubs is accurately taken with this micrometer gage and the bearings are then machined so that the total distance over their faces will be 1/16 in. less. After bearings are finished they are clamped to the axle on which they are to be mounted to avoid any danger of misapplication.

New bearings are first fitted to small-sized axles, and when worn they are rebored to fit axles of the same design, but not worn to so small a diameter. When an axle bearing is applied the date is stamped on the outer edge of the collar, so that a record is kept of the life of each bearing. Armature bearings are of brass, but they are lined with tin base babbitt metal.

The Westinghouse type-113 motors, which are in service on the older cars, classes MP-41 and MB-45, have the axle housings somewhat worn, so these are now being rebored from 7⅜ in. to 7½ in. and new bearings are installed of larger diameter to give a tight fit.

A new wheel lathe, manufactured by William Sellers & Company, has recently been installed. This is shown in an accompanying illustration. The top is fitted with a hoist for handling the wheels and immediately in front of the wheel lathe is a turntable, which is also of great assistance in this work. A 2½-ton monorail electric hoist is another convenient addition. This handles wheels from the truck shop to both the wheel and axle lathes and facilitates this work very much.

"Get In" in South America

"AMERICA should send out some American representatives, clean and stalwart men who are willing to do a day's work and who look like men with good American products to sell." This is a message from Verne Le Roy Haven, editor of *Ingenieria Internacional*, now in South America.

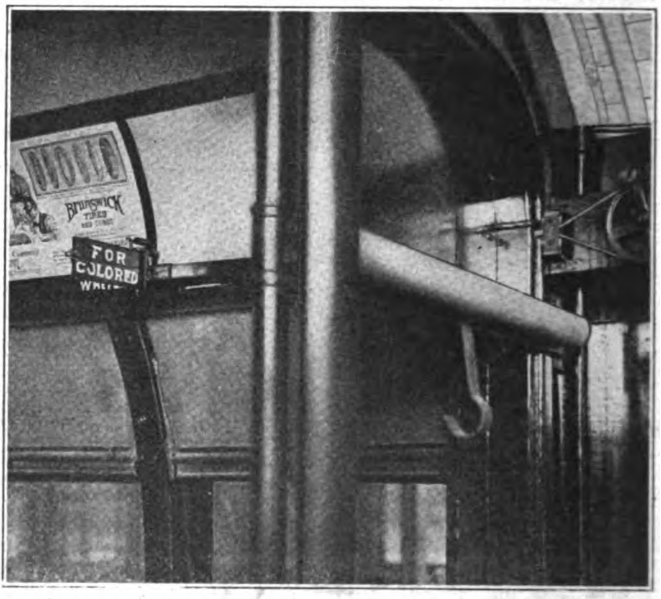
Mr. Haven reports that public works are being started and are in course of construction all along the western coast from northern Peru to Valparaiso. Many of the local projects are financed locally and the people at large are prepared to invest in much-needed improvements and apparently have the money to do the work. A highway, irrigation canal or railway in South America means bringing much greater productive capacity. South America can double her output and find a market for everything, whereas a doubling of output in the United States would glut the world's market. This means much greater opportunity for expansion, relatively, in South America, and hence the activity in the production of all kinds of public works.

Help is needed, it is said, in the construction of these various public works, including railways.

Adjustable Sign for Negro and White Separation

MOVABLE seat signs which can be shifted forward or backward in the car as the proportion of negro and white passengers changes have not worked out satisfactorily on safety cars, due to the operator being too busy to give proper attention to their location. This situation has been overcome in Houston, Tex., by the installation of a mechanism in the cars which makes the sign adjustable from the vestibule. This was designed and a patent applied for by F. J. Bennett, master mechanic Houston Electric Company.

Instead of being mounted on the seat backs the sign is mounted on either side of the car on a ⅛-in. x 1-in. strip placed just below the advertising moulding and extending from one bulkhead to the other. The mechanism is duplicated on each side of the car and each is separately operated. The sign is attached to a small steel cable, which extends through the car behind this strip and passes over a pulley in either vestibule. A handle is provided on the pulley so that it may be rotated and the sign thereby moved forward or backward from either vestibule.



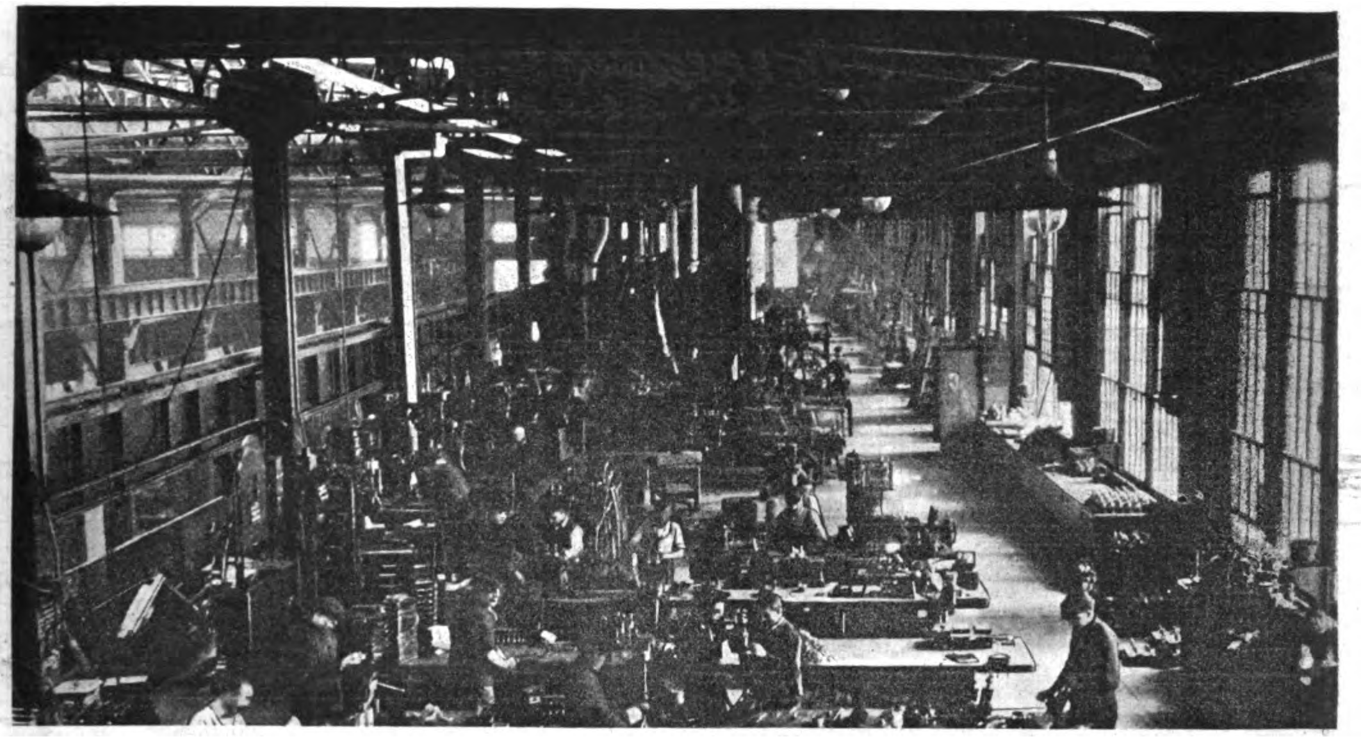
AUTOMATIC PASSENGER SEPARATION SIGN AS SEEN FROM REAR VESTIBULE

Because of the convenience of this arrangement a safety-car operator glancing back into his car and noting that the seats for the white people are about filled, whereas there are vacant seats at the rear of the car, will reach up and rotate the pulley to move the sign farther back. He can do this while running along without leaving his post. Consequently this detail is taken care of, whereas when changing the sign involved leaving his post and going back into the car it was usually neglected. Another feature of this sign is that it cannot be moved except by turning the pulley in the vestibule, thus preventing negroes from shifting the sign.

When the end of a line is reached the operator can quickly reset the sign for opposite running by simply turning the pulley in either direction until the sign comes to the bulkhead, where it strikes a bumper which reverses the sign. The sign is made in the form of an L, with the words "For Whites" painted on the two inner sides of the L and the words "For Colored" painted on the two outer sides.

A.C.-D.C. Multiple-Unit Maintenance on the New Haven

A Description of the Methods of Inspection and Maintenance of Multiple-Unit Equipment on the New York, New Haven & Hartford Railroad Is Given and Operation and Maintenance Costs Are Furnished



IN THIS DEPARTMENT ALL SWITCH GROUPS ARE OVERHAULED AND SMALL PARTS MANUFACTURED, WHILE AT THE REAR THIRD RAIL EQUIPMENT IS TESTED AND BEARINGS ARE BABBITTED

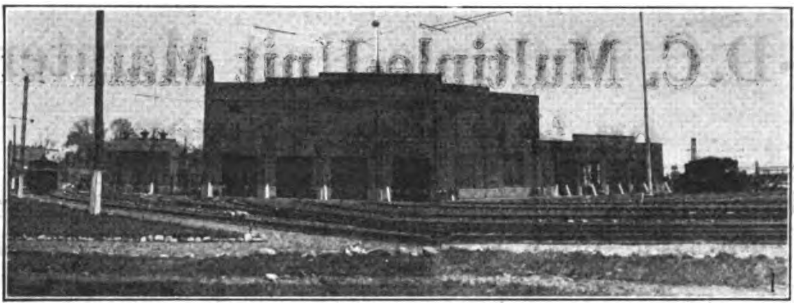
SINCE the first electrification of the New York, New Haven & Hartford Railroad a number of articles have been published in the ELECTRIC RAILWAY JOURNAL describing the electric locomotives and the service which they perform. When the Van Nest shops were opened at Morris Park, New York City, in 1914, another article was published covering the shops and shop equipment. Little has been said, however, concerning the multiple-unit equipment of the New Haven, and practically no data have been published covering the cost of inspecting and maintaining it.

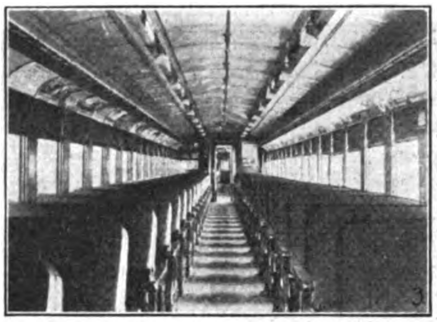
In examining any maintenance or operating cost figures for multiple-unit equipment on the New Haven it must be remembered that these cars are equipped both with a pantograph for alternating-current operation over the private right-of-way of the New Haven and with third rail contact shoes for direct-current operation over the right-of-way of the New York Central Railroad. This double equipment of the multiple-unit "motors" is an important factor governing any figures of cost both of operation and maintenance. Furthermore, while multiple-unit cars on some properties are equipped with only two motors, the New Haven's have four each. On the former properties few and generally no trailers are carried, while on the New Haven the four-motor equipment permits the use of two with every motor car.

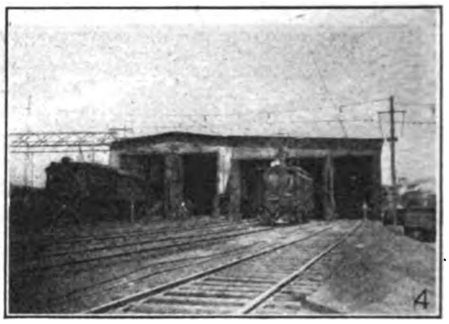
The multiple-unit equipment of the New Haven includes, all told, twenty-seven motor cars and fifty-two trailers. The first cars were purchased in 1909 and placed in service in 1910. These and other cars purchased shortly afterward had open platforms, and of these there are nine motors and twenty trailers. Eighteen motors and thirty-two trailers purchased later have closed platforms. Two of the motor cars and six of the trailers are combination passenger and baggage cars and all but one motor and two trailers are of steel construction throughout. All of the motor cars are equipped with four motors and all but four of them have Westinghouse equipment. There are twenty-one cars equipped with four Westinghouse a.c.-d.c. 175-hp. motors, two with four Westinghouse a.c. 200-hp. motors, two with four G. E., a.c. 150-hp. motors and two with four G. E. 200-hp. motors. In addition to this equipment there are two mail cars which are not equipped with control, but have bus lines and electric heaters.

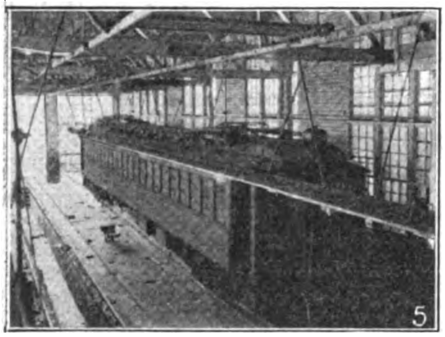
GENERAL DATA OF MULTIPLE-UNIT CARS

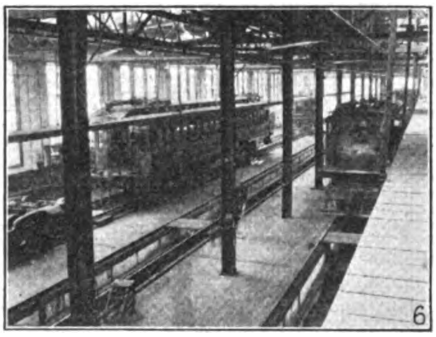
Length over couplers	71 ft. 11 in.	Weight of motor	32,448 lb.
Length over bumpers	70 ft. 7 in.	Weight of air brake equipment	6,900 lb.
Over all width	9 ft. 8½ in.	Weight of control equipment, etc.	27,292 lb.
Height from top of rail to top of a.c. trolley (locked)	14 ft. 3 in.	Total weight	176,180 lb.
Wheelbase	8 ft.	Weight of mechanical equipment	109,540 lb.
Distance center to center of trucks	47 ft. 7½ in.	Weight of electrical equipment	69,640 lb.
Length over end sills	61 ft. 4½ in.	Seating capacity	84
Diameter of wheels	42 in.		
Weight car body	69,100 lb.		
Weight of trucks	40,440 lb.		

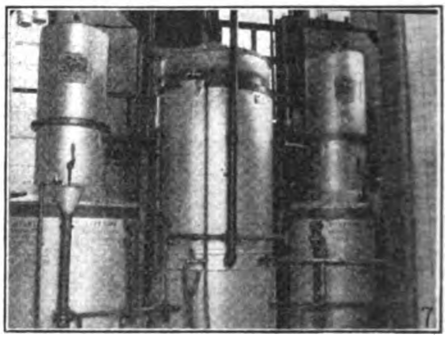


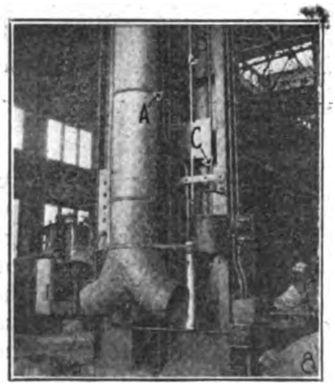


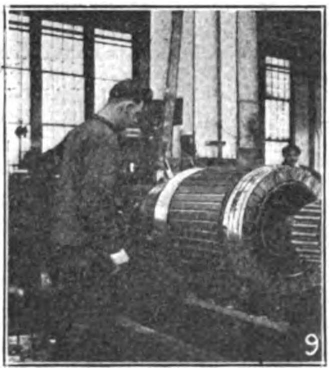


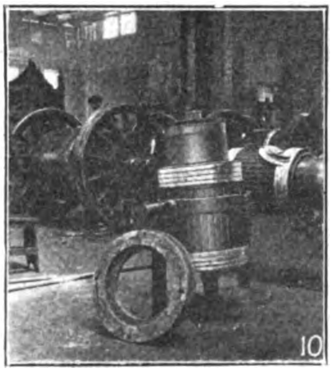


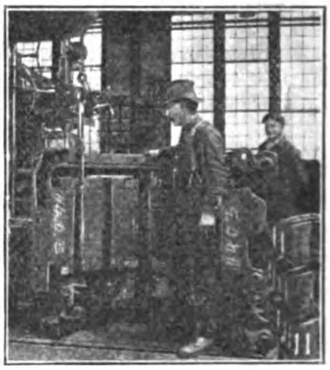


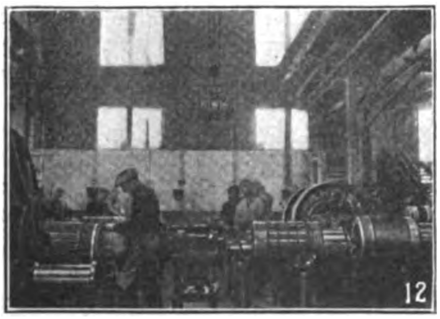


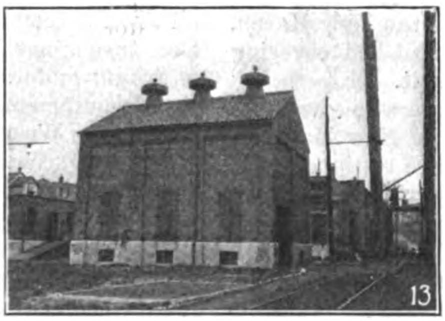


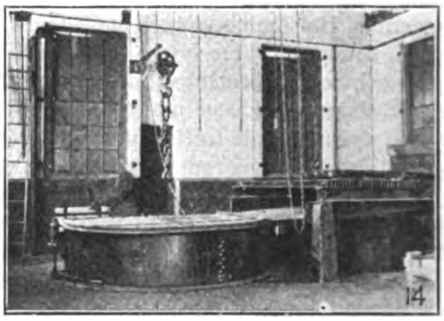




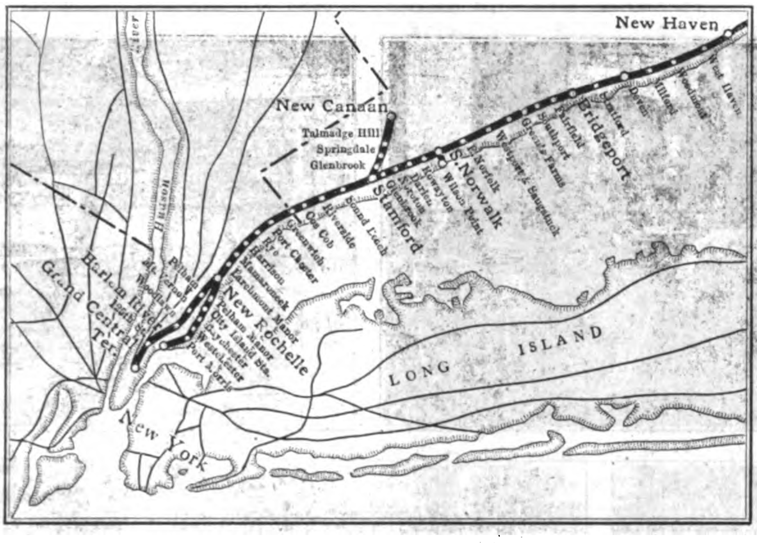








1. The New Haven shops at Van Nest are spacious and completely equipped and the grounds are beautified with flowers.
2. Typical five-car multiple-unit train ready for service. In this case the first car is a trailer.
3. Interior of multiple-unit car showing white enamel ceiling and lighting arrangement.
4. Inspection shed at Stamford, where all multiple-unit cars receive general inspection.
5. Interior of Stamford inspection shed showing pantograph platform and pits.
6. The inspection shed at Van Nest, where multiple-unit cars are given heavy inspection and overhaul and where all painting is done.
7. Acetylene storage tank with carbide generator at each side.
8. Oxyacetylene welding connections in the shop; A, back pressure pipe; B, acetylene pipe; C, oxygen pipe.
9. Banding and soldering a multiple-unit armature.
10. Bakelite is applied to each end of the armature and held in place by large iron rings while the armature is baked before dipping.
11. "Nipper" devised to pull bars from auxiliary motor fields.
12. Armatures are handled by the overhead crane to the bake-oven and lowered through the roof.
13. Fireproof diphouse. Note lever on wall for emptying tank in case of fire.
14. Interior of diphouse, showing tank and draining platform. Note winch on rear wall for raising lid and arrangement at side of tank for automatic emptying in case of fire.


New Haven
West Haven
Woodmont
Milford
Devon
Stratford
Bridgeport
Fairfield
Southport
Green's Farms
Westport & Saugatuck
E. Norwalk
S. Norwalk
Wilson Point
Rowayton
Darien
Noroton
Glenbrook
Stamford
New Canaan
Talmadge Hill
Springdale
Glenbrook
Sound Beach
Riverside
Cos Cob
Greenwich
Port Chester
Rye
Harrison
Mamaroneck
Larchmont Manor
New Rochelle
Pelham Manor
City Island Sta.
Baychester
Westchester
Port Morris
Pelham
Mt. Vernon
Woodlawn
138th St.
Harlem River
Grand Central Ter.
Hudson
River
New York
LONG ISLAND

MAP OF NEW HAVEN RAILROAD LINES OVER WHICH MULTIPLE-UNIT EQUIPMENT OPERATES

An accompanying illustration shows a plan and elevation of a closed-platform multiple-unit motor car, while another indicates the location of the larger part of the electrical equipment. The general data of these cars are as shown in table on previous page.

The multiple-unit operating zone of the New Haven Railroad is shown in an accompanying illustration. There are four operating sections as follows:

1. Stamford to Grand Central Terminal, New York City, 33 miles, of which 12 miles is over the New York Central right-of-way and is d.c. operation, while 21 miles is on the New Haven right-of-way and is a.c. operation. The section is four-track construction throughout.

2. New Rochelle to Grand Central Terminal, New York City, 17 miles. Five miles on New Haven right-of-way is a.c. operation and 12 miles on New York Central right-of-way is d.c. operation. This section is four-track construction throughout.

3. New Rochelle to Harlem River, 12 miles. This is all a.c. operation over the private right-of-way of the New Haven road and is six-track construction throughout.

4. Stamford to New Canaan, Conn., 8 miles. This section is all on New Haven right-of-way, a.c. operation, and includes only one track.

Multiple-unit trains are occasionally called upon to operate as far as Bridgeport, Conn., and on exceptional occasions have operated as far as New Haven.

The average number of multiple-unit trains per day, including all four sections, for the month of April, 1920, was ninety-two. The week-day schedule calls for the following trains:

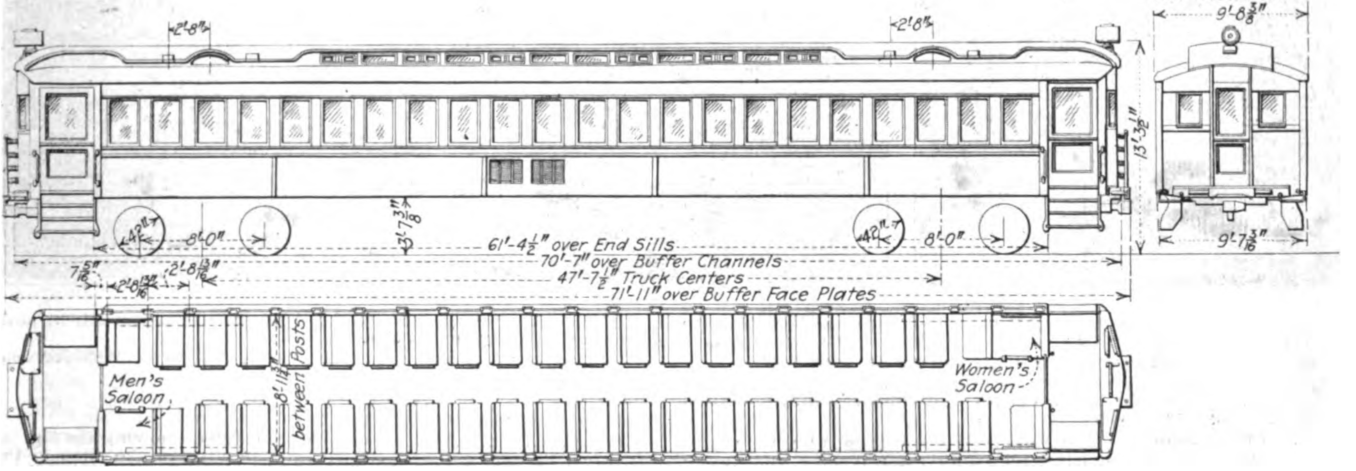
Stamford to Grand Central	14 each way
New Rochelle to Grand Central	6 each way
New Rochelle to Harlem River	21 each way
Stamford to New Canaan	14 each way

The trains operating between Stamford and Grand Central are made up of from three to nine cars, mostly six or nine cars; those from New Rochelle to Grand Central are made up almost entirely of six and nine cars; those from New Rochelle to Harlem River are mostly two-car trains, but run up as high as five cars, and in the summer average four cars, increasing in length at times to eight and nine cars; those from Stamford to New Canaan are all two-car trains. On the New Canaan and Harlem River branches approximately 4,800 passengers are handled per day, while approximately 9,000 passengers per day are handled in and out of Grand Central Terminal by multiple-unit trains.

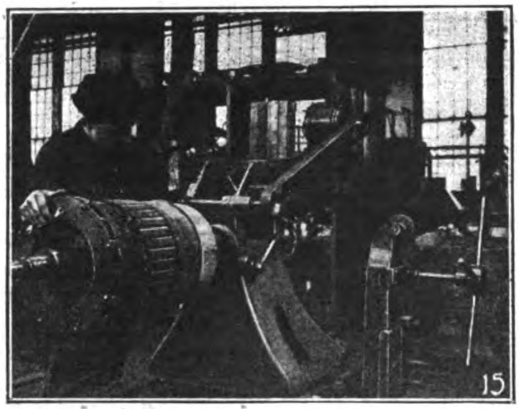
THERE ARE THREE CLASSES OF INSPECTION

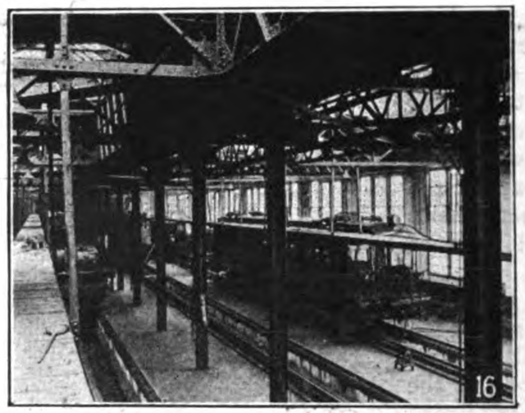
Inspections made on the multiple-unit equipment are divided into three classes, the customary terminal inspection at the end of every run, the regular light and heavy inspection on a mileage basis and the complete overhaul. The regular inspection is that of greatest importance and is the one which will receive detailed consideration in this article. This inspection is made at Stamford, Conn., on the basis of every 2,000 miles of operation of the motor cars. The multiple-unit service calls for between 60,000 and 70,000 motor car-miles per month, resulting in an average of approximately 2,500 miles per car per month. This results in a general inspection at intervals of slightly less than a month.

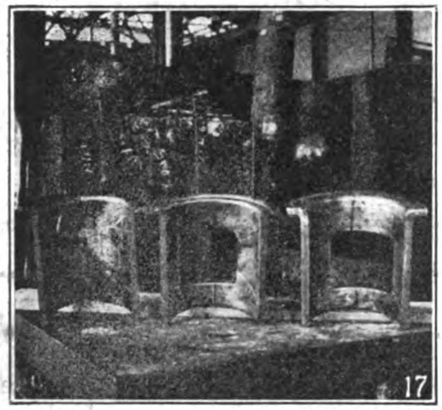
Trailer cars are inspected at the rate of three or four a week, resulting roughly in one inspection per car about once every two months. This inspection amounts to very little as compared with the motor car inspection, but is necessary due to the location on the car of motor-generator sets, change-over switches for emergency

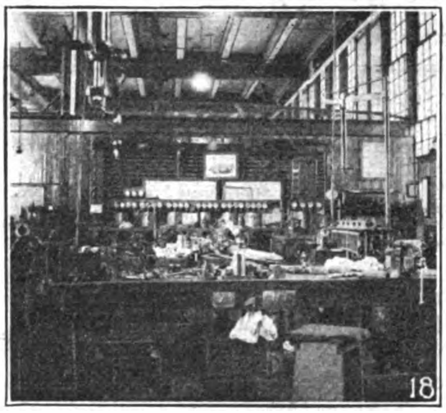

2'-8"
2'-8"
Over Hood Roof
9'-8 3/8"
13'-3 1/2"
42"
8'-0"
3'-7 7/8"
42"
8'-0"
61'-4 1/2" over End Sills
70'-7" over Buffer Channels
47'-7 1/2" Truck Centers
71'-11" over Buffer Face Plates
9'-7 3/16"
7 5/16"
2'-8 13/16"
2'-8 13/16"
8'-11 1/2" between Posts
Men's Saloon
Women's Saloon

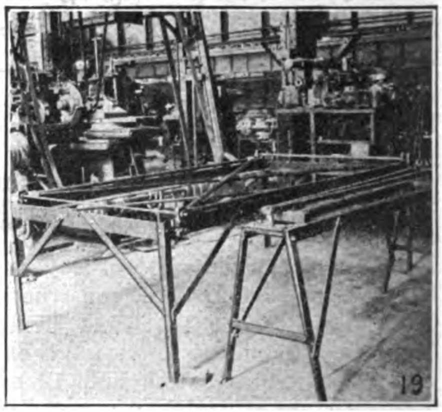
PLAN AND ELEVATION OF NEW HAVEN CLOSED-PLATFORM MULTIPLE-UNIT MOTOR CAR

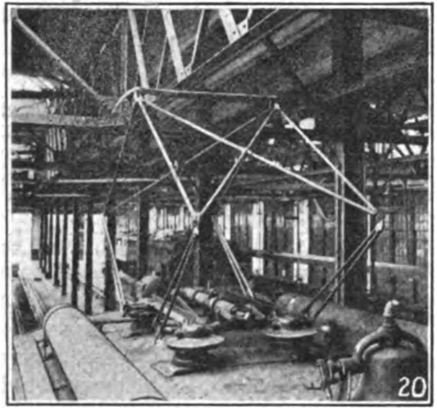


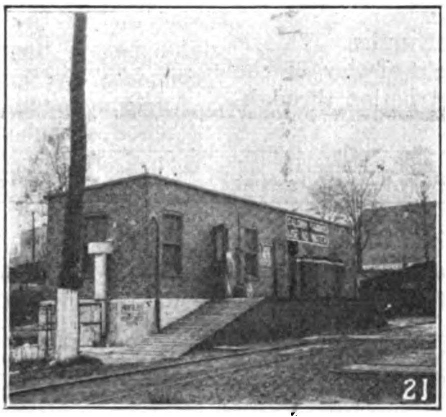


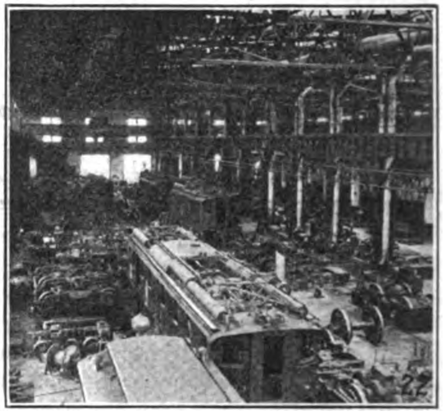


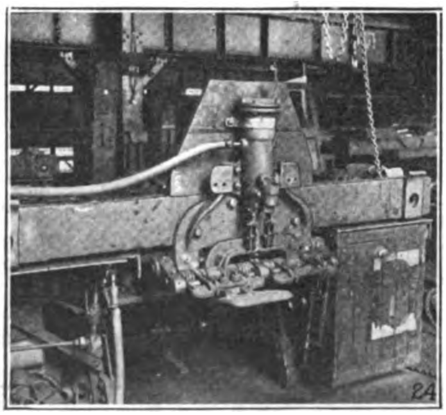


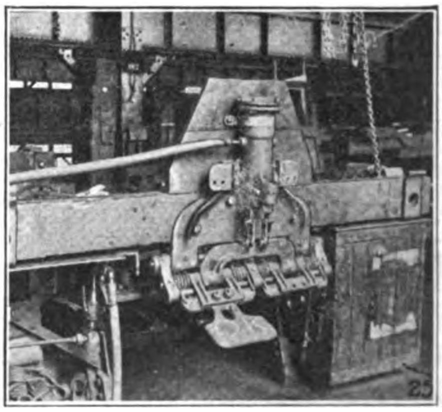












15. Device used for undercutting commutator and exhaust to remove mica dust.

16. Multiple-unit car undergoing painting at Van Nest.

17. Babbitting axle and armature bearings. At left, new bearing; center, worn bearing dovetailed and tinned; right, babbitted bearing ready for service.

18. Air brake department with rack for testing all valves.

19. Jigs used for squaring up pantograph frames during assembly.

20. Details of pantograph construction with pantograph in position on car ready for service.

21. The oxyacetylene generating plant is also of fireproof construction.

22. The erecting bay at the Van Nest shop.

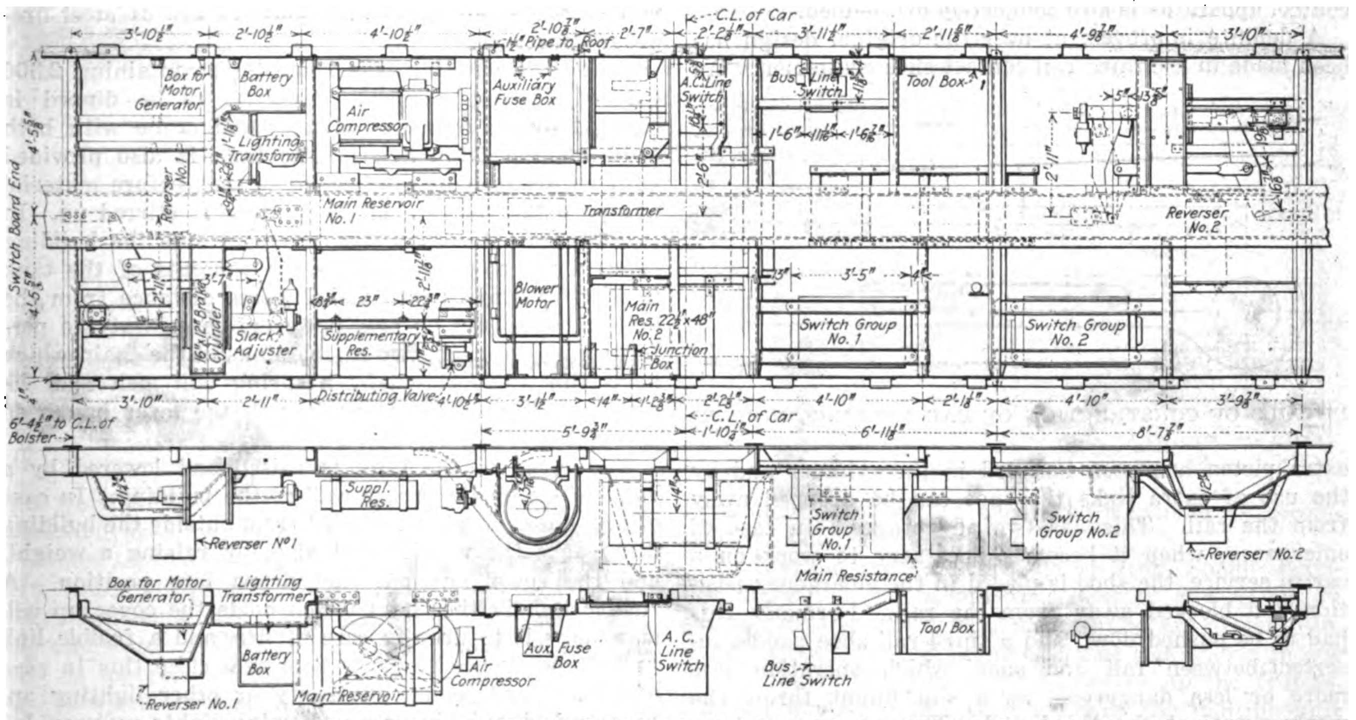
23. Heavy machine tool bay with bake oven at rear.

24 and 25. Third rail contact improvement, showing in Fig. 24 the shoe in the running position, and in Fig. 25 the shoe in the emergency down position.

lighting, controllers, relays and other equipment necessary for multiple-unit operation.

All inspection of multiple-unit motor cars is made at night. This is due partly to the fact that the electric locomotives are inspected during the day and the shop facilities are limited. Such an arrangement also permits a greater use of the multiple-unit cars, as they would ordinarily lie up at night in any case. The inspection crew is divided up so that one, two or three men confine themselves to the inspection of certain parts of the equipment. An inspection card is hung in some convenient position on the car and as the inspection of various parts of the equipment is completed the men who handle this inspection sign their names on the card.

Two men are generally assigned to the inspection of the main motors. The cover is removed and the motor is examined for an overheated armature and the commutator is examined for ridges. The motor is blown out with an air hose to remove all carbon and other dust. In this connection it has been found that ventilated motors keep themselves much cleaner than do those of the non-ventilated type. If the inside of the motor appears oily, it is wiped out, and wood alcohol is used to clean the brushholder insulators and string bands. The motor is checked up for broken brushholder shunts or frayed insulation and for box wear. Brushes are renewed when so worn that they will not run to the next inspection. The insulation is touched up if necessary with shellac or armature varnish. Oiling of the motor bearings is done at this time and never between inspections.


3'-10½"
2'-10½"
4'-10½"
2'-10⅞"
1½" Pipe to Roof
2'-7"
C.L. of Car
2'-2⅛"
3'-11½"
2'-11⅝"
4'-9⅞"
3'-10"
Box for Motor Generator
Battery Box
Air Compressor
Lighting Transformer
Auxiliary Fuse Box
A.C. Line Switch
Bus Line Switch
Tool Box
1'-6"
1'-6⅞"
2'-6"
2'-11"
5"
13⅝"
Switch Board End
4'-5⅝"
4'-5⅝"
Reverser No. 1
Main Reservoir No. 1
Transformer
Reverser No. 2
2'-11"
3'-7"
16"x12" Brake Cylinder
Slack Adjuster
8½"
23"
22¾"
2'-11⅝"
Supplementary Res.
Blower Motor
Main Res. 22½"x48" No. 2
Junction Box
3'-5"
Switch Group No. 1
Switch Group No. 2
3'-10"
2'-11"
Distributing Valve
4'-10½"
3'-1½"
14"
1'-2⅜"
2'-2⅛"
4'-10"
2'-1⅛"
4'-10"
3'-9⅞"
6'-4½" to C.L. of Bolster
5'-9¾"
C.L. of Car
1'-10¼"
6'-11⅛"
8'-7⅞"
Suppl. Res.
Reverser No 1
14"
Switch Group No. 1
Switch Group No. 2
Main Resistance
Reverser No. 2
Box for Motor Generator
Lighting Transformer
Battery Box
Main Reservoir
Air Compressor
Aux. Fuse Box
A.C. Line Switch
Bus Line Switch
Tool Box
Reverser No. 1

TYPICAL INSTALLATION OF ELECTRICAL EQUIPMENT ON A.C.-D.C. MULTIPLE-UNIT MOTOR CAR OF N. Y., N. H. & H. R.R.

Inspection of the switch-group and other electrical apparatus is generally done by two men. The arc chutes are cleaned up, burnt copper is brushed from the switch tips and any tips which need it are changed. If a switch is found defective this unit is changed. The switch cylinders are checked up for possible leaks or slow action and all dirt and dust are blown out of the switch group with an air hose. The insulation is touched up when necessary with armature varnish. A switch unit can be changed in from ten minutes to a half hour and a cylinder can be changed in a few minutes. Storage batteries are checked up and flushed and operating relays are examined. Finally, a breakdown test is made with a testing transformer to see that the switch groups and main resistance are "O.K."

One man and a helper take care of the third rail shoes and pantograph, changing the wearing parts when necessary and checking up the operation of the mechanism. An additional man inspects the compressors and blowers, cleaning the motors in the manner already described for the main motors. Valves of the compressor are examined and the crank case is filled up to line with oil.

A truckman and helper handle the inspection and running repairs on the trucks and brake rigging. Axle bearings are changed if necessary and worn brake shoes are replaced. An additional man specializes on the air brake equipment. Feed valves are inspected and leakage tests made, and all air brake apparatus is checked up. Controllers, relays, push-button apparatus, and everything connected with the control equipment is inspected by one man, who also tests out the operation of the entire car as a final check before it is turned out as ready for service.

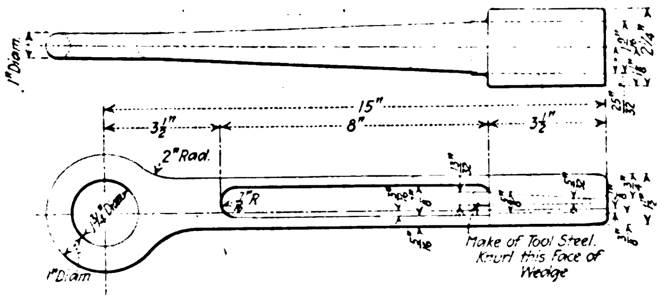
If during the inspection any heavy repair work is found necessary, such as commutator turning, armature or field repairs, wheel turning, etc., the cars are sent to the Van Nest shop. Cars are painted on a basis of every eighteen months of operation. This depends, however, upon when this date arrives, as an attempt is made to handle the painting at some time when the car is at the shop for general repairs.

Trailer cars are inspected in the yards at Stamford. On this inspection an electrical repair man looks over the electrical apparatus and lighting systems, batteries, relays, lighting change-over switches and heating apparatus and control. A truckman inspects the trucks and brake rigging, bearings, etc.

It has already been stated that the first multiple-unit cars were placed in service in 1910. These were changed over from automatic to hand control in 1914 and given a complete overhaul. Since that time no overhaul has taken place on these cars until the present time, indicating that this may occur approximately every six years. This inspection and overhaul, which is now being given to all motor cars, follows the lines of the general inspection already described, except that it is more thorough and all equipment, in addition to being inspected, is completely overhauled.

All auxiliary apparatus is removed and overhauled, all switch cylinders, switches and blowers, compressors and air brake apparatus are overhauled. The body of the car is removed from the trucks and placed on shop trucks and the main motors are removed from the trucks. All loose rivets, nuts and bolts are tightened on the trucks and the trucks are cleaned with wire brushes and painted. The main motors are dismantled, armatures are tested and commutators turned if necessary. The field winding is checked up and given an insulation test and if necessary the armature is wound. The inside of the motor housing is sprayed with armature varnish before the motor is again assembled. All control apparatus is also completely overhauled.

A definite improvement over the original design has been made in the third rail contact shoe equipment. An extra piston has been inserted in the cylinder and by the use of extra links the shoe can be dropped away from the rail. This has two advantages. In case of emergency, when it becomes necessary to work on a car in service, the shoe is placed in the emergency position and blocked away from the rail. Formerly this had to be pushed down and a third rail shoe paddle inserted between rail and shoe, which operation was more or less dangerous, as a slip might throw the worker against the third rail. The emergency down position also comes into play in breaking an arc which does not cause the main d.c. fuses to blow. The result of dropping the shoe gives the effect of a magnetic blowout and quickly breaks an arc which may reach as high a current as 2,000 to 5,000 amp.



DETAILS OF CONSTRUCTION OF BAR PULLING "NIPPER"

ARMATURE WINDING PRACTICE

When an armature comes into the shop to be rewound the coils are stripped and the commutator is cleaned. The Monel metal coils are then reinsulated, put into the bottom of the slot and soldered into the commutator. A layer of mica insulation is placed over the front and back ends of these and the bottom copper coils are placed in position. A layer of mica insulation is placed over this at the front and back ends and the top copper coils are placed. Clips are then put on the front and back ends and the armature is placed in the oven under a temperature of about 200 deg. F. and remains there over night.

The following morning the armature is removed from the oven and temporarily banded, and fiber wedges are inserted on the coils. Clips are wedged for soldering and the end coils cut off even with the clips and soldered. Wedges are removed, mica U-pieces are placed in the front end and treated asbestos tape is woven into the back end. The armature is then permanently banded. Bakelite, in the form of a paste, is applied to both front and back ends and the armature is replaced in the oven at the same temperature and again remains overnight. The following day the armature is dipped and is then baked for 100 hours at a temperature of about 200 deg. F. An accompanying illustration shows the method of handling the armatures by crane through doors in the top of the baking oven.

When the Van Nest shops were first opened armatures were dipped in a tank in the floor of the shop adjacent to the bakeoven. Due to the fire hazard of having this inflammable material inside the shop a separate building entirely fireproof has now been constructed for a diphouse. This building is located on the north side of the shop and measures about 30 ft. x 36 ft. The base is concrete, with brick walls, a tile roof and wire glass windows, and all doors and shutters are of steel fireproof construction.

Inside the building is a large tank containing 2,300 gal. of dipping varnish. Material to be dipped is handled by an overhead air-operated crane with both a 10-ton and 5-ton hoist. The tank is also provided with an air inlet at the bottom so that before material is dipped the varnish can be thoroughly stirred up. In case of fire a lever operated from outside the building opens a valve which permits the contents of the tank to flow by gravity into a tank some distance from the building. Should no one, however, be on duty to perform this operation, two fusible links in the chain which holds this valve closed by a spring will melt and the same result is obtained as though the lever had been operated by hand.

The cover of the tank is raised and lowered by a hand winch on the inside wall of the building. In case of fire, however, a chain pulled from outside the building disengages the winch mechanism by raising a weight, and the cover automatically drops into position. A fusible link in the chain which holds the cover up will also allow it to drop in case of fire, and a fusible link in the chain operating the door will close this in case of fire. There is no electricity or other lighting apparatus inside the building. Electric lights are provided between the shutters and the windows, but when the tank is being used the shutters are opened and there is ordinarily sufficient light. A pipe line across the ceiling, with two large nozzles, is operated by means of a valve located on the outside of the building and the interior can be quickly drenched to smother a fire.

It will be noted from an accompanying illustration that ventilation is provided by means of louvers at the base of the building and ventilators in the roof. Inside the building a radiator is placed in front of each louver. For any material which needs to drain for any length of time after having been immersed in the varnish a rack is provided at the side of the tank and the surplus varnish drains back into the tank.

During the past year only five multiple-unit armatures have been rewound. About six commutators are turned per month. For undercutting after turning the commutator a device originally purchased has been greatly improved upon. This is shown in an accompanying illustration. In making these improvements S. K. F.

ball bearings have been used in the head of the machine to eliminate vibration. The device is also equipped to use two saws simultaneously. A screw at the front provides for vertical adjustment and a clamp at one side holds the saw in the desired position. The practice is to undercut 1/16 in.

In addition to the improvement in the undercutting device, an exhaust tube has been provided to carry away the mica dust. This exhaust tube is connected with the air line from the carpenter shop and the mica dust is drawn away by means of a blower motor located near the roof of the shop.

An interesting device is in use for pulling the bars of the auxiliary motor field. This device is clearly illustrated in an accompanying drawing and is also shown in service. The "nipper," attached to a hoist, is placed over the end of a bar and the wedge dropped into position. It will be noted that the face of the wedge is knurled. The pull of the hoist serves to tighten the grip on the bar and the entire complement of 144 bars can be pulled in half an hour. These bars were formerly driven out by hand and it often took a day to drive out two or three.

It has already been stated that cars are painted on a schedule of about every eighteen months of operation. This work is all done at Van Nest on one track of the inspection shed. According to the program, painting is divided into two classes, "Class A" and "Class B."

In "Class B" painting, which is done approximately every eighteen months, the car is first scrubbed with soap and water and the inside is renovated. Where the paint is marred or cracked on the outside of the car the spots are touched up with a primer. The second day a putty coat is applied, and the third day the outside of the car is sandpapered and touched up with a flat paint. On the afternoon of the third day one coat of Pullman color enamel is applied. On the fifth day the letterboard is varnished and the gold numbers are applied. Meantime, the roof, deck, trucks and platforms have been painted black, the seat frames and floors painted and the seats and curtains renovated with Pantasote renovator.

"Class A" painting is done only when the paint is in bad condition. In this case the paint is first removed with a varnish remover and the car is washed with turpentine, scraped with a wire brush and sanded. A coat of primer is then applied and in forty-eight hours a second or leveling coat applied. The car is then allowed to stand for twenty-four hours and then either "rough-stuffed" with two or three coats a day or puttied and knifed in and sanded. If rough-stuffed the steel is first rubbed with pumice stone and oil. Sandpaper is then applied, followed by one coat of flat color and one of varnish and then leaded and given two coats of finishing varnish. The ceiling of the car, if badly cracked by frost or cold, is scraped down to the steel and sandpapered, after which one coat of primer is applied, this consisting of white lead, finishing varnish and boiled oil, and it is allowed to stand for forty-eight hours, following which one coat of enamel is applied. This gives an excellent white ceiling. To the deck and side walls is applied one coat of buff enamel. The curtains and cushions are Pantasote renovated and the base, floors and seat irons receive one coat of green enamel. This class of painting does not have to be performed more often than every eight to ten years.

Other work which is performed at the shop includes the babbitting of the armature and axle bearings, the repair and manufacture of pantographs, the making of all shunts, contactors and brushholders, the building up of switches, welding of various pieces of apparatus, etc. In the repair of axle and armature bearings no brass liners are used. When the flange of the bearing has worn down about 1/4 in. it is dovetailed and tinned and babbitt applied to take up the wear. The inside wearing surface of the bearing is also rebabbitted, about 3/8 in. of babbitt being deposited and later turned down to about 1/16 in. The method of dovetailing the bearing flange and applying the babbitt is shown in an accompanying illustration.

Pantograph frames are made up from Shelby seamless tubing, 1 in. in outside diameter and 1/32 in. in thickness. Into the ends of this tubing are driven 3-in. maple plugs, 15/16 in. in diameter. The jigs shown in one of the illustrations are used to square up the frames. The top frame is the same on both the multiple-unit equipment and the locomotives, while the bottom frame is 1 in. longer on the multiple-unit cars. All pantograph insulators are the same for all equipment. About 120 pantograph frames a month are made up for all multiple-unit equipment and locomotives.

WELDING WORK MOST CONVENIENTLY ACCOMPLISHED

The Van Nest shop equipment includes facilities for electric welding, but this is not as extensively used as is the oxyacetylene method. This work is greatly facilitated by the location on the premises of an oxyacetylene generating plant. Pipes conveying both the oxygen and the acetylene are carried throughout the shop and outlets are provided at numerous points. An illustration shows the piping arrangement on one of the upright supports which divides the erecting bay from the heavy machine tool bay and provides support for the overhead crane. The pipe at the extreme left is an outlet to prevent back pressure. The one beside it conveys acetylene and the pipe at the extreme right conveys oxygen.

TABLE I—MAINTENANCE COSTS ON MULTIPLE-UNIT CARS, N. Y., N. H. & H. R.R., 1919

Inspection, Repairs and Replacements

Month	Mechanical		Electrical		Total	Total Car-Miles	Cost Cents per Car-Mile
	Labor	Material	Labor	Material			
January	$4,327.08	$2,226.53	$6,681.57	$4,431.11	$17,666.29	163,544	10.8
February	4,190.87	2,397.26	7,415.41	2,980.11	16,983.65	144,601	11.8
March	4,144.85	3,644.60	5,911.02	7,243.19	20,943.66	156,527	12.8
April	3,554.93	3,728.81	8,158.45	7,449.42	22,891.61	155,037	14.7
May	3,031.48	2,437.30	7,958.33	5,183.55	18,610.66	169,107	11.0
June	2,921.46	2,716.66	6,451.01	1,726.14	13,815.27	170,751	08.1
July	1,952.16	2,582.84	5,514.69	2,609.21	12,658.90	187,212	06.8
August	2,052.16	95.81	4,794.07	3,844.64	10,786.68	158,851	06.8
September	2,999.17	3,686.95	5,496.80	1,637.19	13,820.11	154,221	08.9
October	3,350.59	1,874.53	6,610.43	1,252.35	13,087.90	168,370	07.8
November	3,058.78	2,368.11	6,204.72	4,123.52	15,755.13	160,264	09.8
December	3,438.59	992.59	8,630.35	4,179.47	17,241.00	144,750	11.9
Total	$39,022.12	$28,751.99	$79,826.85	$46,659.90	$194,260.86	1,933,235	10.03

TABLE II—CAR DEFECT REPORT, N. Y., N. H. & H. R.R., 1919

	Motor Cars													
	January	February	March	April	May	June	July	August	September	October	November	December	Total	Trailer Cars Total
Compressors	0	0	0	1	0	0	1	1	1	0	0	1	5	..
Compressors canopy switches	0	2	0	0	0	0	0	0	0	0	0	0	2	..
Governors	0	1	0	0	1	0	0	0	0	1	1	2	6	..
Control valves	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Stuck brakes	0	0	0	1	0	0	2	0	1	3	0	3	10	1
Feed valves	3	2	1	1	3	1	5	2	2	1	0	0	21	..
Brake valves	1	0	3	3	1	0	1	1	1	6	1	0	18	..
Distribution valves	0	1	2	1	0	0	0	0	0	0	0	7	11	..
Brakes release slow	0	1	2	1	0	0	1	0	0	0	0	1	6	1
Poor brakes	0	1	0	0	0	0	0	0	1	1	1	0	4	..
Emergency valves	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Whistles	0	0	0	0	1	0	1	0	0	0	0	1	3	..
Signal whistles	1	0	4	0	1	1	1	0	0	1	0	0	9	..
Air pipes	0	0	0	1	0	1	0	1	1	1	0	0	5	..
Angle cocks and hose	0	0	0	0	1	0	0	1	1	0	1	0	4	..
D.c. circ. breakers	1	0	0	0	0	1	0	0	0	0	0	1	3	..
A.c. circ. breakers	1	0	0	0	0	0	0	2	2	0	0	0	5	..
Line switches	0	0	0	0	0	0	0	0	0	0	0	0	0	..
A.c. wiring	0	0	0	0	1	0	0	0	0	1	0	0	2	..
D.c. wiring	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Transformers	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Control wiring	0	0	0	0	0	0	0	0	1	3	1	4	9	..
Current relay	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Line relay	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Overspeed relay	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Jumpers and sockets	1	1	0	0	2	0	1	0	0	0	0	0	5	..
Switch groups	0	0	0	0	0	1	0	0	0	0	0	0	1	..
Switches	0	0	1	0	0	0	0	0	0	0	0	0	1	..
Lights	3	1	0	4	2	1	0	3	1	1	0	6	22	3
Battery lights	1	0	0	0	0	1	1	0	0	0	0	0	3	..
Motor leads	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Pantographs	5	5	4	5	5	11	14	8	4	9	2	6	78	..
Contact shoe equipment	0	0	0	0	0	0	1	0	1	0	1	3	6	..
Contact shoe fuses blown	1	0	2	0	0	0	0	0	0	1	0	0	4	..
Batteries	0	0	0	0	0	0	1	0	1	0	0	0	2	..
Heaters	2	1	0	0	0	0	0	0	0	0	0	0	3	5
Motor generators	1	0	0	0	0	0	0	0	0	0	0	0	1	..
Reversers	1	1	0	0	0	0	0	0	0	0	0	0	2	..
Motors	0	0	0	0	4	3	1	1	2	2	0	1	14	..
Blowers	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Blowers' canopy switches	1	2	0	0	0	0	0	0	0	0	0	0	3	..
Flat wheels	1	2	0	1	0	2	0	0	1	0	0	1	8	..
Hot journals	2	0	0	0	0	0	2	0	0	1	0	1	6	..
Hot armature bearings	0	2	1	0	0	1	0	0	0	0	0	0	4	..
Gears	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Gear cases	1	0	2	0	1	0	0	0	1	0	0	0	5	..
Doors	5	0	2	0	3	3	0	0	1	5	2	4	25	16
Glass	1	0	2	3	0	0	1	0	0	0	0	2	9	3
Car seats	0	0	1	0	0	0	1	0	0	2	1	0	5	5
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Leaky roofs	0	0	0	0	0	0	0	0	0	0	0	0	0	..
Buffers broken	0	0	1	2	0	0	0	0	0	1	0	0	4	..
Cars uncoupled	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Resistance grids	2	1	0	0	2	0	0	0	0	2	0	1	8	..

TABLE III—REPLACEMENT OF SMALL PARTS N. Y., N. H. & H. R.R. 1919

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Control fingers	11	5	0	21	8	14	37	2	6	12	3	12	131
Switch group contact tips	20	6	10	8	10	21	4	58	18	10	2	18	185
Reverser fingers	2	3	2	6	3	5	3	8	5	6	7	3	53
Resistance grids	1	0	7	0	5	6	9	4	5	1	4	1	43
Unit switches	6	1	0	0	10	9	2	6	2	3	0	2	41
Roller side bearings	0	1	0	0	0	1	0	0	0	2	1	0	5
Air brake hose	3	7	0	11	0	0	4	2	0	3	2	3	35
Line switch contacts	2	3	2	4	3	3	2	4	3	2	4	3	35
Motor brushholders	19	6	2	20	14	29	13	16	23	22	13	24	201
Heater coils	0	3	1	1	2	0	2	0	0	4	7	2	22
Journal brasses	34	12	26	19	17	9	8	2	9	11	17	11	165
Pantograph insulators	6	2	0	7	4	7	8	25	7	3	6	3	78
Contact shoe fuses	20	6	6	15	5	11	15	6	28	2	8	8	130
Battery lamps*	..	..	..	..	..	..	..	..	..	..	..	..	...
Car lamps*	..	..	..	..	..	..	..	..	..	..	..	..	...
Motor armature bearings	2	2	0	9	0	0	7	0	0	0	1	0	21
Motor axle bearings	8	3	0	2	8	8	0	10	0	5	1	0	45

* Accurate figures not available.

The generating plant is the standard railroad equipment provided by the Oxweld Company and has a capacity of 200 cu.ft. of acetylene gas an hour. The fireproof building is about 12 ft. x 50 ft. and a portion of the generating room is shown herewith. Briefly, the operation is as follows: Carbide is placed in the top of each of the generators and is automatically fed into the water below. The tank in the center contains the stored acetylene gas. This rises and falls on the same principle as an illuminating gas storage tank. When acetylene gas is being used the tank lowers, pulling chains on the generators and allowing the passage of the carbide to the water below, thus generating gas and again raising the tank. A safety exhaust valve is provided, which prevents the tank from raising above a definite limit. The gas passes from the tank through a hair filter and from there to the master back-pressure valve, thence to the shop line, where each outlet is also equipped with a back-pressure valve.

Adjoining the generating room is the manifold oxygen table, containing twenty 220-cu.ft. bottles, giving a pressure of 2,200 lb. to the square inch. The working pressure in the shop is 50 lb. The average consumption of oxygen per day is about ten bottles and of carbide about 200 lb.

COST OF INSPECTION AND MAINTENANCE

The several accompanying tables present figures on the cost of inspection and maintenance together with data on equipment troubles, number used and mileage of various wearing parts, car-miles operated, etc., for the New Haven multiple-unit equipment during the year 1919. This particular year is not, in some respects, a good one to select, for all costs have been exceptionally high and the poor quality of materials has decreased the obtainable mileage per wearing part. This is generally understood, however, and as the condition is the same throughout the country figures from various properties for this particular year should be more or less comparable.

Table I contains maintenance costs, including inspection, repairs and replacements, for all multiple-unit equipment. For convenience these are divided between mechanical and electrical parts of the equipment and in each case subdivided between labor and material. This gives for the year a cost of 10.03 cents per car-mile. The cost per motor car-mile would be higher, but would not be a fair basis of comparison, as the New Haven cars are equipped with four motors, while those on other properties are generally equipped with two motors. If

TABLE IV—REPLACEMENT AND MILEAGE OF BRAKE, PANTOGRAPH AND THIRD RAIL SHOES AND MAIN MOTOR BRUSHES, N. Y., N. H. & H. R.R., 1919

		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals	Average A*	Average B†
Brake shoes	Number used	148	93	171	133	224	161	138	184	92	191	156	177	1,868	155.7	.....
	Car-miles per shoe	452	636	379	477	298	427	538	332	713	352	421	341	.....	419.0	. .
Pantograph shoes	Number used	20	3	0	7	5	31	6	44	15	20	17	30	198	16.5	. . .
	Car-miles per shoe	3,343	19,724	64,773	9,134	13,345	2,220	12,375	1,387	4,375	3,361	3,863	2,009	.....	3,955	9,775
Third rail shoes	Number used	23	2	1	4	6	11	8	6	19	2	7	8	97	8.1	. .
	Car-miles per shoe	2,907	29,586	64,773	15,985	11,121	6,256	9,281	10,175	3,454	33,616	9,381	7,535	.....	8,080.0	19,950
Motor brushes	Number used	2,890‡	151‡	0‡	1,581	836	877	521	1,067	1,093	1,269	1,109	1,345	12,739	1,061.6	. . .
	Car-miles per brush	23	392	64,773	40	80	79	143	57	60	53	59	45	.....	61.5	151.7

* Mileage figured on a motor car-mile basis.
† Mileage figured on a basis of total car-miles
‡ Number of motor brushes for months of January, February and March not correctly distributed, due to accurate figures not being available.

the motor equipment of the New Haven motor cars is sufficient to permit their use as a locomotive, *i.e.*, to haul two trailers each, it is fair to compare the cost of these three cars as a unit with a single car equipped with only two motors and which cannot haul trailers. This cost of 10.03 cents per car-mile seems reasonable when it is also recalled that the cars are equipped for both a.c. and d.c. operation.

One reason for the higher cost during the winter as compared with the summer months is that the general overhauling of cars takes place during the winter in order to insure that the cars will be in the best condition for the summer traffic. The cost for the entire year is made higher also by the fact that twenty-three out of twenty-seven motor cars and thirty-three out of fifty-two trailer cars were painted during 1919.

In Table II are presented some figures covering motor and trailer car defects reported during the year 1919. There is no high figure in the table. That for pantographs is the highest, but for twenty-seven motor cars, each equipped with two pantographs, seventy-eight reported defects in a year seems low when it is understood that "defects" includes all reports of slow operation, etc., as well as total failures to operate.

Replacements of small parts during 1919 are shown in Table III, covering motor cars only. Replacements and mileage of brake shoes, pantograph shoes, third rail shoes and motor brushes are shown in Table IV. Mileage is figured on a motor car-mile basis and for this reason seems high. The first column of averages is figured on a basis of motor car-miles, while the second includes also trailer mileage. The latter as explained for Table I is the correct analysis for comparison and results in a much more favorable showing.

One-Way Versus Two-Way Trailers

Some Considerations and Opinions on This Problem—Majority of Those Having Experience Favor One-Way Trailers

IN ORDER to bring to light some data on whether one-way or two-way trailers offer more advantages and less disadvantages, the opinions and practices of several operators who have had experience in trailer operation or who have recently made a decision on one or the other type were sought by the ELECTRIC RAILWAY JOURNAL. Their thoughts on the subject are briefed in what follows below. The endeavor in the study made was to bring out an answer to the question of whether one-way or two-way trailers should be adopted if a company was about to inaugurate trailer operation.

If a property already were fully equipped with single-end motor cars it was assumed that the proper trailer installation would be one-way trailers, so this set of conditions was eliminated from the problem as offering only one possible solution. But with double-end motor cars, should one-way or two-way trailers be adopted?

Among the cities using trailers, the Detroit, Cleveland, Omaha and Denver companies are entirely equipped with single-end motor cars, and therefore logically one-way trailers. New Orleans, La., and Gary, Ind., have two-way motor cars and two-way trailers. In Pittsburgh all motor cars, with few exceptions, used in hauling trailers are single-end. About one-third of the trailers are one-way and two-thirds two-way. In speaking of this, P. N. Jones, general manager Pittsburgh Railways, said: "If the carhouse is at the end of the line, in our estimation the trailers because of their simplicity should be one-way. If the carhouse is so located that one-way trailers cannot be used without making unnecessary mileage, then the trailers should be two-way." In Boston two-way trailers were adopted for use with the two-way motor cars. The reason for this was that there are certain prepayment areas and transfer stations so located as to necessitate unloading on one side of the car and loading from the opposite side. Also other prepayment and transfer areas are so located as to necessitate loading and unloading from the left-hand or right-hand side of the car, according to the position of the area relative to the track. One-way trailers have been adopted for Akron, Ohio, on the considerations of greater safety, less cost, less complication in operating, less weight and increased seating capacity. The Public Service Railway of New Jersey has recently ordered 100 one-way trailers. The Baltimore company is using two-way trailers.

In Minneapolis and St. Paul, Minn., where the subject of train operation has been receiving considerable study, Horace Lowry, president Twin City Rapid Transit Company, has this opinion:

> I believe very strongly in one-way equipment, both for motor cars and trains. In our own case we have never operated trailers, as snow and weather conditions are not suitable for this operation, but we have in service an experimental two-car train which is a one-way unit. In order to make a two-way car, train or trailer, it is impossible to make as good looking a piece of equipment or one as well adapted for the handling of the people. The various advantages of the two-way equipment are more than offset by their disadvantages.

H. A. Mullett, assistant general manager the Milwaukee Electric Railway & Light Company, describes the situation in Milwaukee as follows:

> Due to poor loop facilities at terminals and elsewhere, and in view of the existence of many crossovers which permit turn-backs to be made, we are planning to make all two-car trains of the double-end type. In some cases we have motors on each car, whereas in others one car is a trailer. Many of the latter, however, have been arranged with a controller on the rear end, the necessary power cables being carried through from the motor car to the rear end of the trailer, to which point the controller from the rear end of the motor car has been transferred. It is obvious that such trains are in effect permanently coupled together. On a system laid out for double-end, single-car operation we have found it very desirable to arrange two-car trains in like manner. It follows from these arrangements that the trailer as well as the motor car must be two sided, that is, equipped with entrance and exit doors on each side.

All companies operating trailers have equipped their lines with either loops or wyes at the ends, most of them showing preference for the loop, as it avoids the dangerous practice of backing the cars into a side street—a possible source of serious accident. Even those companies making use of two-way trailers and motor cars have found it impracticable to operate without loops or wyes.

In answer to the direct question, With two-way motor cars, would there be any material advantage in two-way trailers, assuming that all lines are equipped with wyes or loops at the end? of nine companies answering, eight replied in the negative without qualification, including two companies now using two-way trailers, and one, the Denver Tramway, answered as follows:

> It is true that wyes or loops make two-way trailers unnecessary, but often with two-way motor cars turn-backs can be made at crossovers instead of at loops or wyes. If one-way trailers were used the entrance would be on the wrong side of the street. In this connection a combination right-hand and left-hand crossover would be necessary.

Nelson H. Brown, general superintendent of railways New Orleans (La.) Railway & Light Company, explains the use of two-way trailers in New Orleans thus: "We are operating at present two-way trailers for the reason that they have been on the property for a great many years. We are considering the purchase of a few new trailers, and it is our plan to use the one-way type. I am sure they are going to offer many advantages over the double-end type, aside from preventing accidents and speeding up car movement."

WOULD NOT RUN TRAILERS WITHOUT LOOPS OR WYES

Another question asked was: Assuming two-way motor cars and no loops or wyes, would two-way trailers be preferable as against building loops or wyes and one-way trailers, in order to begin trailer operation?

The Detroit United Railway replied that it would recommend the installation of wyes or loops and the purchase of one-way trailers, even though two-way motor cars were being used. New Orleans recommended loops or wyes and one-way trailers, saying this combination offered many desirable advantages. The Pittsburgh Railways replied: "We would not attempt to run trailers unless there were loops or wyes at the ends of the lines. It is too much trouble to disconnect, since you will find it takes probably a minute and a half to make the connection and get the brakes in condition to proceed—at least if you have semi-automatic brakes with two hose connections. The companies at Cleveland, Minneapolis and Gary also replied without qualification in favor of one-way trailers and building loops or wyes.

The question was also raised as to whether the necessity to back long distances to a loop or wying point is a frequent occurrence with one-way cars or trains. Mr. Brown at New Orleans states that this depends entirely upon the territory, condition of equipment, roadway, etc., but ordinarily the necessity would not be frequent. Mr. Lowry at Minneapolis writes that it has not been of frequent occurrence in connection with his company. W. E. Cann, Detroit United Railway, says that "The amount of backing up in our city system is a negligible quantity, and long back trips to loops or wye points are not only infrequent but practically unheard of." Likewise, the Cleveland Railway finds the need for backing long distances infrequent. On the other hand Mr. Jones at Pittsburgh replied in the affirmative to this question. And Edward A. West, general superintendent Denver Tramway, has this to say:

> To our mind, this is one of the greatest drawbacks to the one-way motor car and its trailer. Unless long lines were carefully studied and loops and wyes placed in them at convenient points it is often necessary to back long distances. In towns with a great deal of macadamized or dirt streets automobile traffic carries foreign matter into guard rails, which is overlooked by the motorman, and a derailment results. If such derailment is serious, then all cars following must back up. Fires also make backing up necessary and frequent. In our recent snowstorm, at the ends of outlying lines the snow had drifted so as to make it impossible for a car to reach them. In these instances it was necessary to back long distances, and the manner in which such operation interferes with traffic can be readily appreciated. The greatest inconvenience resulting to one-way motor cars and trailers comes from blockades.

Practically all operators with whom the writer has communicated or conversed on this question agree that the possibility of having to back one-way trains in case of a tie-up can be reduced to a negligible item by installing an extra curve here and there at intersecting points with other lines, to permit emergency wying. But Mr. West at Denver is somewhat doubtful as to how far this plan may be followed to relieve the necessity to back one-way cars or trains. He writes:

> Most assuredly extra curves would help, but in practice it is usually found that interruptions occur at places not convenient to establish turn-back points, and although such wyes may be of frequent occurrence along a line or the lines of the company's system, yet they are not frequent enough to avoid unsatisfactory operation at times. There is, of course, a decided disadvantage in having too much special work in the streets. The maintenance of such trackage is expensive and requires frequent inspection and cleaning. This requires a large force of track cleaners and maintenance men and makes a close follow-up necessary.

Edward Dana, general manager Boston Elevated Railway, is somewhat doubtful that track construction solely for emergency wying would be a justifiable expense. To quote him, he says: "It seems to us that the question of emergency track construction must be determined by local conditions. With double tracks and paved streets in our large cities, the installation of additional curves otherwise unnecessary would be a serious proposition."

Another question put to these various operators was as to whether two-way trailers, making it possible to switch back at a crossover in case of a tie-up, would develop any particular advantage or time saving in an emergency necessitating turning all cars back at a midpoint on a line. In such a case, with a double-end motor car and two-way trailer, to switch back would necessitate uncoupling the trailer, running the motor car over the crossover, using another motor car to shunt the trailer onto the other track, and recoupling to the opposite end of the motor car. On the other hand, with one-way trains, the emergency turn-back would bring about the necessity to back the first train or two to the nearest wying point and then presumably to turn all subsequent trains at this point.

In replying to this question, the Pittsburgh company reiterated its former statement that it does not believe in uncoupling trailers on the street. None of the replies indicated a feeling that the two-way trailer would simplify the handling of such a situation or lessen the delay. Mr. Dana says: "We believe it would be preferable and more economical to operate the cars to the nearest loop or wye rather than to attempt to turn the train at a crossover. We operate trailers only on our heaviest lines, where there is a three- or four-minute headway. Of course under such conditions it would be impossible to turn the train at a crossover without seriously interfering with the service on the line.

The experience of the operating officials of the Cleveland and Detroit companies in trailer operation probably dates as far back as that of any company in the country. While neither has had any experience in operating two-way trailers, both have had excellent opportunities to observe the weaknesses of one-way cars.

An official of the Detroit company says: "While we have not had experience with this type of operation," referring to two-way trailers, "our one-end operation has been so successful that we cannot conceive of the two-way trailers or motor cars being any better nor as good." A Cleveland railway official made the following similar comment: "No complication would be involved from the use of the two-way trailer or from double-end motor cars, but there would be added expense as well as weight and no good purpose would be served. Our turn-back and terminal facilities are such that double-end motor cars would add little to the flexibility of our equipment in case of a blockade, and making our trailers double-entrance, with doors on two sides, would not add to the flexibility of this equipment."

N. E. L. A. Reports and Discussions

At the Pasadena Meeting Some of the Subjects Discussed of Special Interest to Electric Railways Were Water-Power Development, Electrical Resources of the Nation, Overhead and Underground Systems and Prime Movers

TWENTY-THREE hundred delegates to the National Electric Light Association last week received a hearty welcome from the West to Pasadena and proved that California, believed by some to be the playground of our country, can also be a place to accomplish real work. The annual convention was held May 18 to 22 at the Huntington Hotel. The formal opening took place on Tuesday night with singing, dancing and fireworks on the lawn of the hotel. On each day following auto trips were provided to points of interest, and on Wednesday evening a mission play was presented. Officers selected for the term 1920-1921 were: President, Martin J. Insull; first vice-president, M. R. Bump; second vice-president, F. W. Smith; third vice-president, Walter H. Johnson; fourth vice-president, F. T. Griffith; treasurer, H. C. Abell.

Development of the natural water-power resources of the nation and its financing was the principal theme of the convention. The coal and fuel oil supply, the cost of all other materials and the supply of labor were also discussed extensively. In his address, delivered on Wednesday, President R. H. Ballard emphasized the imperative need of the industry for the funds which restricted returns have made it difficult to obtain under the existing financial conditions. He said that the kind of public ownership which brings results is ownership by the public at large in the stocks and bonds of local regulated utility companies. In reference to electrification, he said that trunk-line electrification has its greatest argument in the future, for with the rapidly increasing cost of fuel and traffic the ultimate return on any amount now invested in electrification will be more than generous compared with the return on the accumulated amount which might be spent over a long period in patching up the systems. Also, aside from the greater comfort in travel and purely operating economies obtainable, enormous savings in coal are possible through electrical operation of the railroads.

The report of the committee on public policy held that not enough had been accomplished in informing the public concerning public utility operation and suggested that the public can be brought to see the necessity for the expenditure of large sums in electrical development and to realize how the development of natural resources will follow. The policy of offering stock issues to employees, consumers and the general public was commended.

200,000,000 POTENTIAL HORSEPOWER IN WEST

It has been roughly approximated, according to the committee on water-power development, that for the Western States something like 200,000,000 hp. would represent the possible maximum potential horsepower with maximum storage facilities developed and utilized as compared with 60,000,000 hp. when storage is not considered. At present about 75 per cent of the generated power of the West is hydro-electric and the remaining 25 per cent steam. The States of Idaho, Montana, California, Washington and Oregon represent 61 per cent of the total maximum water horsepower of the country, with a total of 36,210,000 hp. Developments in the Eastern States include over 1,000,000 hp. in the States of Alabama, North Carolina, Georgia and Maryland. It is stated that the electrification of the trunk-line railroads of the Western section will amply justify local development.

Present capacity of generating machinery is defined as the electrical resources of the nation by the committee on that subject. The latent power of the country is taken at 54,000,000 hp. in water power and 3,000,000,000 tons of coal. The total central station operating capacity is almost 11,000,000 kw. It is estimated that 2,000,000 to 3,000,000 kw. additional capacity could be absorbed by our present needs by 1922, with almost as much more needed soon thereafter.

In his address before the general session of the convention I. E. Moultrop, chairman of the technical and hydro-electric section, emphasized the great need for research by the association, not to parallel the research work being done by other organizations but to carry out only that which was required by the central station industry.

The danger that lies in overemphasizing the benefit of keeping power and communication lines on separate roads or highways was one of the points brought out by the report of the committee on inductive interference. With higher distribution and lower transmission voltages this is becoming increasingly difficult and expensive. Among the requirements to improve the situation is general recognition of the principle that adequate power and communication service economically supplied are both essential to the public interest.

SINGLE CONDUCTOR VS. THREE CONDUCTOR

After a careful study of the single-conductor vs. the three-conductor cable for high voltages, the committee on underground systems has concluded that with tensions up to 25,000 volts and loads up to 10,000 kva. the three-conductor cable is more economical than the single-conductor cable. The possibilities and the advantages of the single-conductor design for higher voltages and greater loads are pointed out. The subject of current-carrying capacity of underground cables as affected by dielectric and copper losses and temperature of duct lines is discussed in this report and the variations of the characteristics of the different cables are brought out. The committee recommends that careful consideration be given to the prevention of extended trouble with direct-current networks. Low-tension distribution cables should be bonded in each manhole to prevent a rapid spread of trouble in case of a cable burning in two. Another method of protection suggested is the covering of cables with ½ in. of concrete.

The principal activities of the committee on overhead systems have been in the direction of improving the maintenance of suspension-type insulators, pointing out the advantages of preservative treatment of poles and crossarms and undertaking a study of overhead line construction in co-operation with the Bureau of Standards. In answer to a questionnaire, operating engineers ascribed the following reasons, in the order of their importance, for insulator deterioration: (1) Porosity, (2) minute cracks permitting absorption of moisture, (3) troubles from expansion resulting from dissimilarity in co-efficients of temperature expansion of porcelain, cement and hardware. Few operators believe that the ground wire protects lines from severe direct strokes of lightning, but there is a considerable difference of opinion regarding the protection obtained from induced lightning charges.

In the discussion of the above report insulator testing and maintenance, pole reinforcement, and treatment and joint usage of poles were the principal subjects touched upon. To determine the relative values of "megger" tests, high-potential and high-frequency tests, insulators have been subjected first to the megger test and then to the other tests. Of the total number of faulty insulators detected in all three tests the megger located 50 per cent. Of the insulators tested the greatest number of faulty ones were taken from lines near the coast, the next from mountain districts and the smallest number from dry valleys.

The various papers which comprised the report of the committee on electrification of steam railroads were abstracted in the issues of the ELECTRIC RAILWAY JOURNAL for May 22 and 29. In discussing this report the success of actual electrifications was confirmed by several companies which handle railroad loads. W. C. L. Eglin testified to the success of the electrified divisions in the Philadelphia district, as did also F. W. Smith of New York. The viewpoint of railroad men was presented by A. H. Babcock of the Southern Pacific Railroad, who pointed out the importance of disillusioning company officials who believe that money can be better spent in double-tracking systems or along other lines with which they are familiar.

PRESENT STATUS OF ELECTRICAL APPARATUS

A feature of the report of the electrical apparatus committee is that the use of automatic substations for light and power, as well as for electric railway service, is rapidly increasing. It is stated as unlikely that the automatic substation will entirely supplant the substation with attendants, and it is suggested that careful thought be given to making all additional substations of the automatic type and to installing automatic and semi-automatically controlled features on equipment in existing stations where attendants are employed. Additional evidence of the value of balanced-relay protection has been obtained in the case of a 12,000-kw. unit which failed owing to a field breakdown which caused a short circuit in the armature winding. The balanced-relay promptly operated and the damage was limited to slight burning of the armature and field windings.

The general subject of excitation is said to be receiving considerable attention at present, the trend in large and medium size generating stations being unmistakably toward a practice in which each generator is provided with an individual source of excitation. On several large systems employing individual excitation, particularly in metropolitan districts, storage batteries have been provided for emergency excitation in addition to spare exciter capacity. Regarding current-limiting reactors, the committee states that too much stress cannot be placed upon the importance of careful design and construction, which will give the utmost reliability. The committee also reports that grounding of the neutral of three-phase systems solidly or through resistance has rapidly become standard practice throughout the country for both 25 cycles and 60 cycles. A noteworthy improvement has been made during the past year in the design of all circuit-breaker contacts. These designs utilize the mechanical stresses to force the contacts more firmly together, whereas in the past some breakers have been so designed that the mechanical stresses of heavy currents tended to force the contacts apart.

In discussing the report of the electrical apparatus committee, it was recommended that instead of using high voltage for the railway contact systems, 25-cycle or 60-cycle automatic substations and low-voltage trolley systems be used. It was contended that this arrangement should make trunk-line electrification more feasible from an investment standpoint. Trouble with rotary converters has been practically eliminated by increasing the speed, increasing the separation of poles and using high-reluctance commutating poles having non-magnetic material between them and the frame. Barriers between brushes are thus almost unnecessary.

There was considerable discussion on switches, during which it was suggested that one remedy for the situation is to simplify switch construction and make the switches large enough. The standardization of transformer oils was recommended, but was declared by manufacturing representatives to be impracticable because in most apparatus the kind of oil required depends upon the internal construction and materials used in the transformer.

INCREASING ECONOMY IN PRIME-MOVER PRACTICE

Progress in burning low-grade fuel is reported by the committee on prime movers, and it was said that Diesel oil engines have been perfected to such a degree that they may be profitably considered for installation in generating plants. The manufacturing companies are correcting difficulties in steam turbines and boilers which were manufactured during the war period. Problems arising from the interconnection of steam and hydraulic stations are being scrutinized for the purpose of obtaining maximum economy in the whole system.

Operating records of single-shaft turbines, according to the report, have not been entirely satisfactory and several additional turbine failures have occurred during the year. An analysis of the data indicates trouble due to vibration of the wheel structure causing fatigue cracks. Trouble has been accentuated at points in the disk where sharp tool marks or rough surfaces are present or where holes in the wheel are drilled for balancing purposes. Considerable investigation is still necessary on the subject of vibration of wheels before the designs can be completely guarded against this trouble. Records of units manufactured since the last report of the committee indicate that 30,000 kw., 1,800 r.p.m., 60 cycle and 35,000 kw., 1,500 r.p.m., 25 cycle are the present maximum standard sizes of single-shaft, single-barrel units for large installations.

Static and dynamic balancing of large turbine units is receiving increasing attention in the effort to guard against the effects of vibration and resulting injurious effects. Careful selection of oil for turbine use is pointed out as a necessity. In connection with condensers and auxiliary air-removal devices, it is reported that there has been no radical change in apparatus of this type. The possibilities and advantages of high vacuum are becoming more and more realized and the faults of both the prime-mover and condenser equipment are being corrected to this end.

The tendency toward large sizes of boiler units has continued during the past year. Units of 1,000 hp. to 1,500 hp. and over are quite common. One of the most important facts brought out by a questionnaire on superheaters was that, considering their difficult location and the delicate nature of their work, superheaters are causing a surprisingly small amount of annoyance and concern to the operators.

Statements by manufacturers indicate that there have been no radical changes in stoker design, but that efforts have been made along the lines of the perfecting of new devices and the refinement of operating details. There is a tendency to lay out the stoker and the furnace so it will be readily possible to change over from coal to oil, using one or the other, depending upon the fuel-price differential. In mechanically stokered plants, and especially with forced-draft stokers, much higher boiler ratings are obtainable than with hand firing. With coals of the sub-bituminous character boiler output up to 300 per cent of normal ratings may be realized and with lignites it is possible to force boiler output up to 250 per cent of rating.

The past year has witnessed an increased number of plants installed to burn powdered coal and a rapidly growing interest in this development. The handling of powdered coal in large quantities has been successfully carried on in steel plants and cement mills, the coal being transmitted for distances as great as 2,000 ft. from the powdering plant. Several companies are now placing unit pulverizing equipment on the market, one or two units being installed for each boiler. In general, the overload capacity of boilers equipped with powdered-coal-burning devices is not as high as the figures that can be obtained when using underfeed stokers. The report states that this question will undoubtedly be worked out, as it is simply a matter of proportioning furnace volume to boiler heating surface. Properly designed furnaces for burning powdered coal are also well adapted for burning oil. The powdered-fuel equipment also makes available certain low-grade fuels, which cannot as a rule be burned economically on stokers. It is said that one of the questions which has been passed over too lightly by both manufacturers and users of this equipment is that of the ultimate disposal of the fine ashes which now pass out of the stack.

A more careful study of the shape of storage piles of coal is urged with a view to increasing the amount which can be crowded into a given space. Circular piles, for instance, in a row would contain less coal than one rectangular pile of the same length. The plea that small piles reduce the probable fire losses should not be taken seriously, it is said, as at the first sign of heating of the rectangular pile the hot spot can at once be easily and effectively removed by cutting the pile at right angles.

DIESEL ENGINES AND WATERWHEELS DESERVE FURTHER ATTENTION

It appeared to the committee that the stationary Diesel engine has now reached a point of development where no radical changes in design may be expected in the near future. Its regulation, either when operating alone or in parallel with other units (steam or Diesel), is perfectly satisfactory. The fuel consumption of a Diesel engine is practically uniform, regardless of size, in contrast with steam plants. Its advantage in fuel cost is therefore greatest in small sizes. The fuel consumption of the Diesel engine is now guaranteed at 0.4 lb. to 0.5 lb. per horsepower-hour at full load and 0.5 lb. to 0.6 lb. per horsepower-hour at half load. This represents a thermal efficiency of 34 per cent and is about one-third the fuel consumption of an oil-fired steam plant of equal size. Fuel atomizers have been perfected to use the heavy asphalt-base oils of Texas, California and Mexico, but the committee recommends the use of better grades of oil even if it is necessary to pay slightly more for them.

The increased size of waterwheels together with the larger number installed is a most important feature of the past year's development. Single wheels of approximately 40,000 hp. capacity have been installed and much larger ones are contemplated. Automatic hydro-electric plants are receiving considerable attention. Several plants of this type have been built and are working very satisfactorily, the gate openings and output being regulated, according to the water supply available, by means of a float control from pond level. The combined operation of hydro-electric and steam-electric generating stations has become a subject of vital interest, the committee states. Maximum hydraulic output will be obtained if the hydro plant generates the entire load during the off-peak hours and operates at maximum capacity during the peak hours. When a steam plant first takes energy from a hydro-electric plant there is usually a certain distrust of the reliability of the hydro service and various measures have been adopted to enable the steam plants, acting as standby plants, to pick up a large portion of the load in the shortest possible time. It has been proved, however, that the individual hydraulic prime mover is more reliable than the individual steam turbine. The question, therefore, is chiefly one of reliability of transmission lines.

Swiss Railway Electrification Progress

ACCORDING to a report to the United States Department of Commerce by Trade Commissioner H. Lawrence Groves, the work on the Gotthard line is progressing rapidly, and it was expected that the stretch of about 16 miles through tunnel from Göschenen to Airolo would be operating in May, followed by the stretch north of the tunnel from Göschenen to Erstfeld, about 29 miles, in June and the line south of the tunnel from Airolo to Biasca, 45 miles, in September. Probably later in the year the stretch of 12 miles from Biasca to Bellinzona will be finished. The first trials with electrical equipment have been carried out through the tunnel and are stated to have been satisfactory to all concerned.

As rapidly as conditions will permit, the federal authorities now plan to electrify practically all of the government-owned main-line roads in the Confederation. It is planned to spread the work over about twenty years. Within the next ten years it is proposed to transform the line from Zurich, via Olden, Bern, Fribourg and Lausanne, to Geneva. According to the program the line from Zurich to Bern will be started in 1922 and completed in 1924, and in the following two years it is thought that the section from Bern to Lausanne can be completed.

The locomotives for the Erstfeld-Bellinzona line are being built by Brown, Boveri & Company of Baden. Details of the locomotives for this electrification will be found in the issues of the ELECTRIC RAILWAY JOURNAL for Sept. 7, 1918, page 411, and June 14, 1919, page 1,141.

Philadelphia Commission Reports

Among the Recommendations of Mayor's Committee Are Valuation of Existing Property to Permit Fair Return, Organization of New Operating Company to Own Outright as Well as Operate Transportation System and an Increased Fare

THE committee representing the business and civic interests of Philadelphia appointed last April by Mayor Moore of that city to investigate its transportation system has made its report. The chairman of the committee is Alba B. Johnson, of the Baldwin Locomotive Works. The other members are W. P. Barba, Thomas Conway, Jr., C. C. Davis, J. C. Jones, F. A. Lewis, John McDevitt, W. J. Nash, W. H. Wilson and G. S. Webster. A short note about the report appeared on page 1112 of last week's issue. A more extended abstract follows:

Abstract of Report

In making the study of the problems presented to it the commission has had a strong desire to give due recognition to the private rights as well as to the public rights involved and to provide for their due appraisement and just reconciliation. The commission has no sympathy with the point of view that the various transit companies and their security holders ought to be held responsible for the existing inadequacies of service, and that therefore an otherwise unjust attack on their rights can be justified. Nevertheless, the commission recognizes that there are public rights as well as private rights involved, and accepts the principle that where irreconcilable conflict arises the public right must prevail and that any sacrifice of the public right by its guardians for the mere purpose of being generous to the private right is morally vicious, to be condoned only because of the difficulty of vividly perceiving the existence of the public right—a right without definite ownership.

The commission is convinced of the impossibility of laying down at this time any definite program for the removal of the existing transit inadequacies, but it is of the opinion that substantial progress can be made by a comprehensive analysis of the situation, with suggestions for such action as must be taken in order to carry the problem in the direction of solution, and this has been its effort.

The present transit service in the city of Philadelphia is so grossly inadequate as to threaten the proper development of the city. The cars operated in the central business district are greatly overcrowded, especially during the rush hours in the morning and evening.

The president of the present operating company estimates that it will be necessary to furnish transportation for 1,000,000,000 riders during the next twelve months, representing an increase of 15 per cent over the passengers carried in 1919. It is obvious that the addition of these riders must seriously aggravate present conditions unless commensurate relief is at once given.

Although the population and built-up area of the city have substantially increased since 1910, only 29 miles of track have been constructed during this period.

A study of the existing situation made by those members of this commission who are intimately acquainted with the facts discloses that in their opinion there is need for the immediate construction of at least 50 miles of track to serve the present requirements of the city, with substantial additional construction to follow in the near future.

With an increase in passengers from 1913 to 1919 of 48 per cent, the car mileage has been increased but 3 per cent.

With the exception of some 200 cars purchased by the United States Government and leased to the company in 1918, no additional equipment has been provided since 1913. Over 500 cars in the possession of the company were reported to this commission as not available for operation on March 31, 1920.

Much of the existing surface track of the transit system is worn out and requires replacement, for which the company has not heretofore created sufficient reserves.

The company is handicapped by inadequate and antiquated car shops and other facilities necessary to furnish satisfactory service at minimum cost.

REASONS FOR INADEQUACY OF EQUIPMENT

There are two fundamental causes for this inadequacy of present service:

1. The city is without the requisite high-speed lines. The city is many years too late in making reasonable provision for such lines. The only consolation to be derived from the delay is that it will be possible to lay out these lines in the light of the tendencies now manifesting themselves in the development of the city.

2. The present operating company is without adequate financial resources to furnish the additional surface facilities reasonably required of it and is unable to procure the necessary additional capital therefor. The minimum financial requirements of the company to provide necessary additional facilities will be at least $3,000,000 a year for the next three years, to meet which the company's credit resources are totally inadequate.

The company is without financial credit because of the following facts:

(a) It has and can have no marketable securities constituting a lien on the facilities and franchises controlled by it because these facilities and franchises are owned by some fifty underlying companies whose rentals must be given priority to any charge that can be created by the operating company.

(b) Its fixed charges do not have the requisite ratio to the total net earnings from operation. The net earnings from operation in 1919 were $11,645,690.02. The fixed charges of the company, prior to any charge which can be created by it, *viz.*: interest on outstanding indebtedness, rentals paid to the underlying companies and sinking-fund payments under the contract of 1907, aggregated in 1919, $9,929,813.22, or over 85 per cent of the total net earnings from operation. The conservative investor ordinarily requires that the net earnings of a public utility shall be not less than double the interest upon its outstanding indebtedness.

(c) There has been no official valuation by the Public

Service Commission of the property devoted to the public service to justify the company's present net earnings from operation.

(d) The operating revenue of the company has been imperiled by the menace of the independent operation of the city's high-speed lines threatening destructive competition.

PRESENT CORPORATE ORGANIZATION INIMICAL TO BEST INTERESTS OF CITY

The present corporate and ownership organization of the surface transit system is inimical to the best interests of the city for the following reasons:

1. The corporation at present in control of the system and possessing a practical monopoly of the city's streets for surface transit purposes is a mere operating company, without any commensurate enforceable public duty to make extensions as required by the city's development.
2. The operating company possesses substantially no property in its own right, unencumbered by its fixed charges, and the size and priority of these charges effectually excludes a proper basis for extended credit.
3. The multiplicity of companies results in federal excess profits taxation, which the underlying companies have succeeded in imposing upon the operating company to the injury of its resources for service.
4. The separate interests of the several companies prevent a unification of operation based solely on the convenience of the public.

A contributing cause of great importance to the difficulties of the transit situation is the narrowness of the city's streets.

There can be no really satisfactory solution of the transit problems of the city of Philadelphia until:

1. The necessary additional high-speed lines have been constructed.
2. The existing surface system has been improved and extended to meet present requirements.
3. A strong operating company has been established.
4. All of the transit facilities of the city are operated as a unit.
5. Suitable provision has been made for the proper maintenance, development, improvement and extension of the transit facilities of the city as occasion may require.
6. Suitable provision has been made for lessening the difficulties to traffic due to the narrowness of the streets.

Notwithstanding the urgency of the demand for relief from the present situation, the city should suspend the execution of its program for the construction of transit facilities excepting the completion of the Frankford Elevated line to Bridge Street and possibly the elevated line from Front and York Streets to Broad Street and Erie Avenue, because: (1) The present high costs should be avoided if possible; (2) a substantial doubt has arisen as to whether the present layout is the best one for the ultimate development of the city, and (3) a plan for the operation of each unit to be constructed should be provided in advance of the construction of such unit.

A study should at once be made by competent experts to be selected by the city to determine: (1) What, if any, modifications should be made in the present layout of the lines, and (2) the order in which the construction of the several units of the program should be proceeded with. If modifications are determined upon, the requisite permissive legislation should be obtained at the next session of the Legislature.

WHY UNDERLYING COMPANIES DON'T ASSIST

The present operating company cannot hope to receive from any of the underlying companies the financial assistance it requires for the due performance of its public duties. The position of these companies is not unnaturally that, if the operating company is overtaken by financial disaster by reason of its inability to find the capital requisite for the performance of its public duties, it must face the consequences of the obligation of its contract with its lessor company and drop the property values it has created into the lap of that company. Their leases having been made under legislative authority, they recognize no duty of service to the public until, by the gradual disintegration of the structure they have co-operated to erect, they in turn become an operating company. They recognize no duty to protect the public against the inconvenience of this process of disintegration. Their representatives argue with great force that their present owners to a very considerable extent hold their securities on a very conservative basis of return on the capital invested by them, and they therefore owe to the public no moral duty that might otherwise arise from the receipt of large profits accruing from trafficking in public rights.

The requisite financial strength of the operating company ought not to be secured by having the city again come to its assistance by releasing charges and other rights and practically assuming the burden of making extensions, as was done in 1907.

VALUATION INDISPENSABLE—RECONSTRUCTION OF FINANCES

A valuation by the Public Service Commission of the existing transit system is indispensable to any progress in the solution of the transit problem.

The public has a paramount right, superior to all contractual rights, that any company undertaking to operate the surface transit system shall furnish adequate service at a rate of charge which will yield not more than a fair return on the reasonable value of the facilities used and useful in the public service. Until this public right has been measured and the permissible operating revenue available for fixed charges, reserves and dividends definitely ascertained there can be no definite plan for the financial development of the company in control of the system or for the combination of that system with the high-speed lines of the city.

Pending the contemplated valuation of the surface transit system, the city should consider the practicability of a plan to bring about the following results after the completion of the valuation:

1. The organization of a new company owning outright as well as operating all of the facilities of the present separate companies.
2. The exchange on an equitable basis, measured by the value of the contributions of each constituent company to the new company, of the securities of the new company for the securities of the constituent company.
3. The imposition upon the new company of the duty of extending its tracks as public necessity demands upon all streets in which it possesses the right to operate.
4. The creation of a financial plan providing for the proper development of the new company.

5. The operation by the new company of the city's high-speed lines in conjunction with the surface system.

Considering the number and character of the conflicting interests in the present surface transit system, it is not likely that such a plan can be carried through without the help of the power of eminent domain. It is probably legally impossible to make the new company competent to exercise the power as required under the circumstances of the case. The city should therefore seek to get at the next session of the Legislature such an extension of its present power of eminent domain as will enable it to meet the situation. This power is concededly superior to all private rights, and the necessity of providing for reasonable compensation as a condition to its exercise must be relied upon to do justice to irreconcilable interests. The compensation having been paid or secured, the enterprise need not wait upon its distribution among those entitled to receive it. It is hoped that the completion of the contemplated valuation will establish such a basis for fair dealing that for the most part the mere existence of the power of eminent domain without its exercise will be enough to bring about the requisite co-operation of the separate interests involved.

The difficulties inherent in such an enterprise are doubtless very great: (1) The city must obtain the necessary extension of its power of eminent domain; (2) notwithstanding the possession by the city of the power to condemn, the conflicting interests must nevertheless for the most part be reconciled by voluntary action, otherwise there will result substantial city ownership, and (3) the requisite financial support must be found. But the situation should be thoroughly canvassed before the plan is abandoned as impracticable.

PRIVATE CONTRACT VS. PUBLIC SERVICE

An attempt has been made to have the Public Service Commission review the reasonableness of the rentals payable to the underlying companies. It is believed that such an attempt will prove ineffective because of the absence of the necessary jurisdiction of that commission. It may be well, however, for the city to endeavor to get the next Legislature to confer the requisite jurisdiction upon the Public Service Commission. Whether such a jurisdiction, if conferred, could be sustained is a serious constitutional question. On the one side is the sanctity of contract and on the other side is the fact that all of the contracts in question relate to a public right, to wit, a right to occupy public highways, a right in its very essence subject to governmental regulation, and it is a fundamental proposition of constitutional law that this power to regulate an essentially regulatory right cannot be destroyed by the fact that the person in whom the right is vested has made a contract about it.

After all parties have been protected by the completion of the contemplated valuation, it may be that such a jurisdiction might be invoked to the satisfaction of everybody in lieu of the power of eminent domain.

In no event should municipal operation of the transit system be contemplated. It would not only be inefficient but it would open the way to political conditions that would be intolerable.

If the acquisition of the surface system by such a company as is hereinbefore recommended or its acquisition by the city itself to be operated by an operating company in conjunction with the city's high-speed lines both prove impracticable, then the only course left to the city, short of compromising the public right, is that of aggressively, persistently and relentlessly pressing for the service to which the public is entitled by the use of all available legal remedies, so that adequate response to this demand will be the only justification for the continued existence of the company in control of the surface system. But in view of the constructive achievements of the present operating company, not the least of which is its far-sighted solution of its labor problem, as well as in view of the confusion and turmoil which are the necessary concomitants of such a policy as shown by the experience of other cities, its adoption may well be delayed until it promises to be the only solution of the problem.

IMMEDIATE STEPS ADVISABLE

The fact cannot be too strongly emphasized that at best it must be several years before the surface transit problem can be permanently solved, and in the meantime the city must obtain every possible improvement in the existing service by:

1. The replacement of wornout facilities now in use by the operating company.

2. The surface track extensions that are imperatively demanded.

3. A reasonable increase in the number of cars operated on the surface tracks.

4. Relief from traffic congestion in the heart of the city.

The immediate problem is to determine how this relief can be accomplished.

It is possible to help the situation financially by any or all of the following plans: (1) The construction by the city of the most needed surface extensions: (2) the purchase by the city of surface cars to be rented to the operating company, and (3) the increase of the fares of the operating company.

It is unwise for the city to relieve the operating company of its proper public obligations by the construction of the needed surface extensions or the purchase of new surface cars. The company has no adequate financial resources of its own. An increase of all or some of the rates of fares and charges, pending the completion of the proposed valuation, is probably the only practicable method of securing the immediate provision for any considerable part of the needed facilities. The decision as to what charges should be increased devolves upon the present operating company, subject to the right of review by the Public Service Commission.

CONDITIONS FOR PERMIT TO INCREASE FARES

The consent of the city to an equitable increase of fares should be conditioned upon the making of an agreement between it and the company whereby it shall be agreed that:

1. During the continuance in force of such increased charges, pending the completion of the valuation, the present operating company will forego dividends upon its stock.

2. Pending the completion of the valuation the city will recognize the existing rentals and interest obligations of the company, which shall constitute a first charge against net revenues.

3. From the surplus income remaining after the present rentals and fixed charges, including the interest on the proposed **$6,000,000 loan, have been paid the**

company will pay to the city, by way of rental for the Frankford Elevated and other facilities to be leased by the city to the company, a sum at least equal to the interest upon the city's investment in such facilities.

4. The entire surplus income above existing rentals and interest obligations, including the interest on the proposed new $6,000,000 loan, and the rental payment for the use of the facilities to be leased from the city, shall be especially dedicated to the extension of facilities and the improvement of service.

5. The property, representing the investment of any part of the said surplus income, shall be excluded from the contemplated valuation of the company's property, thereby avoiding the objection that the car rider would be forced to pay a return upon property constructed out of the higher fares paid by him. The company will account to the city at intervals of six months for all facilities so constructed.

6. The city's consent to the increase in fare shall terminate with the completion of the proposed valuation, or earlier in the event that the present operating company or the underlying companies do not give full co-operation in bringing about the speedy completion of such valuation. Thereafter the company's net income should represent a fair return upon the fair value of the property, to be fixed by the Public Service Commission.

BUS LINES CONDEMNED

Much can be done to relieve the present congestion in the heart of the city by the rerouting of cars, the better control of vehicular traffic, especially during the rush hours in the morning and evening, limitations upon parking privileges for vehicles and the creation of traffic thoroughfares. The operation of competitive bus lines, while affording slight relief in traffic conditions, will constitute a menace to the revenues of the company operating the transit system. To the extent that such competition results in a diminution of the company's net income, it will prevent improvements in service otherwise attainable under the plan hereinbefore outlined. The question of the proper sphere of bus operation should be studied by the experts whom it is recommended the city shall select to consider what, if any, modifications should be made in the present layout of the high-speed lines to be constructed by the city.

The problems involved in the formulation of a detailed agreement between the city and the present operating company for the operation of the Frankford Elevated do not constitute a part of the work of this commission. It is manifest that the city and the company should co-operate to bring about the operation of the Frankford Elevated at the earliest practicable date. In view of the plan heretofore suggested for providing additional revenues through increased fares and charges, the city has a right to demand that the company shall assume the obligation of paying, in the form of rental, a sum at least equal to the interest on the city's investment in the Frankford Elevated and other facilities leased to the company, this charge to be junior to the present interest charges and rentals of the company, including the interest on the proposed $6,000,000 loan hereinbefore referred to.

(NOTE: For an abstract of the proposals of the company for a discontinuance of all free transfers in favor of 3-cent "exchange" tickets, see page 1175 of this issue. —EDS.)

Pennsylvania Association Meets

President J. H. Pardee of the American Association Addresses Annual Meeting of the Pennsylvania Street Railway Association at Harrisburg

WITH an attendance of approximately 100, the Pennsylvania Street Railway Association held its annual meeting at the Penn-Harris Hotel, Harrisburg, Pa., on Thursday and Friday of last week, May 27 and 28. There were two regular business sessions, at which papers were presented; there was a preliminary business session, at which President Gordon Campbell, York Railways, gave the president's address, and there was an informal dinner on Thursday evening, at which President J. H. Pardee of the American association addressed the members and guests.

A resolution of sympathy to his family and appreciation of his qualities was adopted on the death of R. D. Stetson, general manager Chambersburg, Greencastle & Waynesboro Street Railway, who was killed in an accident on his own road last week.

Some of the regular papers which were presented at the meeting were abstracted in last week's issue of the JOURNAL, and the others, with the discussion at the meeting, will appear in a later issue.

In his presidential address Mr. Campbell mentioned that while the steam railroads were fathered by the government in the times of unprecedented financial stress, the electric railways were forced to meet the situation as best they could. The need for higher fares became evident after the financial stress was generally recognized, but in most cases relief was deferred until the losses were only too evident and the average increase was in no way proportionate to the increased cost. As a consequence maintenance fell behind, and the end of the war found the electric railways presented with the urgent need of new capital. Unfortunately, the past year has not apparently advanced the problem much nearer a solution. He mentioned the extraordinary activity with which the country has turned to manufacturing as an element making it difficult for public utilities, which are unable at best to offer more than a fair return on investments, to obtain the necessary capital. He argued for a better understanding in the communities served and the establishment of a prerequisite in obtaining new capital to the end that the return on the investment will be ample and reasonably assured.

He repeated his statement of a year ago that if 5 cents were a logical rate ten years ago, 10 cents is equally logical under the present conditions, and, further, experience has shown that the riding public realizes that a satisfactory service is worth what it costs.

Another element is the severe hardship upon the railways when they are asked to reconstruct tracks and provide paving never contemplated, and this is doubly difficult at this time of scarcity of labor and material. Electric railways are still performing the function of tax gatherer with no appreciation on the part of the public.

But the situation is not without promise of a brighter future. Public regulatory bodies have generally recognized the necessities of electric railways. At least the one-time popular notion of one fare for all conditions has been exploded. It is reasonable to expect that the pendulum has nearly reached the end of its swing and that with a gradual return to normal conditions electric railways will again be regarded as a conservative investment.

PRESIDENT PARDEE SUMS UP WASHINGTON HEARINGS

At the evening dinner there were between eighty-five and ninety guests. The principal speaker of the evening was President Pardee of the American Electric Railway Association. C. L. S. Tingley, vice-president American Railways, acted as toastmaster. Mayor George A. Hoverter of Harrisburg, Pa., welcomed the association to Harrisburg and paid a tribute to Frank B. Musser, president of the Harrisburg Railways. This was particularly in connection with labor trouble in Harrisburg and the manner in which Mr. Musser and the Harrisburg Railway officials handled the problem. Mayor Hoverter emphasized the fact that he believed friendly relations should exist between public utilities and municipalities for mutual benefit.

Mr. Pardee opened by saying that such meetings of state associations and other regional associations are excellent in that they give a personal touch not otherwise possible. They also make possible co-operation of the best sort. Mr. Pardee took this opportunity to review the Washington hearings and to explain what he thought will be their ultimate outcome, although nothing tangible has yet resulted. He analyzed the testimony at Washington briefly and said that the commission staff is understood to have in preparation a digest of the testimony and a report thereon, and that some sort of an announcement regarding these is expected within the next few weeks. An abstract of Mr. Pardee's remarks will be given in a later issue.

LIEUT.-GOV. BEIDLEMAN WANTS COURAGEOUS MEN—PUBLIC AND RAILWAY

Following Mr. Pardee, Lieut.-Gov. Edward E. Beidleman addressed the dinner guests. Mr. Beidleman was instrumental in the framing of the present Pennsylvania commission law. He said that men in public life who have the courage to stand up for right and just laws, irrespective of temporary popular feeling, are much needed, but that they have a hard time, and, further, that they are not supported publicly and openly by the people who will benefit by these laws, such as railway men themselves. Plain talk and laws are a duty to the public as well as to the railways and other utilities.

He said that, judging from his experience, electric railway men haven't had the courage to stand up in public and show the inequalities of tax distribution, to say that the tax really belongs on the other fellow. There isn't enough plain talk all through our public life, and street railway men, who meet the public so intimately, must join in the education of the public to see that burdens are equitably distributed and must encourage honest criticism on all sides.

Other speakers were Dr. Conley, State Commissioner of Labor, who urged safety campaigns and encouraged efforts to educate the foreign population through the children; H. F. Snow, chief engineer of the Pennsylvania commission, who urged that corporations should not take too many good men away from the commission, but that support be given to commissions to enable them to retain a competent engineering force, and who explained that the Pennsylvania commission gave its engineering force the widest latitude, urging it to get at the facts with a true interpretation; Prof. H. C. Ehlers, assistant engineer to the commission, and Arthur Hull, a local attorney.

At the first session the following officers were elected for the ensuing year: President, T. B. Donnelly, West Penn Railways; vice-president, C. B. Fairchild, Jr., Philadelphia Rapid Transit Company; secretary and treasurer, Henry M. Stine, Harrisburg, Pa.; executive committee, T. B. Donnelly, C. B. Fairchild, Jr., C. L. S. Tingley, American Railways; Gordon Campbell, York Railways; F. B. Musser, Harrisburg Railways, and Thomas Cooper, Westinghouse Electric & Manufacturing Company.

London Railway's Latest Cars

To Reduce the Passenger Interchange Period Three Sets of Doors Are Provided Along the Side of the Car

AS WAS mentioned in the issue of the ELECTRIC RAILWAY JOURNAL for March 5, 1920, the Metropolitan District Railway, London, has placed an order for 100 new cars. Of these forty will be motor cars and sixty trailers. Delivery is to begin in August. These cars show some differences from the rolling stock already in service on this railway. Perhaps the most interesting change is in the matter of motor equipment. It is intended to use five-car trains for service during off-peak periods and eight cars during rush hours. The station platforms in the tunnel portion of the railway will not allow a train longer than one of eight cars. Five-car trains will be made up of two motor cars and three trailer cars and eight-car trains will have three motors and five trailers. Each motor car will be equipped with four GE-260 motors of 180 hp. each. The present equipment of motor cars now in service is GE-69 motors of 200 hp. each. At present four-car trains are running during the quiet hours and eight-car trains during the busy hours. The four-car train has two motor cars, each with two motors, and cars are added in two-car units, consisting each of a motor car and a trailer.

The motors of the existing trains have given trouble frequently due to overloading, and it is expected that this will be obviated by the new arrangement.

The present cars have longitudinal seats at the ends and transverse seats in the center. In the new cars this scheme will be reversed, the transverse seats being toward the end and the longitudinal seats in the center. This has been made possible by a different arrangement of doors, and it will permit freer passenger movement.

Instead of the end doors, as in the existing cars, a set of double sliding doors is provided about a third of a car length along the sides, while center doors like those at present in use are also provided. The number of doors per side remains at three. Each has an opening of 3 ft. 10 in. The motor cars have an additional door at each end, but these are for the use of the motorman and the conductor only.

An endeavor has been made to make the car bodies as roomy inside as possible. The new cars will have no step board outside and the walls have been extended as far out as the edges of the step board on the old cars. As a result of this there is a step construction at the side of the car so that the lower part of the body may clear the station platform. The upper part of the body just overhangs the edge of the platform. The new cars are being built by the Metropolitan Carriage, Wagon & Finance Company, Birmingham, England.

Recent Happenings in Great Britain

National Wage Settlement Repudiated in Some Instances—Glasgow Finally Abolishes the Halfpenny Fare

From Our Regular Correspondent

There has been a great deal of trouble during April over the question of British tramway men's wages. The national settlement arrived at by the Joint Industrial Council for the industry was repudiated by the employees in several important centers, including Manchester, Oldham, Huddersfield, Cardiff and Swansea. The men in these towns went out on strike for the full 10s. a week increase of wages originally demanded, instead of the 6s. awarded by the council.

THE strikes took place against the advice of the trade union leaders and they spread over the Easter holidays. The strikers after a few days were induced to return to work, pending reconsideration of the matter by the Joint Industrial Council. This reconsideration struggled along during the latter half of April, a new point under discussion being an increase in the basic rate of wages as distinguished from war bonuses, the 6s. increase on which stands. This was referred to the nine District Industrial Councils into which the country is divided. When the Joint National Council met again on April 22 and 23 it was reported that seven out of nine district councils had been unable to arrive at any definite recommendation, and they were asked to try to arrive at an agreement within a month in regard to the basic rates to be paid in their areas. Definite recommendations were submitted by the South Wales and Midland District Councils and these were ratified. They involved increases on the pre-war rates which, taken along with the bonus increase already granted, gave increases of 9s. a week.

NATIONAL SETTLEMENT ON EQUAL BASIS

The point to be noted is that the contention of the Transport Workers' Federation for a national settlement on an equal basis for all tramway workers has not been attained, and local or sectional settlements, influenced by local conditions, are being made. The district councils affiliated with the national council were early in May still working with the object of bringing about district settlements.

The railway men of the country (as distinguished from the tramway men) are far from content with the recent national settlement. In the beginning of May the National Union of Railway Men lodged an application for a further increase of wages of £1 a week, and the Associated Society of Locomotive Engineers and Firemen sought increases of 27s. for drivers, 21s. for firemen, and 15s. for cleaners per week. The Central Wages Board, set up under the recent settlement, failed to come to an agreement, and the question was accordingly referred to the National Wages Board. The latter body has a wider constitution than the former, as besides representatives of employers and employed it includes representatives of the public as railway users. If the national board cannot agree a strike may take place.

The bill promised by the government to enable tramway undertakings to raise fares above the present permissible limit so that the undertakings may be able to meet their heavily increased working expenses was, after some discussion, read a second time in the House of Commons on April 12. It is called the tramways (temporary increase of charges) bill. Under it the Minister of Transport is empowered to make orders authorizing the undertakings to raise fares. In the case of municipal tramways the increase is not to be more than sufficient to enable the undertaking to be carried on without loss, while in the case of company tramways the increase is not to be more than sufficient to provide for interest on loan capital and for a reasonable return on share capital. Except in cases of urgency, the Minister, before making an order, is to refer the matter to an advisory committee which is constituted under the bill. The measure was passed rapidly through the committee stage on March 27, when Mr. Neal, parliamentary secretary to the Ministry of Transport, expressed the opinion that some increase of fares for workmen and school children would have to come. The undertakings must, he said, be made self-supporting. He also mentioned that it would be for the advisory committee, constituted by the bill, to determine what was a reasonable return on capital. The third reading of the bill was taken on May 5, and it only remains now to be passed by the House of Lords.

The new electricity supply bill is now before Parliament. Its object is to provide the compulsory powers which were deleted from the act passed last year in consequence of strong opposition in the House of Lords. The bill, to which much opposition is again threatened, provides for the setting up of district electricity boards wherever joint electricity authorities are not voluntarily established and for the acquisition of power stations and main transmission lines for purposes of proposed national supply.

After many attempts the Glasgow Town Council has at last agreed to abolish the halfpenny fare. The resolution was reached at a meeting held on April 29 and it was carried by seventy-two votes to seventeen. Even then there was a certain amount of compromise. The recommendation which came from the tramways committee was that all fares should be increased by a halfpenny. For the longer distances this means only a small ratio of increase. The objection was raised that for the short distances the increase from a halfpenny to a penny was an advance of 100 per cent. This was overcome by the adoption of an arrangement whereby penny tickets or tokens can be bought a dozen at a time for 9d. This brings about a ¾d. fare instead of the ½d. one.

Of course, if a short-distance passenger on the Glasgow road pays only for the ride he is taking at the time it will cost him 1d. There was much discussion and some opposition, although the chairman of the tramways committee quoted numerous figures to show that owing to the increased cost of labor and materials the financial position of the undertaking was hopeless unless fares were increased. Among other things he pointed out that unless the revenues were increased the funds would be exhausted in four months and it would be necessary to borrow money to pay wages. Glasgow is the last place in the country to abolish halfpenny fares. That city has repaid the whole capital of the undertaking, so that there are no interest or sinking fund charges. Whether the present increase in fares will be sufficient remains to be seen.

LEGISLATIVE CURTAILMENT FAILS

The attempt made by the London County Council to get rid of the power of veto of the London borough councils against proposals for the construction of new tramways has failed. A motion was made in the House of Commons on March 22 that the standing order of the House which confers the power of veto should be suspended so as to allow a bill seeking to authorize the County Council to construct additional tramways to be considered on its merits by a committee which would hear all parties. There was much discussion, and the motion was rejected by 120 votes to 60. The opponents represented the automobile interests as well as the borough councils. The latter, it was urged, would, if the veto were removed, be deprived of control. The Ministry of Transport recommended the suspension of the standing order, but the House decided otherwise. The standing order has been in existence for nearly fifty years. It has killed countless tramway schemes.

The English Electric Company has paid a dividend of 8 per cent on the ordinary shares for the past year. This is the company's first year. It is a combination of several important British companies.

In the abstract of British electrification proposals, published on page 717 of the issue of April 3, a misconception may have been caused by the reference to the plans of the London & South-western Railway. This company owns the Waterloo & City underground railway in London, about one mile in length, on which new equipment is to be installed, and is also considering electrifying all of its lines for a distance of 30 miles out of London. The estimate of £750,000 mentioned in the article is for the whole work, not merely for the improvements proposed on the Waterloo & City underground line.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Service at Cost Proposed

Outline of Provisions of New Grant Presented to Committee of Council of Akron

A tentative service-at-cost franchise plan has been presented to the public utility committee of the City Council of Akron, Ohio, by the Northern Ohio Traction & Light Company. By the terms of the contract the City Council would have the right to order all extensions. The value of the company's property within the city of Akron would be fixed by an arbitration board and the city would have the right to purchase or lease the property at the end of any five-year period.

SLIDING FARES SUGGESTED

Under the proposal from the company the city would have the right to prescribe the form and manner in which records and accounts would be kept by the railway and to establish the standard of service. The company would be permitted to operate interurban cars over city tracks and would not be required to issue or accept transfers to the city lines, the city system to be credited monthly with the actual cost of operating interurban cars.

The suggestion is made for a sliding scale of fares and rate of return, with a stabilizing fund of $250,000. When this fund fell below $150,000 the fares would be increased automatically, and when it exceeded $350,000 fares would be decreased automatically. Both a minimum and maximum rate of fare would be specified. The minimum suggested is 4 cents and the maximum 8 cents, with ten tickets for 75 cents. According to the proposed scheme the contract would become effective with an initial rate of 5 cents, which would be continued for at least three months. The rate of fare would progress from the minimum to the maximum through eight specified stages, as follows: 4 cents cash; 5 cents cash, ten tickets for 45 cents; 5 cents cash; 6 cents cash, ten tickets for 55 cents; 6 cents cash; 7 cents cash, ten tickets for 55 cents; 7 cents cash; 8 cents cash, ten tickets for 75 cents.

10 PER CENT RETURN SUGGESTED

The company would be allowed an initial rate of return on the agreed value of the property of 10 per cent per annum. For each step upward in the rate of fare the rate of return would be reduced one-quarter of 1 per cent and vice versa.

The contract would provide for a depreciation account of 3 per cent. It is specified that all matters of dispute shall be arbitrated and that the contract be forfeited for any violation by the company. The term of the contract would be twenty-five years.

The proposals of the company are being studied by the Council committee and negotiations are going forward looking toward a settlement of the present difficulties whereby the company finds itself unable to provide for any further extensions or betterments.

Improvement Program Suspended

Officials of the Portland Railway, Light & Power Company, Portland, Ore., have definitely refused to authorize any improvement work on the streets of the city, in which they are interested, until the financial condition of the company is relieved. This move has stopped completion of the East Seventy-second Street project, estimated to cost $50,000. It places in jeopardy the completion of fourteen other important projects in the city.

The city is undetermined as to what steps it can take in regard to securing completion of the projects. It has been suggested in the case of the Seventy-second Street project that the city complete the work required of the railway and withhold payment of the city's light and power bills as they become due to the company, and thus collect the costs. The belief is expressed that if the company refuses to comply with the franchise provisions the city will have to take the matter into court.

Power Employees Strike

Power house and substation employees of the Brooklyn (N. Y.) Rapid Transit Company went on strike on May 29, evidently hoping to tie up operation over the Decoration Day holiday. In this they were unsuccessful, for unofficial reports indicate that the system had the largest passenger-carrying period in its history. The demands of the men were as follows:

A six-day week instead of the seven days now worked by most of them.

Forty-eight hours a week for those—such as the construction wiremen and helpers—who now work fifty-two.

Two men on all watches instead of the one man now on duty at most of the substations from midnight to 8 a.m.

Recognition of the International Brotherhood of Electrical Workers.

Twenty per cent increase over the seven-day pay for the six days' work being sought.

In the substations rotary tenders now receive 40 to 59 cents an hour, station operators 54 to 73 cents, and foremen operators $36.25 to $43.75 a week, with no overtime and no allowance for necessary absence.

Construction Urged

Detroit Street Railway Commission Called Upon by Council to Speed Up Its Program

A resolution has been introduced in the Council of Detroit, Mich., calling upon the Corporation Counsel to inform that body in writing whether the city could not legally take over the West Warren and St. Jean lines after they had been completed by the Detroit United Railway in the same manner as it expected it will be able to take over the other lines heretofore built in accordance with the day-to-day agreements, when it is financially in position to do so.

IMMEDIATE ACTION ESSENTIAL

The Board of Street Railway Commissioners is also requested to inform the Council when it proposes to start construction of the West Warren and St. Jean lines and when it is expected these lines will be completed. The fact that the Detroit United Railway has been requested to discontinue the construction of these lines, in spite of their immediate and urgent necessity, is alluded to and also the fact that the railway has expressed itself as anxious and willing to act in accordance with the consent, permission and authority which it received in 1919.

In commenting on this resolution, President Lodge of the Council expressed the opinion that Detroit's dire need for additional railway facilities at this time demanded immediate action on the part of the Street Railway Commission and the formulation of some plan by that body whereby the delay can be avoided. The present demands for extensions and service, he stated, arise out of sheer necessity and must be met. It is the duty of the commission to work out a plan at once.

The city, it is pointed out, has laid out its plan of campaign and the company, with its back to the wall, will fight, while the people wait.

CITY PREPARING TO ADVERTISE

Although the plans for financing the municipal railway have not been made public and no bonds have yet been sold, the Street Railway Commission is preparing to advertise immediately for bids for constructing about 20 miles of railway. According to William C. Markham, engineer for the commission, specifications for the construction now planned are practically complete and cover the St. Jean, the Harper, the West Warren and the Charlevoix-Buchanan lines, thus including two of the three vital links proposed by Mayor Couzens for relieving congestion.

Mr. Doherty and Toledo Commission Disagree

Railway Still Has Available Referendum Petition Providing for Settlement Along Lines of Tayler Grant

Toledo's cost-of-service ordinance for the settlement of its railway difficulties is apparently doomed to failure. Members of the commission appointed by Federal Judge Killits and Henry L. Doherty are unable to agree on many of the most vital points. The sanction of Mr. Doherty is necessary before favorable action by the electorate can put the contract into effect. The commission which has been drafting an ordinance providing for public ownership of a transportation system has agreed to send its measure on its way to Council regardless of the action of the cost-of-service commission. This would indicate that the cost-of-service measure is considered practically dead.

MR. DOHERTY indicated that he would probably press his suit in the federal court aimed at a 10-cent fare and in which procedure he seeks to have a valuation fixed and the railway company's rights defined more definitely.

COURT'S AID MAY BE INVOKED

Judge Killits may be called upon to patch up some of the difficulties which have caused the deadlock. He said recently that he would take no part in changing the work of the commissioners when it is submitted to the Council.

The railway, however, has agreed to give the city thirty days' notice before actively pressing the suit for 10-cent fares. The city has an appropriation of $20,000 to protest the matter in the courts.

The municipal ownership commission has not announced the details of its plan, but it is understood that its ordinance will be brief and merely provide for a bond issue for the acquirement of an adequate transportation system. This measure, it is intended, shall allow the city to have bus lines as well as street railway lines. It has been the thought of the commissioners to buy through condemnation proceedings only parts of the existing system of electric railways and use buses for an auxiliary service.

The plan may be applied to a bus system without touching the present status of the street railway, it was indicated, when Councilmen offered to introduce a measure providing for a $2,000,000 bond issue for securing a bus system as protection against the withdrawal of railway service in the coming winter.

REFERENDUM AN ALTERNATIVE

The railway has an alternative for a settlement provided any measure now before Council or the people fails. Last winter when the cars were ousted into Michigan an ordinance prepared by company lawyers and patterned very closely after the Cleveland-Tayler plan was sent out in the form of an initiative petition under the provision of the city charter. Enough names were easily secured to put the proposition before the voters, but when other arrangements were being made for a settlement of the whole question the company did not submit the document to Council or the people.

These petitions are still being held and it may happen that the ordinance will be put before the people if no other agreement can be reached. It provides for improvements in the lines, cost-of-service regulation of fares, municipal ownership or renewal of grant features of the amortization clause, and practically all of the well-known features of the Cleveland plan.

The city officials are attempting to get some definite form of a settlement before the voters at the August primaries. If a measure can be put through in time for the election in August no special election will have to be called.

COURT HEARING IN SEPTEMBER

It is doubtful whether Mr. Doherty can get a hearing before September for the company on the amended cross-bill which asks for 10-cent fares. The present status of the cost-of-service plan may, however, help to bring the case up because it would settle several of the points at issue in open court.

Service Dividend on Utah Interurban

Julian Bamberger, president and general manager of the Bamberger Electric Railroad, Salt Lake City, Utah, announced on the tenth anniversary of the electrification of the road that the company will pay a service dividend or bonus to all employees who have been with the company more than one year. A number of employees have been in service for ten years and they will receive the maximum service dividend of 10 per cent. The minimum dividend will be 1 per cent for those in service one year, to increase 1 per cent for each year and retroactive to Jan. 1, 1920. Dividends will be paid March 25, June 25, Sept. 25 and Dec. 24 of each year excepting the first, which will be given on May 28.

The dividends will be computed from the regular payroll of each three months' period and will be in addition to prevailing wages. In computing the number of years in service, no deduction will be made for the period of the great war when some employees were engaged in government work and in the army and navy.

The bulletin posted by the company, in addition to the details as to the plan, makes the following general announcement:

> In celebration of the tenth anniversary of the electrification of the Bamberger Electric Railroad (formerly Salt Lake & Ogden Railway) and in order to realize an idea of the founder of this railroad, Gov. Simon Bamberger, that recognition should be given, not only to the intrinsic value of an employee's services, but also the added value which long and efficient service brings, it has been determined that a service dividend will be paid quarterly to all employees of this company who have been in the service for one year or more.

100 Per Cent Wage Increase Asked

Employees of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., have asked for a flat increase in wages for all employees who are members of the union of approximately 50 cents an hour, in a proposed new contract between the Amalgamated Association and the company. The scale of wages for trainmen now in force ranges from 43 cents to 55 cents an hour plus a service bonus. The increase if allowed would mean an addition of approximately $1,250,000, or nearly 100 per cent, to the annual payroll. Adding to this the cost of changes in working conditions demanded by the men, the additional cost to the company would be approximately $1,500,000 annually.

Edwin C. Faber, general manager for the receiver, says that in the preparation of these demands the men could not have given much consideration to the question of what their demands would cost the company, since to grant them would require an expenditure for labor in excess of the entire gross receipts of the company.

The company is now collecting on the third rail and Fox River divisions a rate of fare equal to the maximum charge for regular fares made by the competing steam lines, and it is doubtful whether a further advance to 10 cents in the city line fares in Aurora and Elgin would produce any increase in revenue.

$4,000,000 Construction Loan Approved

The ordinance to create a loan of $4,000,000 for the completion and equipment of the Frankford elevated railroad was passed on June 1 by the Council of Philadelphia, Pa., upon the expiration of the two weeks' period required for the advertising of a councilmanic loan previous to final action.

The loan was passed without debate or a dissenting vote. After the meeting of Council Francis F. Burch, chairman of the finance committee, said the proposed new loan for general purposes would probably provide for a further appropriation of $1,500,000 for the Frankford road, the outside sum William S. Twining, director of city transit, estimated would be necessary to repair the road for operation in addition to present available funds and the $4,000,000 loan.

Council postponed action for another week upon the question of the election of the city's two representatives in addition to the Mayor on the board of directors of the Philadelphia Rapid Transit Company to succeed Col. Sheldon Potter and William Hancock, whose terms have expired.

Preparing for Louisville Report

Trial Period of Three Months Has Expired—Constructive Publicity Campaign Under Way

In anticipation of a report that is to be made shortly relative to operations of the Louisville (Ky.) Railway during a three months' period, by a special committee or operation board, the company is preparing the public for its announcement by carrying a poster reading "Know the Truth" over the front fender of each car. There was no explanation of the sign. It had the public talking and asking questions freely as to what the sign meant. Then the company placed cards in the cars. In the two upper corners were small circles in which "Know the Truth" was found.

UNDER the heading "Ready to Report" the company said:

> Facts about the Louisville Railway learned by our practical operation of the property soon will be made public.
>
> These facts will be told plainly, fully, frankly and honestly.
>
> We want the public to know the truth.
>
> When the public understands our mutual problems the solution will be simplified.
>
> The success of the Louisville Railway means Louisville's success.
>
> Watch the newspapers. Read the car signs. "Know the Truth."

NEWSPAPERS USED LIBERALLY

The executive committee is also using newspaper space in acquainting the public with its work, and what it has in mind. One of these statements in advertising form was as follows:

> "Know the Truth" is a slogan under which the executive committee of the Louisville Railway will report to the public the result of its several months' study and operation of the local street railway system.
>
> This slogan was chosen because it expresses the attitude that the committee believes the public—whether it be car rider, employee, official or stockholder—should have toward this big vital public utility.
>
> The truth about the Louisville Railway as it has been learned by intensive study by the committee will be told frankly, plainly, fully and honestly.
>
> Nothing will be glossed over. Nothing will be covered up.
>
> The story of every vital problem of the lines, the reasons for them and possible suggested solutions of them will be set forth fearlessly.
>
> What the solution of these problems is the committee does not attempt to say at this time. For the present, at least, this is to be a campaign of information aimed solely at establishing understanding of the facts through truth.
>
> With understanding arrived at through truth will come valuable suggestions from the vital elements to the successful operation of our street railway—the public, city officials, employees and stockholders—that certainly will re-establish the service on the firm foundation that it justly deserves and must have if it is to continue to operate.
>
> Our sincere wish is that the riding public will watch the car signs, read our newspaper advertisements and statements, ask us questions and—Know the Truth.

The teaser advertising used for a solid week on the front end of the cars attracted much attention. The answer to the mystery has the public on its toes, so to speak.

The executive management committee held a conference with Mayor Smith recently and told of its publicity campaign, which is being supervised by Labert St. Clair and Robert Dougan, Washington, D. C.

NEW PRESIDENT NOT ANNOUNCED

Messrs. Dougan and St. Clair accompanied W. S. Speed, John W. Barr and W. H. Kaye, forming the management committee. The publicity experts were introduced to the Mayor and outlined the campaign to educate the public.

The three months' test operations expired on May 18. The report will be made as soon as the details can be figured out and the matter placed in comprehensive form. The committee of directors continues in charge. No successor to T. J. Minary, as president, has been appointed. Mr. Minary is now chairman of the board.

Mr. Barr stated that the question of a new president would be covered in the report of the three months' operations. Mayor Smith states that his "mind is still open on the subject." A number of the members of the City Council, however, are bitterly opposed to a fare increase over the franchise agreement.

Texas Interurban Assured

Announcement Made at Dallas on June 1 That 135-Mile Interurban Has Been Financed

Construction of the 135-mile interurban railway from Dallas to Wichita Falls, Tex., is assured and cars will be in operation over the entire line by the summer of 1922, according to J. F. Strickland, president of the Texas Electric Railway, and others behind the project. Building of the line was assured when citizens of Dallas made advance stock subscriptions of $1,016,000 and citizens of Wichita Falls subscribed $500,000. George T. Bishop, Cleveland, Ohio, now guarantees to sell $4,500,000 of first mortgage bonds. The General Electric Company will complete the financing of the line. Kemp & Kell, Wichita Falls, will construct the line, exclusive of power stations and transmission lines, for $7,500,000. The latter will be built by the General Electric Company. They will cost $2,000,000 to $2,500,000.

FINANCIAL PLAN REVIEWED

In announcing the results of the conferences held in Dallas recently at which the entire matter was considered Wiley Blair, chairman of the committee that promoted the line, issued the following statement:

> A financial plan for the building of the Dallas-Wichita Falls interurban has been agreed to between the local interests and the General Electric interests. Under this plan, $4,500,000 is to be provided on first mortgage bonds, and George T. Bishop, Cleveland, has undertaken to see if that sum can be obtained from bankers. The remainder of the money needed for the construction of the line will be furnished by the local interests in Dallas, Wichita Falls and all the territory between, and by the General Electric interests, the local and General Electric interests each contributing one-half.
>
> The details of the plan will be announced after they have been worked out by the lawyers. It, therefore, seems clear that the Dallas-Wichita Falls interurban can be built if the people in Dallas, Wichita Falls and intervening territory subscribe their share, and if Mr. Bishop is able to obtain from investment bankers $4,500,000 on the first morgage bonds.
>
> It remains for the citizens of Dallas to do their part in buying their portion of the preferred stock necessary to construct the line. The committee that has been working on this for the last fifteen or sixteen months feels optimistic. The members have met with every encouragement, both at home and elsewhere. Especially do they want to attest to the interest shown and the help given by the General Electric interests. Owen D. Young, vice-president of the General Electric Company, has given a great deal of his time and attention to the matter, and through his efforts responsible people, with George T. Bishop at their head, became interested.
>
> The construction of this line means so much to Dallas, Wichita Falls and all points between that it behooves every citizen to put his shoulder to the wheel and help put this proposition over.

This statement was made by Mr. Blair before the successful completion of the details was announced at Dallas on June 1.

Hollanders Visit U. S. Companies

P. M. Montijn, technical manager of the Hague Street Railway, The Hague, Holland, and T. Egbert van Putten, general manager of the Municipal Street Railways & Ferries, Amsterdam, Holland, are making a tour of investigation of the electric railway industry in the United States. They are paying particular attention to a study of the safety car. The visitors have inspected several railway properties in the East, and have looked over the plants of the J. G. Brill Company, Philadelphia; the American Car Company, St. Louis, and several railway properties in the Middle West. Mr. Montijn will pay a special visit to Terre Haute, Ind., to study safety-car operation there. Later he will look into the automatic substation installations at Des Moines, Iowa. Mr. van Putten expected to return to Holland early this month, but Mr. Montijn will extend his trip to the Pacific Coast, making it a joint pleasure and business trip, visiting the Grand Canyon and other scenic spots and several railway properties on the coast. He will probably sail for Holland on July 8.

The Hague Street Railway serves a population of 400,000 and carries about 35,000,000 passengers a year. The Amsterdam property serves a population of 775,000. Mr. Montijn was surprised to learn, when in Terre Haute, that the company there in serving a population of only 66,000 carries 16,000,000 passengers a year. In other words, The Hague, with six times the population, does only a little more than twice as much riding as Terre Haute.

Co-operative Plan of M. I. T. a Success

For the past year an interesting experiment in co-operative engineering education has been conducted by the Massachusetts Institute of Technology and the General Electric Company. While the co-operative scheme in itself is not new, several departures from the usual plan were introduced, which have produced decided results.

The class was limited to thirty students, who were chosen entirely upon the records which they had made in the equivalent of the first two years' work of the electrical engineering course.

Included in this group were graduates from Yale, Harvard and other universities, besides men who had completed their first and second years solely at Technology. The year (twelve months) is divided into four three-month periods, the students spending alternately thirteen weeks at the Lynn works of the General Electric Company and eleven weeks at the institute, followed by a two weeks' vacation.

The result of this year's work has been gratifying to the originators of the plan as well as to the students and the co-operating company, and the latter has now arranged to increase the number of men who can be enrolled in this year's class to sixty. The new class, which has already nearly completed its quota of members, will enter upon the work on July 6.

Utility Plank to Be Suggested in National Platform

A platform plank to be suggested to the Republicans in national convention in Chicago will urge national and state regulatory bodies to take such appropriate and prompt action as will insure the continued functioning of the public utilities pending a final solution of the problems involved.

Randal Morgan, president of the United Gas Improvement Company, Philadelphia; Philip H. Gadsden, chairman of the emergency committee of the American Gas Association, New York City, and chairman of the American Electric Railway War Board and of the committee on national relations of the American Electric Railway Association, and Thomas N. McCarter, president of the Public Service Corporation of New Jersey, have gone to Chicago. There they will appear before the proper committees of the convention, in an effort to have a plank helpful to the public utilities of the country included in the Republican party platform.

The gentlemen named will point out that all public utilities are faced with a serious crisis arising from the shortage of essential materials and the great increase in the cost of labor and material. They contend that the continued efficient operation of the railroads and other public utilities is essential to the welfare of the nation, and that any interruption to their service or impairment of their ability to attract new capital would be a national calamity.

The recent railroad act passed by Congress, Mr. Morgan asserts, is based upon the recognition of the fundamental principle that labor and capital engaged in service to the public must receive such compensation as will insure the continued flow of new funds and of workers into the industry. It will be pointed out that this principle should be extended to all public utilities.

Court Prevents Service Suspension

Davenport Saved from Heavy Loss and Public Inconvenience by City Merchants Acting Through Court

To prevent a tie-up of electric railway service at Davenport, Ia., on June 1, twenty-two of the leading merchants of that city, through their Retail Merchants' Association, stepped into the breach and secured an injunction from District Judge A. J. House restraining the city from putting the old 5-cent fare back into force. This injunction, a temporary one, also restrained the company from suspending service. The Tri-City Railway, however, while it has been losing money at the present 7-cent fare and 60-cent wage scale, has shown no disposition to stop operation if it could be assured a continuance of the 7-cent fare.

MERCHANTS took this action at the eleventh hour when it appeared there was no way to prevent a tie-up. Immediately following service of injunction papers the company made an agreement with its trainmen to continue the 60-cent wage scale in force pending a settlement by arbitration. The men are asking a new scale with a $1-an-hour maximum.

COMPANY ASKED FARE EXTENSION

The company went before the Council a month ago and asked a ninety-day extension of the 7-cent fare in order to insure car operation until a wage settlement with the trainmen and shopmen could be effected. This the Socialist majority in the Council turned down, insisting the company go back to the 5-cent fare on June 1 as provided in its original franchise.

Trainmen were notified by the traction lines that a pre-war fare meant a pre-war wage scale, 33 cents an hour. The men stated they would not work for this fare. With this crisis confronting the city the retail merchants got together, retained attorneys, and drew up a petition to the court for a temporary injunction restraining the city from enforcing the old franchise and its 5-cent fare.

This action has had general public approval. The public has been anxious for a continuance of street car transportation, remembering last year when a five-day cessation of service due to the trainmen's strike caused heavy monetary loss and untold inconvenience.

The city has not yet answered the merchants' action. The company immediately stated it would obey the injunction. The trainmen are also co-operating in solving the question.

ONE RADICAL SEES THE LIGHT

It is regarded as probable that the Socialist majority in the City Council will instruct the city attorney to fight the injunction. Dissension in the Socialist ranks, however, has broken out. The Mayor, Dr. C. L. Barewald, a Socialist, has come out for the 7-cent fare. He is backed in his action by Harold Metcalf, police magistrate and one of the powers in the party here.

It is planned to keep the injunction proceedings tied up in the courts until the company and the men have come to an agreement on wages and a new franchise can be prepared for submission to a popular vote.

It is understood that Tri-City Railway officials are now preparing a new franchise along general service-at-cost lines. This measure will include an important provision for a flexible curtailment or expansion of mileage operated as well as a flexible scale of fares.

The temporary injunction secured by members of the Retail Merchants' Association is worded as follows:

> Now on this 28th day of May, 1920, the foregoing petition being presented to the court in chambers at Maquoketa, Iowa, the plaintiffs appearing by W. M. Chamberlin, Charles Grilk and Henry Thuenen. It is now ordered that the clerk of this court shall issue a temporary injunction restraining the defendant Mayor and Aldermen of the city of Davenport from in any manner interfering with the continued operation of the street railways in the city of Davenport by the Tri-City Railway, as the same are now being operated under and by virtue of an ordinance passed and approved Oct. 1, 1919, and from collecting and charging the fares now being charged and collected as provided by the certain city ordinance of the city of Davenport, passed and approved Oct. 1, 1919.
>
> And also enjoining and restraining the defendant Tri-City Railway from discontinuing the operation of its railway lines in the city of Davenport, or charging fares in the operation of said street railways in excess of the fares now provided in the said ordinance of Oct. 1, 1919, set forth and attached to the petition filed herein. Plaintiffs to file bonds in the sum of $1,000, to be approved by the clerk. These injunctive orders should continue in effect subject to the further orders of this court.

Electrification Cost Prohibitive

Steam railroads entering Buffalo, N. Y., will not be compelled to electrify their lines as demanded in a resolution introduced in the City Council. The Council feels that the cost would be too great for the railway. Experts testifying before the City Council on behalf of the steam roads said that it would cost the New York Central alone $65,000,000 to electrify the lines and tracks in Buffalo and $105,000,000 if the tracks in the suburbs were included.

Approximate calculations of the cost of electrifying 82 miles of track owned by the New York Central in the Buffalo district as submitted by Edwin B. Katte, chief electrical engineer for the New York Central, showed electric locomotives alone would cost $32,000,000. Other figures were: power station, $5,000,000; contact system, $11,000,000; transmission and feed system, $3,300,000; duct line system, $2,000,000; locomotive repair shop, $1,100,000; circuit breaker houses, $200,000; track bonding, $750,000; telephone system, $75,000; engineering cost 10 per cent, or a total of $65,000,000. To this was added $1,500,000 for electrification of short connecting lines.

Settlement by Conference Indicated

Pittsburgh Mayor and Council Bow Themselves Out of Wage Controversy—New Turn in Events

The controversy between the receivers of the Pittsburgh (Pa.) Railways and the trainmen has assumed a most peculiar aspect. On June 3 it seemed that a strike would be averted. It will be recalled that Mayor Babcock and members of the City Council had sought to act as a Board of Arbitration to decide whether the men should accept the receivers' proffer of 59, 63 and 65 cents an hour or be awarded more pay than this. The receivers of the railway appear to have out-generaled the Mayor and members of the City Council in their attempt to make political capital of the controversy. This development has, perhaps, commanded the most attention lately.

The wage controversy in Pittsburgh had its incipiency back in April. The men at that time demanded a 75 per cent wage increase, or a maximum hourly pay of 91 cents. When the receivers made their offer of 59, 63 and 65 cents an hour, they demanded that in case of the rejection of this proposal arbitration be resorted to as a means of settling the questions in dispute. At the same time the receivers named S. E. Duff, a consulting engineer of Pittsburgh, to represent them on the board of arbitration. The men rejected the wage proffer and also ignored the receivers' proposal for arbitration. In consequence a strike seemed inevitable.

William B. Fitzgerald, international vice-president of the Amalgamated Association, was at this juncture brought to Pittsburgh by the local trainmen's union. At about the same time, Mayor Babcock and the City Council, who, it seemed, had lost interest in the matter, again projected themselves into the affair. They asked the receivers and the tranmen's wage scale committee to meet with them in the Mayor's office on May 27.

The trainmen had previously called a meeting for May 27 to vote on the matter of a strike, but they agreed to postpone action a couple of hours to await the outcome of the meeting in the Mayor's office.

At the meeting in the Mayor's office the Council passed a resolution as follows:

> Resolved, That it is the sense of the Mayor and the Council that the men and receivers be urged to adjust their controversy by arbitration, that the arrangement with the wage committee shall be 59, 63 and 65 cents an hour from May 1, 1920, until finally fixed by the arbitrators.

The receivers supplemented this with the following statement:

> If the proposed plan is accepted by the men and brought to us by the Mayor with his recommendation and that of the Council, it will be accepted by us.

The men at their meeting, a session which lasted into the early hours of the following day, voted two to one to accept arbitration. The following day they proposed that Mayor Babcock and members of City Council constitute the board of arbitration to decide the questions in dispute.

The Mayor addressed a communication to the receivers, informing them of the men's proposal.

When Receiver Charles A. Fagan learned unofficially that the Mayor had addressed such a communication to the receivers, he made a statement to the newspapers. Upon receipt of the Mayor's official letter, the receivers jointly replied that the letter of the wage committee to the Mayor, of which the latter sent a copy to the receivers was not in any sense an acceptance of the terms stated in the resolution adopted by the Mayor and the Council, nor did the Mayor's letter indicate any recommendations of the receivers.

When the Mayor and the Council read this communication from the receivers, they began, as they admit, to "see things differently," and immediately called the receivers and the trainmen's committee together again. At this meeting, the Mayor and the Council told the men they could not act as arbitrators. They indicated that they could not regard the proposal of the men as in any sense an acceptance of the resolution adopted by the Mayor and the Council on May 27. This resolution plainly provided that all matters involved in the present controversy should be submitted to arbitration. They said that this would include all questions in dispute both on the part of the men and on the part of the receivers.

Mayor Babcock then admitted to newspapermen that the series of conferences which he started some time ago looking to the adjustment of the controversy had been for naught and that the controversy would likely have to seek new channels for solution. He admitted that the city officials were "eliminated."

There has since been nothing done. The receivers say that in view of the fact that they named their arbitrator in the first place, it is now up to the men to name their man just as soon as possible. What the men intend to do, they will not say.

In quarters usually well informed, however, there is a feeling that the receivers and the men will yet get together and settle their differences amicably without arbitration.

Wage Matter Adjusted

The danger of a strike on June 1 was averted in Jackson, Battle Creek, Kalamazoo and Lansing on the Michigan Railway's lines. The men will work temporarily on a wage scale granted by the arbitration board.

The Jackson City Commission late on May 28 adopted a resolution fixing the rate of fare on city lines at five tickets for 35 cents, 5 cents for school children and 10 cents for single cash fares. This is not as much as was asked by the company and it is maintained that it will not meet the present wage demands of the men. The Commission, however, informed the company that in the event any other city on its lines was granted a lower fare, a like fare was to be established in Jackson. The Councils of Battle Creek, Kalamazoo and Lansing are considering the matter and it is expected that an agreement will be reached whereby the company can charge a rate of fare sufficient to pay the higher wages to the men in these cities.

Detroit Strike Averted

Railway Withdraws Transfer So As to Increase Revenues When Men Threatened to Vote on Strike

Following the refusal of the Council of Detroit, Mich., to authorize a 6-cent fare on the ground that it was without authority to pass such an ordinance, the trainmen of the Detroit United Railway sent notice to President Frank W. Brooks in response to his request for more time in which to negotiate with the city, that they would meet on May 31 to vote on a strike. They said this action would be taken unless they were granted 70, 73 and 75 cents and regardless of whether or not the company collected higher fares.

The Mayor cast further doubt on the figures presented by the company accompanying its fare petition, and stated that the company assumed the unheard of position that it was never at any moment to operate at a loss. The company's proposition to be allowed the fare increase and have the audit of the books follow was branded by the Mayor as the most insulting holdup in his experience. It was his opinion that an independent analysis of the accounts with the proper credit to revenue for terminal revenue for interurban line terminals would show that the company could pay the increase demanded without any raise in fare.

A strike was averted temporarily at least by withdrawing transfer privileges on all lines as a means of gaining increased revenue claimed to be necessary to meet the men's wage demands. This agreement conceding the demands of the men is to be retroactive to May 16 and effective until June 15. In the meantime if an agreement can be reached with the city as to a rate of fare sufficient to "meet the financial obligation involved" the company will sign a wage contract for one year.

All transfer privileges were withdrawn effective at midnight on May 31. In a communication to the Council the company explained the move and offered to have its books examined by a committee of citizens.

The Corporation Counsel led a request for an injunction seeking to have the court compel the company to issue transfers on the Pingree and day-to-day lines. In addition the court is asked to order the railway to sell tickets on the Pingree lines at the rate of eight for 25 cents as required by the franchises.

News Notes

Inquiry by Local Body Into Rates.—The question of an increase in the rates for the Sioux City (Iowa) Service Company is in the hands of a committee appointed by the Chamber of Commerce. The wage question is held up pending the presentation of the rate finding.

Men at New Orleans Want More.—Trainmen in New Orleans, La., have presented demands to the New Orleans Railway & Light Company for a flat scale of 75 cents an hour. The men are now receiving a sliding scale of 38 cents, 40 cents and 42 cents an hour depending on length of service.

Reading Transit Increases Pay.—The Reading Transit & Light Company, Reading, Pa., on May 20 announced an increase of 4 cents an hour, from 50 to 54 cents, in the wages of the motormen and conductors of its entire system, comprising Reading, Lebanon, Norristown and Roxborough.

Tri-City Linemen Strike.—The linemen of the Tri-City Railway & Light Company, Davenport, Ia., have struck for higher wages. The rates demanded are so exorbitant that if they were put in force the line foreman on the city lines would draw more than $5,000 a year, including the overtime which is normally put in.

Increase Asked by Cincinnati Men.—On May 15 the platform men of the Cincinnati (Ohio) Traction Company presented a demand for an increase of wages from 50 cents an hour to 90 cents an hour. Officials of the company say that if the demands are granted the rate of fare under the service-at-cost grant will have to be raised to 10 cents.

Wage Matter Regarded Closed.—While no definite acceptance of the 10 per cent wage increase has been received from the brotherhood, officials of the Interborough Rapid Transit Company, New York, N. Y., consider the matter closed. It is understood 90 per cent of the locals have agreed to the proposal replacing the original demand for a 25 per cent increase.

Linemen on Strike in Omaha.—The linemen of the Omaha & Council Bluffs Street Railway, Omaha, Neb., are on strike because of failure of the company to meet demands relative to the allowance of time for getting from headquarters to the job and from the job back to headquarters. The demands were considered so unreasonable that no negotiations are being held with the men.

Four-Cent Wage Advance. — The Northern Texas Traction Company, which operates in Fort Worth and runs the Dallas-Fort Worth interurban line, announces a flat increase of 4 cents an hour for all trainmen on both the city and the interurban lines. The trainmen have been receiving wages ranging from 42 cents to 50 cents an hour. Under the new scale the wages will range from 46 cents to 54 cents an hour. The new wage advance will add $75,000 a year to the company's payroll for the city lines alone. Wages on both city lines and interurban have been increased by $652,991.08 since 1915.

Wage Increase in Springfield. — Motormen, conductors, dispatchers, carhouse workers, trackmen and other employees of the Springfield (Ill.) Consolidated Railway will receive wage increases during the coming year totaling $30,000 as the result of the new wage agreement signed by representatives of the Brotherhood and A. D. Mackie, general manager of the railway. Under the new scale trainmen will receive increases amounting to 5 cents each on the hour, making their wages vary from 46 to 50 cents an hour, instead of from 41 to 45 cents. The new agreement will be effective until May 15, 1921.

Accident on Electrified Line.—When a stone retaining wall on the main line of the Chicago, Milwaukee & St. Paul Railroad, near Ragner Station, a few miles west of the divide in the Cascades, gave way without warning recently, two of the line's electric locomotives hurtled over a steep rocky embankment 300 ft. to a position near the Sunset Highway. Five trainmen were injured, two of them seriously. Damage to the locomotives was estimated at between $50,000 and $75,000. The stone wall reached a height of 30 to 40 ft. at the lower end. Its failure was attributed by officials of the company to recent rains, which had weakened the roadbed. The accident is the first that has occurred to the Milwaukee's electric equipment.

Wage Hearings Started. — The Mayors of Rochester, Syracuse and Utica, N. Y., were invited to attend the first session of the arbitration board held in Rochester on June 3. The board will hold hearings on the question of rates of wages for the electric railway employees in the cities mentioned. Arthur E. Sutherland, a Rochester attorney, is chairman of the board. Mayors unable to attend the hearing will send representatives so that the public interests may be conserved in so far as they are involved in the dispute. The place of the second hearing, or third, if necessary, has not been discussed by the arbitration board. The railways and the labor unions will be represented at the first hearing.

Wage Hearing on June 11.—The Railroad Commission of Wisconsin will hold a hearing in Milwaukee on June 11, 1920, to consider the increase in wages recently recommended to be granted the railway employees of the Milwaukee Electric Railway & Light Company by the State Board of Conciliation. Under chapter 530 of the laws of 1919 of Wisconsin, the Railroad Commission must determine the ability of the company to pay the increased wages. If necessary the commission can order an increase in fare to provide the revenue needed. City Attorney Clifton Williams of Milwaukee has announced that the city will oppose a further increase in fare, even to the extent of appealing to the courts if necessary.

Port Stanley Line Tied Up.—Extensive damage to the property of the London & Port Stanley Railway, London, Ont., has accompanied the strike of the employees. The men walked out on May 13 at midnight, and when an attempt was made on May 14 to operate trains on the line, this was found to be impossible owing to what was then said to be a break on the wires near this city. The commission asserts that the first step toward a settlement must come from the men. The men assert that they will meet the commission at any time, but that the first move must be made by the commission.

Public Represented by Commission.—In the review of labor matters in St. Louis, Mo., affecting the United Railways which appeared in the ELECTRIC RAILWAY JOURNAL for May 15, page 1014, the statement was made that "no provision was made in the arrangement for representation of the interests of the public, which, however, are protected in theory by the State Public Service Commission." As a matter of fact, any and all findings of the board of arbitrators which directly or indirectly affect the public, either in change in service or rates, must be laid before the Public Service Commission, which is the representative of the public, before acceptance by railway. Further, the city and public have the right to appear before the commission and file their exception to any or all of the recommendations of the board of arbitration.

Railway Matters Go Before Voters.—Preparations are being made at Duluth, Minn., for the special municipal election there on June 21 in connection with which the Duluth Street Railway was appraised. Two charter amendments and three proposed ordinances will be submitted. Included among the latter is a proposal to increase fares from 5 cents to 6 cents and a municipal ownership ordinance. Proposed Ordinance "A" provides for the regulation of the service to be given and fixing the fare and regulation of the fare to be charged by the Duluth Street Railway in the city of Duluth. Proposed Ordinance "D" provides for the issuance and sale of $3,500,000 of bonds of the city of Duluth for the purpose of acquiring by purchase or condemnation the lines of the Duluth Street Railway within the city of Duluth, together with the rolling stock and equipment.

Financial and Corporate

Valuations Exceed Costs

Figures for Big Railroads Under I. C. C. Indicate Ultimate Valuations Will Exceed Fixed Costs

That the Interstate Commerce Commission's preliminary reports of the cost of reproducing the railroads of the United States more than sustain the aggregate property investment account of the companies was affirmed by the carriers in the advance freight hearings. This testimony was offered by Thomas W. Hulme, general real estate agent of the Pennsylvania Railroad, and also vice-chairman of the railroad presidents' Committee on Federal Valuation. This is the first official indication of what trend the valuation by the commission was taking.

TOTAL $20,000,000,000

Mr. Hulme, in presenting an analysis of the commission's report, stated that when the inventory was completed for all the roads of the country, it would undoubtedly show a reproduction cost at 1914 prices in excess of the carriers' own investment statement, and that on the basis of present prices the total would be far in excess of this. The aggregate railroad property investment obtained by the carriers in reports presented by them to the commission is over twenty billion dollars. This figure, Mr. Hulme said, would be more than sustained at 1914 prices, while the application of 1920 prices would add billions more.

The present government preliminary reports cover fifty railroad systems, with a mileage of 51,853. Cost of reproduction at 1914 prices including the value of land is indicated as $3,203,-782,543 as compared with a property investment account as carried on the books of the company of $3,158,278,156. They are principally small roads. At the time they were investigated or shortly thereafter many of them were in receivership.

TEN LARGEST ROADS COMPARED

The preliminary reports, Mr. Hulme asserted, were minimum figures, and in a number of cases the carriers believed that final figures will be considerably larger. He said that wherever there was a difference of opinion between the local engineering forces of the government and the representatives of the carriers the government engineers put in the figures that they deemed to be the minimum. It is but natural that there should be many errors and differences of opinions in inventories involving such great amounts. Another point which Mr. Hulme brought out is that the land value of $340,741,031, includes in many cases not the present value but the original cost. In case present values of land were used, this figure would, of course, be increased.

The ten largest roads in the list of fifty covered in Mr. Hulme's statement show the following comparison between the carriers' investment account and the government estimates of the cost of reproduction as of 1914:

Name of Road	Property Investment	Reproduction cost and land
Great Northern	$384,273,863	$418,204,335
Rock Island	341,401,305	388,601,208
N. Y., N. H. & H.	195,505,844	319,599,023
Boston & Maine	195,903,526	276,528,128
Big Four	144,375,812	159,269,845
Oreg.-Wash. R.R. & Nav.	156,642,559	143,347,128
Mpl., St. P. & S. S. Mar.	116,953,635	114,701,111
Oregon Short Line	113,094,103	109,685,219
Chic. & Eastern Illinois	78,990,280	77,751,855
Central of Georgia	62,003,324	73,609,448

Cleveland Interurban Increases Its Net 149 Per Cent

The financial condition of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, improved materially over the previous year, so much so that notwithstanding a 22 per cent increase in operating expenses and taxes, the surplus or net income for the year increased 149 per cent. This is equivalent to a return of 2.57 per cent on the $2,500,000 capital stock outstanding. The income statement is shown in the accompanying table.

Year Ended Dec. 31	1919	1918	Per Cent Increase
Gross earnings	$691,043	$551,860	25.30
Operating expenses and taxes	459,476	376,500	22.02
Net operating income	$231,567	$175,360	32.02
Interest charges	167,188	149,553	11.79
Net income	$64,379	$25,807	149.00

Chicago Elevated Deficit

The report of the earnings of the Chicago Elevated Railways for the month of February, 1920, the first month under the 8-cent cash fare and the two-tickets-for-15-cent rate, showed a deficit. The report for March, 1920, also showed a deficit as follows:

Total earnings	$1,358,521
Total expenses	1,158,204
Balance for interest	200,317
Fixed interest charges	205,409
Deficit	$ 5,092

Employees Urged to Save

T. E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, has again done an unusual thing. Just when everybody seems bent on spending as much as he can Mr. Mitten has gone straight to the men and women of his company with a message to save. He urges the budget. On it the success of the Philadelphia Rapid Transit Company has been built during his incumbency. Mr. Mitten knows what it means for a company or an individual to live within its or his income.

Wants People to Decide

Mayor of Boston Says Extension of Credit by City Should Be Decided by Referendum

A bill is now pending before the Legislature in Massachusetts to provide for the public operation of the electric railway lines in the Hyde Park district of Boston. The bill was introduced by the committee on street railways of its own motion, after several alternative measures had been discussed.

6 PER CENT RENTAL

It provides in substance that the railway in Hyde Park now owned and operated by the Eastern Massachusetts Street Railway shall be turned over by them to the trustees of the Boston Elevated Railway system, to be operated in conjunction with that system. It also provides for a rental of 6 per cent on the value of the property, as estimated by the Public Utilities Department, to be paid by the Boston Elevated Railway to the Eastern Massachusetts Street Railway in pursuance of certain detailed provisions contained in the act. The rate of fare is not to exceed the unit rate of fare which the Boston Elevated Railway may charge.

There is a provision that any deficit in the operating cost is to be paid by the city and that the city shall provide such funds for the rehabilitation of the Hyde Park lines as will enable adequate service to be maintained and for this purpose may borrow not to exceed $200,000.

It is the opinion of Mayor Peters of Boston that unless the Legislature amends the bill so that the city will not be obliged to provide money for the rehabilitation of the line a referendum should be attached. In commenting on the matter the Mayor said:

> To the first of these provisions the Mayor has given his assent, feeling that the situation in Hyde Park in respect to transportation is sufficiently serious to warrant the expenditure involved. He is, however, utterly opposed to the second provision, the substantial effect of which is to take money raised by taxation and apply it to the rehabilitation of a privately owned street railway, with only a remote possibility of reimbursement.
>
> It is true that the last section of the act provides that within ninety days of the return to the Eastern Street Railway of its property the company shall pay the city of Boston a sum equal to any increase in the value of the property as determined by the Department of Public Utilities. This, however, in view of the well-known financial condition of the line, is not regarded by the Mayor as satisfactory.
>
> OPPOSE CITY LENDING CREDIT
>
> The Mayor is strongly in favor of the adoption of the amendment which strikes out that part of the bill requiring the city to provide funds to rehabilitate the road. If this amendment should not be adopted, he feels that there ought at least be a referendum to the voters of the entire city.

75.8 Per Cent Increase in Lake Shore Net

The Lake Shore Electric Railway System, Cleveland, Ohio, as a whole, seems to be somewhat better off than a year ago, although only an average of 3.83 per cent was earned on the total capitalization of $7,500,000. With this surplus, however, the company could pay $160,000 dividends as required on the preferred stock and still have left a 2.62 per cent return on the $4,500,000 of common stock, provided the cumulative preferred dividends are disregarded. The combined income statement is shown in the accompanying table.

Year Ended Jan. 31	1919	1918	Per Cent Change + Inc. — Dec.
Gross earnings	$2,611,755	$2,189,324	+19.28
Operating expenses and taxes	1,895,533	1,593,083	+18.98
Operating income	$716,222	$596,241	+20.13
Interest and fixed charges	428,504	432,861	— 1.01
Net corporate income	$287,718	$163,380	+75.80

Public Service Revenue Improves

Net income of the Public Service Railway, Newark, N. J., for April, as shown by a report filed with the Public Utilities Commission, amounted to $108,099. The net income for April, 1919, showed a deficit of $96,496, or a gain in net income of $204,595, as between April, 1919, and April, 1920.

Gross income for April, 1920, amounted to $532,103, as compared with $326,209 for April, 1919. Total income deductions for the two months compared in the report were practically the same, amounting to $424,004 for last month and $422,705 for April, 1919.

The total revenue from transportation in April, 1920, was $2,232,154, as compared with $1,741,083 for April of last year. The revenue from other railway operation amounting to $40,522 for April, 1919, increased to $50,599 last month, so that the total railway operating revenues for last month were $2,282,754, as compared with $1,781,606 for April, 1919.

The company carried a total of 37,893,656 passengers and 6,781,610 as transfer passengers. Passenger revenues from cash fares amounted to $2,161,125 and from revenue transfers to $67,004, which give a total passenger revenue of $2,228,130. The average fare per revenue passenger, including transfer revenue, was .071 and the average fare for all passengers .058.

Gloucester Lines $128,707 Behind

In a letter to Mayor Charles D. Brown of Gloucester, Mass., Chairman Homer Loring of the Eastern Massachusetts Street Railway trustees has called attention to the fact that the Gloucester district, since the railway has been operated by the public trustees, has failed to earn the cost of service by $128,707.

The letter states that the trustees discontinued the Essex power station and carhouse and made other savings last fall in an effort to reduce the deficit; the Gloucester power station was closed down on May 12 and power is now being purchased from the electric light company, and in a further effort to continue the operation of cars the trustees sent to Gloucester fourteen one-man cars at a total cost of $85,000.

Mr. Loring says the trustees have taken every step possible to give the district an opportunity to put itself on a self-supporting basis and adds:

> Notwithstanding these economies it is clear that the district cannot be operated without loss while depending upon car fares alone. Some other source of revenue must be obtained. The situation has reached a crisis and we would like to confer with you and others whom you may select, representing the city's interests.

Intercorporate Relations Under Review

The transit inquiry in New York was resumed by the city on May 20. The Deputy Commissioner of Accounts Loudoun was the principal witness. He went over much of the incorporate history of the companies included in the Brooklyn Rapid Transit System. He was examined more particularly with respect to the work of the Transit Development Company. This company was organized in April, 1902. It was incorporated for the purpose of handling real estate, manufacturing and selling power and the like. It appears that the power houses and some of the other plants of the Brooklyn Rapid Transit are leased to the Transit Development Company for operation. Dr. John Bauer, financial expert of the corporation staff, testified concerning Dual Contract No. 4. He asserted that the Public Service Commission was four years behind in checking up some of the work under the contract.

Consolidation of Receivership Suits Denied

John W. Seaman has lost his suit against the United Railways, St. Louis, Mo. The receivership for that company has been upheld by the United States Court of Appeals in a decision rendered at St. Paul, Minn. The appeal of Samuel W. Adler for dismissal of the receivership on the ground that no cause of action was stated has been denied. The court ruled, however, against consolidating the two receivership suits of Mr. Seaman and Mr. Adler and decided that they must be tried separately. According to the decision, the receivership will stand in the Seaman case until Special Master Lamm reports to the District Court.

The Appellate Court also confirmed the adverse decision of the District Court in the suit brought by Mr. Priest, counsel for the railway, to have the evidence in the Seaman suit thrown out and the case argued again.

Tax Assessment Protested

The Houston (Tex.) Electric Company has filed before the City Commission a petition asking reduction of valuation of its properties for taxation. The city of Houston increased the company's valuation from $2,694,000 to $3,194,000. The city maintained that the company's property should be assessed at one-half the valuation agreed on for calculation of earnings under the new franchise. The special master in chancery fixed this value at $6,000,000. The company contends that it might be necessary to increase fares again if the city insists on increasing assessments for taxation.

Valuation Under Way at Knoxville

Preparations are fast going forward for the conduct of the appraisal of the property of the Knoxville Railway & Light Company. It was noted previously that Albert S. Richey, Worcester, Mass., has been retained by the Railroad & Public Utilities Commission to value the property. The company will be represented by J. H. Perkins, Birmingham, Ala. Mr. Richey has just announced the retention of C. W. Stocks as his resident engineer in charge of the work of directing the valuation. For similar work Mr. Perkins has selected Charles P. Abraham. Mr. Abraham was also associated with Mr. Perkins in like capacity in the 1919 appraisal of the property on the Memphis Street Railway. Prior to this, he was engineer in the rate and statistical branch of the United Gas & Electric Engineering Corporation, New York.

The appraisal was ordered in connection with the denial by the Railroad & Public Utilities Commission of Tennessee of the application of the Knoxville Railway & Light Company for an increase of fares as emergency rates. Upon the filing of the reports of the valuation engineers, the right is reserved to the parties in the case to apply for such further relief as may appear reasonable. The examination ordered by the commission will be conducted into the amounts invested in the property of the company upon which it is entitled to a reasonable return. This examination will be made by experts, one to be appointed by the commission and one by the company, with the right reserved to the municipal authorities of the city, if they see proper to exercise it, of appointing an expert to act with the experts appointed by the commission and the company.

The reports of the experts are to be filed with the commission by Sept. 20. The cost of the examination, except the expenses and charges of the expert of the city, are to be paid by the company.

Seattle Sobering Up

Municipal Ownership Not an Unmitigated Blessing—Inquiry Into Purchase Planned

Mayor Hugh M. Caldwell of Seattle, Wash., recently took the first step in his investigation of the transaction by which the city in 1919 purchased the railway lines of the Puget Sound Traction, Light & Power Company for $15,000,000. Mr. Caldwell had promised in his campaign speeches about two months ago that he would conduct the inquiry. A communication was sent to Walter F. Meier, Corporation Counsel, asking for a written opinion as to whether the city of Seattle has any ground for an action against the former owners of the railway lines to recover damages for misrepresentation or to void the transaction.

The Mayor declares that it is estimated by those conversant with the deal that the price paid was $5,000,000 to $6,000,000 in excess of the real value of the lines.

In his letter the Mayor cites the case of the city of Tacoma against the Tacoma Light & Water Company in 1897, in which the city recovered $800,000 for misrepresentation by the vendor in the sale of a water plant to the city. He asks the Corporation Counsel to advise whether any other course can be followed by the city in seeking relief from its contract with the traction company.

Mayor Caldwell states that if it can be shown that the company misrepresented the value of the property it offered for sale, he believes the city has cause for action and that he will take steps to bring about such action.

A. W. Leonard, president of the Puget Sound Power & Light Company, the successor to the Puget Sound Traction, Light & Power Company, said:

> As I understand it, the city of Seattle offered the Puget Sound Traction, Light & Power Company a certain amount for its railway lines within the city limits. The company accepted the offer, delivered the property and both sides have thus far lived up to the contracts and agreements.

Ole Hanson, Mayor of Seattle at the time of the street railway negotiations, and active in the completion of the deal, recently returned to Seattle. He announced that he will make an early answer to Mayor Caldwell's charges that the city paid an exorbitant price for the railway.

$6,000,000 of Notes Offered

Formal offering was made on June 1 of $6,000,000 of American Light & Traction Company five-year 6 per cent gold notes with common stock purchase warrants attached. These warrants entitle the holder to purchase common stock in the ratio of two-thirds of one share for each $100 face value of the notes, at prices varying between $142 a share and $152 a share. The notes are being offered by Halsey, Stuart & Company, National City Company and Bankers' Trust Company, New York, at 94.75 and interest, yielding more than 7½ per cent.

Financial News Notes

Rehabilitation Planned. — Business men of Greenville, Texas, since the recent sale under foreclosure of the property of the Greenville Power & Traction Company and the discontinuance of service by the railway have become interested in devising some means by which the railway may be financed and service resumed.

Road in Douglas Quits.—The Douglas Traction & Light Company, Douglas, Ariz., has discontinued the operation of its railway lines. There were 10 miles of track. Douglas, a city of 8,000 inhabitants, has more than 1,000 private automobiles. In addition the jitney was permitted to compete with the railway. In 1918 the railway was operated at a loss of $12,000 and in 1919 at a loss of $20,000.

$829,175 from Unused Real Estate.—The auction sale of the unused real estate of the Interborough Rapid Transit Company, New York, N. Y., on June 25 realized good prices, some of the parcels going as high as $7,200 for city lots and an average of $2,540 was realized for the first thirty-five parcels auctioned. A total of $829,175 was realized. Offerings included unoccupied land in Manhattan, the Bronx and Borough of Queens.

Will Default in Interest.—Judge Julius M. Mayer of the Federal District Court virtually decreed on May 26 that the Columbus Avenue line of the New York (N. Y.) Railways shall be junked. The system, with only $696,465 cash on hand, cannot afford to pay bond interest due on that line and Job E. Hedges, receiver, was ordered to let the interest go to default rather than sacrifice other more valuable, though actually unprofitable, lines.

Stone & Webster Incorporate.—The firm of Stone & Webster has been incorporated under Massachusetts laws and will henceforth be known as Stone & Webster, Inc. The partnership has consisted of Charles A. Stone, Edwin S. Webster, Russell Robb, Henry G. Bradlee, Frederick P. Royce, George O. Muhlfeld, Henry B. Sawyer, Frederick S. Pratt, Harry H. Hunt and Howard L. Rogers. Stone & Webster, Inc., will continue the business with the same personnel.

$150,000 Profit in Boston in April.—The total receipts of the Boston (Mass.) Elevated Railway for the month of April were $2,845,092; the total cost of service, $2,694,902; net profit for the month, $150,189. The net deficit to be overcome on April 30 was $511,076. The total revenue passengers carried in April was 28,188,564, and the receipts from fares were $2,780,554.49. The receipts per revenue passenger were 10.093 cents; cost of service per passenger, 9.561 cents.

Fund for Improvements Supplies Capital.—The Toledo Railways & Light Company, Toledo, Ohio, has received $202,971 out of the Craig fund by order of Judge Killits to pay for betterments to the property and improvements in service recently made by the company. Trolley and rolling stock repairs, track renewals and substation improvements were listed in the itemized account. The fund is created by the court to insure improvements. Six per cent of the earnings are paid into it weekly. There is now a balance of $6,504 in the fund.

Tri-City Purchase Authorized.—The Illinois Public Utilities Commission has issued an order authorizing the Tri-City Railway to purchase the Moline, Rock Island & Eastern Traction Company for $195,000 of capital stock of the Tri-City Railway. The Tri-City Railway was also authorized to issue capital stock for the purpose of purchasing the property. The Moline, Rock Island & Eastern Traction Company operates between Moline and Silvis. This company and the Tri-City Railway operated separately until the 7-cent fare was granted by the Illinois Public Utilities Commission. One of the contingencies stipulated in the grant was that universal transfers should be issued. Two fares had been charged previously.

Bonds of Northern Ohio Issued.—A syndicate in which Hollister, White & Company, New York, N. Y., are participating is offering at 96 and interest to yield about 7.85 per cent $2,000,000 of six-year 7 per cent secured gold bonds of the Northern Ohio Traction & Light Company, Akron, Ohio. The bonds are dated June 1, 1920. It is explained that the present issue of bonds will reimburse the company for the payment at maturity of an underlying bond issue and for recent capital expenditures. The $2,000,000 of six-year 7 per cent gold bonds will be secured by the pledge with the trustee of $2,500,000 principal amount of the company's first lien and refunding mortgage bonds. Additional six-year 7 per cent gold bonds may be issued from time to time against the deposit of cash or against the similar pledge with the trustee of first lien and refunding mortgage bonds, which are secured by a direct mortgage on all the property of the company subject to the liens of underlying mortgages. The company's seven-year 6 per cent secured gold bonds, also due June 1, 1926, are, with the exception of the coupon rate and sinking fund provision, almost identical in form and security with the present issue of six-year 7 per cent secured gold bonds. Another of the bankers participating in the offering is the National City Company. This company is advertising the issue widely. It says that the earnings of the Northern Ohio Traction & Light Company have continued to improve monthly.

Traffic and Transportation

Three Cents for Transfers

P. R. T. Files Tariff Extending Exchange Tickets—No Transfers in Central District

The report of the Mayor's transit committee, published briefly last week and at greater length in the body of the paper this week, recommended an increase in fares on the Philadelphia (Pa.) Rapid Transit system, under certain conditions. On May 29 the company made public its reasons for filing an application for more money and setting forth the advantages of making the increase by a 3-cent charge for transfers.

The company estimates that it will be called upon during 1920, if existing fares were continued, to carry 1,000,000,000 passengers. In 1910 it carried only 445,599,000 passengers. In 1919 the number was 872,000,000 passengers, of which 17 per cent rode on free transfers and 6 per cent traveled on 3-cent "exchanges" or transfers. The company estimates that about half of the 170,000,000 free transfer passengers of last year asked for transfers only because they were free, and that if there was a 3-cent charge for them only about half of this number would buy them. This would mean that the car service now supplied to 85,000,000 passengers who only partly need it could be given to the same number of passengers who actually depend on the cars for service.

The comparative results of this plan are estimated as follows:

	1919 Actual	1920 Estimated Transfers and Exchanges as Now	1920 Estimated Universal 3-cent Transfer
Passengers carried	872,000,000	1,000,000,000	915,000,000
Effective car capacities	2,707	3,061	3,061
Passengers per car capacity per annum	322,000	327,000	299,000

Seventy-six per cent of the present passengers pay the 5-cent fare. The company considers that these passengers should not be disturbed in such a way as will serve to lessen the number of short rides, "which are now the only profitable business remaining." The over-congestion of transfer passengers in the delivery district, it continues, could be reduced by the elimination of all transfers and exchanges in that district. The gain from this change and in requiring two 5-cent fares rather than one fare and a 3-cent transfer is estimated at $500,000 per annum, while the added relief from congestion following this move would be of almost incalculable benefit to the traveling public, according to the company.

Skip-stop savings, according to the company, produced for the winter of 1919 the equivalent of seventy-four cars. The remaining economies being made effective on this account will be the equivalent of adding eight additional cars during next winter, which, added to the forty-six car capacities made by rerouting and the 300 reconstructed cars which the company has under way, makes a total of 354 additional car capacities possible of accomplishment by the company for use during the winter of 1920.

Relief Plan Defeated

Portland Voters Reject Program Approved by City Council—Fare Increase Seems Certain

At a special election on May 21 the voters of Portland, Ore., rejected three ordinances previously passed by the City Council and providing financial relief for the Portland Railway, Light & Power Company. The defeat of the measures was decisive. It leaves the company with only one course if it is to continue operation—an increase in fare.

The three ordinances proposed to relieve the company from license and franchise taxes and also from a portion of the bridge tolls. They would also have relieved the company from all charges for paving on work which would have to be done if the tracks were not at present in the streets. Finally, they proposed to relieve the company of pavement reconstruction and repair costs when such repair and reconstruction have not resulted because of the presence of the tracks.

The measures were passed by the City Council several weeks ago as offering the most practicable means of averting an advance in fare. The State Public Service Commission had previously refused the company's application for a rate increase. In rejecting the application the commission urged the city to co-operate with the company in working out some plan of relief. No effort was made by either the city or by traction officials to campaign in behalf of the proposed measures. Their defeat was not unexpected.

Defeat of the measures has had the immediate result of sending the company's application back to the State Public Service Commission, which resumed hearing of the case on June 1. A final decision is likely to be forthcoming within thirty days. An increase in fare, possibly to 8 cents, is the expected action of the commission. The commission some months ago expressed the belief that increased revenue was imperative.

Will Reroute Many Lines

New Orleans Railway & Light Company to Make Changes Specified in New Municipal Ordinance

A comprehensive program for the improvement of electric railway transportation in New Orleans, La., has been adopted by the City Council with the co-operation of the New Orleans Railway & Light Company. The Council has passed an ordinance which provides for the rerouting of ten lines, the tearing up of the tracks in thirteen streets, and the laying of tracks in four streets. This measure has been adopted to bring about a more equable distribution of traffic, and to relieve the congestion in the downtown business district.

The movement for the rerouting of a number of lines and for stricter regulation of vehicular traffic was started some time ago by the New Orleans Association of Commerce. The association appointed a special committee to investigate transportation conditions in the city. In accordance with recommendations made by this committee, a rerouting ordinance was passed by the Council on April 21.

WILL SHORTEN ROUTES

Under the provisions of the measure J. D. O'Keefe, receiver of the company, was given fifteen days within which to accept or reject its terms, the ordinance further providing that, if accepted, the work upon the rerouting scheme was to begin within thirty days. The matter was referred by Mr. O'Keefe to the trustees for the bondholders in New York City, one of which is the Empire Bank & Trust Company. Although two extensions of time have since been granted by the City Council, the receiver has not yet received advices from the trustees as to his course of action. However, it is reported that Mr. O'Keefe favors the measure, and that it will ultimately be accepted.

The most noteworthy changes effected by the ordinance will be those in St. Charles Street from Canal Street to Lee Circle. All tracks will be eliminated from St. Charles Street between these two points and the street will be used exclusively as a light vehicular driveway along its entire length from Canal Street to Carrollton Avenue, a distance of slightly more than 4 miles. Heavy vehicular traffic will then be thrown on to Tchoupitoulas Street, from Canal to Annunciation Street, and five of the uptown car lines will be routed via Magazine Street.

It is provided in the ordinance that the pavement along these streets to be torn up is to be restored at the expense of the company. Considerable paving, chiefly bitulithic, and resurfacing with bituminous paving, is also provided, although granite block pavement and cobblestone are named when called for in the original franchise of the company. It is estimated, however, that the new construction work will not exceed 1,600 feet.

Bus Application Denied

Pennsylvania Commission Refuses to Sanction Competition with Scranton Railway

Plans for the operation of motor buses in Scranton, Pa., in competition with the lines of the Scranton Railway, were halted on May 25 by an order of the State Public Service Commission. The commission refused to grant the Commonwealth Transportation Company a certificate of convenience for the use of streets occupied by the railway on the ground that the establishment of two competing systems of transportation would be contrary to the best interest of the public.

In denying the application the commission declared that such competition would inevitably result in the elimination of either the bus company or the railway as a carrier, with a consequent deterioration in service. It held that electric railway service was essential to the city's development, and that if the railway were forced to abandon operation through competition, the public "would be poorly compensated for by the auto car service." It further pointed out that to allow the application would be to invite injurious motor bus competition in every other city in the State.

The Commonwealth Transportation Company several months ago applied to the Scranton City Council for a franchise to operate six bus lines. The franchise ordinance subsequently enacted was vetoed by Mayor Connell. It was then passed by the Council over the Mayor's veto.

The commission said in its order:

> * * * It is argued that the proposed service will not come in serious competition with the street railway, but there is no disguising the fact that this will be the inevitable result. Conceding that there is merit in the contention that the street railway company does not provide adequate or convenient transportation for all who desire to make use of such service, and that this accommodation for that part of the public not adequately or conveniently served will be furnished by the operation of these auto buses, the commission is confronted with the serious question of the effect the operating of these motor vehicles will have on the service now furnished by the street railway company. The designated routes of operation practically cover the city and are coextensive with the tracks of the street railway.
>
> It is not the case of one system of transportation supplementing another, but of two systems operating in the same territory and competing practically for the same patronage and the ultimate result is involved in the solution of the question of the survival of the fittest, with a gradual deterioration in the service of one or both until this result is reached. Unquestionably, street railway service in a city like Scranton is absolutely necessary to its development and to its social and business life and if the street railway is forced to abandon its service by competition, such as here proposed, the public will suffer a loss that will be poorly compensated for by the auto car service.
>
> It is true that a few may be better served by a jitney operation than by the street car line service, but it is fundamental that the accommodation and convenience of the many should not be sacrificed for the benefit of the few, and individual disadvantages and inconveniences are common to all public service of a common carrier nature, and of necessity always have and always will exist. The time may come, although not now apparent, when the auto bus service will be substituted for the service now furnished by the street railways, but the commission is far from being convinced that the public is now ready to accept the change or to choose auto buses as the better agent of the two to most efficiently and conveniently serve it. The commission is convinced, however, that the public can not for long have both services under the fact and circumstances disclosed in this case.
>
> To approve this application would not only be a reversal of the policy which this commission has heretofore consistently pursued, namely not to grant a certificate of public convenience for a jitney service directly, or injuriously competing with the street railways, but it would also be an invitation to establish an auto bus service in every city in the commonwealth in direct and injurious competition with its street car service and this in the face of the fact within common knowledge that the street railways generally are urgently demanding increased rates to enable them to continue their service. It is easy to say let the street railways go to the wall or be forced out of business by competition, but surely that will not be the attitude of the public if called upon to decide the question for itself, and we will not decide for it until better informed than at present. * * * In any event, as the question presented for decision involves every city within our jurisdiction, we are constrained to ahere to the policy heretofore adopted of protecting all public service that is reasonably adequate or that can be made so against ruinous competition, and consequently to refuse this application.

Freight Service Will Stop

The Birmingham Railway, Light & Power Company, Birmingham, Ala., will discontinue freight service between Birmingham and Bessemer and between Birmingham and Ensley, if the Public Service Commission acts favorably upon a petition to be filed in a few days. Judge William I. Grubb, of the federal court, approved a petition of Lee C. Bradley, receiver, asking for authority to start the proceedings. The petition will ask that the company be required to handle no freight in less than carload lots between Birmingham and the points named.

Action of the receiver was due to the heavy inroads made on the freight service by trucks handling small freight. During the past three months, the petition sets out, the freight handled decreased to $9,812, as compared with a sum of $12,015 for the same three months of 1919. The receiver stated in his petition that the cost of operating the freight service including taxes for the first three months of this year was $13,170.

Freight equipment, the receiver showed, is in such condition that a considerable sum will have to be spent for overhauling and reconstruction. The entire shop facilities of the company will be engaged in repairs to and rebuilding of passenger cars.

Judge Grubb authorized a loan of $60,000 to pay preferred claims for labor, materials and machinery, which obligations were incurred within the six months preceding the receivership on Jan. 23, 1919.

Car Speed Up in Kansas City

Traffic in the retail district of Kansas City, Mo., has been speeded up 25 per cent to 100 per cent since the introduction of improvements suggested by John A. Beeler, according to a recent announcement by Robert P. Woods, city member of the Kansas City Railways board of control. Mr. Woods declared that 100,000 persons had been benefited twice daily by the traffic changes made by Mr. Beeler. Mr. Woods gave better loading facilities and a rearrangement of car stops as the chief causes of the improvement.

A check, according to Mr. Woods, shows these improvements: The average speed on Twelfth Street was formerly 2¼ miles an hour during the rush hours. Twenty-five per cent more cars now pass through the district in the rush period. On a large part of the Eighth Street division the average rush-hour-hour speed was 1¾ miles an hour and in some places only ¾ of a mile an hour. At Eighth Street and Grand Avenues 15 per cent of cars provided for the rush period were delayed by congestion until after the need for them had passed.

The speed at some points has been increased 200 per cent and the average speed increased 50 per cent. Forty-seven and a half per cent more cars pass through during the rush hours. Mr. Woods stated that the benefits on Main Street and Grand Avenue have averaged 25 per cent to 40 per cent. He said that on these streets vehicular traffic and parking limited the results obtainable.

Will Halt City Buses

At the close of the trial of a suit brought by the Brooklyn (N. Y.) City Railroad against the city of New York, Supreme Court Justice Callaghan in Brooklyn on May 26 announced he would direct that a permanent injunction be issued restraining Grover A. Whalen, Commissioner of Plant and Structures, from continuing the operation of municipal buses in competition with certain surface lines owned by the company. The court held that no emergency for such operation existed, as the city contended, and therefore that the city was exceeding its authority.

The permanent injunction will not be issued until the Court of Appeals has passed upon the city's appeal from the decision of the Appellate Division sustaining a temporary injunction. If the Court of Appeals reverses the Appellate Division the injunction will not issue and the buses will continue to run. Counsel for the company figured damages at about $1,000 a day. Mr. Whalen had testified that the buses were carrying on an average of 85,600 passengers a day in Brooklyn, 55,000 on the lines competing with the Brooklyn City Company.

Justice Lydon of the Supreme Court on May 25 decided that the bus lines operated by authority of the city in competition with the Seventh Avenue-Delancey Street and the Eighth and Fourteenth Street crosstown lines of the New York Railways were running illegally and that the city was without express legal authority in the matter. An order was signed prohibiting the city officials from continuing the operation. At the same time action was stayed until the Court of Appeals has decided the suit brought by the Brooklyn City Railroad.

Transportation News Notes

One-Man Cars on Jersey Road.—The Morris County Traction Company, Morristown, N. J., has announced that it will use one-man cars exclusively on its line between Summit and Elizabeth. Double-truck cars will be replaced with "safeties."

Trailers for Wheeling Line.—Trailers are being attached to all cars operating over the Warwood-Wheeling line of the Wheeling (W. Va.) Traction Company. The addition of trailers was made necessary by the constant increase in traffic on the line.

Asks More in Seneca Falls—The Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y., has filed with the Public Service Commission for the Second District an application for permission to raise the fare in each zone to 8 cents. The line operates between Geneva and Seneca Falls.

Jitney Fares Raised in Birmingham.—Jitney rides in Birmingham, Ala., now cost 7 cents each. The bus operators recently decided to raise their fares, and, after considerable discussion, agreed on the 7-cent charge. The Birmingham Railway, Light & Power Company charges a 6-cent fare.

Seven Cents in Rome.—The Public Service Commission for the Second District on May 25 issued an order authorizing the New York State Railways to charge 7-cent fares on its lines in Rome, N. Y. The fare is now 5 cents. The company is authorized to install the new rate on three days' notice.

Fares Raised in Austin.—The City Commission of Austin, Texas, has passed an ordinance authorizing the Austin Street Railway to install a 7-cent fare, with four tickets for 25 cents when tickets are purchased. Children under twelve years of age are given a 3-cent fare. The increased fares went into effect on June 1.

Permission for One-Man Cars Refused.—The Hornell (N.Y.) Traction Company has been refused permission by the Public Service Commission to operate one-man cars on its North Hornell city line. The commission holds that it would not be safe to operate one-man cars over the railroad tracks crossed by the electric railway in the north end district.

New Divisions for Bay State System.—Five new operating districts for the Eastern Massachusetts Street Railway, Boston, Mass., have been established by the public trustees of that system. New divisons will serve Hingham, Weymouth, Milton, Norwood and Hyde Park. Service was recently restored on the Weymouth lines after that town had appropriated $28,000 to meet operating costs.

Wants More in Port Arthur.—The Port Arthur (Tex.) Traction Company has applied to Port Arthur City Commission for an increase in fare from 5 cents to 8 cents. This is the first time the company has asked for a fare increase. In petitioning for an advance in rates, the company stated that its bonds were selling at present at 65 and that money could not be obtained for necessary repairs and extensions.

Safety Campaign in Birmingham.—A one-week safety campaign began in Birmingham, Ala., on May 24. The campaign, which was under the auspices of the Birmingham Automobile Club, aimed to eliminate all accidents during the week. The management of the Birmingham Railway, Light & Power Company co-operated in the safety movement. Automobile steering wheels were tagged with the slogan of the club, "Be Careful."

Seven Cents on Schenectady Lines.—A 7-cent fare on the lines of Schenectady (N. Y.) Railway was authorized on May 24 by the Board of Alderman of that city. The fare is now 6 cents. The new rate is to continue until May 31, 1921. The Public Service Commission for the Second District several months ago authorized the company to collect 7 cents in communities where it operated over the tracks of the United Traction Company, Albany.

More Trains in Operation.—The Brooklyn (N. Y.) City Railroad on May 24 extended the use of multiple-unit train on its Brooklyn Bridge-Long Island City lines, via Graham Avenue and the Vernon Street Bridge. Trailer operation in the past had been impossible due to the lack of loops and wyes at Long Island City. More safety cars have also been put on the Nassau Avenue line and ten of these cars are now in service on that line during the rush hours.

Postpones Galveston Hearings.—Hearing of the petition of the Galveston (Tex.) Electric Company for a permanent injunction to restrain the city of Galveston from interfering with it in putting into effect a 7-cent fare, has been continued in the United States District Court at Houston. The city of Galveston is now having an appraisal of the company's lines in Galveston made, and postponement was asked until this work is finished. The city will contest the petition.

New Company Magazine Christened.—Volume 1, No. 2 issue of the monthly magazine started by E. B. Atchley, publicity manager of the Northern Ohio Traction & Light Company, Akron, Ohio, by and for the system's employees, has appeared under its new name of the *Northern Light*. A contest with a prize for the best suggestion for a name resulted in more than 150 proposed names, nine employees having suggested the winning title. The contest was announced in the first number of the paper.

Asks Rise in Wichita Falls.—The Wichita Falls (Tex.) Traction Company has applied for authority to put a 7-cent fare into effect in Wichita Falls. L. L. Allbritton, general manager, has notified the City Commission that recent additions to equipment, made necessary by the rapid growth of the city, demand an increase in operating revenue which can be had only by increased fares. The company is now losing money and faces receivership unless relief can be had. The present fare is 5 cents.

Fewer Transfers in Dallas.—Fewer transfers are being called for by passengers on the lines of the Dallas (Tex.) Railway since the new form of transfer was put into effect on May 11, according to a statement by Richard Meriwether, vice-president and general manager of the company. Reports of trainmen show an average of 500 fewer transfers issued daily now than under the old system, Mr. Meriwether said. The new transfer gives a flat fifteen minutes to transfer from one line to another, points of transfer being definitely fixed.

Interstate Fares Raised.—Increased fares on the lines of the Washington Railway & Electric Company, Washington, D. C., running into Maryland, became effective on June 1. The new fares are 8 cents cash or a token in each zone on the company's lines, and were established with the consent of the Interstate Commerce Commission. There are five zones in Maryland from the District line to the terminus of the City & Suburban line running to Laurel, four zones on the Rockville line, and one zone each on the Cabin John and Forest Glen lines.

Plan of Political Control Defeated.—The Chamber of Commerce of Camden, N. J., has abandoned the plan of urging the operation of the Public Service Railway's lines in Camden County through a board of control. The chamber offered a number of suggestions to the company. Thomas N. McCarter, president of the company, said that such a plan would make a political football of the railway problem. The report of the Chamber of Commerce suggested that a board of control be appointed, four members to be named by the Governor and the fifth by the employees of the road.

One-Man Cars Proposed for Salt Lake.—One-man safety cars may be introduced in Salt Lake City, Utah, as a means of solving the financial difficulties of the Utah Light & Traction Company. Use of "safeties" was suggested at a recent conference between representatives of the company and members of the State Public Utilities Commission. The company some time ago applied for an increase in fares from 6 cents to 7 cents. It later filed an amended petition asking for an 8-cent fare. The commission held a number of hearings on the application, but as yet has not announced its decision in the case.

Three Cents a Mile Asked.—The Marion & Buffton Traction Company, Marion, Ind., has filed a petition with the Indiana Public Service Commission asking for an increase in rates from 2¼ cents to 3 cents a mile. The petition recites the fact that despite previous increases in fares, first to 2½ cents and later to 2¾ cents a mile, the operating expenses have increased faster than the gross revenues. Five increases in wages have been granted employees since May 1, 1918, when trainmen received a minimum of 24 cents and a maximum of 30 cents an hour, compared to 40 and 45 cents maximum today.

Seven-Cent Fare Enjoined.—Federal Judge Edwin Holmes has issued an injunction restraining the Meridian Light & Railway Company, Meridian, Miss., from charging a 7-cent fare on its lines. Judge Holmes overruled the recommendation of Special Master M. C. Terrell, upholding the increase. The court sustained the contention of the city that the company had no right under its franchise to raise its fare. The rate was raised from 5 cents to 7 cents some time ago. The company has announced that it will appeal the case to the higher federal courts and that pending final settlement of the matter the higher rate will remain in effect.

Rerouting Reduces Accidents.—A marked reduction in the number of accidents in Los Angeles, Cal., has attended the rerouting of the lines of the Los Angeles railway. The rerouting of the car lines began on May 9. Figures for the week of May 2 to 8, preceding the introduction of the new system, showed a total of 273 accidents. Of these, 187 were classed as traffic accidents, including collisions between street cars and autos and other vehicles, and eighty-six as miscellaneous, such as injuries at the step in alighting from car. The week of May 9 to 15 showed a total of 256 accidents, or a decrease of seventeen. The number of traffic accidents was reduced by six and that of the miscellaneous accidents by eleven.

Higher Fares if Tracks Are Changed.—The elimination of the surface tracks of the Pacific Electric Railway from Hill Street, Main Street and other thoroughfares of Los Angeles, Cal., will necessitate an increase in the fare charged by that company. H. B. Titcomb, vice-president, recently stated that while the Pacific Electric was willing to make the improvements, it could not afford to do so at the present rate of fare. Mr. Titcomb pointed out that the company's deficit in 1920 would probably total $2,000,000. Its payroll for the present year will amount to $6,789,000, or an increase of 90 per cent over that for 1917. The system expects to carry approximately 90,000,000 passengers in the present year as against 78,500,000 in 1919.

Smoking Allowed on "L."—Smoking is now permitted on certain of the lines of the Boston (Mass.) Elevated Railway, under an order recently issued by Edward Dana, general manager. On weekdays smoking is permitted during rush hours only in the rear car of southbound trains carrying Forest Hills signs, and in the forward car of northbound trains carrying Everett signs. The hours are approximately from 5:15 a.m. to 10 a.m., and from 3:30 p.m. to 6:30 p.m., when trains of six or more cars are being operated. Smoking is not permitted on trains of less than six cars at any time, nor on Atlantic Avenue trains, trains looping at Sullivan Square or Dudley Street, nor on any trains during the middle of the day or evening, or on Sundays and holidays.

Asks Rise in Interurban Rates.—Permission to increase the fare charged on the Cincinnati, Lawrenceburg & Aurora Electric Street Railway, Cincinnati, Ohio, to points in Ohio, is asked by C. E. Hooven and Edgar Stark, receivers of the company, in a petition filed in the Insolvency Court. Since June, 1913, the road has been operated by the receivers, and during that time, it is set forth, $150,000 has been expended to repair damages by floods, and in 1918, under court orders, $200,000 had to be spent for changes and necessary improvements. These sums have been paid out of salvage and earnings, except $60,000 outstanding receivers' certificates, the receivers say. No interest has been paid on the $750,000 bonds of the corporation since Jan. 1, 1913, and bondholders are demanding payment.

One-Man Cars Increase Traffic.—One-man safety cars are proving popular in Birmingham, Ala. Twenty-five of these cars are now in service on three of the lines of the Birmingham Railway, Light & Power Company. It is estimated that on the Lakeview and Highland lines, where "safeties" are being operated, traffic has increased from 25 per cent to 30 per cent. Many persons not heretofore patronizing these lines are reported to be doing so since the introduction of the one-man cars. Part of the increased travel has come from persons using other lines of the company, but much has come from those now using electric cars instead of automobiles. During the year ended March 1, 1920, the number of car riders increased by 9,850,086 over the number carried the year ended March 1, 1918. The number of riders for the former period totaled 60,398,814.

Asks More on I. R. T.—The Interborough Rapid Transit Company, New York, N. Y., on May 28 applied to the Public Service Commission for the First District for authority to increase subway fares. The company also declared its intention of applying for an increased fare on the elevated lines which it leases. Commissioner Nixon refused the application and at the same time denied a request for a hearing. The company thereupon obtained from Supreme Court Justice Giegerich a writ of certiorari requiring Mr. Nixon to explain the reason for his refusal. The application, like that of the Brooklyn Rapid Transit Company, was the first step toward an appeal to the courts for a decision as to whether or not the commission has jurisdiction to consider rates of fare. It reviewed the financial condition of the company, laying special stress on the fact that to avert trouble with its employees the company had granted an increase of 10 per cent to become effective June 6. This advance in the pay of the men, it was stated, would increase operating expenses $2,000,000 a year.

Ten Cents Not Enough for Jacksonville.—A 10-cent fare would be insufficient to meet the needs of the Jacksonville (Fla.) Traction Company. A statement to this effect was made by L. R. Nash, valuation engineer, representing Stone & Webster, at a hearing before the Florida Railroad Commission on May 20 on the application of the company for permission to charge a higher fare in Jacksonville. Mr. Nash declared that the average return for the entire period of the company's existence was only about 3½ per cent. From the year 1915 to date no dividends have been paid on common stock, and from 1916 to date no dividends have been declared on preferred stock. The company has outstanding more than $1,000,000 in notes and is unable to secure credit for the payment of these. The company is not asking for a specific increase in fare, but is so placing its case before the commission that the latter will see to it that a fair return is granted. The Florida Supreme Court some time ago handed down a decision ordering the commission to take jurisdiction of the case.

Queue Loading on D. U. R.—A queue system of car loading has been adopted in Marysville, Mich., on the line of the Rapid Railway, one of the interurban lines of the Detroit United Railway. The Marysville Village Commission has passed an ordinance providing that the system shall be used whenever ten or more persons shall be waiting at any street intersection or at any regular stopping place to board any car. Under the terms of the ordinance those people standing in the queue formation nearest the front of the car shall board by the front entrance and those nearest the rear of the car shall board by the rear entrance. In case of a two-car train those nearest the rear shall board the second car. However, if one of the cars is filled to capacity, "then the car not so filled shall be boarded in an orderly and regular manner, just as if there were only one car." Any person violating or failing to observe any provisions of the measure shall be liable to a fine of not more than $25 and costs or to imprisonment for not more than thirty days in the county jail, or both. Queue loading in Detroit has been described previously in the ELECTRIC RAILWAY JOURNAL.

Personal Mention

H. E. Weeks Elected

Davenport Executive Chosen President of the Iowa Electric Railway Association at Omaha Meeting

H. E. Weeks, vice-president of the Tri-City Railway & Light Company, Davenport, Iowa, was elected president of the Iowa Electric Railway Association at the meeting of that body in Omaha, Neb., on May 21. The naming of Mr. Weeks came as a recognition of his long and faithful service to the association. In addition to taking an active interest in committee work, he has served as secretary-treasurer of the State organization since 1913.

Mr. Weeks was born in Alton, Ill., on March 19, 1874. When twenty-one years old he went to work for the Alton, Granite & St. Louis Traction Company. Shortly thereafter he became associated with J. F. Porter in the electrification of the Alton horse-car lines and the building of the new line to St. Louis. When the property was sold to the Clark interests, in 1906, Mr. Weeks went to Davenport as secretary-treasurer of the Tri-City Railway & Light Company, a reorganization of several local companies negotiated by Mr. Porter.

H. E. WEEKS

Mr. Weeks became vice-president of the Tri-City system early in 1919. He also holds the position of treasurer and assistant secretary of the subsidiary companies. His department has charge of the property records and valuation work of the several underlying companies.

Mr. Weeks served from 1908 to 1913 as secretary of the American Electric Railway Accountants' Association, while the work of drawing up a standard classification of accounts was being carried on with the Interstate Commerce Commission. He is now a member of the committee of the National Electric Light Association which is working on a similar standard classification of accounts for all electric light companies.

John I. Beggs Again Heads Milwaukee System

At a meeting of the board of directors held in New York on May 24, 1920, John I. Beggs was elected president of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. An interview with Mr. Beggs, upon his recent assumption of the control of the company in his capacity of chairman of the board of directors, appeared in the ELECTRIC RAILWAY JOURNAL for May 8. Mr. Beggs is quoted in the Milwaukee press as having said that there would be no important changes in the organization of the company.

Alexander F. Werner, chief engineer of the Detroit power stations of the Detroit (Mich.) United Railway, has resigned.

P. V. See, superintendent of equipment of the Hudson & Manhattan Railroad, operating the Hudson River tubes between New York and New Jersey, has resigned. Mr. See has been appointed superintendent of equipment of the Northern Ohio Traction & Light Company, Akron, Ohio.

C. W. Stocks, associate editor of this paper, has received a leave of absence for a few months to become resident engineer in charge of the appraisal which Albert S. Richey will conduct of the property of the Knoxville Railway & Light Company for the Railroad & Public Utilities Commission of Tennessee.

E. O. Shryock has resigned as superintendent of the Northwestern Pennsylvania Railway to accept the position of superintendent of railways of the Northwestern Ohio Railway & Power Company, with headquarters at Oak Park, Ohio. Mr. Shryock has been superintendent of the former system since 1913. In 1914 he introduced one-man safety cars on the company's lines in Meadville, Pa. Mr. Shryock entered the service of the Meadville & Cambridge Springs Street Railway as an electrician's helper in 1905. Later he was employed by the People's Incandescent Light Company, a subsidiary, as electrician. During the following years he served both railway and light company in the successive capacities of motorman, conductor, extra dispatcher, electrician, trouble man, meter reader, solicitor and business manager. He then joined the Northwestern Pennsylvania Railway as superintendent.

New Ottawa Manager

F. D. Burpee, Superintendent Since 1912, Promoted—A Pioneer in the Canadian Traction Field

F. D. Burpee, whose appointment as manager of the Ottawa (Ont.) Electric Railway was noted briefly in the ELECTRIC RAILWAY JOURNAL for May 29, is a pioneer in the field of electric traction in Canada. Mr. Burpee became connected with the Ottawa Company soon after that system, the first electric railway in Canada, was organized. He has kept pace with the development of new ideas in the industry and is a strong advocate of the service-at-cost plan of operation. He is now forty-four years old.

Mr. Burpee began his railroad career with the Canadian Pacific Railway in 1891. Two years later he entered the employ of the Ottawa Electric Railway. For the following five years he worked in various departments and in 1898 was appointed assistant to the superintendent and secretary-treasurer. In 1912 he succeeded Col. J. E. Hutcheson as superintendent. He occupied that position until February, 1916 when he enlisted for overseas duty with the Canadian Expeditionary Forces.

F. D. BURPEE

The vicissitudes of war finally landed him with the Railway Construction Troops in France, where he was engaged for two years on the British Front in the construction of narrow and standard gage railways. He returned to Canada in March, 1919, and retired with the rank of Major. Upon his return to civil life he resumed his former duties with the Ottawa Electric Railway, continuing as superintendent until his recent advancement to the position of manager. He is succeeded as superintendent by A. J. Tobin.

Arthur F. Allyn has been appointed chief engineer of Detroit power stations of the Detroit (Mich.) United Railway. Mr. Allyn succeeds Alexander F. Werner, resigned. Mr. Allyn was first employed by the company in 1901 as engineer at the Farmington power station. Later he was made chief engineer of that station.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Pole Production to Increase During 1920

Hard Winter and Transportation Delays Responsible for Scarcity of Pole-Line Equipment

Although pole-line stocks are low in a number of places, as was noted in the May 1 issue of the ELECTRIC RAILWAY JOURNAL, an actual shortage of poles does not exist except at the distribution yards. Delayed shipments, rather than a shortage in the supply, is believed to be responsible for present conditions.

According to reports from the West and Northwest, a very bad winter was experienced in the territory between the Cascades and the Rockies, which resulted in stocks being low this spring. The actual production, however, it is reported, during 1920 will probably be the largest in the industry, and unless the demand is much heavier for the balance of the year than it has been during the first four months there will be plenty of poles to supply the demand and to leave a normal stock on hand next spring.

At present large interests are accepting all the business offered, subject to their ability to deliver. It is believed by large producers that all orders booked up to the present time could be shipped within the next sixty days if cars were available.

Orders for Turbo-Units Is Falling Off

Demand Has Been So Heavy This Spring that Factories Are Quoting Late 1921 Shipments.

During the last few weeks reports from manufacturers have indicated that the heavy volume of turbine orders which has been coming in since the first of the year has dropped off. In particular this refers to central-station buying rather than to industrial buying, and the drops vary in amount. It seems to indicate a retrenchment on the part of public utilities in view of present economic conditions and the outlook for conditions in the next twelve months.

The let-up in turbine orders is quite pronounced in the case of one prominent manufacturer of units, and varies on down through other producers to the point where the let-up is not very noticeable. A large central station which has just cut its twelve-million-dollar program about 30 per cent attributes the reduction to the difficulty of financing such projects, the inability to get the material needed and the unrest in the building trades. Vitally necessary extensions are being pushed on to completion, however, although the more remote additions are being permitted to rest for a while.

Manufacturers are running their plants at full capacity in an endeavor to fill the orders on hand, and in some cases manufacturing capacity is rather heavily overbooked. Large units around 30,000 kw. could with difficulty be booked for shipment before late in the year 1921, so heavy has been the demand. That brings schedules up to from twelve to eighteen months on these large sizes, depending on the manufacturer, and from that time on down to eight months is being quoted for the smaller station units, say 500 kw. One large organization, it is reported, will soon have a productive capacity of 300,000 kva. per month in turbo-units.

Turbo-unit prices have been rather unstable during April and May, virtually all prices having been revised upward in that time, some almost every two weeks, and in one case a 5 per cent advance in April having been followed by two of the same amount in May. Prices in representative cases are reported about 84 per cent above pre-war prices, and production costs are declared to be above this figure.

Orders on turbine auxiliaries have kept up and are expected to continue for a time, in keeping with the time lag by which this class of apparatus always follows orders on the large units. Shipments on turbo-auxiliaries are quoted from eight weeks to four months. Some units are still to be heard from, although the large units to which they apply have been ordered for some months.

Delivery Situation Growing Serious

Lack of Railroad Rolling Stock Causes Anxiety—Car Control by Centralized Authority Helps

Transportation overshadows production as a prime necessity of the hour, looking at the present difficulties of the delivery situation from the standpoint of the electric railway purchasing agent. A representative of the ELECTRIC RAILWAY JOURNAL discussed the outlook early this week with the head of a large purchasing department whose work is now greatly handicapped by the inadequacy of railroad service. This official did not hesitate in stating that the delivery situation is the worst today that he has ever known.

So great is the congestion on the railroads handling his purchases that thirty men are at present in the field devoting their entire efforts to pushing forward shipments of material and equipment of various kinds needed by operating companies and on construction jobs in which this concern is interested.

No single class of material tops the list as most difficult to move, although steel and coal are giving probably more trouble than any other commodities at the moment. Throughout all industry strikes have cut down the efficiency of manufacturing and transportation companies. The shortage of cars and locomotives from which the railroads are suffering cannot be made up in a few weeks, but close observers of industrial conditions generally appreciate that immediate steps must be taken and efforts kept up with the utmost energy to relieve this shortage, if disastrous results are not to follow in the country's business.

A purchasing agent who buys coal for central stations in the East recently pointed out that it is an impossibility for the railroads serving his companies to furnish all the coal needed in his section of the country. The shipment of coal abroad is proceeding on a scale which threatens the continuity of industry on this side of the ocean, and drastic steps toward control of this traffic are likely to be forced soon. Buyers of coal have concentrated too much, in some sections at least, upon securing particular kinds and grades of fuel. The time is ripe for some action to withhold from foreign buyers, it is believed in some quarters, at least a portion of the shipments which are moving eastward so freely to the detriment of American industry. Unless in the height of the war, there never was a time when a careful study of the fuel problem from the combustion engineering and analytical standpoint was so desirable.

Deliveries are being extended a month at a time, according to the experience of some purchasing departments. Prices still tend to move upward in railway material. The need of maintenance is apparent on the railroads of the country, and were it not for the fact that electric railways are not now buying in large quantities, their difficulties would press still harder in view of transportation troubles caused by lack of car and locomotive repairs. However, a good deal of material is being sent by express for railway service, although weight limitations are cramping much movement in this way. The motor truck is helping out the purchasing agent and the operating man within its proper field of service, but even here accidents and delays are being experienced.

Fortunately some light appears to be breaking in the working out of the centralized control of car service on the railroads; sentiment against further parsimony in the provision of rolling stock on railroads has found expression in the legislation which authorizes the Interstate Commerce Commission to direct the flow of money into channels which in time will offer some relief from the present congestion, and there is also some evidence that the days of under-production are drawing rapidly to a close.

Traction Prices Unaffected by Retail Reduction

Review of Various Economic Factors Differentiating Commodity and Electrical Markets

While there has been a large amount of price slashing in general retail commodities there is no reason to expect an immediate or as sudden a reflection in prices of electric railway supplies. Different economic factors control these markets and they must be considered by careful buyers.

In the general retail field rapidity of turnover counts for almost everything. A large part of the stock is made up of seasonal goods and unless these move in season there is a dead investment. When for one reason or another goods are moving slowly it is far better to accept a small profit or even sell at a slight loss to keep the goods moving.

In the electric railway supply field the roads had long ago reached the low point in buying and since the beginning of the year have been buying on a more extensive scale. In this field, therefore, there is no occasion for stimulation of sales by lessening the profit. Furthermore, this is not a field that responds to such tactics as rapidly as do retail buyers. Finally it is not possible in this field to conduct bargain sales. If prices go down they must stay down, and such reductions invariably call for further slashes.

It is reasonable to expect that manufacturers will extend to the traction companies any savings that might accrue from lower costs of raw materials. Until then, however, it is doubtful if much relief can be expected.

High labor costs undoubtedly will serve to prevent any very large drop in the majority of electric railway materials and equipment for some time. This is probably the strongest factor in the current price situation.

Railway Projects in Costa Rica

Among the public improvements projected for Costa Rica is the construction of a railroad from Alajuela to Grecia, a distance of 11 miles, and the electrification of the government-owned Pacific Railroad, with a line diverting the course by way of Esparta.

English Electric Company, Ltd., Expands

Trade alliances are being consummated in the electrical field in Europe, according to the English *Electric Journal* for April, 1920. The English Electric Company, Ltd., Queens House, Kingsway, London, England, includes the Dick, Kerr Works, Preston; the Ordnance Works, Coventry and Scotstoun; the Phoenix Works, Bradford; the Siemens Works, Stamford, and the Willans Works, Rugby. The French and Belgian companies with which the English Electric Company is associated have been reorganized under the names of Constructions Electriques de France and of Constructions de Belgique, each with a capital of 40,000,000 francs. The former will manufacture rolling stock and equipment for electric railways, including standard motors, at a plant which is now reported nearing completion near Lyons. The company has entered into a contract with the Midi Railway of France for the construction of water turbines with a total output of 300,000 kw. to be utilized in connection with the electrification of the railway, the construction of 200 electric locomotives and an important contract for electrical machinery.

Rolling Stock

Danbury & Bethel Street Railway Company, Danbury, Conn., has purchased through its receiver, Judge J. M. Ives, six rebuilt trolley cars from the Union Railway Company, New York City. They are the ten-bench size, open type car, to replace those burned in a recent fire. Shipment was made the last week in May. In addition, three more safety cars have been ordered by the receiver for delivery as soon as possible. Three are already in process of construction. The company is rebuilding two of its old cars into safety type.

Track and Roadway

Boise (Idaho) Railway.—The Boise Railway will spend between $25,000 and $30,000 during the present year on extensions and betterments.

Interborough Rapid Transit Company, New York, N. Y.—The Interborough Rapid Transit Company on May 27 opened for operation the East Bronx extension of the Pelham Bay branch of the Lexington Avenue subway line.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway will re-lay the rails on its Squantum line. The line was discontinued and the rails taken up nearly a year and a half ago.

City Railway, Dayton, Ohio.—Arrangements are being made by the City Railway to extend its line west on Third Street, Dayton, to Crown Point, with a spur to the Soldiers' Home. Plans for the improvements have been submitted to the City Commission.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—All brick paving operations in Omaha, both for work to be done by the city and by the Omaha & Council Bluffs Street Railway, have been brought to a standstill by lack of brick. Owing to the transportation tie-up neither the city nor the company has been able to procure the necessary material.

Philadelphia, Pa.—Sealed proposals, addressed to the Director of the Department of City Transit of Philadelphia, Pa., will be received until June 22, for the following work:

Contract No. 571—Station platforms and shelters on Kensington Avenue at Huntingdon Street, Tioga Street, and Torresdale Avenue, and on Front Street at Berks Street, including steel framework and railing, reinforced concrete platform floors, etc.

Contract No. 572—Track construction in Front Street from Arch Street to Callowhill Street and in Frankford Avenue from north of Harrison Street to Bridge Street, comprising about 7,286 ft. of single track and two crossovers.

Contract No. 573—Concrete deck in Front Street from Arch Street to Callowhill Street and in Frankford Avenue from Dyre Street to Bridge Street, comprising about 2,980 ft. of structure.

Contract No. 574—Station platforms and shelter on Frankford Avenue at Pratt Street, including reinforced concrete platform, underpassage floors and stairways; wood roofs covered with asphalt and felt roofing, etc.

Power Houses, Shops and Buildings

Georgia Railway & Power Company, Atlanta, Ga.—The Georgia Railway & Power Company will install a 50-mile transmission line between Lindale, Ga., and Gadsden, Ala., to connect with the transmission lines of the Alabama Power Company.

Pacific Electric Railway, Los Angeles, Cal.—The Railroad Commission of California has issued an order requiring the Pacific Electric Railway to install depot facilities at its Canal Avenue station at Los Angeles, at a cost of not less than $4,000.

Trade Notes

Frank Sutton, consulting engineer, has removed his office from 80 Broadway to 140 Cedar Street, New York.

Hunter Illuminated Car Sign Company, Linden Avenue, Brooklyn, N. Y., has completed plans for improvements to its plant, to cost about $6,000.

Electric Storage Battery Company, Philadelphia, Pa., will move its Cleveland office about June 10 from its present location, Room 1217-1222 Citizens Building, which it has occupied since May 1, 1903, to Chester Avenue and

East Twenty-fourth Street. The new offices will occupy the entire second floor of the "Exide" battery service station, extensive alterations having been made for the purpose. H. F. Sauer is acting manager of the Cleveland office.

The Aluminum Company of America, 120 Broadway, New York City, is contemplating building an addition to its plant at Massena, N. Y., to cost about $200,000.

The Cooper Hewitt Electric Company, Hoboken, N. J., has recently purchased property adjoining its plant which will eventually double its present floor space.

E. G. Long Company, 50 Church Street, New York, N. Y., manufacturer of electric railway supplies, has filed notice of an increase in capital stock from $100,000 to $250,000.

The Cleveland Welding & Manufacturing Company, West 117th Street and Berea Road, Cleveland, Ohio, contemplates building an addition, 90 ft. x 155 ft., to its factory, to cost about $75,000.

The F. J. Klenck Company, 55 New Montgomery Street, San Francisco, is manufacturing fiber sheets, rods, tubes and washers and paper in sheets of from 0.004-in. to 0.125-in. thickness for insulation.

The Hammond Steel Company, Inc., Syracuse, N. Y., announces the election of Clyde E. Dickey as first vice-president and general manager. He is president of The Dickey Steel Company, Inc., New York City.

The King Manufacturing Company, St. Joseph, Mo., has doubled its factory space. The additional space will be used for the manufacture of ornamental lamp posts, ornamental brackets and commercial lighting units.

Frank Clark, who has been with the Rome Brass & Wire Company, Rome, N. Y., for the past twenty-six years, has resigned and will become associated with the National Conduit & Cable Company, Hastings, N. Y.

Safford K. Colby has resigned as assistant general sales manager in charge of electrical conductors of the Aluminum Company of America, New York City, to become president of the American Magnesium Corporation, Niagara Falls, N. Y.

J. N. Lapoint has been elected president of the Arnold Electric Tool Company, 902 Chapel Street, New Haven, Conn., succeeding Frederic Levere, who recently resigned. Mr. Lapoint is president of J. N. Lapoint, New London, Conn., manufacturer of broaching machines.

Dwight E. Robinson, 21 East Fortieth Street, New York, N. Y., has been placed in charge of eastern railway sales for the Du Pont Fabrikoid Company, Wilmington, Del. The selling arrangements previously existing with the Wendell & MacDuffie Company, 61 Broadway, N. Y., have been terminated.

Esterline Company, Indianapolis, Ind., has appointed Ludwig Hommel & Company, Cleveland, Ohio, as representatives for that district. Linn O. Morrow, formerly connected with the sales department of the Cutter Company, Philadelphia, will cover eastern Pennsylvania, southern New Jersey, Maryland, Delaware and the District of Columbia.

The Blaw-Knox Company, Pittsburgh, Pa., manufacturer of transmission towers, steel buildings, etc., a New Jersey corporation, has filed notice with the State Department of an increase in capital stock from $3,000,000 to $14,000,000 to provide for general business expansion. Arrangements have been made by the company for issuing $2,000,000 of preferred stock.

The National Railway Appliance Company, New York City, will represent the Drew Electric & Manufacturing Company, Cleveland, Ohio, in the sale of its overhead line material, including hangers, ears, splicers, insulators, frogs, etc., as well as specialties. The territory includes all New England states, Southern New York, New Jersey, Pennsylvania east of Altoona, Delaware, District of Columbia, Maryland and North Carolina.

Edward J. Cheney, formerly of the General Electric Company and recently chief of the division of light, heat and power of the Public Service Commission, Second District, New York, announces the opening of an office June 1 at 61 Broadway, New York City, for general engineering and consulting practice, with particular attention to public utility problems, including rates, appraisals, public relations, design, construction, operation and management.

Ira Cushing has resigned from the Boston office of the General Electric Company to become sales engineer with James C. Barr, dealer in power plant, railroad and electric railway supplies, with headquarters at 84 State Street, Boston. Mr. Cushing is past chairman and secretary of the Boston Section A. I. E. E., and is widely known in New England electrical circles. For some years he has been engaged in switchboard engineering and other special work in the Boston office of the General Electric Company.

B. W. Stemmerich, formerly manager of the equipment section, railway department, Westinghouse Electric & Manufacturing Company, has been placed in charge of the safety car division of the St. Louis office of this company. For twenty-eight years Mr. Stemmerich has been in the employ of the Westinghouse company. He started as assistant stock order clerk and after several years of clerical and correspondence work was appointed assistant manager of the railway equipment section of the railway and light department; in 1917 he became manager.

E. M. Herr of Pittsburgh, Pa., president of the Westinghouse Electric & Manufacturing Company, and L. A. Osborne of New York, president of the Westinghouse Electric International Company, who have recently spent several months in Japan studying conditions, were on May 12 decorated with the order of the Rising Sun by the Emperor of Japan. This order is the highest honor the Emperor can bestow. Mr. Herr received the third class and Mr. Osborne the fourth, the higher classes being awarded only to Japanese national heroes.

Roller-Smith Company, 233 Broadway, New York, has made an agency arrangement with the W. Montelius Price Company, 524 First Avenue South, Seattle, Wash., to handle the Roller-Smith Company's line of electrical instruments, meters and circuit breakers in the State of Washington, the State of Idaho and part of the State of Oregon. W. M. Price is the active head of the W. Montelius Price Company, and in addition to representing the Roller-Smith Company he also represents Stanley & Patterson, Inc., Northwestern Electric Company, Electric Controller & Manufacturing Company, Monitor Controller Company and Sundh Electric Company.

New Advertising Literature

Window Glass.—Glass Founders Corporation, Milltown, N. J., has issued a folder on its "Ultra Glass" for car window use.

Indexes.—The General Electric Company, Schenectady, N. Y., has issued indexes to its descriptive bulletins and sheets and supply-part bulletins, both dated April, 1920.

Arc-Weld Bonds.—The Ohio Brass Company, Mansfield, Ohio, has issued a pamphlet on "O-B Electric Arc-Weld Bonds," showing specifications for every clause of welding steel to steel with steel.

Transportation. — The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a two-color pamphlet, "Recent Notable Achievements," including illustrations and descriptions of transportation facilities on land and on sea, also of mammoth power generating units.

Busbars, Disconnecting Switches and Choke Coils.—The Lewis & Roth Corporation, Philadelphia, has issued a special bulletin, No. 28, covering its outdoor bus supports, combination outdoor disconnecting switch and choke coils, porcelain base choke coils (indoors), etc. Bulletin No. 29 describes and illustrates the Fisher-Chase fuse and disconnecting switch.

Transmission Equipment.—Bates Expanded Steel Truss Company, Chicago, Ill., has issued a compact engineering handbook containing information pertaining to the construction of modern transmission lines, electric railway lines and outdoor substations. It includes a discussion of the engineering principles governing the design, selection and installation of all types of poles and engineering tables.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
L. C. PAUL, Editorial Representative GEORGE BUSHFIELD, Editorial Representative G. J. MACMURRAY, News Editor W. B. ANDERSON, Asst. News Editor

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It's the Sore Spots Which Stand Out Now

ONE of the most promising signs for the future of the electric railway industry in its relations to the public is the noticeable change in complexion of the situation as a whole. Now it is the few sore spots which attract attention, whereas a few months ago we were happy to see a few healed and healthy areas.

This condition, however, does not necessarily mean that all is well and further effort useless. These sore spots must still be healed, the remedies must be intelligently applied and the cure must be permanent. The whole industry is vitally interested that bad conditions, which have a contagious quality, do not spread again.

Those who are responsible for finding the solution in present points of trouble will best serve the industry and themselves by being sure that the solution is equitable and just. Their obligation extends beyond the areas of present trouble.

Getting Along Well with Little

ONLY ingenuity on the part of master mechanics, combined with the widespread application of electric and gas welding and cutting, has made it possible to keep the "rolling" in rolling-stock during the past few years.

The straits to which some shops have been reduced are remarkable, to say the least. Sometimes energy that could have been used more advantageously in other directions has been expended in planning and constructing makeshifts. In war time this was excusable, but it should not be continued in peace time. This devising of apparatus to reduce maintenance costs is interesting, of course, but at this stage of the electric railway game there are, or ought to be, commercial devices to perform all routine operations. What is right for a factory is not so for a repair shop. There are exceptions, to be sure; cases in which the manufacturers have not "sensed" the need for certain devices or in which there is not sufficient demand to warrant development cost. And there is a broad field for ingenuity in applying the equipment that may be available.

Take, for example, this matter of welding. Possession of the finest kind of a welding outfit is just the beginning. Welding is an art and a science. Some enthusiasts think that the colleges ought to turn out "welding engineers." That's going too far, but many users of the welding processes, either in person or by deputy, are showing real engineering talent. The writer visited a shop some time ago where an impregnating outfit for armature dipping was sorely needed, but—you know the rest. Consequently the master mechanic found a discarded steel reservoir, some odd pieces of pipe, etc., and by the aid of electric arc and gas torch he has made something very creditable in the desired direction. It's too bad, in a way, that he had to do this, but he's going to cut down armature maintenance costs, which is what he's after.

Everywhere, or nearly so, one finds that greater life is being obtained from wearing parts of rolling-stock equipment. The cost has been rising because everything costs so frightfully, but what would the costs have been if maintenance practice had not improved? Where the master mechanic has a fair chance he'll do even better. And it is a wise policy for his good work to be recognized when he does it.

Pocket Veto May Kill Much Discussed Water Power Bill

AT THE time these comments are going to press President Wilson has apparently killed, by failure to sign, the water power bill which has been so long studied and worked over by Congress these past twelve years. The continuance of the influences retarding the development of this economical production of electric power for our railways and industries is especially serious in these days of high fuel costs and much needed conservation.

It is rumored that the bill received the indorsement of the Secretaries of Agriculture and War, who, with the Secretary of the Interior, would constitute the first Water Power Commission, but that Secretary Payne still maintained his well known opposition to the bill with its provisions regarding developments in the national parks. If this is so Secretary Payne must have taken a great responsibility or he has found at the last moment some element not evident to those who have studied the proposition carefully for many months. The President, of course, in his weakened physical condition has probably had to depend on his advisors.

The result, if the bill should be killed, would be serious and much progressive study and work on this water power legislation has been made ineffective. In that case, Congress, urged on by the engineering and industrial advice of the country, should of course pursue the constructive course of repassing the bill upon reconvening in December. Water power legislation then may assume an important political aspect.

A Splendid Endorsement of Electric Trunk Line Operation

WE PUBLISH elsewhere in this issue an abstract of a committee report of the American Railroad Association, mechanical section, which comprises an interesting and instructive symposium of the operating experiences had by railroad operating men with their respective systems and conditions of electrification. Running through all these papers one observes an underlying loyalty for the particular system and type of equipment in use on the author's own roads, a rather natural reflection of the friendly controversy among the electrification experts. But through these somewhat biased expressions about the performance of the electric locomotive on the several roads one discerns that the foremost claims made for electrification have been unequivocally substantiated. These are the greater economy, increased capacity of the line, less delay attributable to engine trouble, greater safety and less discomfort for trainmen in tunnels, etc.

In the full report one author, referring to an element of the system in use on his road, points out how very successful the under-running third rail has been, while another infers that the overhead current collecting system is by all means the best scheme. The significant thing is that each system of electrification adopted on the various railroads has made good both technically and financially in a generous measure, which means that thus far no serious mistake has been made in trunk line electrification.

Nearly every one of the papers gives comparative data for steam and electric operation, showing very decided improvements in economy in favor of the latter. In view of these statements, we believe our surprise at some of the statements made by Mr. Basford in his able paper on the steam locomotive as an investment, also abstracted elsewhere in this issue, is well founded. He broadly describes those who have talked about the merits of electric operation as "propagandists," but we doubt if he will be disposed so to characterize the authors of the symposium papers to which reference was made when these come to his attention at the A. R. A. convention. The steam locomotive has done a great work, but the time is rapidly coming when it must give way more and more to its more economical, more efficient successor, the electric locomotive.

Engineers Have Made an Epochal Forward Step

THE greatest step, or at least the greatest potential step, in the history of engineering in the United States was taken on Thursday and Friday, June 3 and 4, at the Joint Engineering Conference in Washington. Assuming that the future action of engineers will be in line with their action at this conference, it is impossible at this time to foretell with any certainty the ultimate beneficial results, though one should have no fear of exaggeration in this regard.

An engineering voice which may speak with the authority and prestige of all engineers and groups of engineers has been created, and, most important, this voice has been created for the avowed purpose of public service, that engineering may take its legitimate share of the burden of decisions affecting national policy.

The Federated American Engineering Societies, the official body formed, is greater than any of its present or possible component parts. Drawing, as it will in its governing council, from every national and local engineering organization and affiliation, it will represent a composite engineering opinion and a composite engineering prestige which can and will make itself useful in the nation's service. It will not assume to speak in technical fields, already so well covered by individual societies; it will not attempt to speak in local or individual cases, unless there is a national element in the consideration. It thus cannot compete, as some would have us believe, with any existing individual organization; it is too big and too comprehensive. It is the organ for co-operation of all engineers for common effort.

The American Electric Railway Engineering Association, not composed of individuals, may seem to occupy a unique position with reference to the federated societies, but this should not in any way tend to operate against the association assuming its full share of co-operation in the federated societies. The indirect and intangible results which are bound to accrue both to engineering and to the nation from the activities of the American Engineering Council are of a nature which cannot be brought about by the activities of any individual association.

The ultimate result is a higher professional standing for engineering and the allied technical professions gained from the recognition of duties and obligations and the performance of acts in conformance with this recognition. Every engineer should see in this movement an opportunity and a duty to assist in making engineering and the industries and business attendant upon engineering take their proper place in the nation's social and economic structure.

Getting Together on Heavy Electric Traction

THE present is a fitting time to organize co-operation among the committees of the several associations interested in electrification of steam railroads. The report of the meeting of the heavy traction committee of the American Electric Railway Engineering Association, printed in the issue of this paper for May 1, page 908, shows that the need for some such co-operation is in the minds of railroad men. There is bound to be duplication of effort unless eventually some sort of clearing house for information is provided, such, for example, as a joint committee of associations having or to have electrification committees. Among such associations at present, in addition to the A. E. R. E. A., are the A. R. A. (mechanical section), with its committee on design, maintenance and operation of electric rolling-stock, C. H. Quereau chairman; the A. I. E. E., with its committee on traction and transportation, W. S. Murray chairman; the N. E. L. A., with its committee on electrification of steam railroads, F. M. Kerr chairman; the American Railway Engineering Association, with its committee on electricity, E. B. Katté chairman, and the American Society of Mechanical Engineers, with its railroad section of the newly formed committee on professional sections, Mr. Katté chairman. And undoubtedly there are other association committees in the same field. To be sure, the memberships of these committees are overlapping to a considerable extent. This is advantageous in partly preventing duplication, but it is burdensome to the men concerned.

All committees on electrification must necessarily collect numerous construction and operating data. This might be done by one committee rather than a half dozen, with good results to all concerned. Each of the fields represented by the national societies mentioned has a vital interest in electrification. The men who are active in these fields have all to gain and nothing to lose by co-operation. One of the first things to be done is to define the purposes and the scope of the heavy traction work of each committee. The more accurately these are defined the more effective will be the work of the several committees. Engineers are busy men, and they are impatient with any committee work which involves lost or otherwise useless motion. Their first query is this: "Is it worth while?"

Iowa Judge Sets Precedents—with Complications

IN CONTRAST with the repeated decisions of the War Labor Board that the earnings of a company had no bearing on the rate of wage, Judge Martin J. Wade of the federal court, under whose direction the Des Moines (Iowa) City Railway is being operated by the receiver, has officially recognized the fact that an electric railway cannot pay out money that it has not earned to its employees in wages. This decision was made in connection with the award of 70 cents an hour maximum wages to trainmen by a board of arbitration, the approval of which by the court was necessary before it could be made effective, since the receiver had declared the company unable to pay that scale of wages. This decision of the court contained another very important precedent, for it was stated that before any higher wages than the 60 cents an hour scale ordered by the court could be paid the obligations for depreciation and fixed charges had a prior claim on the net earnings.

Summed up briefly, the terms of the Judge's decision were as follows: That the city has not given fair treatment to the company or the men; that the only source of money for paying interest and wages is from the fares received from the people of the city; that the present 5-cent fare is lower than that existing in any other city of comparable size; that the people are to blame if the service is bad, for they have been unwilling to pay for any better service; that the contract which the company had with its labor is not binding on the receiver except as the court has permitted the receiver to continue operation under that contract; that the court has the right to terminate this contract, but will not do so now. The decision then points out that it is impossible for the receiver to pay the 70 cents an hour wage awarded, orders the receiver to pay a maximum of 60 cents an hour dating back to March 1 in lieu of the previous 57 cents maximum, and states that if there is any surplus at the end of the year after the payment of operating expenses, depreciation and fixed charges as provided for in the franchise, and after the payment of certain preferred equipment claims, then the remaining surplus shall go to the employees in additional wages up to 70 cents an hour.

This is a very interesting ruling. The people get a deserved scolding; the employees get a slight increase and a promise of more if the company prospers; the company perhaps gets a little better assurance of its ability to continue as a going concern, and the bondholders get an indication that their first mortgage has priority over a prohibitive wage scale, if not much else, as a consolation. In one sense the decision places the employees on a bonus basis, it seems to us. If they are faithful in giving the best possible service and use their influence in helping the people to understand the necessity for increased fares they may be rewarded by a distribution of the resulting profit—a dividend on their labors. But just what this all means is in doubt; there are many complications ahead.

Whether there will be any surplus over fixed charges to award to the employees in Des Moines is problematical, for to date, in the absence of a public utilities commission, there has been no court decision in Iowa which indicated that the power to regulate the rate of fare was beyond that legislated to the municipalities, and the municipalities of Iowa have shown almost no disposition thus far to grant any increases in fares. One decision of the State Supreme Court has upheld the full jurisdiction of the municipalities in this matter, but a rehearing of this case is in progress and a decision is expected on June 29. Its outcome is so vital a matter that all street railway activities in the State are being held in abeyance and all plans made contingent upon the outcome of this expected decision on the rehearing of the Ottumwa case. On this decision also hangs the possibility of the Des Moines company earning any surplus whatever; certainly there will be no surplus over fixed charges for increased wages on a 5-cent fare.

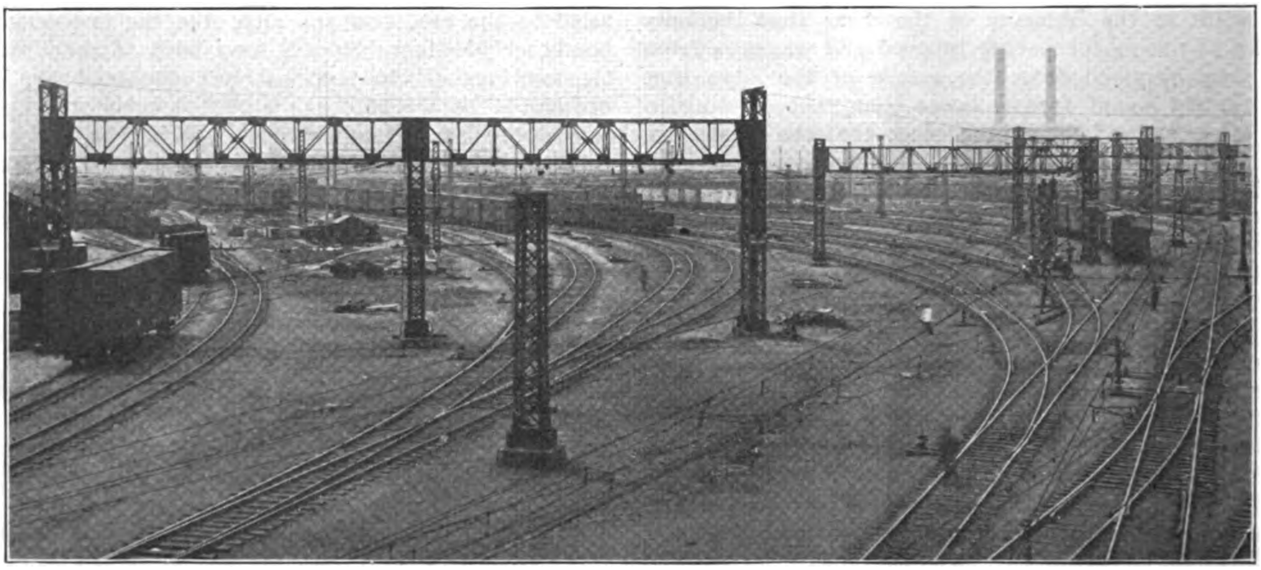
How Will Municipalities Pay for Their Railways?

IF THE piecemeal plan of constructing the proposed municipal railway in Detroit, which is being attacked in the federal court, should finally be adopted the city financiers will have to determine what kind of a bond to sell to secure the $15,000,000 authorized at the recent municipal election. That is to say, they will have to decide whether the bonds will have as security the credit of the city, like the ordinary city bonds, or whether they will have back of them simply the earnings of the proposed municipal railway. The ordinance, as we read it, is not clear on this point, so we are assuming the city will have a choice in the matter. If it does not, the question is still worth considering, because it is one which will arise in any city where the municipality purchases a railway or engages in any other commercial enterprise.

If the plan of pledging the credit of the city behind the bonds is followed, it is obvious that a lower rate of interest can be obtained than if the bonds are issued by a private company, as taxes will make up any deficiency in earnings. This, of course, is of great advantage to the security holder, but, conversely, is a serious objection from the standpoint of the taxpayer, who is thereby obliged to guarantee the earning capacity of the municipal undertaking. To avoid this, the expedient has been adopted in some cases of making the income of the utility the only security behind the bond, but to the bondholder this would mean that he would have simply an income bond on a property conducted by persons who have no selfish interest to see that an income is earned. It is hard to see that even a pledge on the gross earnings would be much more valuable than one on the net earnings, because it is only as an operating undertaking that the property has value. If a lien on the gross receipts is valuable because the security holder can extort his interest under threat to shut the utility down unless it is paid, the bond is open to the objections to a straight municipal obligation, already mentioned. Undoubtedly the immunity from taxation enjoyed by municipal bonds is a considerable advantage so far as the investor is concerned, but this advantage is secured, of course, at the expense of the taxing authorities, in the way of lower tax returns.

Broadly speaking, then, there is no economic benefit from the low interest rates obtained in municipal financing, as each supposed advantage is paid for directly or indirectly by the public. The only economic benefit possible to the public at large in the conduct of a utility is that to be secured from efficient operation, and that is more likely to result from private than from public management.

Freight Yard Electrification Possesses Many Advantages



There are thirty-five miles of track in the New Haven's Oak Point Terminal Freight Yards in New York, of which three views are given above. When the possibilities of electrification become realities, yards like these will not need such air spaces, but with double or triple level trackage, with streets and warehouses and other buildings constructed over the trackage, they may be economically located near the center of industry.

The Significance of Electrification

Official of Electrified Road Tells What Electrification Has Done and Indicates Possibilities He Foresees — Huge Air Spaces Recovered — New Conceptions of Railroad Operation—Many Corollary Advantages

By Edward G. Buckland
Vice-President New York, New Haven & Hartford Railroad, New Haven, Conn.

THUS far electrification has been adopted by steam railroads not upon general economic principles, but for individual reasons which applied locally. The main considerations have been (1) tunnel operation; (2) terminals; (3) track congestion; (4) fuel saving; (5) utilizing hydro-electric power; (6) mountain grade operation. These reasons have provided ample justification for the several electrification projects which are at present in successful operation, and often two or more of the reasons have applied in a given instance.

It is characteristic, however, of practically all of the main line electrifications which are now in service that electric operation is mixed with steam operation; that is, the two kinds of motive power are operated on the same division. The expenses of the electric operation are thus added to the cost of the steam operation, with no opportunity to realize completely the economies of the electrical installations.

The first demonstration of heavy electric traction in this country was in 1895, when heavy trains were moved electrically at slow speeds and at infrequent intervals through a long tunnel. In spite of the disadvantages to which a pioneer installation is necessarily exposed, this installation has been kept in operation and has continued to serve its purpose. The work went far toward demonstrating the technical practicability of conveying and utilizing large amounts of power, such as are required for operation under steam railroad conditions.

Edward G. Buckland, vice-president and general counsel of the New York, New Haven & Hartford Railroad, was president of the company during federal control, while the present president, E. J. Pearson, was federal manager. Mr. Buckland had a considerable part in the installation, some twenty years ago, of the first telephone train dispatching on the New Haven and among the first on any railroad. He has always been interested in and a student of the possibilities and economies of electrification from the standpoint of a steam railroad officer. In the accompanying article he has recorded some of his views and interpretations.—*Editors.*

The operating characteristics of electric motive power are radically different from those of steam motive power and in general are greatly to the advantage of the former. The matter of control is a very striking example of this. In the case of steam locomotives one man is necessary on each locomotive for controlling its movements, and an additional man is required for maintaining the fire, whereas in the case of electric locomotives, equipped with the so-called "multiple-unit" control, one or several locomotives thus equipped may be handled with perfect ease by one man from any locomotive.

This feature is of great value, especially when applied to motor cars, in that trains of any length required may be made up to handle the traffic and operated from either end by one man. The expense of turning these trains at the terminals of the runs is also eliminated. Increased switching efficiency also results.

Another characteristic of electric traction is that the power produced by the electric motor is continuous and not pulsating, as is the case with the steam locomotive. Thus a more rapid acceleration can be secured with electric trains, especially with motor cars equipped with multiple-unit control. This enables trains to get away from stations more quickly and thus greatly reduces the schedule time of the runs, and is especially valuable for city and suburban service where many stops are to be made.

In a long tunnel in New England, the traffic through which is both freight and passenger, the congestion was very serious under steam operation. Although the tunnel is double tracked, only one train was allowed through at one time and much discomfort was often experienced both by train crews and passengers. Now, under electric operation, three trains are allowed through simultaneously in the same direction and no discomfort is experienced. The tunnel, so far as railroad operation goes, virtually does not exist. The increased capacity and added safety and comfort have justified the electrification in this instance. This experience has been duplicated in several other installations.

On another Eastern railroad the capacity of a single track tunnel on a heavy grade had been reached with steam operation. The railroad was faced with the necessity of either double tracking the tunnel or locating an additional track around a mountain. Either plan would have been very expensive. Electrification of the tunnel and grade was substituted and has postponed for some years, if it has not altogether eliminated, the necessity for the additional track. Regardless of other advantages obtained by electric operation in this instance (and they have been many) that item alone has justified the electrification.

There has been some development of terminals in large cities in which electric propulsion was substituted for steam propulsion because of the impracticability of using steam in tunnels and underground stations and because of the necessity for securing added track capacity in restricted areas.

On Manhattan Island in New York City there are two large trunk line terminals, neither of which would have been practicable as at present operated without electrification, as in both instances the tracks are virtually entirely underground. In one terminal the tracks run through the station and the coach yards are reached by passing under the East River. The approaches to the station are also through river tunnels. The operation of the tunnels by steam would have been entirely out of the question under present traffic conditions. The other terminal is a stub end, and the tracks necessarily spread out over a considerable area. The elimination of steam through the tunnel approach was ordered by law after a serious accident and the terminal was thus virtually of necessity electrified. Advantage was taken of this electrification, when the terminal was enlarged, to install the tracks at two levels, thereby nearly doubling the track capacity at very little increase in land requirements. In addition, the area over the tracks has been made available for buildings, so that a minimum of real estate expense is chargeable to the terminal operation. Best of all, an ugly gash has been transformed into a boulevard 120 ft. broad and 2 miles long, with cross streets, all restored to public use. Property values formerly depreciated by the smoke and noise of steam operation have enormously increased. Locations formerly shunned are today the most sought after for residences, churches and modern high-class apartment houses. The savings thus made have alone justified the electrification, regardless of other economies and advantages.

In another large city the terminal congestion was such that the railroad was faced with the alternative of a substantial enlargement of the terminal or electrifying the suburban service. It chose to electrify, and the operation of suburban trains by multiple-unit equipment has afforded relief from congestion, due to elimination of numerous movements for shifting and turning locomotives. The track capacity at the terminal has practically been increased by about 20 per cent.

Application of electric traction in heavy mountain grade main line work has been made in several instances, both here and abroad, for the purpose of utilizing available hydro-electric power, increasing capacity of the line, decreasing operating difficulties on both ascending and descending grades, or for all of these reasons combined.

In many foreign countries and in certain parts of this country fuel is expensive and difficult to obtain, and in these territories there is often abundant water power. Under such circumstances railroad electrification is likely to offer attractive returns on the necessary capital investment, even though traffic might not be dense enough to warrant it under normal circumstances. Such localities are usually mountainous and the electric locomotive solves many problems which under steam operation are very troublesome.

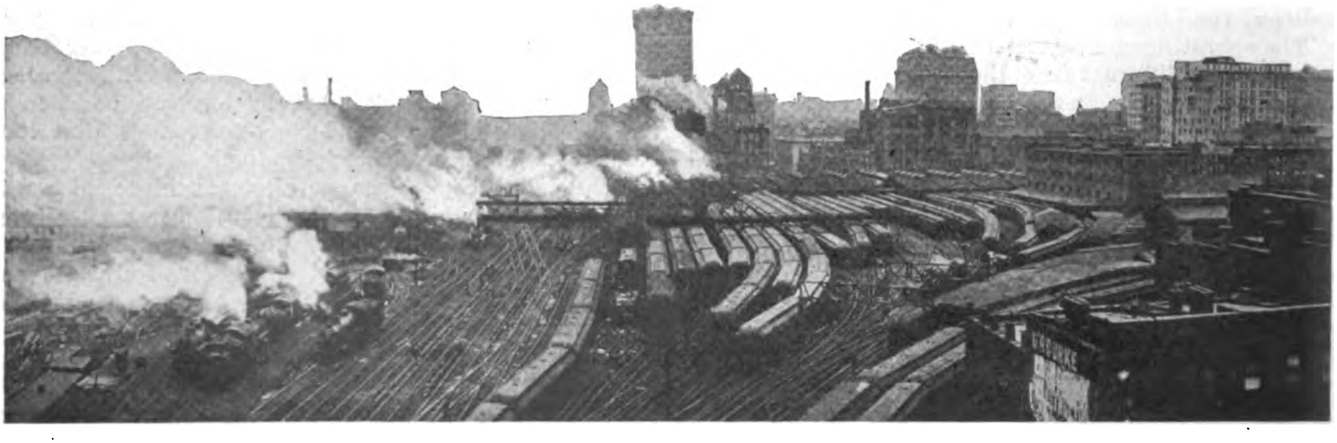
A characteristic of electric traction for mountain grades is that the electric locomotive may be so designed as to return power to the line when descending heavy grades. This feature is of great advantage in controlling the speed of the train independently of the brakes, and, in addition, the power thus returned to the line may be used in assisting the power station in hauling trains up ascending grades. It has been found in two instances of mountain grade electrification that the economies of regenerative braking form a large part of the operating economies, due to the saving on brake shoes and repairs to brake rigging alone and regardless of the increased safety of operation.

When it is considered that twenty years ago electric traction was limited practically to the ordinary street car, the progress has been truly remarkable, but in spite of the many important installations now in successful operation its development may be said to have hardly yet begun.

As electrification becomes standardized and as the art develops—and it is developing very rapidly—the advantages of electrification, economic and otherwise, will become more and more clear, and undoubtedly we shall see general railroad electrification in the not distant future.

One of the most distinct economies of electrification appears in the direct saving of coal, and this economy will become increasingly evident as our coal supply becomes less plentiful. We have been extremely profligate in the use of our natural resources, including coal; and a most wasteful agent in the consumption of coal, in spite of recent material improvements in design, is the steam locomotive, a machine in which efficiency is necessarily largely subordinated to capacity.

Smoke abatement and noise elimination are serious present day problems in large cities. Smoke is a disagreeable nuisance and it is the opinion of many authorities that it is distinctly harmful to health. It has a detrimental effect on vegetation, and by settling upon buildings detracts from their beauty in no small measure. It is particularly obnoxious because it is discharged into the atmosphere close to the ground and is trailed over long distances in the most thickly settled areas. It is not necessary to call attention to the disadvantages due to the noise made by the exhaust of steam locomotives—especially switching locomotives—in the midst of populous districts. Railroad freight and



The Grand Central Terminal in 1906—before electrification. This terminal is a stub end and the tracks necessarily spread out over a considerable area. The elimination of steam through the tunnel approach was ordered by law after a serious accident and the terminal was thus virtually of necessity electrified.

passenger yards and engine houses must be located in the vicinity of terminals in order that their full efficiency may be realized and the smoke and noise of steam switchers is therefore concentrated at these points. In a few cities the establishment of railroad freight yards outside of the city limits has been secured, but this has, of course, resulted in considerable inconvenience to shippers.

Looking into the future, to the time when steam railroads will be generally electrified, especially in the vicinity of large cities, we may predict that the passenger terminals will be operated at two or more levels, and that over the passenger yard areas will be erected revenue-producing office buildings and hotels which will allow practically full realization of the value of the land —land usually as expensive as any in the city. Passenger cars can be stored on tracks conveniently located within the terminal area at little cost for the storage space. Many non-revenue car-miles to and from yards can thus be saved.

Freight yards, similarly, can be located at points convenient to shippers and consignees, as it will be practicable to operate at more than one level, with warehouses immediately above the tracks for the storage of freight which has been unloaded or is to be shipped. It is not at all impossible to conceive that there will be developed facilities which will allow the freight car bodies to be removed from the trucks immediately upon receipt and lifted in electrically operated elevators to a floor above, where the material may be unloaded at leisure, another car body being installed on the trucks. The freight car may thus be immediately removed to make room for additional incoming goods. Such freight terminals, being operated at maximum efficiency and occupying little space, can economically be placed near the center of industry, thereby reducing to a minimum local haulage distances.

The smokeless and noiseless electric locomotives can be stored and operated wherever convenient for railroad operation without danger of criticism from neighboring land owners.

Travel on passenger trains is so comfortable under electric operation as compared with steam operation, especially in summer, that when electric operation becomes general travelers will wonder how it was possible to put up with the inconveniences of dirt and noise, such as exist at the present time.

Railroad operation undoubtedly will result in increased speed and reliability with the development of electrification. Snow and extreme cold weather will no longer cause the interruptions and delays which they do at present. The power of electric locomotives can be increased practically indefinitely, to correspond with the demands of service, while the capacity of a steam locomotive is limited by track clearance requirements. Cold weather, which stiffens the oil in journals and increases train resistance, also increases materially the radiation losses of steam locomotives and thus reduces their available power. The same conditions increase the capacity of electric locomotives by increasing the allowable temperature rise, which is the limiting factor in the development of their power.

When a whole railroad system is electrified there will be many changes in the standards of operation. Divisions which are now practically limited in length by steam locomotive limitations can be made as long as desirable from an operating point of view. In one railroad electrification the electric zone includes in one operating division of more than 400 miles four divisions previously operated by steam. Coaling and water facilities are, of course, not required with electric operation. The release of coal cars required for distributing coal and of cinder cars, which are often required, is an important item in these days when railroads are many of them operating at or beyond the proper limit of their capacities.

In many cases great difficulty is experienced in obtaining the proper water supply, and, especially in the large areas in the West which are very dry for a great part of the year, in obtaining water at all. Many railroads in all parts of the country are obliged to spend large amounts of money annually for maintaining water softening plants, while pumping stations, track tanks and storage reservoirs are common to all railroads. All of these may be eliminated when electricity is substituted for steam.

As the manufacture and distribution of electricity for railroad use grows large power stations can be concentrated at points where coal may be conveniently and economically handled and used without disagreeable smoke and great quantities of water power which are at present going to waste can be economically exploited to haul trains.

There have been developed within recent years large and economical generating units which will increase coal-saving possibilities materially, especially with loads made possible by combination of the railroad with industrial and lighting service. This combination will

Best of all, an ugly gash has been transformed into a boulevard 120 ft. broad and 2 miles long, with cross streets, all restored to public use. Property values formerly depreciated by the smoke and noise of steam operation have enormously increased. Locations formerly shunned are today most sought after for residences, churches and apartment houses.

increase economy of production and, by allowing the railroad transmission system to serve also as a commercial feeder, will make available at outlying points power which would not otherwise be economical. The use of such power when not required for other purposes is nearly unlimited. Electrical energy may be readily transformed into light, heat and power, and in these aspects can serve many of the necessities of modern life.

It is entirely feasible to use off-peak power for refrigeration, for instance; a large amount of perishable fruits and vegetables which are now wasted, owing to lack of transportation facilities during the season when they are ripening, could, if cheap refrigeration were available at the point where they are grown, be saved for market. Producers might create local cold storage plants where the refrigeration could be entirely accomplished by the use of electricity during off-peak hours. They would then be able in times of market glut to take their perishable products to cold storage and receive exchangeable storage receipts, whereby they could at their convenience market the product and avoid the disadvantages of an overstocked market. With the development of refrigeration, small refrigerating plants might be installed in all houses at a minimum price, by which air in the ice boxes could be kept continually cool through the use of off-peak hour electricity.

This secondary power might be economically used for other household purposes as well, such as washing, ironing and sewing machines and cooking; in fact, in California such developments are already in successful operation, helping much toward lightening the burdens of both city and rural housekeepers.

Water pumping, especially in the smaller cities and towns, might also absorb off-peak power to advantage. In agricultural districts the advantage of this form of power would be even greater than in urban districts and much land not now efficiently cultivated would be made available through irrigation.

When we look back fifty years and realize what progress the application of electricity has made, and when we think how dependent we are upon that form of energy today, it is difficult to predict what the next fifty years will bring forth. Railroads are as yet nearly undeveloped fields in this regard, and therefore one of the fields where future progress will be most impressive, all the more so because railroads are perhaps the branch of industry most closely associated with our national life.

There are, however, considerations which must be squarely faced and problems—both economic and engineering—which must be solved before electrification can become general. Many of the economies of electric operation are directly proportional to the ton-miles or train-miles hauled. It is obvious, therefore, that there is a definite traffic density beyond which the savings will not pay the cost of maintaining the distribution system (which is approximately proportional, not to the traffic, but to the miles electrified) and the interest on the additional capital invested. In these instances, unless there is some especial local reason for electrification, it would certainly not be justified, and to electrify under such circumstances would but discredit electrification as a whole and retard development.

The art of railroad electrification is, comparatively speaking, quite new, and much remains yet to be standardized. There is, for instance, still a great deal of doubt among engineers as to the relative desirability of alternating and direct current systems, and the advocates of each system can point to entirely successful installations to prove their contentions. In the early days of railroading much expense and waste were experienced because track gages were not standardized, and, similarly, definite electrification policies and standards should be developed and made available in order that the obvious advantages of standardization and interchangeability may be obtained. There undoubtedly must be more experimentation before one system or the other can be adopted as standard.

The railroads which have already made electrification installations have of course borne the heavy expenses which are incident to all development and experimentation, but the data made available by these pioneers have been of inestimable value. The railroads which within the next few years install electrification will, by adding to and compiling information already gained, assist in standardizing heavy electric traction construction, just as street railways are standardized today. In this way only can progress be continuous. In this connection the experience which is being gained abroad will be of great value, as foreign railroads are deeply interested in coal conservation and their development of electric traction undoubtedly will be very rapid.

Kilowatt-Hour Consumption in United States

ACCORDING to figures recently compiled by the Division of Resources, United States Geological Survey, the output of kilowatt-hours in the United States during January, 1920, was 3,854,599,000. Of this amount, 1,274,401,000 kw.-hr. was produced by water power and 2,580,198,000 by fuel. These figures are based on returns received from about 2,800 power plants of 100-kw. capacity or more engaged in public service, including central stations, electric railways and certain other plants which contribute to the public supply. The capacity of plants submitting reports of their operations is about 90 per cent of the capacity of all plants. The average daily production of electricity during January was 124,300,000 kw.-hr. The total production of electricity by public utility plants during 1919 was 40,003,000,000 kw.-hr.; 14,076,000,000 kw.-hr., or 36.6 per cent, by water power and 25,054,000,000 kw.-hr., or 63.4 per cent, by fuels.

The fuel consumption of the public utility stations in the United States during 1919 was as follows: 35,000,000 short tons of coal, 11,050,000 barrels of oil and 21,700,000 M cu.ft. of gas. The equivalent coal for all fuels consumed during 1919 would be 38,347,000 tons.

With 25,540,000,000 kw.-hr. produced by fuels in 1919, an average of practically 3 lb. of coal was required per kilowatt-hour of electricity produced. On this basis, it would have required the consumption of 22,140,000 tons of coal in addition to have generated the kilowatt-hours produced by water power.

A. R. E. A. Will Join Council

THE American Railway Engineering Association has accepted an invitation from the United Engineering Society to become a member society of Engineering Council. This makes six member societies. The others are the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining and Metallurgical Engineers, the American Institute of Electrical Engineers and the American Society for Testing Materials.

Bonding and Bond Testing on Electrified Steam Roads

Experiences on the Pennsylvania Railroad Electrification at Philadelphia Indicate That for Trunk Lines Different Equipment from That Developed for Street Railways Is Needed

BY JOHN W. LOGAN, JR.
Boston, Mass.

THE subject of rail bonding for trunk line electrifications has not been given the attention which it deserves. The methods of bonding and of maintenance, including bond testing, now in use are extremely elementary in their character. Bonding for city and interurban trolley systems has had the attention of engineers for years and new methods are constantly appearing, but these methods are not applicable to trunk line electrifications on which uninterrupted service night and day is the prime requisite.

In view of the fact that manufacturers continue their selling campaign on standard welding outfits for this purpose, it is evident that they do not understand the peculiar conditions, such as clearances, portability, etc., to which such an outfit has to conform in order to be of any service in this particular class of work. It is the purpose of this article to show the conditions under which work such as bonding and bond maintenance on important trunk line electrifications must be done, as well as the manner in which this work is now being handled on the Pennsylvania.

BONDING WORK MUST NOT HAMPER TRAFFIC

The business of the Pennsylvania Railroad or any other railroad is transportation. Existing conditions demand the full use of all tracks and no obstruction of the rails can be permitted. For this reason all bonding apparatus is required to clear the running parts of the rails at all times. Welding outfits or pressure clamps as at present designed will not meet these conditions. Even a quickly detachable outfit is out of the question, because men who are required to work on the rails, where slow freight and high-speed express trains are passing continuously, have enough to think about in order to get themselves off the track to clear a passing train. The bonding outfit would not at times be detached and an experiment with such apparatus might easily prove disastrous. On the tramway system cars may be stopped by simply raising the hand or flagging, without much loss to the railway, but the "Broadway Limited," for example, cannot be stopped in this manner, nor can the railroad afford to grant track-bonding clearances for the working gang. It is this essential point that has been overlooked in the working out of track-bonding apparatus for use on steam roads.

The bonds used by the Pennsylvania are of the expanded-terminal type as manufactured by the American Steel & Wire Company and the Ohio Brass Company. Two bonds are used for each rail joint and both rails are bonded, except in the interlocking zones, where only one is bonded. The stranded conductor is equivalent to a No. 0 conductor, and when this terminal is expanded tight in a clean hole conductance is sufficient for the 11,000-volt alternating current system. It should be understood that these conditions are theoretical, while actual working conditions sometimes differ widely, as will be explained later.

BONDING PROCEDURE ON THE P. R. R.

Most of the bonds now in use on the Pennsylvania system were installed by the contracting engineers at the time of the electrification in 1914, and since that time the railroad has had to do only with replacements, such as are made necessary by rail deplacements and breakage. A gang of about eight men does all the bonding.

When a trackwalker sees a broken bond he reports this to the electric traction department and places a temporary jumper around the joint. Two or three bonders are then sent out to repair the bond. If the strands are broken the terminals must be drilled in the rail web by means of a ratchet drill. If a whole section is to be rerailed an air compressor and air drills are used. Both kinds of drills clear the rails at all times except that the handle of the hand drill, when upright, projects 2 in. above the rails. This is ratcheted and ordinarily drops clear when the workman gets out of the way of the passing train. If he should move so quickly that the drill is forgotten it will clear itself.

The hand method of drilling holes requires the workmen to carry around a heavy piece of iron, called an "old man," for the drill backing. Air drills can be used, but as the signals are operated electrically, the difficulty of supplying compressed air is considerable. It has been suggested that the necessary holes be drilled in the shop, with saving in complication on the road, but this is not really practical because the holes, when drilled in this manner, would be dirty by the time that bonding is to be done. Thus hand reaming would be required, which is as unsatisfactory as drilling on the ground. More time is spent in hand drilling than in the work on any other part of the bonding and one man can drill only from twenty-five to thirty holes by this method in an eight-hour day.

When the contracting engineers installed the bonds on the Pennsylvania Railroad they tested them, but the railroad made no tests of its own until the summer of 1919, although, as noted above, all trackwalkers are instructed to watch for broken bonds, to report these to the electric traction department and to place jumpers around the defective joints. The last-named is essential as the bonds are also used for the signal current. Even with the most careful trackwalkers, however, this inspection is only superficial, as they do not see both sides of each rail and many types of breaks are not noticeable from a standing position.

Usually the first indication of faulty bonding is signal trouble traced to this source. If the section in which there is signal trouble has not been recently tested, bonders must be sent out to the section in trouble to "test" the bonds by eye and by feeling the tightness. The trouble is usually located by using this method, but meanwhile the signals have been in trouble for at least several hours. When signal trouble is located in a section in a scientific manner reference is made to the test reports and these will point to the bond in trouble by showing it up as having tested the poorest in that section.

The "scientific testing" or true bond testing is now being done with an instrument built by the American Steel & Wire Company in conjunction with the Weston Electrical Instrument Company. It is the type ordinarily employed for such testing, comprising essentially a differentially wound milli-voltmeter. By this means the voltage drop across the bonded joint applied to one coil is balanced against the voltage across two points on the rail proper applied to the other, when continuous current is flowing through both sections in series.

Since alternating current is used for traction, a storage battery capable of supplying about 100 amp. to provide the test current must be carried around. Theoretically, of course, an alternating current meter could be used if it were desirable to use alternating current for the testing, but the traction current fluctuates too much to make this practical. The method, like that used by the West Jersey & Seashore Railroad, of sending a small direct current through the rails during the night for testing is not possible here due to the signal transformer connections, which would short circuit the rails through the transformer or cause stray current in the signal operating devices.

The testing party consists of three men carrying an Edison one-cell 80-amp.-hr. storage battery, a milli-voltmeter and appliances for connecting the battery across the points from which conductors are led to the voltmeter. Two points for one coil are at a fixed distance apart and are placed directly above the terminals of the bonds, while a third point, giving the voltage for the differential coil, is movable, and is moved in and out until a balance is obtained, when the length of good rail having a resistance equal to the resistance of the bonded joint can be measured. Each bond tested has its test value recorded and is located for the records by the number of joints east or west of a certain catenary pole number and by the north or south rail of a certain track number.

There are several objections to apparatus of this standard type for railroad work. It is bulky and heavy, but most of all it ties all three men together with the wires, and all three must clear their apparatus for passing trains, even when between two tracks.

This method of testing is extremely slow and, therefore, costly, as is seen by the fact that one testing crew covered only eight miles of four-track line in three months. This, however, was due partly to rainy weather, when testing was omitted, for reasons shown later. One crew is able to test about 250 joints a day. Even the use of the more modern type of tester which does away with the movable point will not reduce this time much, due to the necessity for supplying direct current.

Experience in testing the bonds by the method outlined has brought out several interesting and important things which, while known to many engineers, are not generally realized.

First, the resistance of any particular joint may vary considerably from day to day, depending on several things. For example, if the bolts on the splice bar are loose the working of the splice bar will sometimes bring bright spots of the steel tightly together. At other times the contact may be so poor as to render the conductance of the steel across the joint negligible. Again, the dampness of the rails has a remarkably important effect on the resistance of the joint. This latter probably can be explained in two ways. Just after a rain a rust will form inside, between the steel surfaces, and will cause high resistance as far as the steel conductance is concerned. This rust wears off rapidly as trains pass over the joint, causing a brightening of the bearing surfaces. Also since the majority of trains over the road are steam trains, the dirt accumulating on the joints will affect materially the resistance with changes in degree of wetness. Probably the former effect is the greater.

The conducting effect of the splice bars is so great that even with both bonds broken the joint may test out as "good."' For this reason such testing is not a true indication of the bonding, but only of the momentary resistance of the joint, which may be quite different after the next train passes. It must not be concluded, however, that because this is true such testing is worthless, for if a joint tests bad it proves that something is wrong with the bonds. This is the angle from which testing results must be viewed and not the reverse. Because a bonded joint tests "bad" one day and then "good" the next is no reason to assume that the joint is good and the test in error, for the second time the conductance may have been improved, as shown above, and yet the joint may be subject to "going bad" at any moment.

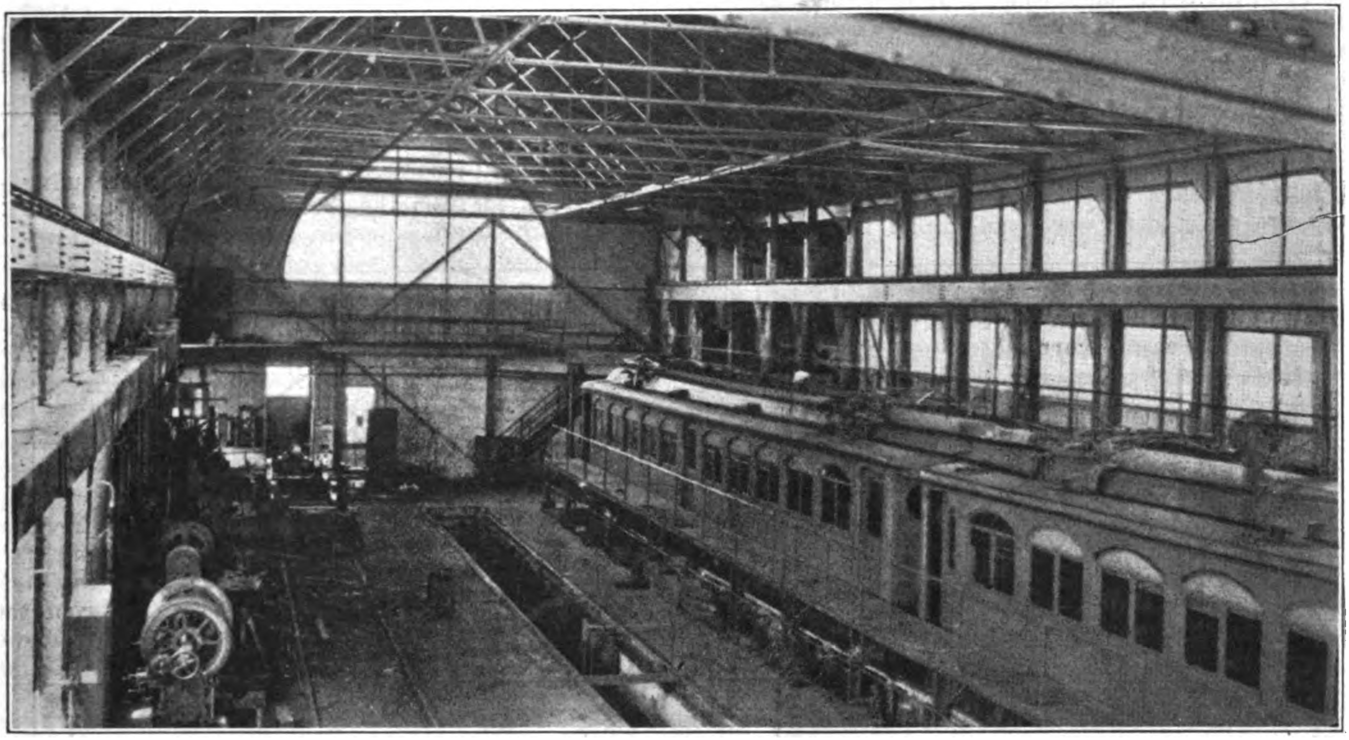
When bonds which tested "bad" were first ordered replaced the men reported that in several instances both terminals were tight and the strands whole, leading to the false impression that the test was in error and the joint well bonded. Although, of course, it cannot be assumed that every test is correct, repeated trials of testing during various stages of removing the old and replacing the new bond indicate that a bond perfectly tight in the rail and unbroken is not necessarily "good."

Two conditions in particular may be found: First, the terminal lug in the rail may be tight in spots, but the metal or the hole may have been dirty when the bond was applied. Second, the soldering in the soldered terminal may have been faulty and the lug may have been struck with a hammer to make the strands tight. This latter is not the fault of the bonders. It is caused by the trackwalkers jamming the strands inside the splice bar bolt when tightening the latter and thereby eliminating the loop left in the strands to provide flexibility. Under this condition it is obvious that any expansion in the rails will cause the strands to pull loose in the soldered terminal. Thus it is evident that tightness of terminals or intactness of strand is not a true sign of good bonding.

In conclusion I wish to express the belief that better methods of bonding for this class of work should be found and a method for daily bond testing developed. And above all, it must be remembered that the problem of bonding on trunk lines is entirely different from that of bonding on street railways.

Maintenance of Single-Phase A.C. Multiple-Unit Equipment on the Westchester

Inspection and Maintenance Practice on a High-Speed Suburban Line, Together with Complete Data Covering Costs of Such Inspection and Maintenance



INTERIOR OF WESTCHESTER SHOPS WHERE MULTIPLE-UNIT CARS ARE INSPECTED, OVERHAULED AND REPAIRED

THE New York, Westchester & Boston Railway is a high-speed suburban line operating between Harlem River, New York City, and Mt. Vernon, N. Y., a distance of 10.53 miles, where the line divides, one branch going to New Rochelle, N. Y., a distance of 1.9 miles, and the other to White Plains, N. Y., a distance of 9.23 miles. From Harlem River to West Farms operation is over the tracks of the New York, New Haven & Hartford Railroad and from West Farms to Mt. Vernon the construction is four-track. From Mt. Vernon to both White Plains and New Rochelle the construction is double-track. The system is equipped for single-phase 11,000-volt alternating-current operation, energy being received by means of an overhead pantograph. Operation began in 1912, during which and succeeding years several articles appeared in the ELECTRIC RAILWAY JOURNAL describing shop and operating problems and supplying maintenance costs.

The cars used on the Westchester are of steel construction throughout, with general dimension and weights as follows:

Length over buffers	72 ft. 7¼ in.
Length over sills	70 ft. 4 in.
Length over corner posts	61 ft. 4⅛ in.
Widths at eaves	9 ft. 9¾ in.
Over-all width	10 ft. 4 in.
Height from top of rail to top of roof	13 ft. 3⅛ in.
Distance between truck centers	47 ft. 7½ in.
Wheelbase	8 ft.
Seating capacity	80
Weight of motors and control equipment	24,450 lb.
Total weight of car	120,000 lb.

These cars are equipped with two Westinghouse 6-pole single-phase motors, located both on a single truck. The motors are of the forced-ventilation type and have an hourly rating of 175 hp. each. The motor trucks are equipped with 42-in. steel-tired wheels, while the trailer trucks are equipped with 36-in. rolled steel wheels.

There are forty-five cars in all, including thirty-eight standard cars, such as the one shown in an accompanying illustration; two express cars and five trailer cars. The latter are used only when service requires, which is seldom, and at that time are used in the ratio of three motor cars to one trailer.

The service which these cars are called upon to furnish consists of 119 trains per day between Harlem River and New Rochelle and ninety-two trains per day between Harlem River and White Plains, or 211 trains per day on the main line from Harlem River to Mt. Vernon.

During the off-peak hours single cars are used, but during the rush hours trains are used in length up to a maximum of four cars. The average number of car-miles run on the Westchester during the month of April, 1920, was 4,500.

EQUIPMENT INSPECTED ON MILEAGE BASIS

The multiple-unit cars are inspected approximately every 3,000 miles. In addition to this inspection there is, of course, the usual terminal inspection at the end of each run. The cars average about 3,000 miles per month, so that each car receives a general inspection on an average of once every month.

For the general inspection the force is divided up so that certain men specialize on certain parts of the equipment. One man, for instance, is responsible for all oiling. This includes compressor, blower, motor generator, truck journals, axle bearings, armature bearings, truck parts, etc. In addition to this, waste oil from the motor overflow cup is used for lubricating journal box guides and brake rigging slides. Thin graphite grease is used on the center plate bearing at such times as the car is jacked up for general overhauling of the trucks. Hard stick graphite is used on the diaphragm plate at the ends of the cars, being rubbed on the high spots as well as on parts that show where the plates have been in contact.

A second man specializes on the trucks. These are carefully inspected for looseness of any parts, brake shoes are replaced if worn and brakes are adjusted, wheels are gaged to show wear and are removed for turning when necessary. The inspection work on the motor is done by a third man, who notes the condition of the commutator and of the brushholders and replaces any worn brushes. Any dirt in the motor is blown out by compressed air. The same inspection is also given to the blower motor, the air compressor motor and the motor generator. All control apparatus is carefully inspected by a fourth man. This includes the switch group, reverser, various relays, train coupler sockets and jumpers. These parts are adjusted and worn parts are replaced and finally the whole is tested for proper operation.

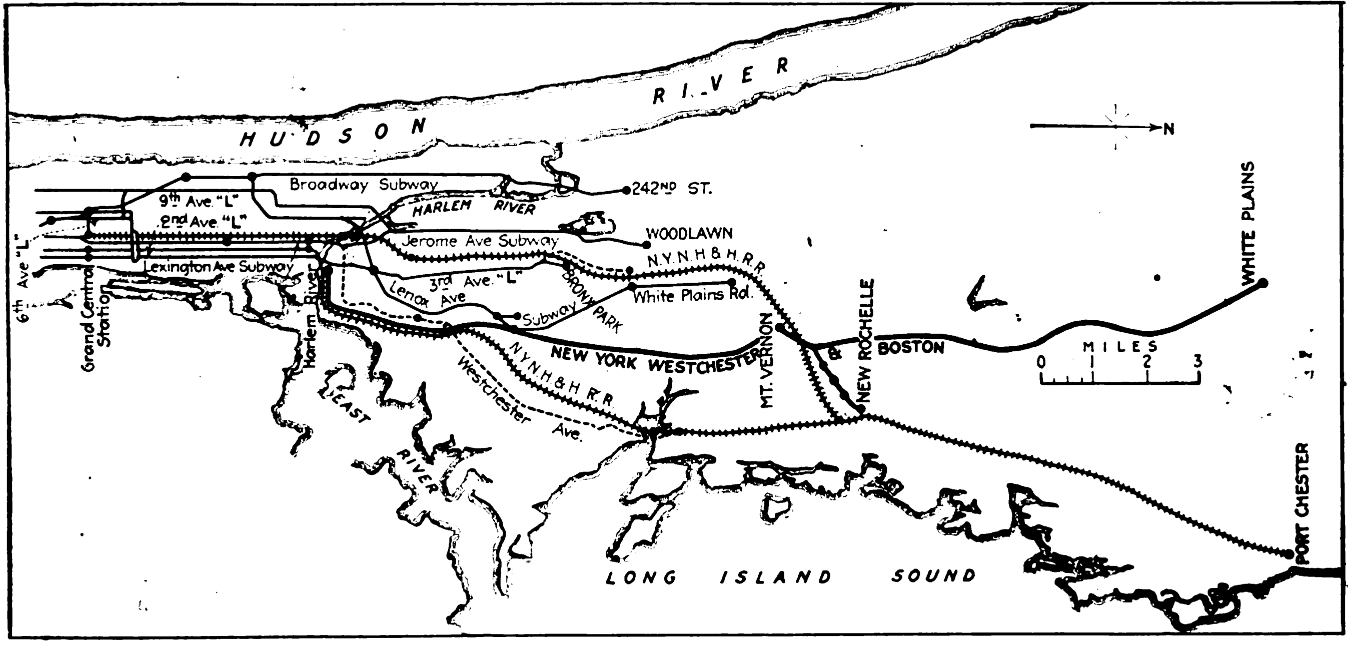
One man inspects, lubricates and replaces any worn parts, including shoes, on the pantograph and finally tests this for operation. Another inspects the car body, adjusts, replaces and repairs sash, seats and doors. A third handles the inspection of the air brake equipment, removing and replacing with cleaned and tested parts those that are due for periodic cleaning. This includes compressor governors, feed valves, brake valves and control valves. The air compressor itself is allowed to run until the operation indicates that it needs attention. This in some cases has been as long as eight years.

There is no time at which the entire car receives a general overhauling. This is done on an installment plan at the time of the general inspection, as experience has shown that certain parts need a general overhauling more frequently than others. For instance, the truck receives a general overhauling at such time as the wheels need turning. This is approximately every 40,000 miles on the trailer trucks and every 30,000 miles on the motor trucks. The motor truck mileage between overhauling dates would be approximately the same as that for the trailer trucks except for the fact that it has been found cheaper to turn the wheels on the motor trucks and overhaul the trucks at the same time the motor is overhauled. This has been found to approximate every 30,000 miles.

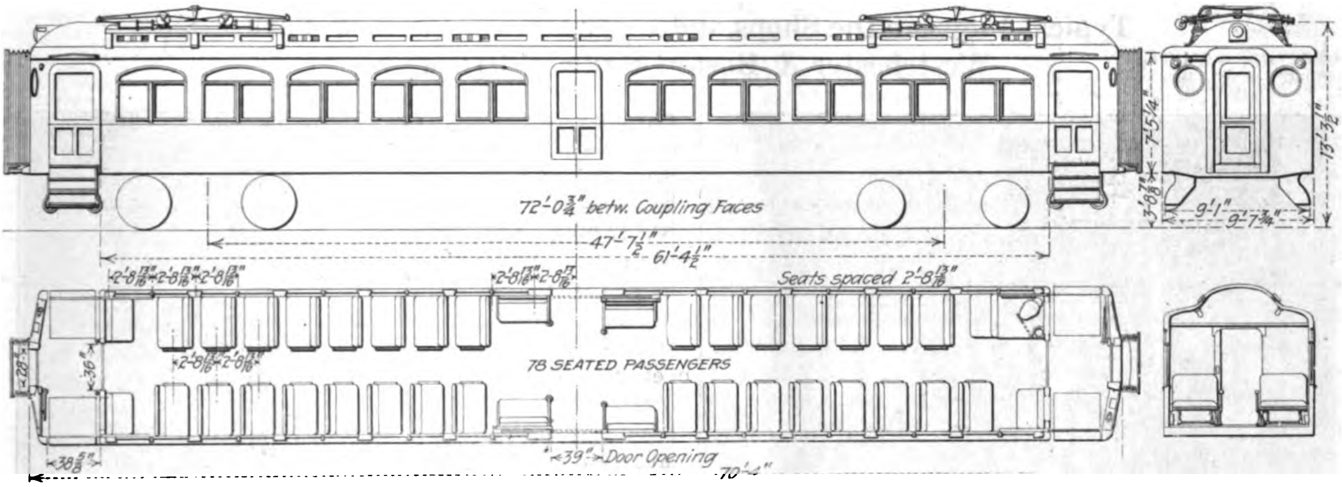
When the truck is to receive a complete overhauling the car is lifted from the truck by means of a yoke attached to the overhead crane, as shown in an accompanying illustration. The heavy fabricated supports shown are then released, by removing a pin, and drop into position under the car sills. The car is lowered onto these and the yoke removed. Both this track and the adjoining one are furnished with a hand-operated turntable of diameter sufficient to accommodate a single truck and so located that when the car is resting on the supports the truck is centered on the turntable.

The turntable is revolved 90 deg. and a chain from the crane hoist is attached to the truck. In this way it is drawn from under the car and placed on the turntable of the adjoining track, whence it can be drawn by the crane to a convenient point for overhauling. The reverse operation of replacing the truck is accomplished in the same manner. This plan eliminates heavy pushing and pulling by the workers; in fact, two men on the floor and one crane operator can handle the operation very satisfactorily.

At the time the motor is overhauled the commutator is turned and undercut, brushholders taken out and worn ones replaced and reset to the proper tension. Fields are inspected for their condition and blown out thor-



MAP OF THE NEW YORK, WESTCHESTER & BOSTON SYSTEM, SHOWING ALSO NEW YORK CITY CONNECTING RAPID TRANSIT LINES



PLAN AND ELEVATION OF THE NEW YORK, WESTCHESTER & BOSTON RAILWAY MULTIPLE-UNIT CARS

oughly by compressed air. The inside of the motor housing is painted by means of a spray gun. Motor bearings are checked up for wear and if in good condition are used again. The armature is thoroughly blown out and thrust bearings ckecked up for wear. On the Westchester great importance is placed on not allowing the end thrust to become excessive either on the truck journals or motor bearings. During 1919 there were but seven armatures wound. This is a representative number for that period. Commutators are turned about every ten months, which is equal to every 30,000 miles.

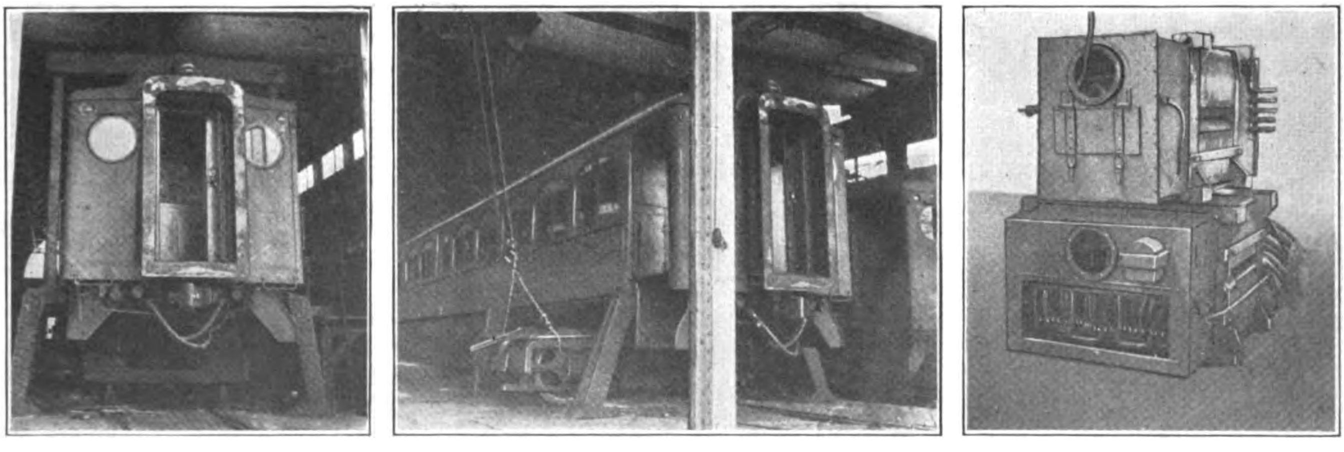
Feed valves and control valves are overhauled every third inspection, brake valves every sixth inspection, governors and safety valves every twelfth inspection. As previously mentioned, the general inspection averages once every month, so that these parts receive a general overhauling every third, sixth and twelfth month respectively. Compressor valves are also inspected every six months and receive a general overhauling every four years. Brake cylinders are overhauled once a year. The air brake testing department, with testing rack, is shown in an accompanying illustration.

Pantographs are made up in the shops, the jig shown in an illustration being used to square up the pantograph during construction. The pantograph frames are made of sherardized lock-joint tubing, 1 in. in outside diameter and 0.028 in. thick. Maple plugs are inserted in the ends of the tubing. It will be noticed from the illustration that, unlike many pantographs, only one cross bar is used. It was found that this provided more than sufficient strength while it reduced both the weight and the cost of construction.

The pantograph shoes are also made in the shops, being pressed out of No. 14 gage sheet iron, size 8¾-in. x 48 in., in a 400-ton wheel press. Bending the ends would take very little pressure, but putting the slot in the center necessitates a pressure of 60 tons, due to the fact that the iron is actually stretched to some extent to form the slot. This is done with a die, the slot being formed in advance of the bending of the sides.

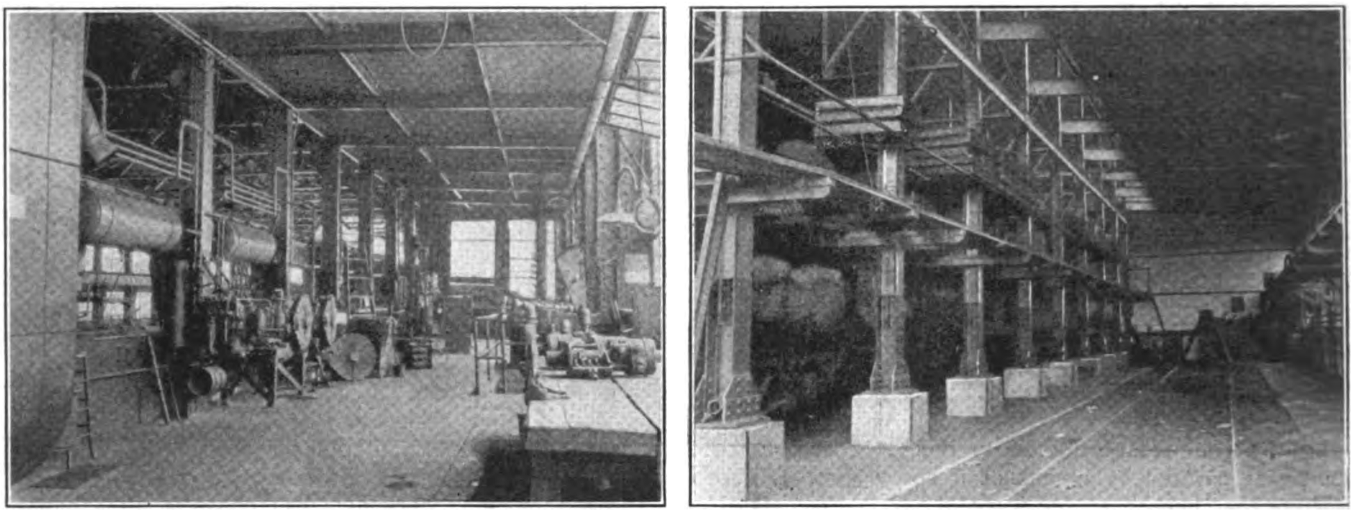
A device which is now being placed on the pantographs, illustrated herewith, greatly facilitates the release of the pantograph from the "down" position when the car is in the yards or on a siding and no air is available to perform the operation automatically. A 15-ft. pole is carried in a pipe support under the sill of the car. This is shown in the illustration of the car resting on the shop supports. Ordinarily it has been the practice to maneuver this pole around to release the catch which holds the pantograph down. Now a simple pipe and spring attachment has been devised which makes it an easy matter to release the pantograph by means of the original pole.

Some of the changes which have been made in the car equipment include the substitution of a two-coil transformer which weighs 1,000 lb. less than the original auto-transformer. This necessitates a separate return to the transformer. The comparative sizes of the two transformers are shown in one of the illustrations which shows them together.

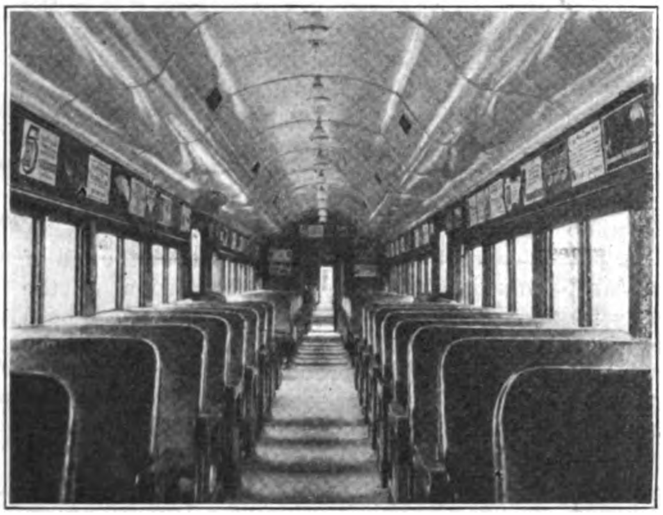


AT LEFT, THE CAR BODY IS HOISTED WITH A YOKE ATTACHED TO THE OVERHEAD CRANE. IN CENTER, THE YOKE REMOVED, THE CAR BODY RESTS ON THE SUPPORTS AND THE TRUCK IS PULLED OUT BY THE CRANE. AT RIGHT, THE NEW TRANSFORMER (ON TOP) WEIGHS 1,000 LB. LESS THAN THE OLD ONE

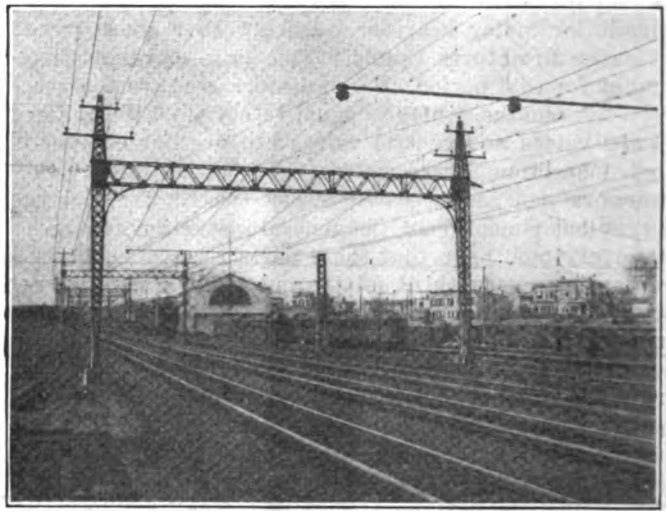
Typical Views in the Shops and Elsewhere on the New York, Westchester & Boston Railway Property



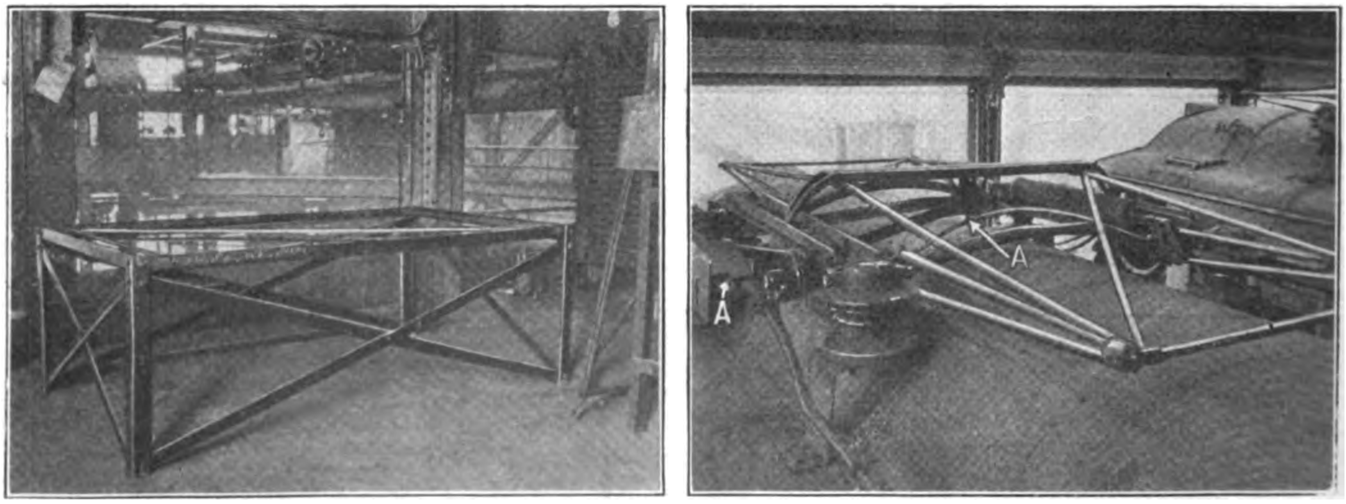
AT LEFT, THE AIR BRAKE DEPARTMENT IS LOCATED ON THE NORTH BALCONY. AT RIGHT, INTERIOR OF TWO-TRACK PAINT SHOP, SHOWING PERMANENT PLATFORMS AND RACKS FOR STORAGE OF SEAT CUSHIONS AND BACKS



INTERIOR OF WESTCHESTER STANDARD MULTIPLE-UNIT CAR, SHOWING PRESENT LIGHTING



MAIN FOUR-TRACK RIGHT-OF-WAY, WITH SHOPS AND STORAGE TRACKS AT THE RIGHT



AT LEFT, JIG USED TO SQUARE UP PANTOGRAPHS DURING ASSEMBLY. AT RIGHT, EACH SIDE OF THE PANTOGRAPH FRAME HAS ONLY ONE CROSS BAR. NOTE ALSO THE SPECIAL DEVICE "A" FOR MANUALLY UNLOCKING THE PANTOGRAPH

TABLE I—MAINTENANCE COSTS OF MULTIPLE-UNIT CARS N. Y., W. & B. RY., 1919

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
Repairs—Labor and Material													
A.C. equipment	$365.14	$773.00	$404.89	$608.93	$593.94	$399.14	$351.46	$394.05	$353.37	$443.49	$856.22	$936.75	$540.36
Motors........	491.29	474.23	531.72	802.15	849.16	610.39	635.67	448.71	408.57	498.94	375.59	812.15	578.21
Control equipment........	84.81	47.37	51.22	51.35	276.72	252.03	235.32	107.66	190.02	55.03	128.29	121.21	133.42
Car body......	480.13	309.17	725.57	325.47	383.66	621.54	644.71	577.63	406.30	352.91	383.96	601.35	484.37
Trucks, wheels and axles.....	694.49	517.79	606.36	1,422.70	1,416.92	1,076.50	1,342.24	981.58	742.09	576.74	542.93	611.10	877.62
Gears and pinions.........	3.03	3.52	26.32	58.59	112.22	8.83	44.39	128.39	49.68	9.09	77.91	72.54	49.54
Pantographs...	266.18	189.24	161.68	125.68	172.76	252.09	95.95	229.87	139.78	176.19	317.90	551.90	223.27
Air brakes......	145.84	146.35	66.53	124.47	191.74	226.09	245.14	402.37	285.04	260.56	160.54	295.31	212.50
Brake shoes....	282.00	201.00	283.50	250.50	172.50	255.29	454.90	396.22	258.21	269.14	334.57	372.03	291.66
Miscellaneous shop expense and supervision.......	646.66	546.95	659.93	479.97	441.79	486.45	468.50	442.49	461.92	707.30	564.74	773.24	581.66
Total........	$3,459.57	$3,208.62	$3,517.72	$4,249.81	$4,611.41	$4,188.35	$4,518.28	$4,108.97	$3,294.98	$3,349.39	$3,742.65	$5,147.58	$3,972.61
Cost (cents per car-mile).....	2.66	2.76	2.68	3.24	3.30	2.98	3.14	3.53	2.45	2.43	2.70	3.66	2.96
Inspection—Labor													
A. C. equipment	42.65	32.87	36.67	37.84	58.75	42.98	77.38	59.59	69.76	60.45	60.92	85.26	54.59
Motors........	79.32	72.46	71.02	65.26	62.14	56.52	72.59	69.78	99.73	83.38	96.11	116.08	78.70
Control equipment........	35.34	19.17	8.08	25.07	10.91	10.18	25.01	50.10	39.71	46.01	22.17	18.70	25.87
Car body......	62.54	45.66	54.87	60.08	48.54	40.38	58.65	59.52	96.74	86.13	48.30	53.60	58.75
Trucks, wheels and axles.....	3.88	0.48	....	....	....	....	0.95	....	4.10	9.49	6.74	25.35	4.33
Gears and pinions.........	....	....	....	....	....	....	....	....	....	....	....	....	....
Pantographs....	78.87	67.61	68.12	63.69	57.45	64.18	70.22	84.94	92.60	64.17	55.52	41.20	66.55
Air brakes......	77.41	58.78	50.46	65.00	71.31	51.71	81.85	70.81	134.77	126.37	78.66	63.86	78.42
Brake shoes....	45.93	54.64	61.27	56.47	55.53	53.14	64.00	44.01	105.06	131.02	93.40	136.81	75.11
Miscellaneous shop expense and supervision.........	53.25	53.44	53.44	53.44	53.44	53.44	59.37	59.37	107.51	65.30	81.03	80.58	64.47
Total........	$479.19	$405.11	$403.93	$426.85	$418.07	$372.53	$510.02	$488.12	$749.98	$672.32	$542.85	$621.44	$506.79
Cost (cents per car-mile).	0.37	0.35	0.31	0.33	0.30	0.26	0.35	0.42	0.56	0.49	0.39	0.44	0.38

NOTE.—Costs of car cleaning, lubricating materials and incandescent lamps not included in above.

The lighting arrangement in the original cars has also been changed, the forty-two 23-watt side lights having been removed and ten 56-watt lamps with shades having been placed along the center of the car.

Since the construction of the shop proper, a two-track paint shop addition has been built. One man devotes his entire time to the painting, continually keeping one car going through the shop. This results in the painting of each car approximately every eighteen months.

When cars are brought in for a periodic painting all seat backs and cushions, lamps and shades are removed. The car is blown out with compressed air and all window sash are removed. The ceiling is washed down with a solution of soap and water in which is included a small amount of alcohol. The inside of the car is sandpapered, following which the ceiling receives a coat of white enamel and the interior walls are painted with an interior enamel. Seats and cushions are cleaned with a renovator and replaced. This also applies to the curtains.

The exterior of the car is cleaned with Exlo emulsion and the roof is scraped and painted. The pantographs are also painted. The sides of the car are then cleaned with steel wool and painted with a New York, Westchester & Boston standard enamel. The sash is burned off on the outside and painted. The inside is cleaned and varnished.

As the car goes through the paint shop the door engines, of which there are six per car, are overhauled. All equipment under the car is given a coat of black paint and the rubber matting in the vestibule is replaced if badly worn.

As compared with the figures presented in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, the accompanying tabulation of maintenance costs will show considerable increase, but this has not been out of proportion to increases in the cost of all other materials and work, and in fact the accompanying figures make a very favorable showing.

The total costs of maintenance are shown in Table I, being divided under the heads "Repairs" and "Inspection." The costs for repairs include both labor and material, while those for inspection naturally include a labor charge only. None of these figures include the cost of car cleaning, lubricating materials and incandescent lamp renewals. The cost for "A.C. Equipment"

TABLE II—DELAYS AND MINUTES DELAY TO MULTIPLE-UNIT CARS CHARGEABLE TO DEFECTS IN VARIOUS PARTS OF EQUIPMENT, 1919

	Brakes		A.C. Equip.		Cont. Equip.		Panto.		Misc.		Total Delays	Total Min. Delay	Pass. Car-Miles per Delay	Pass. Car-Miles per Min. Delay	Cars Removed from Service	Total Passenger Car-Miles
	No.	Min.	No.	Min.	No.	Min.	No.	Min.	No.	Min.						
January.........	7	21	2	6	1	12	0	0	3	13	13	52	9,983	2,496	8	129,780
February........	5	20	3	20	3	7	0	0	4	30	15	77	7,742	1,508	14	116,136
March...........	6	19	3	9	0	0	0	0	8	25	17	53	7,716	2,475	7	131,165
April............	2	6	2	5	1	3	0	0	0	0	5	14	26,243	9,373	9	131,216
May............	2	10	2	13	5	23	0	0	2	6	11	52	12,674	2,681	8	139,418
June............	6	43	2	11	3	22	0	0	1	7	12	83	11,708	1,704	8	140,499
July.............	2	11	2	12	1	4	0	0	2	14	7	41	20,512	3,502	8	143,587
August..........	3	24	1	4	5	28	0	0	1	6	10	62	11,630	1,876	5	116,309
September.......	5	30	0	0	3	44	0	0	3	20	11	94	12,219	1,429	6	134,405
October.........	2	18	4	21	1	16	0	0	1	6	8	61	17,209	2,254	4	137,594
November.......	3	12	4	26	0	0	0	0	4	39	11	77	12,605	1,800	11	138,663
December.......	4	23	6	68	0	0	0	0	1	8	11	99	12,772	1,419	6	140,490
Totals.........	47	237	31	195	23	159	0	0	30	174	131	765	163,013	32,517	94	1,599,262
Av. per month....	3.91	19.6	2.58	16.2	1.91	13.2	0	0	2.5	14.5	11	64	13,584	2,710	8	133,272

NOTE.—Thirty-eight cars in service.

includes all a.c. wiring, the blowers, the transformers and the switch groups. Costs for control equipment cover all direct-current apparatus, such as the batteries and the direct-current side of the switch group and control. The total cost of maintenance and inspection expressed in cents per car-mile for the year 1919 was 3.34 cents.

In Table II are shown the number of delays and the number of minutes delay to multiple-unit cars chargeable to defects in various parts of the equipment. The column "Cars Removed from Service" does not indicate that these cars necessarily broke down on the road, but simply that some defect was discovered which made it advisable to turn the car into the terminal for inspection at either end of the run. The figures in this table show that there was an average of only eleven delays per month, totaling sixty-four minutes per month, or less than six minutes per delay. It is also shown that there were 13,584 car-miles operated for every delay.

Table III shows the defects in any part of the car equipment reported by motormen during the year 1919. This table is made up from a monthly car defect report, which is analyzed carefully. It should be explained that the recorded defects in pantographs include all reports of slow operation, etc., made by the motorman, and this does not mean that the pantographs were broken or failed to operate.

Table IV shows the number of replacements of various equipment parts for the multiple-unit cars during the year 1919. The replacement of car lamps might at first seem high, but when it is recalled that there are forty cars in continuous operation, requiring 410 lamps, it will be seen that the replacement of an average of 58.5 lamps per month, or 15 per cent, is in reality very small.

Table V shows the number of replacements and the mileage of brake shoes, pantograph shoes and main motor brushes dring 1919. The number of pantograph shoes used and the mileage obtained from each is noticeable as compared with some of the early years of operation. This is to be attributed to the fact that the steel contact wire has now worn down so that the surface is flat and thus does not present a single narrow line of contact. The wearing surface is now approxi-

TABLE III—CAR DEFECTS REPORTED BY MOTORMEN IN 1919, N. Y., W. & B. RY.

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Compressors	1	3	0	0	0	1	1	1	0	1	1	1	10
Governors	3	2	1	0	1	1	1	0	2	1	2	1	15
Control valves	0	0	1	0	0	0	0	0	0	2	0	0	3
Brakes leak off	0	0	0	0	0	0	0	0	0	0	0	0	000
Stuck brakes	4	4	1	5	2	4	0	0	0	1	0	1	22
Electric brakes	0	1	0	0	0	0	0	0	0	1	0	0	2
Feed valves	2	1	1	0	0	2	0	0	1	0	2	1	10
Brake valves	2	0	0	0	0	0	0	0	1	0	0	0	3
Brake release slow	0	0	0	0	0	0	0	0	1	0	0	0	1
Poor brakes	1	3	1	1	1	0	0	0	3	2	0	0	12
Emergency valves	0	1	0	0	0	0	0	0	1	0	0	0	2
Whistles	0	1	0	1	0	0	0	0	0	0	1	0	3
Air pipes	1	0	0	0	0	0	0	0	0	0	0	0	1
Angle cocks and hose	1	1	0	0	0	2	1	1	4	0	0	0	10
Line switch	0	1	0	1	0	1	1	1	0	0	0	0	5
A.C. wiring	0	0	0	0	3	0	3	0	0	1	0	0	7
Transformers	0	1	1	0	0	0	1	0	0	0	1	0	4
Control wiring	1	0	0	0	0	0	0	0	0	0	0	1	2
Current relay	0	0	0	1	1	1	2	0	4	0	1	1	11
Jumpers and sockets	0	1	0	0	1	1	1	1	2	0	0	0	7
Switch group	0	3	1	1	2	1	0	3	2	2	1	2	18
Switches	1	2	0	0	1	0	1	0	0	1	1	1	8
Lights	0	1	0	0	0	0	0	0	0	0	0	0	1
Battery lights	0	0	0	0	0	1	0	0	0	0	0	0	1
Motor leads	0	0	0	0	0	0	0	0	0	0	0	0	0
Pantographs	11	8	7	2	15	16	12	8	10	14	11	9	123
Batteries	0	0	0	1	0	2	1	0	2	1	0	1	8
Heaters	2	3	2	0	0	0	0	0	0	0	2	0	9
Motor generators	0	0	0	3	0	1	3	0	1	3	0	1	12
Reverser	0	0	0	0	0	0	0	1	1	1	0	1	4
Motors	8	13	12	9	3	4	1	2	3	5	6	3	69
Blower	2	1	1	1	0	0	0	0	1	1	0	0	7
Flat wheels	1	4	0	0	0	0	0	0	0	1	0	0	6
Hot journals	0	0	1	3	2	0	3	1	4	1	1	2	18
Hot motor bearings	0	0	0	0	0	0	0	2	0	1	0	0	3
Gears	0	0	0	0	0	0	0	0	0	0	2	0	2
Doors	3	3	8	4	2	3	0	3	4	4	1	3	38
Glass	0	0	0	1	1	2	0	0	3	0	1	0	8
Car seats	0	0	0	0	0	0	1	0	2	1	2	1	7
Trucks	1	2	0	0	0	2	2	0	2	4	5	3	21
Leaky roofs	0	0	1	0	0	0	1	0	0	0	0	0	2
Cars uncoupled	1	1	0	0	0	0	0	0	0	0	0	0	2
Shop	0	1	0	0	0	0	0	0	0	0	2	0	3
Motormen	0	0	0	0	2	0	0	0	0	0	1	0	3
Miscellaneous	3	6	5	2	3	2	1	8	5	3	3	5	46

TABLE IV—REPLACEMENT OF EQUIPMENT PARTS FOR MULTIPLE-UNIT CARS IN 1919, N. Y., W. & B. RY.

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Controller and interlock fingers	0	51	65	30	87	0	0	30	86	25	30	6	410
Switch group contact tips	8	40	44	63	32	54	36	66	68	28	34	30	503
Reverser fingers	3	0	0	0	0	0	0	0	0	13	0	0	16
Resistance grids	0	15	0	0	8	17	0	21	3	3	12	8	87
Switch group unit switches	1	0	13	2	0	0	0	0	6	7	7	1	37
Canvas blower connections to motors	0	0	00	14	0	6	0	6	0	0	0	0	26
Air brake hose	12	6	0	0	12	0	14	39	48	0	0	0	131
Line switch contacts	0	0	0	0	0	16	35	0	0	0	0	0	51
Brushholders	0	0	0	6	0	6	0	0	6	6	12	0	36
Heater coils	0	0	0	0	0	0	0	0	0	0	0	3	3
Pantograph insulators	0	1	1	0	3	2	0	2	0	0	6	0	15
Pantograph air hose	3	0	0	0	0	0	0	0	0	0	7	0	10
Battery lamps	85	20	10	25	30	0	0	15	10	0	14	0	209
Car lamps	85	70	120	40	57	45	20	45	60	30	65	80	717
Headlights	0	0	0	0	0	0	0	0	0	0	0	0	0
Gage lights	0	6	0	0	0	12	0	0	0	0	0	0	18
Motor bearings	0	0	0	0	0	0	0	0	0	0	0	0	0
Journals bearings	1	0	0	0	0	0	0	0	0	0	0	0	1
Gears	0	0	0	0	0	0	0	1	0	0	0	0	1
Pinions	0	0	0	2	2	0	0	2	0	0	1	0	7
Solid wheels	12	0	0	0	0	2	16	0	0	0	0	0	30
Tires	0	4	4	12	12	4	0	8	6	4	2	2	58

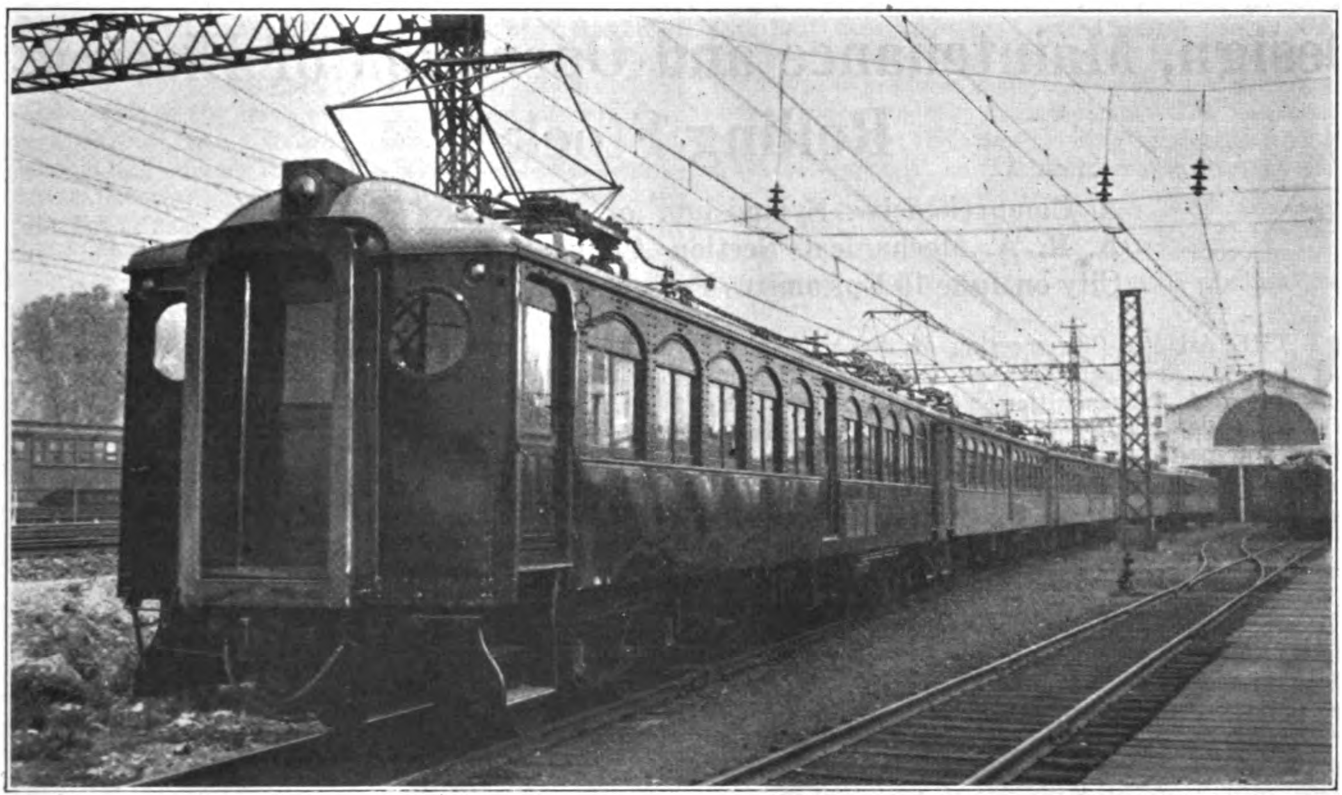
TABLE V—REPLACEMENTS AND MILEAGE OF BRAKE SHOES, PANTOGRAPH SHOES AND MAIN MOTOR BRUSHES FOR 1919, N. Y., W. & B. RY.

	Brake Shoes		Pantograph Shoes		Motor Brushes	
	No.	Brake Shoe-Miles per Shoe	No.	Car-Miles per Shoe	No.	Brush-Miles per Brush
January	188	8,974	65	2,019	1,600	3,936
February	134	11,267	76	1,547	1,400	3,982
March	189	9,022	96	1,380	1,300	4,843
April	167	10,214	52	2,554	1,100	5,726
May	115	15,760	45	3,136	950	7,044
June	145	12,596	38	3,743	550	12,262
July	282	6,619	60	2,409	650	10,603
August	200	7,560	51	2,282	400	13,957
September	162	10,895	58	2,341	450	14,482
October	170	10,632	61	2,280	750	8,898
November	193	9,434	70	2,013	850	7,957
December	213	8,685	80	1,779	900	7,591
Totals	2,158	121,658	752	27,483	10,900	101,281
Average per month	179	10,138	63	2,290	908	8,440

TABLE VI—COMPARISON OF MISCELLANEOUS AVERAGES OF VARIOUS ITEMS FOR YEARS 1913-1919, N. Y., W. & B. Ry.

	1913	1914	1915	1916	1917	1918	1919
Total cost, inspection and repairs	$1,820.04	$2,032.00	$2,044.85	$2,363,95	$2,168.42	$2,835.25	$4,457,24
Cost per-car mile, inspection and repairs (cents)	1 53	1.68	1.62	1.73	1.65	2.19	3.34
Total cost, repairs only	1,350 79	1,615.84	1,768.11	2,094,37	1,853.78	2,419.58	3,949.75
Cost per car-mile, repairs only (cents)	1.13	1.35	1.4	1.53	1.41	1.87	2.96
Miscellaneous carhouse expenses	417.39	767.52	747.22	799.26	520.60	476.11	813.25
Cost lubrication per 1,000 car-miles (cents)	0.21	0.22	0.23	0.17	0.20	0.19	0.31
Car-miles	118,975	120,471	126,213	136,695	130,934	129,182	133,272
Delays	5.05	3.50	4.30	7.2	5.50	8.0	11.0
Minutes delay	43.7	25.5	25.7	38.7	30.5	64.0	64.0
Kilowatt hours per car-mile	4.94	4.86	4.68	4.84	4.65	4.77	5.10

NOTE—Miscellaneous carhouse expenses contain the cost of car cleaning, lubrication, incandescent lamps, etc.



TYPICAL FOUR-MOTOR CAR TRAIN READY FOR RUSH HOUR SERVICE

mately the diameter of the wire. This results in considerably less wear on the shoes and consequently fewer shoes are used per month. On the other hand less mileage has been obtained from motor brushes. This is due to increasing severity of service requirements.

Table VI shows a comparison of miscellaneous averages of various items for the years 1913 to 1919. This table shows very clearly the effect of increased cost of materials and labor. The column "Miscellaneous Carhouse Expenses" includes the cost of car cleaning, lubrication, incandescent lamps, etc., not included in Table I. Car cleaning includes two general cleanings during the month as well as interior washing and disinfecting. In addition to this all cars are dry swept and brushed every day, the windows being dry cleaned.

Government Increased Wages

DURING the testimony of Director-General Hines before the committee on appropriations of the House of Representatives the Director-General was asked to explain the widespread difference between wages under private control of interurban railways and when they were being operated by the federal government. As examples were cited four interurban lines using electricity as motive power. Two were under federal control and two were under private control. The former two roads were the Waterloo, Cedar Falls & Northern and the Fort Dodge, Des Moines & Southern. The two under private control were the Cedar Rapids & Iowa City Railway and the Clinton, Davenport & Muscatine Railway. A study of these four railways, which were operated under similar conditions, brought about the accompanying tabular analysis.

Mr. Hines contended that standardization of wages throughout the country on the railroads resulted in important economies despite the fact that wages were raised in certain sections of the country. He took issue with the figures in the tables submitted by Representative Good. He later added to his testimony the following note:

> While an investigation is being conducted into the details of the salaries and wages mentioned, a report received by the Director-General, Mr. Hines, from C. D. Cass, general manager of the Waterloo, Cedar Falls & Northern Railroad, the property mentioned as having been under federal control, is to the effect that during 1919 there was no superintendent of substation on the property drawing $530 per month and, in fact, that there was no official or employee on the property drawing that amount, the highest salary of any officer or employee having been paid to Mr. Cass as general manager and that being $6,000 per annum. Prior to federal control Mr. Cass received $12,000 per annum. If possible, a communication will be sent by the Director-General to the chairman later concerning the details of the other wages given in the table presented by the chairman.

COMPARISON OF SALARIES AND WAGES, 1919, FEDERAL AND PRIVATE CONTROL OF INTERURBAN RAILWAYS.

Class of work.	Private control	Federal control	Per cent of increase of Federal control over private
Small-station attendants, per month	$90.00	$120.00	33.33
Motormen, per hour	0.50	0.75	50.00
Conductors, per hour	0.50	0.75	50.00
Freight-service employees, per hour	0.55	0.76	38.18
Clerks, per month	95.00	100.00	5.26
Section men, per month	0.32	0.40	25.00
Bridge repair men, per month	0.32	0.53	65.63
Superintendent, substation, per month	165.00	530.00	221.21
Blacksmiths, per hour	0.45	0.72	60.00
Electricians, per hour	0.50	0.72	44.00
Carpenters, per hour	0.50	0.72	44.00
Car inspectors, per hour	0.45	0.67	48.89
Laborers, per hour	0.33	0.40	21.21

Mr. Good refuses to be shaken from his claim, as he supplements Mr. Hines' note with the following:

> Attention is called to the fact that an examination of the detailed information upon which the comparative table in question is based shows that substation operator pay per month on the Fort Dodge, Des Moines & Southern Railway was $120 per month under private control (1917) and reached a maximum of $530 per month (1919) under Federal control.

Design, Maintenance and Operation of Electric Rolling Stock

A Comprehensive Symposium of Papers Read at the A. R. A. Mechanical Section Convention at Atlantic City on June 10 Epitomizes Present Practice in This Field

AT THE Atlantic City meeting of the Mechanical Section, American Railroad Association, begun this week, the committee on electric rolling stock, C. H. Quereau, New York Central Railroad, chairman, on June 10 presented as its report a symposium covering operating experiences and general data of most of the steam railroad electrifications in the country. Brief abstracts of some of the papers forming this symposium are given below:

A PIONEER ELECTRIFICATION

J. H. Davis, electrical engineer Baltimore & Ohio Railroad, reported for that road in respect to the Baltimore tunnels. The class LE-2 locomotives, although of obsolete design, are still in operation and are today handling the maximum tonnage freight trains over the division, notwithstanding the fact that while they have been in service steam motive power has been replaced twice in order to secure greater capacity. Their continuance in service is due to the flexibility of multiple-unit control in that they are now used in a three-unit combination, whereas they were originally in a two-unit combination.

The locomotives purchased in 1910 and 1912 are of the Detroit tunnel type and can be considered as standard for the present electrification. Future additions probably will be of this type, with minor modifications to increase capacity slightly. These will involve increasing weight to 120 tons and changing the gear ratio to 83:19, which will give tractive effort at the one-hour rating of 33,800 lb. with a speed of 12.2 m.p.h. This will permit handling maximum-tonnage freight trains (2,600 tons, including steam locomotives) without dangerous overloading.

After a number of contact conductor arrangements had been tried out, of which Mr. Davis gave details, the present standard construction, he said, was adopted. In this the insulator rests on a wood-block support, eliminating the use of any metal except for the fastening bolt. The guard boards are supported on a malleable iron casting, but this is mounted independently from the insulator support. When the new construction was first installed there was some apprehension lest it might be pushed over the insulator on curves due to the effect of creepage and expansion. Anchors, however, have not been found necessary, although the rail is laid on a maximum grade of 1 per cent and is subjected to heavy traffic conditions.

As to bonding, Mr. Davis reported that the original bonds of an early concealed type with compressed terminals had short life and have been replaced by bonds of cable type extending around the joint plates. These are of 500,000-circ.mil section, 43 in. in length, with expanded pin terminals. With 130-lb. track rail now being laid a cable bond passing under the joint plates is being used, with terminals at both ends applied at the factory. While joint plates must be removed in installing this bond, it is shorter than the other, and increased life is expected because a bond placed outside of the plate is sometimes injured during replacement of ties, etc. Bonds applied to the head of the rail have been tried, but none has proved satisfactory for heavy traffic conditions.

RESULTS OF THE NEW YORK CENTRAL ELECTRIFICATION

C. H. Quereau, superintendent of electrical equipment New York Central Railroad, gave operating and other data regarding its electrified section. He traced briefly the history of the development, including the reasons for adopting electricity, giving among other things the following dates: First scheduled multiple-unit train, Dec. 11, 1906; first scheduled electric-locomotive train, Feb. 13, 1907; first switching service, April 14, 1907, and all scheduled trains July 1, 1907. Operation began with thirty-five locomotives and 180 multiple-unit cars, of which fifty-five were trailers. It was later found important to have all multiple-unit cars equipped with motors, which was done. At present there are seventy-three locomotives and 241 motor cars.

TABLE I—INSPECTION AND REPAIRS OF ELECTRIC LOCOMOTIVES

Year	Cost per 1,000 Miles Labor	 Material	 Total
1912	$18.88	$14.60	$33.22
1913	19.82	14.54	34.36
1914	21.55	21.34	42.89
1915	19.01	13.79	32.80

To indicate the reliability of electric operation, Mr. Quereau stated that in 1918 there were thirty-seven detentions of electric locomotive trains and 50,127 miles were run per detention, and seventy-one detentions with the multiple-unit cars, or 83,469 miles per detention. In 1908, under steam operation, on the Hudson passenger division the figures were 664 detentions and 6,045 miles per detention.

The cost of inspection, repairs and maintenance of the electric equipment, as given by Mr. Quereau, are shown in Table I, which figures, he states, are fair averages for the twelve years of electric operation until 1918, when wages were appreciably increased by the government. These figures do not include fixed charges. Table II was given to show the relative numbers of steam and electric locomotives required.

TABLE II—ENGINES USED—HUDSON DIVISION

	Steam		Electric	
	53 Engines and 78 Coaches		17 Engines and 97 Multiple-Unit Cars	
Harlem Division				
	41 Engines and 95 Coaches		11 Engines and 116 Multiple-Unit Cars	
Switching Crews				
At G. C. T.	16 crews	11 engines	11 crews	5 engines
At Mott Haven	20 crews	14 engines	12 crews	6 engines
Total	36 crews	25 engines	23 crews	11 engines
Shop crews	26 crews	20 engines	18 crews	12 engines
Total	62 crews	45 engines	41 crews	23 engines

Summarizing the electrification situation in the United States, Mr. Quereau directed attention to these facts: There are fourteen roads which have electrified divisions, on eleven of which there are tunnels; 925.37 miles of route and 1,906.05 miles of track have been electrified; of the seven roads using direct current, four are 600-volt, two 2,400-volt and one 3,000-volt; of the alternating current roads four, with single-phase equipment, use a voltage of 11,000, one road uses three-phase current at 6,600 volts, and one uses single-phase current at 11,000 volts with split-phase current on the locomotive; on five roads third rail is used, and on eleven there are overhead contact wires.

REGARDING THE NEW HAVEN

The situation regarding the New Haven electric rolling stock was reported by W. L. Bean, mechanical assistant. He stated that on the principal electric division (New York to New Haven) there are now 104 electric locomotives and twenty-seven multiple-unit and fifty-two trailer cars. All operate at 11,000-volt, single-phase and some are arranged to operate also at 660-volt direct current.

Mr. Bean divided the locomotives of the New Haven into two groups, standard types and experimental types. Of the former he referred to the one using gearless motors for fast passenger service, the first type built, which is now obsolete for single phase. The second standard type comprises the geared passenger, freight and switcher locomotives, respectively with these wheel arrangements, 2-6-2-2-6-2, 2-4-4-2 and 0-4-4-0. Of the experimental locomotives he mentioned the geared three-truck fast freight or passenger locomotives, 2-4-4-2; the geared two-truck fast freight or passenger locomotives, 2-4-4-2; the geared side-rod freight locomotive, 4-4-4-4, and the side-rod locomotives, 2-4-4-2.

The type that proved best for passenger and freight service is the geared type with twin motors; that is, two motors bolted together and driving one pair of wheels through helical springs. This type is now standard. For switcher service the same general type is standard, except that a single motor and an 0-4-4-0 wheel arrangement are used, better to adapt the locomotive for this purpose. Increased switcher power will be obtained by multiple operation of units.

Mr. Bean pointed out that in addition to standardizing the locomotive, the railroad has brought about a corresponding standardization of auxiliary and control apparatus, a few of the major instances being as follows: (1) Standard motor for freight and passenger service; (2) universal blower motor, applicable to all classes; (3) universal compressor motors; (4) standard pantograph; (5) standard line switch, and (6) many detail parts of control apparatus and switch groups not interchangeable as a whole.

Mr. Bean divided the multiple-unit cars into two groups; those operating on 11,000 volts, single-phase only, and those operating on both single-phase and direct current. There are six motor cars of the former and twenty-one of the latter types. Each can pull two trailers. There are fifty-two trailer cars. Of the twenty-seven motor cars but two are now equipped with automatic control, although originally eight were so equipped. The six cars built for alternating current only have straight alternating-current motors, the control being arranged to change the connection of the motor as the speed varies to obtain best commutation. Four of the first motor cars were equipped with a flexible drive similar to that used on the gearless locomotives. Fourteen later ones came with the helical-spring drive. The last four cars were built with flexible gears, and all motor cars were later changed to these gears. The flexible gear produces easier riding and a simpler design and conduces to easy maintenance. The development has been toward replacing existing apparatus with that of larger capacity, so that an increased tonnage rating can be secured or a greater daily mileage.

The installation of larger units involves rearrangement of apparatus so that a considerable change in appearance results due to but a small modification in design.

THE ONLY THREE-PHASE ELECTRIFICATION IN THIS COUNTRY

William Kelly, general superintendent of motive power Great Northern Railroad, described the electrification of the Cascade Tunnel and Tye Yards, commenced in 1908 and completed in 1909. There are here four three-phase locomotives, power being taken from two overhead contact wires at 6,600 volts and transformed on the locomotive in two three-phase transformers to 500 volts. All motors are of the three-phase induction type and the control is of the Sprague multiple type.

The locomotives weigh 115 tons each, all driving wheels being traction wheels and each motor being coupled to its axle like a street car motor. The motor shaft has a pinion on each end, with nineteen teeth, the driving gears having eighty-one teeth. Although the gear is not cushioned to equalize tooth pressure, both pinions wear evenly, the tooth pressures appear to be uniform and the wear to date has been almost negligible.

The four motors are of 250 nominal horsepower each, but can carry 50 per cent overload for the short periods that the railroad is able to use them continuously. The regenerative control is used, but this feature, Mr. Kelly said, has proved of practically no value to the Great Northern.

As to maintenance, the railroad has a one-stall locomotive shed, where periodical inspections are made as well as all repairs except turning of tires, which is done at the Delta shop, 76 miles away. A crew of four electricians is necessary, but this same crew could take care of much more equipment.

Mr. Kelly gave the following data on cost of operation: Repairs per locomotive-mile, $7.53; wages, $27.39; lubrication, $0.20; supplies, $0.33; total $35.45. The mileage per pint of cylinder oil is 313; per pint of car oil, 19; the average gross tons per engine-mile, 345; the average tonnage per train, 1,035, as three locomotives are used; the total passenger-car miles, 48,096; the total ton-miles, 8,461,770. These data are for the year 1918.

ANOTHER SINGLE-PHASE ELECTRIFICATION

The Hoosac Tunnel electrification was covered by L. C. Winship, electrical superintendent. This 7.9-mile tunnel electrification was undertaken primarily to increase the capacity of the tunnel and to eliminate smoke. With electric operation, which began in May, 1911, four Mallet locomotives used for helper service were diverted to other uses and electric helping locomotives were provided for all trains. The original electrical equipment consprises five a.c. locomotives of the 2-4-4-2 type, developing 51,000 lb. tractive effort as a maximum—20,500 lb. continuously—working under a trolley pressure of 11,000 volts. Two similar locomotives were added in 1917. These handle 1,750 tons behind the steam locomotive.

ELECTRICAL OPERATION ON THE B., A. & P.

The Butte, Anaconda & Pacific Railway was electrified during 1912 and 1913. In the symposium it was covered by F. W. Bellinger, electrical superintendent, his contribution being the same paper as that read at the Pasadena convention of the N. E. L. A. on May 21. As this paper was fully abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for May 29, page 1101, it will not be necessary to repeat the abstract here. Mr. Bellinger concluded his paper with the significant statement: "For our service the electric locomotive is in every respect far superior to the steam engine."

EQUIPMENT FOR HEAVY TRACTION ON THE NORFOLK & WESTERN

John A. Pilcher, mechanical engineer Norfolk & Western Railway, described the equipment on the portion of the Pocahontas division familiarly known as the Elkhorn grade. The conditions here, he said, were favorable for electric traction because there was an entire short operating division on which electric power could be substituted for steam between engine terminals without shortening or interfering with adjoining operating divisions. In addition there were heavy grades where power requirements were great, and the large volume of traffic taxed the capacity of the line because of physical limitations and slow operating speeds. In this case the primary objects of electrification were the increased capacity of the line, and economy and increased efficiency of the service generally. The present electrification extends from Vivian to Bluefield. For information beyond that contained in his paper Mr. Pilcher referred to the issue of the ELECTRIC RAILWAY JOURNAL for June 5, 1915, and to papers before the New York Railway Club on March 19. 1915, by George Gibbs and on March 16, 1917, by C. H. Quinn.

Comparing electrical operation with steam, Mr. Pilcher said that it was customary under the latter to make up a train to a maximum weight of 3,250 tons behind the engine and to handle it by a Mallet road engine and a Mallet helper over the division, with a Mallet pusher in addition at the 1½ per cent and 2 per cent grades, or three engines per train. In cold weather and under adverse conditions the trains were reduced to about 2,900 tons. The engines were of the latest compound type, fitted with mechanical stokers and superheaters, weighing about 370,000 lb. on drivers and 540,000 lb. total, including tender, with a tractive power of about 85,000 lb. Tonnage trains were handled normally at speeds of 7 or 8 m.p.h. on the grades, but on account of the ventilating conditions the speed was reduced to 6 m.p.h. in the Elkhorn tunnel.

The decision to electrify, arrived at about seven years ago, followed a careful study by the officials of the road of the actual steam operating costs on this particular division. Twelve electric locomotives were provided for the service, replacing thirty-four Mallets. Alternating current at 11,000 volts with an overhead contact wire was selected for the installation, with the locomotive equipped with three-phase motors, a phase converter being used on the locomotive to change the single-phase current into three-phase current. The drawbar pull of the locomotive varies from a maximum of 114,000 lb. during acceleration to the 14-mile speed to 86,000 lb. and operating at this speed uniformly on a 1 per cent grade. The valuable characteristic of this type of electric locomotive is its capacity of safely exerting full tractive effort for a considerable time while standing.

Mr. Pilcher said that electric operation has been in service too short a time to give data as to performance, but the estimates of increased capacity have been fully met. The acceleration of one of these heavy trains is impressive as regards the amount of power required. Preliminary tests indicate that getting a train in motion up the grades requires as much as 11,000 hp. (electrical), and that running at uniform speed up the grade requires 8,000 hp.

There are twenty coal trains hauled eastward daily and six time-freight and passenger trains are helped up the grade. The daily coal-train tonnage eastward is 65,000.

DATA REGARDING THE C., M. & ST. P. RY. ELECTRIFICATION

The general superintendent of motive power of the Chicago, Milwaukee & St. Paul Railway, H. R. Warnock, contributed to the report a synopsis of the results of electrification of sections of that road. The railway was first interested in electrification at the time of its extension from the Missouri River to the Pacific Coast. The reason for its consideration was to lessen the fire hazard, as the line was building through a very extensive forest reserve of the government. The consulting engineers first decided upon a single-phase trolley system, but the plan was abandoned owing to insufficiency of power available on the St. Joe River. In the meantime the road secured a site for power development on Clark's Fork of the Columbia River.

The railway, in its operation, to secure terminal facilities at Butte and traffic for its new road, established relations with the Amalgamated Copper interests in Montana and acquired a substantial interest in the Butte, Anaconda & Pacific Railway, which was owned by the Amalgamated company. About this time the Great Falls Power Company, which was also controlled by the copper interests, was seeking a market for power from its important development and to that end acquired the Madison River Power Company and the Butte Electric Company, which were controlled by C. A. Coffin, president of the General Electric Company and affiliated interests, the combination being called the Montana Power Company.

For the purpose of developing a market for power as well as to develop electrified operation and to secure the savings therefrom the B., A. & P. was electrified, the contract being made with the General Electric Company. The engineering work was done by the Montana Power Company and the General Electric Company. The result of this undertaking was successful financially as well as technically.

About this time a representative of the General Electric Company made a report on the electrification of the Rocky Mountain division of the C., M. & St. P., based upon duplication of the locomotives and substation apparatus in use on the B., A. & P. No consideration of regeneration or control of peaks was contemplated. Based upon this report the contract was made with the Montana Power Company for a nominal sum of 10,000 kw. for the Rocky Mountain division, with options provided under certain times for an increase to a maximum of 25,000 kw. The contract further provided that apparatus would be secured by the railroad capable of regulation of power factor, and that the minimum monthly charge would be equivalent to an average of 60 per cent of the nominated maximum power.

The road entered into a similar contract for the extension of the electrification to include the Missoula division from Deer Lodge, Mont., to Avery, Idaho. It was concluded that the topography of the road was particularly suited to regeneration and that this would be required. Another conclusion was that automatic means should be provided for the limitation of the maximum demand for power.

The Westinghouse Electric & Manufacturing Company submitted an analysis, including an estimate on the cost of electrification, based on a single-phase trolley, split-phase locomotives for freight service, series commutator motors for passenger service and substation apparatus to convert from 60 cycles and to reduce automatically both voltage and frequency when the demand exceeded the predetermined peak setting. Each locomotive and each dispatcher's office was to be equipped with frequency meters so that at all times those interested in the condition of power demand would be able to function advisedly.

Analysis of the probable load condition with 2,500-ton trains led to the conclusion that a voltage higher than 2,400 was economical, and supporting this was a demonstration by the Westinghouse Company of a high-voltage car equipment, which was operated at 6,000 volts, direct current. The voltage of 3,000 was therefore decided upon and contracts were made with the General Electric Company for the electrification of 440 miles from Harlowtown, Mont., to Avery, Idaho. The execution of this electrification has been unique in the perfection of its details. The technical result of the electrification has been quite a success, and the financial result, due particularly to fuel and labor conditions, and the indirect value due to the publicity of this operation have been equally satisfactory.

Mr. Warnock also described the additional electrification of the Columbia and Coast divisions, which has been covered in detail in recent issues of the ELECTRICAL RAILWAY JOURNAL.

In regard to operating organization, Mr. Warnock said that the two divisions, Rocky Mountain and Missoula, are under one superintendent, who had two assistants, one for each. Train dispatching is done from Deer Lodge by telephone, one set of three dispatchers handling the Rocky Mountain division and another the Missoula division. Under steam operation there were two division superintendents, one at Three Forks and the other at Missoula. Each of these points had two sets of dispatchers operating in either direction, which made a total of four dispatching districts.

Electric locomotives run from Deer Lodge through to Harlowton and Avery, respectively. Under steam operation locomotives were changed at the intermediate engine points, Three Forks and Alberton. The radius of the locomotive has, therefore, been doubled. The locomotive repair shop is at Deer Lodge, two men being located at Avery and Harlowton respectively, to attend to light inspection. The master mechanic at Deer Lodge has general charge of substations, a supervisor being in direct charge of the latter. Three operators, each working on an eight-hour shift, are provided at each substation. Maintenance of the trolley and transmission lines is under the charge of a general foreman of maintenance, reporting to the superintendent of the two divisions. In general, three maintenance crews are used, each consisting of a foreman, two linemen and a helper, provided with suitable work train.

A WORD FROM A C., M. & ST. P. MASTER MECHANIC

The division master mechanic of the C., M. & St. P. Ry., E. Sears, reported that comparing his experience with maintenance of equipment under 3,000-volt and 600-volt operation, the former is affected more by weather conditions; that is, all resistance units have to be kept freer from moisture. Also experience has shown that it is poor policy to try to break heavy currents at 3,000 volts, except through resistance, for the vapor and fumes formed by the copper will cause the current to jump as far as 6 ft. A number of contactors were burnt out, due to the facts that there were no circuit breakers on the locomotives and that the main motor currents were broken through twin contactors. This trouble has been eliminated by the insertion of a small amount of resistance ahead of the contactors when arcs are broken. The new locomotives are equipped with high-speed circuit breakers.

Mr. Sears has not found any special difficulty in keeping insulators clean to prevent creepage at 3,000 volts. There has been no trouble with the "freezing" of the contactors, which require very little attention. Under normal operation there is about 600 volts drop between substations, with a greater variation brought about by the power-limiting apparatus. The method of collecting current from the overhead is ideal, being sparkless, with little wear on the double No. 0000 contact wire.

Mr. Sears said that the pantographs are greased with graphite grease at terminals and require no further attention on the road. The average life of pantograph strips is from 9,000 to 10,000 miles. Pantographs can be more cheaply maintained than third rail shoes, but are susceptible to being torn off on account of lack of alignment of the overhead. This is probably due to the method of overhead maintenance, as it appears that the overhead maintenance crew depends upon the pantographs to show where the bad places in the overhead are. In hot weather, when the expansion is greatest, as many as fifteen pantographs have been lost in one month.

ELECTRICAL EXPERIENCE ON THE LONG ISLAND

G. C. Bishop, superintendent of motive power Long Island Railroad, gave an account of electric operation on its lines. As this subject was covered in last week's issue of this paper, it will not be necessary to go into details here. He said that the Long Island still furnishes the most extensive example of multiple-unit passenger train operation. Steam-operated express trains to the eastern end of the island are taken from the Pennsylvania station by electric locomotives to Long Island City, at which point steam locomotives are attached. It is probable that in the near future electric locomotives will haul these through trains to Jamaica. The freight service is still conducted by steam and on some portions of the electrified system steam locomotives are used to operate both freight and through passenger trains.

SOUTHERN PACIFIC ELECTRIFICATION EXPERIENCES

The electrification of the Southern Pacific Company's Oakland, Alameda & Berkeley suburban lines was discussed by George R. McCormick, general superintendent of motive power. This improvement, he said, was part of the general rehabilitation of the Southern Pacific property carried on by Mr. Harriman. In the fall of 1906 instructions were given to begin electrification. At present more than 900 electric trains are operated daily from the two ferry landings and 32,000,000 passengers are handled annually. He referred to a complete description of the distribution and trolley system given in the ELECTRIC RAILWAY JOURNAL for Oct. 21, 1911.

The trains on the O., A. & B. run from one to seven cars, operated on the multiple-unit system, a train unit consisting of one motor and one trail car. On the motor car are four 140-hp. motors. The two motors on each truck are connected permanently in series, so that although the equipment is a four-motor one, the control is of the two-motor type. The car repair shop, located at West Alameda, was designed for inspection and quick overhaul of the entire equipment. Detailed description of these cars and this shop will be found in the ELECTRIC RAILWAY JOURNAL for June 17, 1911.

The total single-track mileage electrified on this system is about one hundred and the car equipment comprises sixty trail coaches, fifty straight motor coaches, twenty-nine baggage and passenger motor coaches, two express and baggage motor cars and ten street cars. The system was placed in electrical operation in 1911.

The report abstracted above was presented, in the absence of the chairman, Mr. Quereau, by J. A. Pilcher, who said he would not attempt to read the paper, but in presenting it for consideration he wished to call attention to the great number of different schemes that had been studied in connection with the problem of electrification. This method of operating our roads, he said, now seems destined to become a great factor in the development of the future and is particularly adaptable to all service conditions requiring a heavy power output. Mr. Pilcher referred to the constant speed feature of some electric locomotives as being particularly desirable in order to maintain dependable service.

There was no discussion of the paper.

The chairman of the association, W. J. Tollerton, said he considered the subject of electrification a very important one, especially when viewed from the standpoint of conservation of fuel.

The paper was received and a vote of thanks was extended to the committee for the exhaustive paper that had been prepared.

Mr. Hurley on Trade Papers

EDWARD N. HURLEY, formerly chairman of the Federal Trade Commission and during the war chairman of the United States Shipping Board, has a good opinion of trade papers. In the course of an address on June 8 to the Associated Advertising Clubs of the World at Indianapolis he said:

> When I was chairman of the Federal Trade Commission I made it a point to have the principal trade papers in the United States sent to me regularly. These were read not only by myself but by the entire staff, so that we might have a finger on the pulse of the country's industry. Advertising agencies placing national and international advertising could well insist on every man in their employ reading the trade journals of the industries of their clients so that they may keep themselves currently informed on the conditions in the businesses for which they are writing copy. I believe in the business journals. I have been closely associated with the work of many and have made a study of them, and I am firmly convinced of the editorial strength and value of many of these publications.

The Locomotive as an Investment

Author of A. R. A. Paper on This Subject Points Out Some Improvements Made in Steam Locomotives in Recent Years

IN AN individual paper contributed to the program of the A. R. A. Atlantic City meeting by G. M. Basford, president Locomotive Feed Water Heater Company, some information is given as to the steam locomotive in its rôle of rival of the electric locomotive. Mr. Basford said that the locomotive is a big investment and it must be so considered and so treated. In no other branch of engineering development have so much progress and improvement been made in efficiency as has been made in the steam locomotive during the present official generation, and the improvement has just begun. If all new and all existing locomotives are made as efficient as the best, and it is possible to make them nearly so, private ownership and operation of railroads will be put in the way of success, but no matter how efficient the power unit may be as a unit, its operation must be such as to obtain the benefit of the possible efficiency for the maximum number of ton-miles per hour. Among other things this calls for the best locomotives and the best use of locomotives, quick and continuous movement, reduction of idle hours, quick terminal movements, improved dispatching, improved maintenance and repair facilities and repair methods, as well as fuel and labor-saving improvements of every kind. Whatever, said Mr. Basford, we may have in the future, today the steam locomotive is the most vital influence in the progress of civilization. Its possibilities for assisting in meeting the problems of the present and future by reducing the cost of transportation are beyond the imagination of all who have not made a careful study of the improvements now available for increasing capacity. Whenever you wish, he said, you may put on the rails locomotives that, from a performance and particularly from an efficiency standpoint, will hold their own with the best non-condensing power plants on land or afloat. You may at any time produce a drawbar horsepower-hour for 2.25 lb. of coal at the speed giving the maximum power of the engine. The problem is how to make all the locomotives of this country approach the standard already set, how to make the best use of facilities that are already available, also how to keep abreast of future improvements.

Mr. Basford challenges some of the contentions made by proponents of the electric locomotive in these words: "Electric locomotive partisans are propagandists in arguments for electricity vs. steam. They argue, however, on the basis of the steam locomotive as they knew it in the past rather than as it is today. They further weaken their case by absurd claims to the effect that electric locomotives can save two-thirds of the coal burned by all the steam locomotives in the country, and they base their claims on the steam locomotive of ten years ago. The truth is that in five years of this period the economy and capacity of the steam locomotive have more than doubled. The object is not merely to win out against the electric but to pit the steam locomotive against the high cost of everything. Constructive, systematic policy of locomotive engineering and operation is the way to do this and it will do it.

"We are told that electrics are replacing steam locomotives. We do not hear enough about the thirty-eight steam Mikados that replaced twelve Moguls and thirty-eight Consolidations on the Missouri, Kansas & Texas several years ago and of the 41.8 per cent increase in train-loads, also of the reduction of 23 per cent in the number of trains. The Norfolk & Western replaced fifty-seven engines with forty, with the reduction of 26 per cent in the number of trains for the same traffic. The Delaware & Hudson showed a saving of 43.8 per cent coal by substituting Mallets for Consolidations. Each Mallet replaced two Consolidations. A year later each of these Mallets showed 7.6 per cent better fuel records and each of them continued to do the work of two Consolidations, while burning less coal than one of the Consolidations. On the Chesapeake & Ohio twenty-five Mallets replaced forty-four Consolidations, saving 37 per cent in the cost of handling freight traffic. This has been going on the country over in cases too numerous to mention, but too little is said about these improvements and too little is said about future possibilities. When every existing locomotive is thoroughly modernized, when all are operated with the study, care and supervision called for and when coal and fuel oil are used as if they were expensive, then this association and the men who make it will be recognized for saving the railroads. In this scheme of things the obsolete engine, lacking power-saving, capacity-increasing, fuel-conserving and safety factors, has no place."

100,000 Square Feet of Exhibits

At Atlantic City Convention of A. R. A., Mechanical Section, the Exhibits, in Extent and Variety, Exceed Previous Records

IN CONNECTION with the annual convention of the American Railroad Association, mechanical section, at Atlantic City this year the exhibits of railway supplies is, as usual, an important feature. Every square inch of space on Young's "Million Dollar Pier" was utilized this year, including the balcony in the main entrance hall. Even then a large number of prospective exhibitors were turned away; others had to be satisfied with smaller space than they wished or else to share space with fellow manufacturers. When the convention opened on Wednesday, June 9, there were 359 exhibits, using a floor space of over 100,000 sq.ft. Last year, which surpassed any previous one, there were 314 exhibitors, occupying an exhibit space of 93,499 sq.ft.

Due to railroad strikes and freight congestion, many of the exhibits had great difficulty in getting their material to Atlantic City. A large number of Philadelphia concerns and even those at greater distances used motor trucks to bring in their equipment.

Machinery Hall was filled to capacity with all types of shop tools. Automatic machines attracted considerable attention, and in studying the various exhibits one gained a definite impression that manufacturers are endeavoring to solve the labor problem by producing machines that will cut down the operators' duties to a minimum. Another point that one cannot fail to note was that numerous devices that were considered innovations only last year are now being manufactured as standard equipment.

Discussions of the possibilities of increasing shop capacity and efficiency that have come up during the past year have directed the manufacturers' attention to the possibilities and they are proceeding to carry them out. The men responsible for the care and maintenance of railway equipment realize now as never before the particular value that comes from having up-to-date tools to carry on their work. The wages now being paid to labor make inefficient machinery not only unsatisfactory but very expensive. In comparing the machine tools exhibited with those ordinarily found in electric railway shops one is forcibly impressed with the value of the late type of equipment and the need for our repair shops to keep abreast of the times in order to increase production and efficiency.

Many automatic turning and grinding machines as developed for railway work were in operation at the convention. Some of these automatic machines were really a combination of several machines, each one performing a definite operation and using a certain tool arrangement. The use of such machines has been extended to many operations previously done on other types. Thus rings and parts that require accurate finishing for air brake use, which were formerly made of brass and ground by hand, are now finished in a grinding machine equipped with a magnetic chuck. Various other parts and operations show the possibility of large savings by the introduction of automatic machines in railway shops.

The saving of labor in connection with machine-shop equipment was ably supplemented by many exhibits of equipment for handling and transporting material in the shops. The several displays of hoists, cranes, jacks and truck tractors demonstrated how great savings were possible by use of these devices for handling equipment and material.

Details of the important features of the exhibits will be given in a later issue.

Merchandising Transportation Discussed by Missouri Utilities

Public Utilities Association Holds Fourteenth Annual Convention—Subjects of Particular Interest to the Industry Were Discussed—New Officers

THE Missouri Association of Public Utilities temporarily displaced the legislators of the State when it held its fourteenth annual convention in the State Capitol at Jefferson City last week. The business sessions were devoted to the consideration of the possibilities of merchandising transportation, financing utilities, public relations and regulation and the development of water power in the state. Interspersed were other equally busy sessions devoted to the enjoyment of golf, a barbecue, dancing, a banquet and baseball. The business sessions were held in the State House of Representatives, where the association members and guests were welcomed by Lieut.-Gov. Wallace Crossley, who said that the State was due for a great industrial development and that the public utilities should be equipped to supply the additional service that will be required of them. L. P. Andrews, acting president of the association, responded to Governor Crossley's address on behalf of the association.

F. G. Buffe, general manager of the Kansas City (Mo.) Railways, delivered an address on "Merchandising Transportation," which will be published in a later issue of this paper.

"Public utilities should render the best possible service under the conditions, not only because it is the duty of the companies to do so but because it is very difficult for a commission to give relief from inadequate rates when the service is not what it should be." This was the statement of William G. Busby, chairman of the Public Service Commission of Missouri, in an address he delivered on the advantages of state as compared to municipal regulation. "Municipal plants may be constructed in Missouri without permission of the commission, but when in operation the rates charged and the service rendered come under the jurisdiction of the commission."

"Utilities have been yellow," said M. H. Aylesworth, executive manager of the National Electric Light Association, in his address on "Public Relations." "Agitators have been allowed to denounce utility companies with impunity, and the public utility men have not given the public the correct information about their companies. The utility men should get out and fight those who malign them, because dishonest attacks will be prevalent until they are exposed by an honest defense."

The weakness of most utility financing is the fact that the company's securities have been mainly sold outside of the community served, according to C. E. Randall of the Bank of Commerce, Springfield, Mo., who said, in the course of his address on the financing of public utilities: "Practically every community can finance extensions and betterments of the utilities whose service the people require. Better conditions for public utilities will come with a more thorough public knowledge of the needs of the company, and nothing in the future can be as bad as what the utilities have gone through and conquered."

The officers and committees elected to serve for the year 1920-1921 were as follows: President, L. P. Andrews, Sedalia, Mo.; first vice-president, Herman Spoehrer, St. Louis.; second vice-president, Col. P. J. Kealy, Kansas City, Mo.; third vice-president, E. R. Locke, Mexico, Mo.; secretary-treasurer, Frank D. Beardslee, St. Louis, Mo.; executive committee, E. D. Smith and Hugo Wurdack, both of St. Louis; E. R. Locke, Mexico, Mo.; T. C. McKenzie, Hannibal, Mo., and J. S. Tritle, St. Louis. The last three were hold over members of the executive committee from last year. Members elected to the public affairs committee were E. D. Bell, St. Louis, chairman; L. B. Landmann, Jefferson City, Mo.; B. C. Adams, St. Joseph, Mo.; J. Dana, Kansas City, and J. D. Van Mauer, St. Louis. Members of the public affairs committee who held over from the previous administration were Hugo Wurdack, St. Louis; E. H. Algermissen, Montgomery City, Mo., and W. H. Henby, University City.

Regional Power Development

BY WAY of discussion of the plan outlined by W. S. Murray for a "super-power" development along the Atlantic seaboard, C. M. Garland, consulting engineer, Chicago, Ill., contributes an article to the A. I. E. E. *Journal* for May, in which he advocates study, in this connection, of the Mond byproduct system of gas generation with low temperature distillation of coal. He claims that in the United States the value of $2,500,000,000 is consumed annually with coal in the form of tar and ammonium sulphate, of which 25 per cent could be recovered. In the Mond process the coal is converted into gas, tar and ammonia, the last named having a value of from $2 to $4 per ton of coal gasified. The tar consists principally of pitch, which has little or no value. The gas has a calorific value of about 140 B.t.u. per cubic foot and from 65 to 70 cu.ft. are produced per pound of coal. Mr. Garland's point is that any super-power plan must include provision for industrial heating, which he thinks the Mond system would do.

One-Man Cars in Australia

THE Electric Supply Company of Victoria, Ltd., was the first to place one-man cars in operation in Australia, introducing them on its property at Ballarat and Bendigo, Victoria, about six and one-half years ago. Some information concerning these cars appeared in the ELECTRIC RAILWAY JOURNAL for Jan. 22, 1916, page 172, in a communication from P. J. Pringle, chief engineer and general manager of the company.

Mr. Pringle has recently compiled comparative figures on accidents to passengers alighting from or boarding both one-man cars and cars under the control of a conductor. The result for Ballarat appears in the accompanying table. In connection with this it should be explained that the one-man cars were introduced in May, 1913, and during the following year were installed on five routes. From May to July, 1915, they were installed on two additional routes. Thus the year 1916 shows the full effect of the installation of one-man cars. This year should be compared with 1911 and 1912, when there were no one-man cars in operation. The year 1913, when the one-man cars were first introduced, also offers an interesting comparison, as no accidents in connection with their introduction are reported.

COMPARISON OF ALL ACCIDENTS REPORTED DUE TO PASSENGERS ALIGHTING OR BOARDING TRAMCARS, BALLARAT, AUSTRALIA

Year	Control	Alighting	Boarding
1911	Conductor	47	3
1912	Conductor	40	5
1913	One-Man	0	0
1913	Conductor	62	3
1914	One-Man	6	1
1914	Conductor	39	3
1915	One-Man	7	3
1915	Conductor	24	2
1916	One-Man	12	1
1916	Conductor	13	3
1917	One-Man	7	0
1917	Conductor	12	2
1918	One-Man	3	0
1918	Conductor	10	1
1919	One-Man	3	1
1919	Conductor	7	1
Total, 1913-1919	One-Man	38	6
	Conductor	167	15

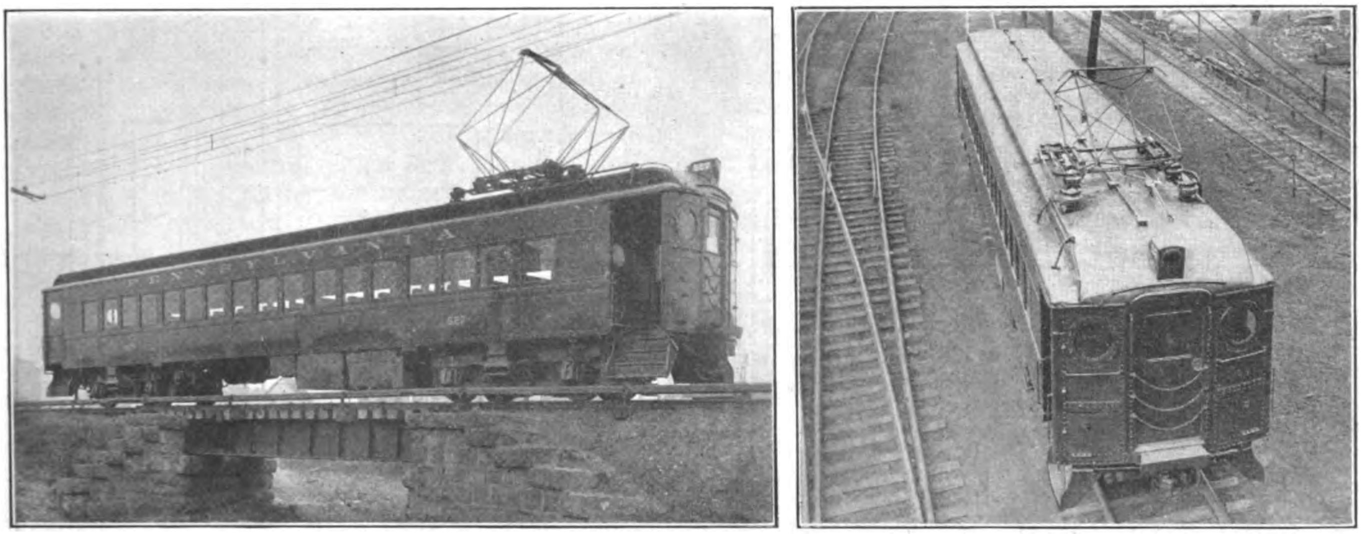
When all the one-man cars were in operation the annual mileage of these cars was approximately 400,000, out of a total of 500,000, or 80 per cent. As the numbers of passengers per car-mile on the two types of car do not vary materially, the number of accidents due to the greater mileage even if the one-man cars had been in charge of a conductor might have been expected to be four times as great as on those cars which operate only 20 per cent of the mileage. As a matter of fact, in the last four years there were forty-two alighting accidents and seven boarding accidents on cars in charge of conductors, while there were only twenty-five alighting and two boarding accidents on the one-man cars.

Another convincing result of the efficiency of one-man operation in Australia is the fact that since the introduction of the one-man cars the premiums insuring the company against third party claims have been reduced four times, the reduction in total amounting to 40 per cent. This fact is particularly important in view of the increasing importance which is being given to the safety-first campaign both in Europe and in this country.

New Equipment for the Philadelphia Electrification

Motor Is of Commutating-Pole Type and Control Provides for Protection Without Circuit Breakers on Cars—Ingenious Screens Used to Exclude Dust from Motors

BY WALTER H. SMITH
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.



AT LEFT, PENNSYLVANIA RAILROAD MULTIPLE-UNIT CAR. AT RIGHT, CONSTRUCTION AND MOUNTING OF PANTOGRAPH. NOTE CONSTRUCTION OF INSULATING BASE

THE electrified portion of the Pennsylvania Railroad terminating at Broad Street Station, Philadelphia, covers a distance of 20 miles to Paoli and one of 12 miles to Chestnut Hill. There are now 115 motor cars in service in this electrified zone, including nine combination passenger-baggage and two baggage-mail cars. Since the original equipments were placed in service the Westinghouse company has developed a new single-phase railway motor, as well as certain refinements in control and auxiliary apparatus. The railroad, in accordance with its policy in providing for future requirements, has equipped a car with these motors.

The old equipments now in service employ two 225-hp. Westinghouse, single-phase, doubly fed commutating motors, both of which are mounted on one truck. The new equipment will employ two 250-hp. single-phase commutating motors of the commutating-pole type, similarly mounted. The new motors will be interchangeable with the old ones, so far as mounting on the trucks is concerned, except for the pinions, the gear ratio for the old equipments being 24:55, while that for the new equipment will be 21:55. The gears are of the flexible type and consist essentially of three parts, (a) center, (b) rim and (c) the flexible members or springs. The rims are made from high-grade treated steel forgings accurately machined with 5¼-in. face. These flexible gears may be compared to shock absorbers and will very largely relieve the armature bearing and motor windings from vibration due to irregularities in the track or other causes.

The frame of the motor is of the box type, made of steel cast in a single piece. At the ends are large openings machined to receive the bearing housings and to permit removal of the armature.

RESISTANCE LEADS ARE NOT USED

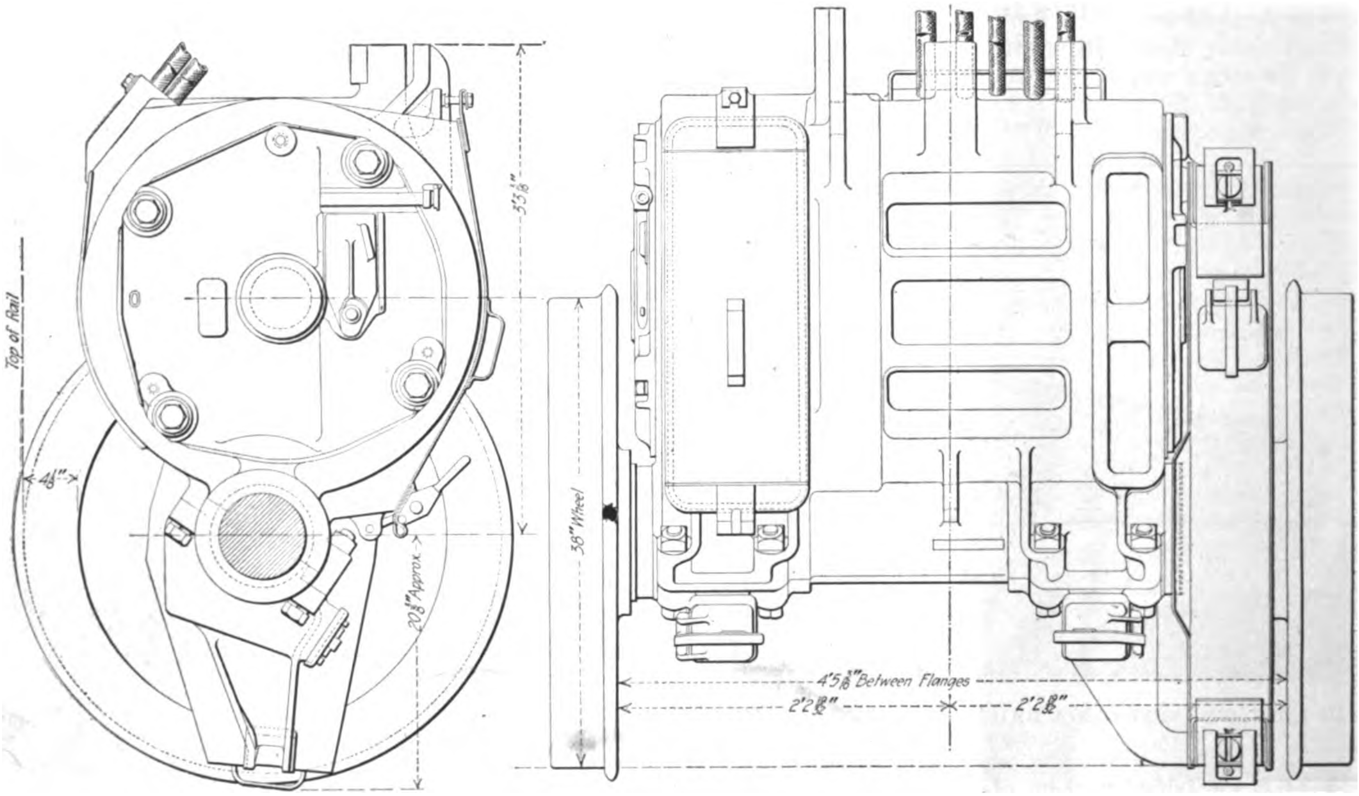
The armature is lap-wound, with coils cross-connected, but has no resistance leads between the commutator bars and the coils. The armatures, main fields, auxiliary and commutating-pole windings are permanently connected in series, as shown in the accompanying circuit diagram.

The new equipment is designed for multiple operation with those now in service. The Westinghouse type "AB" (automatic acceleration, battery operated) multiple-control system is employed and permits a train of from two to ten cars to be operated from the master controller on any car; that is, each car of the train is propelled by its own motors and is controlled as a single unit.

It is to be understood that any two equipments with different motors, gear ratios and different weights of car will operate in multiple if designed for the same rate of acceleration and placed under the control of a current limit relay, provided that (a) the tractive efforts per ton for each car at start are approximately equal, (b) the free running speeds of both cars are equal when the motor curve is reached, (c) the balancing speeds of both cars are equal.

The energy for operating the magnet valves of the control apparatus and other devices is secured from a motor-generator set and storage battery at approximately 200 volts. The storage battery consists of 25 cells of the Edison B-2-H type in series and connected so as to float on the system when the motor-generator set is running. The control circuit is tapped from the first and sixteenth cells. The lighting system for the car is also supplied from one or the other of these units and will be described later.

The car is provided with one sliding shoe pantograph trolley, having automatic, self-adjusting action to conform to any trolley wire height from that of 15 ft. 6 in., the lowest under bridges, to a normal height of 22 ft. along the open line. The pantograph is mounted on the roof of the car above the motor truck. It is raised and held in position by spring pressure and lowered by compressed air from the control reservoir. The insulating base of the pantograph consists of four porcelain insulators. In addition to this, there is a secondary insulating base consisting of four porcelain insulators similar to those which form a part of the trolley and arranged to carry angles which act as supports for the pantograph as a whole. This construction also provides double insulation. The pantograph is provided with a grounding switch to insure safety to any one working on the apparatus of the car. The construction and mounting of the pantograph are shown in one of the reproduced photographs.



OUTLINE OF THE SINGLE-PHASE COMMUTATING-POLE MOTOR, SHOWING OVER-ALL DIMENSIONS AND CLEARANCES

HOW THE PANTOGRAPH IS CONTROLLED

The operation of the pantograph is controlled by two push buttons which are incorporated in the master controller. These push buttons actuate two magnet valves which control the admission of compressed air into the operating cylinders. The pantograph is released by the "trolley unlock" button. This button completes the circuit to the "trolley unlock" magnet valve, which admits compressed air to the operating cylinder of the locking device, causing it to disengage and allow the springs to raise the pantograph and hold it in the running position. This button is provided with an automatic release in order that the magnet coil will be de-energized when the operator's hand is removed. The "trolley unlock" magnet-valve circuit is so interlocked with the main motor circuit that the pantograph cannot be raised when the master controller is in any running position.

The trolley is lowered by the "trolley down" button. This button completes the circuit to the "trolley down" magnet valve, which controls the admission of compressed air to the operating cylinders. These force the pantograph down, where it is locked and held in position by the locking device. This button is not provided with an automatic release and must be pulled down manually to release the air from the main operating cylinders before the pantograph can be raised again.

A small hand pump is supplied in order to provide a means to disengage the locking device and raise the pantograph when there is no compressed air in the control reservoir. A few strokes with this pump will compress enough air to charge the locking-device release cylinder.

There is no line switch or oil circuit breaker provided to disconnect the transformer from the trolley in case of motor trouble, overload, ground or short circuit. The following methods are employed as a means of protection to both the high and low tension circuits.

A series transformer is inserted in the high-tension lead from the pantograph to the primary winding of the main transformer. The secondary winding of this device is connected to the operating coil of the pantograph-lowering relay. This transformer has a ratio of 20 to 1, and when excess current flows through its primary winding, as in the case of a ground or short circuit in the main transformer, the relay will function and lock in position so that the "trolley down" magnet coil will be energized and the pantograph on the affected car will be automatically lowered after the power has been removed from the trolley wire, either by the operation of the sectionalizing or power house breakers.

The functioning of this relay prevents the release of air from the operating cylinders and the pantograph cannot be raised again until the relay has been manually reset.

The motors and low-tension circuits are protected by two relays which function on an overload. One of these relays is inserted in the motor circuit between the preventive coil and the compensating relay and the other is in the auxiliary circuit between the switch group and the commutating-pole windings. The parts of these devices that govern the control circuit are connected in series and it is only necessary for one of them to function in order to open all of the switches of the group that have been closed and to cut off power.

When excessive current flows through the relay operating coil in the main motor circuit, or the auxiliary circuit to the commutating-pole windings, the armature of the relay affected is raised and locked in position by a latch, thus rupturing the control circuit and opening all switches. The relay is "reset" to its normal position by removing the control cutout plug from the "cutout" receptacle in the master controller and inserting it in the "reset" receptacle. The control plug must again be inserted in the "cutout" receptacle before operation of the car or train can be resumed.

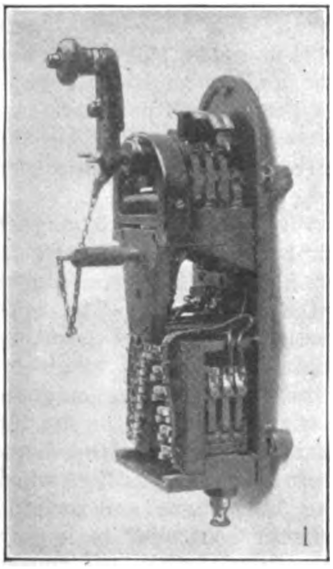
The main transformer is of the shell type. The laminations are built up closely around the assembled coils with interleaved joints and are clamped tightly together between end frames. There are three separate and distinct windings, each consisting of a series of coils clamped together and arranged with ventilating ducts so as to secure practically a uniform temperature throughout the entire winding. The transformer is cooled by the flow of air from the ventilating system, which will be described later. The ventilating air enters the low-tension end and is discharged at the high-tension end.

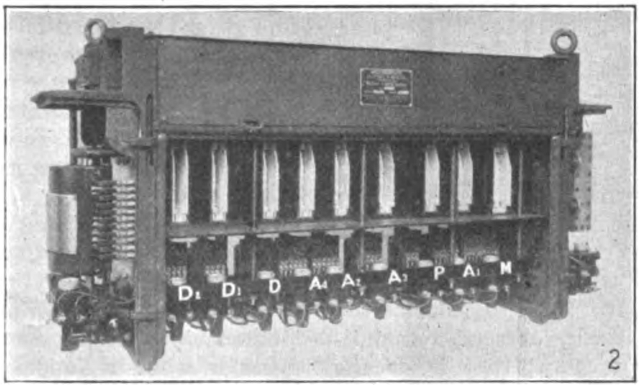
Alternating current at 11,000 volts, 25 cycles, is collected from the trolley wire through the pantograph and series transformer to the primary winding, thence to the rails which form the return circuit.

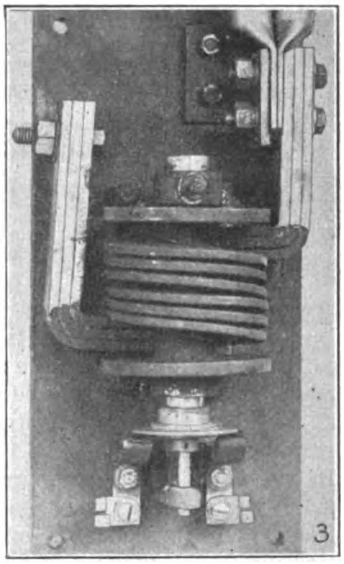
The main circuit arrangement requires only one preventive coil. This coil is supplied in order to secure smooth acceleration and to prevent the breaking of the main circuit during transition from one transformer tap to another during acceleration. It is also of the shell type and has a single winding. This device makes it possible to secure seven accelerating points with five switches, as shown in the diagram. The preventive coil is suspended from the underframing of the car body near the switch group and transformer so as to secure the shortest possible run of cable. It is also cooled by the flow of air from the ventilation system.

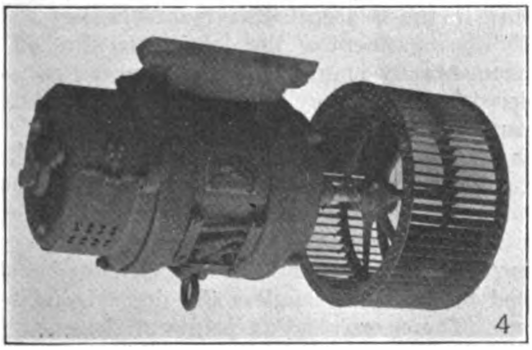
SOME DETAILS OF THE CONTROL APPARATUS

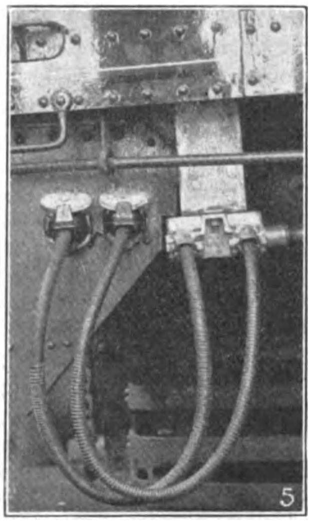
The control system employs nine electro-pneumatically operated switches. These switches are assembled in a group and enclosed in a steel box which is located under

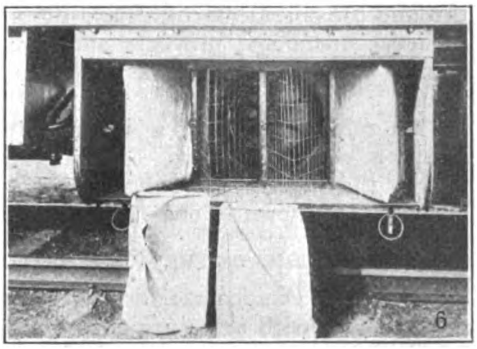












VIEWS OF PARTS OF THE EQUIPMENT OF THE PENNSYLVANIA MULTIPLE-UNIT CAR

No. 1—Master controller, cover removed. Note control plug, cutout, and reset receptacles; also automatic spring release. Plug in upper hole to reset, in lower for cutout.

No. 2—Front view of switch group and sequence switch end, covers removed. Note sequence switch drum and reverser magnet valve at opposite end.

No. 3—Accelerating limit relay.

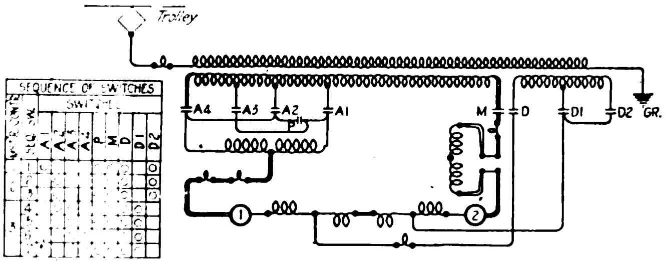
No. 4—Blower motor and runner.

No. 5—Arrangement of train-line jumpers. Note method of carrying jumpers in dummy receptacles when not in use and also armor for jumper cable. Right-hand jumper for brakes, left-hand for control.

No. 6—Air intake to the ventilating system. Cover at side of car removed. Note blower runner and arrangement of screens.

the car body adjacent to the transformer. This box also contains additional apparatus as follows: (a) Reverser, (b) limit relay, (3) compensating relay, (d) sequence switch. The unit-switch contacts are enclosed in an arc chute. At the sides of the arc chute adjacent to the contacts are heavy copper blowout coils. These coils are connected to the main circuit in such a manner as to produce a magnetic field, in which the arc, after it is established, will travel outward away from the switch contacts. The arc after once being formed by the switch contacts separating becomes a conductor similar to a coil in the slot of a motor and travels under the influence of this magnetic field. The switch contacts are provided with arcing horns so constructed that as the arc moves outward it is lengthened and is finally broken.

The reverser is of the drum type and determines the direction of flow of current through the main motor fields with respect to the armatures and accordingly determines the direction of armature rotation. The drum is rotated from one position to the other by the action of one of two magnet valves which control the admission of compressed air to the operating cylinders. These magnet valves are energized from the control circuit and are marked "forward" and "reverse" for corresponding movements of the car or train.



SCHEMATIC DIAGRAM OF CONNECTIONS FOR THE SINGLE-PHASE COMMUTATING-POLE MOTOR

The acceleration of the car is controlled by the action of the limit relay. Its purpose is to prevent the motors from receiving excessive current. With this device the car may be accelerated automatically or semi-automatically at the option of the motorman; that is, if the master controller is placed in the first or second position at the start the sequence drum will progress to its corresponding position, *viz.*, 1 or 3, as the case may be. In case the master controller is thrown to position 3, the drum will progress to position 7 and the entire acceleration will be independent of the motorman. The functioning of the relay due to heavy main motor current through the operating coil delays the progression of the sequence drum and prevents additional switches from closing until the current has fallen to a predetermined value.

This relay consists of a single coil of heavy copper strap, a plunger, frame, disk and contacts through which the control circuit passes. This piece of apparatus is shown in one of the illustrations.

FUNCTIONS OF THE COMPENSATING RELAY

In order to compensate for transformer action in the main motors with armature currents of both large and small values, as are encountered when starting a car and after it is up to full speed, the compensating relay is supplied. It is inserted in the main circuit between the number one motor and the overload relay. It is similar in construction to the limit relay, using the same parts with the addition of one extra disk and set of contacts through which one of the control circuits passes. It has a lower setting than the limit relay in order that there will be no simultaneous operation of the two pieces of apparatus.

When the car is first started the current in the motor circuit is of such a value that the plunger is raised to the upper position, causing the upper disk to bridge two contacts, thus completing and maintaining the control circuit to the "D2" switch magnet coil. After the car speeds up and the current in the motor circuit falls to a certain value the plunger drops to the lower position and causes the lower disk to bridge the lower two contacts, thus completing the control circuit to the "D1" switch magnet coil. The "D1" and "D2" switch magnet coils are interlocked so that both switches cannot be closed at the same time.

If the master controller was thrown to the last position at all times the compensating relay would not be required and the function of impressing different voltages across the commutating-pole windings of the main motors could be taken care of by contacts on the sequence switch drum. Operating conditions have shown that this is impossible, and since the above feature must be adhered to whether the master controller is in the first, second or third position the application of the relay is imperative.

EIGHT POSITIONS OF THE SEQUENCE SWITCH

The sequence switch is of the drum type and has eight positions, including the zero or "off" position. The other seven positions correspond to the seven point acceleration chart shown in the diagram. The drum has contact plates mounted on it and arranged in such a manner that as it rotates to the various positions certain control wires are connected together, forming the various control circuits required for the proper sequence of the unit switches.

The drum is rotated by the action of two magnet valves which control the admission of air pressure in the two operating cylinders. One of these magnet valves is marked "off" and the other "on." The "off" magnet valve admits compressed air into the operating cylinder when it is de-energized, while the other exhausts it when it is de-energized. Both of these magnet-valve operating coils are de-energized when the master controller is in the "off" position, therefore the drum will always return to the zero or "off" position when neither coil is energized. The "on" magnet coil remains energized as long as the master controller is in any running position. The energizing of this coil causes equal pressure in the two operating cylinders, but will not result in any movement of the drum until the "off" magnet is momentarily energized and the pressure reduced in the corresponding cylinder. The intermittent or momentary energizing of the "off" magnet valve during an acceleration of the car is controlled by the limit relay, which determines the rate of acceleration of the car or train. The operating magnet coil of the "M" switch is interlocked with this drum in such a way that it cannot be energized and the switch closed and power applied to the motors unless the drum is in its "off" position. The corresponding points of the master controller and sequence switch drum are as follows:

Master Controller	Sequence Switch Drum
Off	0
1	1
2	3
3	7

The car is provided with two master controllers of the single-handle drum type. Through this device the proper connections are made from the motor-generator set and storage battery to the control train line for operating the magnet valves of the switches in the proper sequence for the acceleration of the car. The supply wire leading from the storage battery switch to the master controller is connected to the "cutout" and "reset" receptacles and this renders the equipment inoperative without the control plug. The controller is provided with an automatic release and will not remain in any running position after the operator's hand has been removed. Moving the handle to the right will set the reverser in the proper postion for forward movement of the car and moving it to the left *vice versa*. At the bottom of the master controller are the two push buttons for the operation of the pantograph. The master controller is shown in one of the illustrations.

The wires comprising the control train line are run in one cable throughout the entire length of the car and are connected between cars by jumpers when the car is to be operated in a train. One end of the jumper is permanently connected to the train line in the junction box at each end of the car and the other end is carried in dummy receptacles when not in use. The arrangement is shown in the cut on page 1209.

The car is provided with one switchboard panel located in a cabinet in the vestibule at the motor truck end and has the following apparatus mounted on it: One motor-generator switch, one battery switch, one governor switch, one control cutout switch, one limit relay cutout switch, one blower motor switch (fused), one compressor-motor switch (fused), three heater switches (fused), one automatic heat regulator, four lighting resistor units and fifteen fuses for lighting and auxiliary circuits.

DUST SCREEN USED IN VENTILATING INTAKE

The ventilating system for cooling the transformer, preventive coil and main motors is supplied from a blower. The runner for this blower is a 21¼-in. single inlet wheel mounted on the shaft of the motor at the end opposite the commutator and enclosed in a steel casing. The motor is of the doubly fed type, supplied with current at 100 volts from taps on the main transformer, and runs continuously. The ventilating air is taken into the system from under the car body through a screening device, as shown herewith. That portion of the ventilating air required for the main motors is taken into the channel beam of the car body and carried forward to the motor intakes.

All of the car and headlight lamps are supplied with current at 30 volts through the various circuits, each of which is protected by a fuse mounted on the panel board. The current is obtained from the motor-generator set and storage battery, as before stated.

Under normal operation of the car at night the lighting system receives its energy from the motor generator, which is adjusted to give approximately the 45 volts required to float the storage battery on the system. The voltage is then reduced to the proper value for the lamps by means of resistance units inserted in the various circuits.

Whenever the motor circuit of the set is not energized, either due to the pantograph being lowered or to the power going off, the resistance units are automatically cut out of the circuits by the functioning of the battery disconnecting relay and the lights burn at the same degree of brilliancy with current supplied from the battery. At the same time the battery is disconnected from the generator and prevented from feeding it and running it as a motor. The storage battery will supply the lighting system for approximately two hours.

The car has no power bus or lighting train line. Therefore the main motor and lighting circuits are independent of the corresponding circuits on other cars in multiple operation.

The Milwaukee Electrification*

Some of the Important Reasons for the Widespread Interest Which This Great Undertaking Has Awakened

BY F. H. SHEPARD
Director of Heavy Traction Westinghouse Electric & Manufacturing Company

THE most widely known section of railroad track in the world is the electrified section of the Chicago, Milwaukee & St. Paul Railway, now operating over four mountain ranges and crossing the backbone of the American continent. The eyes of the whole world are on it today, and for several important reasons.

It is the first electrification of any stretch of railroad of considerable length on which the operation is exclusively electric; that is, not combined with steam locomotive operation. It is also the first extensive railroad electrification to use hydro-electric power. Other considerations of importance are the great size and power of the locomotives, the use of regeneration on mountain grades, the first use of a 3,000-volt direct current and special provision for the most economical use of hydro-electric power.

The courage with which this undertaking was advanced is one of the amazing things in American railroad history. Electrifications already existing had been confined to comparatively short stretches of road where conditions obtaining due to terminal or grade congestion, tunnel operation or other local conditions had governed. In this case the determination to electrify followed the construction of a new transcontinental route, the underlying reason for the decision to electrify being undoubtedly the earnest desire to adopt the best in operation as a means to develop the best railroad. The availability of power supply at an attractive price from the great electric transmission network of the Montana Power Company was, of course, an important factor as well. But the chief consideration was that wherever electrification has supplanted steam more reliable and better operating conditions have been secured.

The present and potential distribution of power in the State of Montana had already made that State foremost in the use of electric power per capita. The utilization of water power is there seen carried to a high degree. Originating with the storage of the mountain run-off in the great Hebgen reservoir, adjacent to Yellowstone National Park, power is successively generated by plants located along the Madison and Missouri Rivers, the same water generating electric power seven times before its final release.

In this system, which includes the development on the course of the Columbia River, as well as minor water powers on the Yellowstone, there is already installed an aggregate of 300,000 hp., with undeveloped sites for

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*Abstracted from extended article in the Milwaukee Employees' Magazine.

150,000 hp. additional. This is interconnected and distributed by 2,000 miles of high-voltage transmission line, much of which is 100,000-volt line, and serves jointly the mines, cities and railroads of the State.

The exclusion of steam locomotive service from the electrified line of the Milwaukee has secured the operation and maintenance of the electrical equipment in a most efficient manner. While a part of this is due to the skill with which the operation and maintenance of this apparatus is directed, a large part is also due to the zeal and interest of the operating forces. The engine men and maintenance forces have mastered the new power and the details of the electrical apparatus to an amazing degree.

Illinois Central Electrification Progress

Making of Plans Only Work to Be Done This Year—Construction of New Power Plant to Handle I. C. Load Started

THE Illinois Central Railroad does not contemplate doing any work in connection with the improvement of the Lake Front in Chicago this year. That is, no work will be done in the way of grading, filling, electrification or terminal station construction. The financial situation and other conditions are believed by the company to be so uncertain as to make it unwise for any railroad company to embark in enterprises necessitating the raising of money on any considerable scale at this time. The only actual work that will possibly be done this season is the subway for foot passengers from the Randolph Street station westward underneath Michigan Avenue. This tunnel is very urgently needed on account of the delay to patrons of the Illinois Central's suburban service in getting across Michigan Boulevard because of the constant stream, especially during the rush hour, of six rows of automobiles. Some studies are being made by a small organization in connection with the electrification project, but there may be no definite decision to report as to type of electrification systems, equipment, etc., perhaps for a number of months.

NEW GENERATING PLANT WILL BE READY

In preparation for carrying the load of the Illinois Central Railroad after this is electrified, and also for caring for the very large growth in its business to the south of Chicago, the Commonwealth Edison Company is planning to build a new 180,000-kw. power plant in the southeastern section of the city, which will be known as the Calumet Station. A 40-acre tract of land on the Calumet River, and located at 100th Street and Commercial Avenue, has been purchased as the site of the new plant. The new station will be laid out for six 30,000-kw. turbo generators, of which two will be put in as the initial installation. These two units have just been ordered, one from the General Electric Company and one from the Westinghouse Electric & Manufacturing Company. These will operate at 325 lb. steam pressure with 250 deg. superheat. There will be four Babcock & Wilcox boilers per turbine, each having 15,000 sq.ft. of heating surface and equipped with an economizer having 10,000 sq.ft. of heating surface. The order for the first eight boilers has also just been placed. It is expected that the station will be in operation in the fall of 1921.

Located close to the mouth of the Calumet River, the new power plant will have all Lake Michigan as a water supply. The situation is also favorable in regard to coal, for the Pan Handle Railroad circles the proposed station on the west side and the Chicago Outer Belt Railroad is adjacent to it on the south side. One of the features of the power plant will be the method of handling the coal supply and cinders to and from the boilers. Cars loaded with coal will enter at one end of the plant and the same cars will emerge from the other end loaded with cinders. The details of the station design are not as yet available.

This Calumet Station will make the fourth large generating plant operated by the Commonwealth Edison Company in supplying energy for all the local transportation companies and most of the power and light energy consumers of Chicago. The present three stations are the Fiske and Quarry Streets plants, located in the central part of the city, and the Northwest Station, located in the northwest section of the city. The new station will greatly reduce the line losses involved in supplying the southeast section of the city and provide necessary capacity for the growth of the many industries there.

The station will be well situated for supplying energy not only to the electrified Illinois Central Railroad but to numerous other roads running south and west and east from Chicago, when they later undertake electrification. The total capacity of the present three stations is 489,000 kw.

Chicago Hearing Concluded

AT THE concluding hearing before the Public Utilities Commission of Illinois, held in Chicago on May 26, on the financial situation of the public utility companies, George M. Reynolds, president of the Continental & Commercial National Bank, Chicago, testified that if public sentiment does not change from its traditional attitude against increases in utility rates it will only be a question of time until the utilities will be unable to function.

Mr. Reynolds said that would be a fatal blow to the development of the city. He also made the point that much could be done to improve the value of utilities securities if the commissions would be quick to recognize the justice of applications for increased rates. He declared that the fact that commissions have not met the changing financial and operating conditions in a prompt and business-like way has had much to do with the decline in the value of utility securities and in the market for them. There has been a tendency to assume that the present period of high prices is abnormal and that it would be unfair to set up rates which would pay a fair return on present operating costs.

Mr. Reynolds thought the fallacy of this view had now been pretty well established, nearly all economists agreeing that the low level of pre-war prices will probably never be reached again, or certainly not for a long time.

A liquid fuel which is being tried out in Great Britain and which is said to promise well is composed of a one-to-one mixture of coal dust and fuel oil. The coal dust is pulverized and treated with a small proportion of soap, fatty acids or other substances which will reduce its tendency to settle in the oil. The fuel has been given the name "Colloil."

The Federated American Engineering Societies Organized

Consummation of Many Months' Work of the Joint Conference Committee of the Engineering Societies Results in Successful Association of National, State, Regional and Local Engineering Societies of the Country

IN A two-day session held in Washington on Thursday and Friday, June 3 and 4, the representatives of some sixty national and local engineering societies and affiliations of the United States formed an association to be known as The Federated American Engineering Societies. This conference of engineers, representing an aggregate membership of more than 120,000, was the result of plans made after many months of study by the Joint Conference Committee of the four so-called "Founder Societies." This Joint Conference Committee had invited all the various engineering societies and affiliations and allied organizations to send delegates to an organizing conference, the number of delegates sent to be proportional to the strength of the societies sending them, in the proportion of one delegate for each one thousand members, societies having a membership between 100 and 1,000 being allowed one delegate. After frank and complete discussion, a type of organization was agreed upon and a constitution with its accompanying by-laws was adopted to be reported back to the various societies for final ratification.

The object of the federated societies as stated in the constitution is:

> Service to others is the expression of the highest motive to which men can respond, and duty to contribute to the public welfare demands the best efforts that men can put forth. It shall therefore be the object of this organization to further the interests of the public through the use of technical knowledge and engineering experience and to consider and act upon matters common to the engineering and allied technical professions.

The whole tenor of the discussion leading up to the adoption of this constitution as the final business act of the conference was in line with this object as finally stated. Discussion on every hand was with an apparent desire to permit engineering to take its legitimate place in the interests of the public.

The meeting was opened by an address by Richard L. Humphrey, chairman of the Joint Conference Committee, a consulting engineer of Philadelphia, Pa. Mr. Humphrey reviewed the work of the Joint Conference Committee which resulted in this engineering conference and urged that the conference visualize a broad plan and not allow itself to get confused by details. He made a strong plain talk outlining the ideals with which the Joint Conference Committee had worked. In outlining the chief elements he said, in part:

> This is an auspicious occasion and is fraught with great potentialities for strengthening and advancing the engineering and allied technical professions in this country. It is one of the most important gatherings that has ever been planned; it can be considered a success if harmony is its outstanding characteristic, for it is only through harmony that we may achieve the results that ultimately result in the greatest success.
>
> We are met not to discuss details but to use our best endeavors to reach a harmonious agreement as to fundamental principles. This occasion, to be properly utilized, must deal with the fundamental principles involved and leave the working out of the details of whatever plan that may be agreed upon to the governing board of the new organization.
>
> I would suggest that this problem be approached with an open mind and that the discussion be on a broad, unselfish plane, having one object, namely, the good of the engineering and allied technical professions.
>
> I believe that the keynote of this conference could be properly expressed by the word "service"; we desire first to serve the country, and, second, to serve the societies and organizations of which we are the representatives. One cannot contemplate service, which means giving—not receiving—with any feeling that it is actuated by selfish motives, but rather is it the giving of our best.

Lieut.-Col. Charles W. Kutz, U. S. A., Engineer Commissioner of the District of Columbia, then welcomed the conference on behalf of the District and also of the six local engineering organizations. He mentioned that engineers had in the past neglected team work and in things engineering were for themselves, like the unshod blacksmith's mare and the unshod shoemaker's child.

Calvert Townley, president of the American Institute of Electrical Engineers, and J. C. Hoyt, one of the representatives of the American Society of Civil Engineers, were elected respectively permanent chairman and permanent secretary of the conference, and Mr. Townley distinguished himself during the next two days in a masterly administration of the duties of his office during several interesting parliamentary debates.

The morning session of June 3 was entirely devoted to debate on the following resolutions, which were finally adopted unanimously:

> *Resolved*, That it is the sense of this conference that an organization be created to further the public welfare where technical knowledge and engineering experience are involved and to consider and act upon matters of common concern to the engineering and allied technical professions, and
>
> *Resolved*, That it is the sense of the conference that the proper organization should be an organization of societies and affiliations and not of individuals.

In the afternoon addresses were heard under the subject of "The Functions of the Engineer in Public Affairs" by Arthur P. Davis, president of the American Society of Civil Engineers and Director of the United States Reclamation Service, and Philip N. Moore, past president of the American Institute of Mining and Metallurgical Engineers, now of the War Minerals Relief Commission; also on public highway questions, such as "Federal Aid Roads" by Thomas H. MacDonald, Chief of the Bureau of Roads and Road Engineering, and the "Economic Value of Good Roads" by W. D. Uhler, Chief Engineer of the Pennsylvania State Highway Department.

One of the most interesting sessions was held Thursday evening, at which three addresses were given. The first was on "Co-operation of the Engineer and the Business Man in Public Affairs," an exceptionally able discussion by Homer L. Ferguson, past president of the United States Chamber of Commerce and president of the Newport News Shipbuilding Company.

The second address was "The Value of Publicity for the Engineer" by James H. McGraw, president of McGraw-Hill Company. Mr. McGraw showed how publicity in the past has not fitted the engineer's type of mind, at least publicity which the engineer himself must make.

But today things are different and the engineer has a wonderful opportunity for the right type of publicity. Engineers and engineering activities are more than ever in the minds of the public, which is ready to have them dramatized. The engineer is more and more taking the place of the pioneer farmer, the lawyer or business man as a hero in fiction. Such facts can be capitalized and the opportunity taken to impress upon the public how great a factor of today's civilization the engineer really is.

In working out some of these problems of making the engineer class conscious, of bringing out his human as well as his technical qualities and of placing him and his works in their true light in the public eye, Mr. McGraw showed the place of the popular and news press, and particularly of the technical press. He pledged the technical press to a constant service to the engineer and his works and to establishing a common understanding of the needs of all engineers.

In line with the principles of Mr. McGraw's address, the conference adopted on Friday as a part of the constitution and by-laws a publicity platform of far-reaching significance:

CONSTITUTION

Article X. Publicity

The organization shall stand for the principle of publicity and open meetings under such regulations as may be provided for in the by-laws.

BY-LAWS

Chapter 4. Publicity

SEC. 1. The privilege of attendance at all meetings of the American Engineering Council, of the executive board and committees, when not in executive session, shall be extended to any proper person, but this privilege does not extend the right to speak or vote. Any proper person shall have the right to inspect and make true copies of the record of all meetings of the council, executive board and committees.

SEC. 2. The committee on publicity and publications may employ a publicity secretary, whose duty, under the direction of the executive board, shall be to prepare and supply to the engineering, technical and general press news from the Federated American Engineering Societies and of the engineering world, and to co-operate with the editors of engineering and technical publications in disseminating information in regard to this organization and its activities. The committee on publicity and publications may appoint a co-operating board of engineering editors to counsel or assist in any or all of its activities.

The third address was "The Engineer and National Prosperity" by George Otis Smith, Director of the United States Geological Survey, who said in one place that "my political conviction is that the future of our nation will be largely what you engineers make it, and national prosperity must be worked out in terms of the nation's industry."

The Thursday evening session was followed by a smoker tendered by the Washington Society of Engineers and the affiliated organizations.

On Friday morning, June 4, the report of the committee on constitution and by-laws was heard and most of the day was devoted to a discussion of the details of the constitution and by-laws. This committee, which, like the other committees of the conference, was large and representative, had done an excellent piece of work and what it had prepared was adopted after much searching debate, but without much alteration. The constitution is a general instrument without unnecessary detail. It provides for membership as follows:

Article III. Membership

SEC. 1. SCOPE—The membership shall consist of national, local, state and regional engineering and allied technical organizations and affiliations, classified as follows:

1. National engineering and allied technical organizations.
2. Local, state and regional engineering and allied technical organizations other than local associations, sections, branches and chapters of national organizations.
3. Affiliations consisting of any one, or a combination, of the following constituents: (a) Local sections and associations of members of national organizations included under (1). (b) Local engineering and allied technical societies and clubs, not of national scope. (c) Local engineers and members of allied technical professions and their associates.

It provides that the management of the organization shall be vested in a body to be known as the "American Engineering Council" and its executive board. Representation on this council consists of representatives from the various national, local, state and regional organizations and affiliations to the extent of one representative for a membership of from 100 to 1,000 inclusive and one additional representative for every additional thousand members or major fraction thereof. An executive board of thirty members of the council, consisting of the six elected officers of president, four vice-presidents and treasurer and twenty-four others representing national and local societies in proportion to the total membership in the national and local societies, is provided, and charged with conducting the business organization under the direction of the council.

The finances of the organization are provided by contributions from the member societies, each national society contributing $1.50 per individual member and each local, state and regional organization and affiliation contributing $1 per individual member.

During the Friday sessions an address on the subject of "The Engineer in Public Affairs" was made by L. K. Sherman, president American Association of Engineers and president United States Housing Corporation, and one on "Rendering Service" by F. H. Newell, past president American Association of Engineers and professor of civil engineering at the University of Illinois. Another interesting talk was by J. H. Strong, when he explained the vote of "present" of the American Association of Engineers on the adoption of the constitution. He voiced the sentiment of his association as being for harmonious action for the best interests of the engineer and for the fullest co-operation with the rest of the engineers, but said the association delegates present could not interpret their duty to say that A. A. E. would join the federated societies as now outlined.

Friday evening three addresses were given, on "Education of the Engineer for Public Service" by Robert S. Woodward, president Carnegie Institute, Washington; "Engineering Research and National Progress" by James R. Angell, chairman National Research Council, Washington, and "The Executive in Engineering" by Samuel M. Vauclain, president Baldwin Locomotive Works, Philadelphia. Mr. Vauclain's address was especially full of inspiration. He described the kind of work of an executive and showed how by nature the engineer fits such a position. He said he has confidence in the engineer because the engineers of America have never fallen down on anything they have undertaken. Mr. Vauclain graphically illustrated his conception of the engineer executive by quoting several interesting experiences of his own in getting things accomplished during the war.

Four important resolutions were unanimously adopted at the close of the business sessions of the organization conference:

1. Urging the payment of adequate salaries for the teachers of engineering in our technical institutions in order that adequately trained young engineering talent may be made regularly available.
2. Advocating the immediate adoption of appropriate measures to give effect to the recommendations made to Congress by the commission which recently reported upon a more adequate salary schedule for the engineering and other technical services of the federal government.
3. Indorsing the bill which has for some time been under consideration by Congress for the creation of a Department of Public Works.
4. Expressing the appreciation of the organization conference for the valuable work of the Engineering Council, especially its offers of assistance in making effective and operative the newly devised plan of organization, and expressing thanks to the Washington Society of Engineers and the Cosmos Club for their courtesy and assistance afforded during the sessions of the conference.

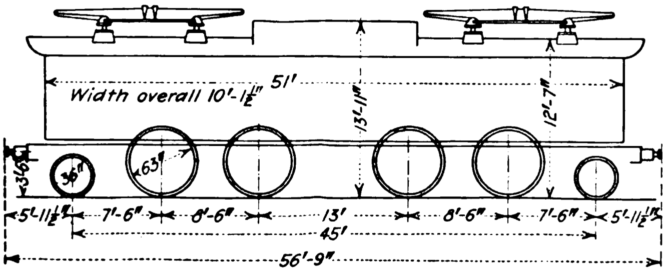
The Joint Conference Committee, which had so successfully formulated plans for the present conference, was charged with the duty of perfecting the permanent organization provided by the constitution. This committee is composed of members from the four "Founder societies" and has its headquarters at Engineering Societies Building, New York. Richard L. Humphrey, consulting engineer, Philadelphia, is chairman.

Locomotive for Paulista (Brazil) Electrification

3,000-Volt, Direct-Current System, with Provision for Regenerative Braking, Will Soon Be Installed—Vacuum Train Brakes to Be Used

THE Paulista (Brazil) Railway has under way the electrification, at 3,000 volts, direct current, of the double-track line between Jundiahy and Campinas. Brief articles on this electrification were printed in the issues of the ELECTRIC RAILWAY JOURNAL for April 24, pages 855 and 878, and May 8, page 972.

Further information is now available as to details of the locomotives, which will be supplied by the Westinghouse Electric International Company for passenger and freight services respectively, both types of these locomotives being arranged for regenerative braking.

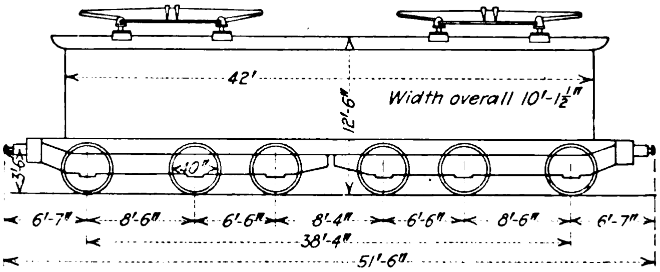


GENERAL ARRANGEMENT AND PRINCIPAL DIMENSIONS PASSENGER LOCOMOTIVE

Each passenger locomotive will have two main running gears, each with a 2-4-0 wheel arrangement. These will be coupled back to back through an articulation link and will support a single cab. A two-wheel radial guiding truck and two driving axles in a rigid wheelbase will be included in each running gear. The two-wheel guiding truck will be of the Rushton side-equalized type. The locomotives will weigh 121 tons each and the details will be as given in Table I.

Each driving axle will be equipped with a twin-armature motor with quill drive. The pinion on each motor shaft will drive a single gear, mounted on a quill, which is centered in bearings in the motor frame and surrounds the drive axle. The motors will have forced ventilation, and each twin will have a one hour rating of 500 hp. and a continuous rating of 400 hp.

The nominal rating of the locomotive will be 2,000 hp., corresponding to a tractive effort of 17,000 lb. at 44 m.p.h. The maximum starting effort will be 44,000 lb. and the maximum speed 65 m.p.h.



DIAGRAMMATIC ELEVATION OF FREIGHT LOCOMOTIVE

Eight armatures per locomotive will be available for different motor combinations. The two armatures of each motor will be connected permanently in series and will be arranged to secure three motor combinations as follows: (1) All in series, giving one-quarter speed. (2) Two in series and two in parallel, giving one-half speed. (3) All in parallel, giving full speed.

In each of the three motor combinations the motor fields will be tapped, thus providing a total of six operating speeds. Shunt transition will be used in passing from one combination to another. The method of regeneration will be somewhat similar to that used on the Chicago, Milwaukee & St. Paul locomotives built by the Westinghouse company, but axle generators will not be used. Regeneration will be available in each of the three combinations.

TABLE I—CHARACTERISTICS OF PASSENGER LOCOMOTIVE

Classification	2-4-0 + 0-4-2
Length over buffers	59 ft. 9 in.
Length over cab	51 ft.
Total wheelbase	45 ft.
Rigid wheelbase	8 ft. 6 in.
Diameter of driving wheels	63 in.
Diameter of guiding wheels	36 in.
Weight of complete locomotive	242,000 lb.
Weight of mechanical parts	123,000 lb.
Weight of electrical equipment	119,000 lb.
Weight per driving axle	45,375 lb.
Weight per guiding axle	30,250 lb.

Power for the auxiliaries and control will be obtained from the line through a motor-generator set, delivering current at approximately 80 volts to the blowers, air compressors, light and control. This motor generator will also furnish excitation for the main motor fields during regeneration.

The braking system will differ from the usual type used throughout this country in that train vacuum brakes will be used instead of air brakes. The vacuum exhauster on the locomotive will have a capacity great enough to operate the brakes on the entire train. In addition to this exhauster a small compressor will be installed to supply compressed air to operate the locomotive brakes and control. Both the air and the vacuum brakes may be used at the same time. The use of the small compressor permits cutting out the large exhauster when the locomotive is switching or running light.

Each freight locomotive will have two main running gears, each with three driving axles in a rigid wheelbase. The two running gears will be coupled through an articulation link. The total weight of the freight locomotive will be 94 tons. Table II gives the general physical characteristics of the freight locomotive.

The motor equipment will consist of six single-armature geared motors, with a one hour rating of 250 hp. and a continuous rating of 200 hp. with forced ventilation. These ratings are at a potential of 1,500 volts and the motors will be connected two in series.

The nominal rating of the locomotive will be 1,500 hp., corresponding to 25,500 lb. tractive effort at 22 m.p.h.

TABLE II—CHARACTERISTICS OF FREIGHT LOCOMOTIVE

Classification	0-6-0 + 0-6-0
Length over buffer	51 ft. 6 in.
Length over cab	42 ft.
Total wheelbase	38 ft. 4 in.
Rigid wheelbase	15 ft.
Diameter of driving wheels	40 in.
Weight of complete locomotive	188,000 lb.
Weight of mechanical parts	99,500 lb.
Weight of electrical equipment	88,500 lb.
Weight per driving axle	31,333 lb.

The maximum starting effort at 25 per cent adhesion will be 47,000 lb. and the maximum speed 40 m.p.h.

The six armatures will be arranged in the following three combinations: (1) All in series, giving one-third speed; (2) three in series, two in parallel, giving two-thirds speed; (3) two in parallel, three in series, giving full speed. Field control will be provided in each combination, as on the passenger locomotive, and the regenerative scheme will be similar to that on the other locomotive, as will also the auxiliaries, control equipment and brake equipment, using duplicate apparatus units.

As will be remembered from the previous articles the Paulista electrification equipment will be furnished part by the General Electric Company and part by the Westinghouse Company. General information regarding the G. E. locomotives was contained in the first two articles mentioned above.

Association News

Engineering Committees Whipping Reports Into Shape

ASSOCIATION headquarters have been the scene of much activity of late, Engineering Association committees being particularly in evidence. The equipment committee met on June 3 and 4, the heavy traction committee on June 4, the power generation committee on June 7 and the power distribution committee on June 8, 9 and 10. The way committee will meet on June 14 and 15.

At the meeting of the heavy traction committee, Chairman Sidney Withington, New Haven, Conn.; L. S. Wells, New York City, and J. C. Davidson, Roanoke, Va., were in attendance. The committee studied the results of a canvass made by means of a questionnaire, showing heavy electrical equipment on steam railroads, and arranged for the preparation of the data in useful and attractive form in the report. A salient feature of the committee's work this year, as previously, is to be the furnishing of adequate information on progress in heavy traction to the membership of the association.

The committee on power generation received reports from its sub-committees and devoted most of its time to the form in which power plant data will be presented for convenient reference and discussion. The data will supplement those given in last year's report and will serve as standards of reference for estimating the economy of operation in plants of various sizes. The meeting was attended by Chairman A. B. Stitzer, New York City; H. E. Davis, Utica, N. Y.; A. H. Kruesi, Schenectady, N. Y.; F. A. Scheffler, New York City; E. H. Scofield, Minneapolis, Minn.; W. C. Slade, Providence, R. I.; H. B. Reynolds, New York City, and C. E. Bailey.

The three-day session of the power distribution committee was a strenuous one, as it was taken up almost entirely with detailed study of specifications, made with a view to suggesting necessary revisions. On account of the thoroughness with which details were considered, a vast amount of valuable technical information was brought out, which will doubtless be reflected in the discussion at Atlantic City. With but two exceptions all members of the committee were able to be present as follows: Charles R. Harte, New Haven, Conn., chairman; C. C. Beck, Mansfield, Ohio; R. W. Eaton, Providence, R. I.; H. H. Febrey, New York City; C. J. Hixson, Schenectady, N. Y.; Charles H. Jones, Chicago, Ill.; J. H. Libbey, Boston, Mass.; F. McVittie, Rochester, N. Y.; M. B. Rosevear, Newark, N. J., and W. Schaake, Pittsburgh, Pa.

Claims Association Committee Meetings

AT THE New York headquarters on May 28 meetings were held by the Claims Association committee on revision of the constitution and by-laws and on interchange of claims statistics. The members in attendance were H. D. Briggs, Newark, N. J.; W. F. Weh, Cleveland, Ohio; J. S. Kubu, Utica, N. Y., and John J. Reynolds, Boston, Mass.

The purpose of the first-named committee is to revise the constitution and by-laws of the Claims Association so as to have it conform with the revised constitution of the parent association. The points needing revision were gone over at the meeting and arrangements were made for the preparation of a revised copy to be submitted to the executive committee of the Claims Association.

The committee on statistics arranged for a questionnaire to be sent out on the subject regarding which statistics can profitably be interchanged among the companies. The results will be compiled at the association office and furnished members only on request.

Publicity Men in Conference

A MEETING of the committee of publicity men was held at the association offices in New York on June 5 for the purpose of considering a program of work to be carried out in addition to that already under way, and for the further purpose of considering the matter of co-ordination of its work with that of the committee on publicity recently appointed.

President Pardee, who sat with the committee, explained that the function of the newly appointed committee on publicity is to act in matters involving the publicity policy of the association, and in the appointment of the committee it was the purpose that the work of the two committees should be closely co-ordinated. Mr. Pardee advised the committee that the following executives had been invited to serve as members on the committee of publicity: **Barron G. Collier**, president Barron G. Collier, Inc., chairman; **Horace**

Lowry, president Twin City Rapid Transit Company; Britton I. Budd, president Metropolitan West Side Elevated Railway; C. D. Emmons, president United Railways & Electric Company; C. B. Buchanan, vice-president Virginia Railway & Power Company, and Frank Hedley, president and general manager Interborough Rapid Transit Company.

The general sentiment was that an arrangement of this kind would prove mutually helpful to the publicity men and executives in that ideas and policies could be readily correlated. The committee discussed the program of work suggested and agreed to collect information as to campaigns conducted by various companies on specific subjects. A form of questionnaire was agreed upon and will be sent out from the association headquarters. Another meeting of the committee will be held in July, at which time replies will be gone over and a report prepared.

There was also discussed the matter of an exhibit at the coming convention and the chairman designated Mr. Burroughs to have charge of the details of this exhibit.

Those present at the meeting besides President Pardee were: Leake Carraway, Virginia Railway & Power Company, chairman: Luke Grant, Chicago Elevated Railways, vice-chairman; W. Dwight Burroughs, United Railways & Electric Company, Baltimore, Md.; W. P. Strandborg, Portland Railway, Light & Power Company, Portland, Ore., and Prof. James T. Grady, Brooklyn City Railroad, Brooklyn, N. Y., members; and E. B. Burritt, secretary; W. Caryl Ely and Perry Arnold of Barron G. Collier, Inc., and J. W. Welsh and Henry Surguy of the American Association.

Purchasing Agents and Storekeepers Will Meet

A MEETING of the purchasing agents and storekeepers with a program of discussion on topics of interest to them at the Atlantic City convention next October is assured.

President E. R. Hill of the Engineering Association has appointed W. H. Staub, purchasing agent of the United Railways & Electric Company of Baltimore, and P. F. McCall, general storekeeper of the Metropolitan West Side Elevated Railway, Chicago, as a committee to prepare a program for a meeting of purchasing agents and storekeepers to be held in connection with the coming convention of the Engineering Association at Atlantic City, Oct. 11 to 15. It is believed that such a meeting, with a program dealing with matters directly affecting the work of these departments, will prove of great interest and benefit to purchasing agents and storekeepers throughout the industry.

Messrs. Staub and McCall are now at work on this program and would welcome suggestions from purchasing agents and storekeepers throughout the industry as to matters which should be discussed. Purchasing agents should communicate direct with Mr. Staub and storekeepers with Mr. McCall.

The field of work before purchasing agents and storekeepers under present conditions is of such importance that it is highly desirable that an opportunity be afforded for a gathering of the heads of these departments of member companies for a discussion of the subjects to be presented in the program and such other topics of interest as may come before the meeting.

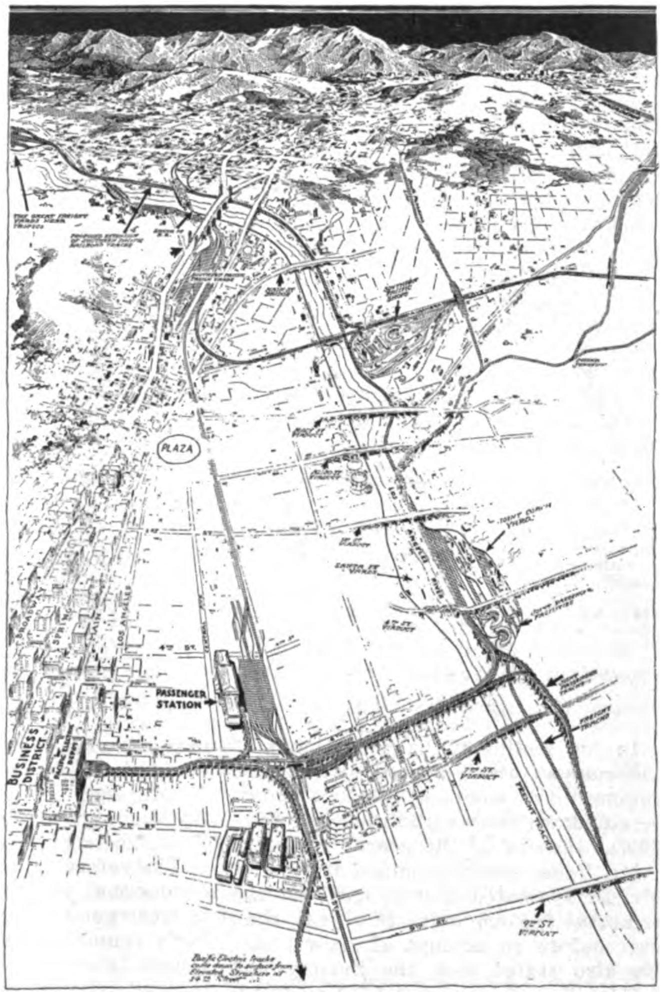
The committee bespeaks the co-operation and assistance of all purchasing agents and storekeepers.

$6,000,000 Joint Station Proposed

The Southern Pacific, Los Angeles & Salt Lake and Pacific Electric Lines Offer New Terminal Plans in Los Angeles

PREVIOUS issues of this paper have described the proposed Plaza Terminal for a union depot for all railroads entering Los Angeles, as recommended by the California State Railroad Commission on July 31, 1919.

The report of the Railroad Commission's chief engineer discusses three possible sites, namely, the Plaza site, the Southern Pacific Company's site and the Santa Fé site, the last being dismissed as not being desirable for use as a terminal.



SKETCH SHOWING PROPOSED UNION STATION AT LOS ANGELES AS RECOMMENDED BY THE SOUTHERN PACIFIC COMPANY, LOS ANGELES & SALT LAKE RAILROAD AND PACIFIC ELECTRIC RAILWAY

The accompanying illustration shows the location of station and arrangement of tracks recommended by the Southern Pacific, Los Angeles & Salt Lake Railroad and Pacific Electric Railway.

Among the advantages urged in favor of this plan are the following:

Its estimated ultimate cost is $16,809,000, with an immediate expenditure necessary of $6,441,000, as against, for the Plaza site, ultimate cost $25,397,000 and immediate expenditure $15,666,000.

While both plans provide for grade crossing elimination, the proposed site blocks street traffic less than the Plaza site.

The station would be located closer to the active business district than if built at the Plaza.

From a railway operating standpoint the proposed location simplifies many problems.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Portland Arbitration Closed

Maine Board Will Meet in Executive Session on May 12—Hearings Ended

C. F. Berry, treasurer of the Cumberland County Power & Light Company, Portland, Me., was called recently in the arbitration in connection with the readjustment of the compensation of the trainmen of that company. It was brought out that the Cumberland County Power & Light Company does not own the Portland Railroad, but merely leases it at a rental of 5 per cent. Judge Joseph E. F. Connolly, arbitrator for the company, was inclined to regard the men as well paid for the service which they performed. He thought that the sensible thing for the men to do, if they were not satisfied, was to seek other employment, or to wait until affairs cleared up and not crowd the company at this time.

Mr. Berry presented the following comparative statement of income:

	Year Ended Dec. 31, 1917	Year Ended Dec. 31, 1918	Year Ended Dec. 31, 1919	Four Mos. Ended Apr. 30, 1920
Gross income	$1,185,597	$1,216,357	$1,513,500	$467,839
Operating expenses	900,100	993,820	1,244,210	464,505
Taxes	60,650	72,284	85,964	31,845
Net income	$224,846	$150,252	$183,325	$19,510
Interest and discount	156,567	160,557	163,720	82,869
Dividends (5 per cent)	99,950	99,950	99,950	33,316
Surplus	$31,670	$110,255	$880,344	$135,696

In his testimony he stated that if the company had a good season this summer, the company's deficit might be cut down between $50,000 and $60,000 at the end of the year.

Mr. Vahey cross-examined Mr. Berry. Mr. Berry stated that it had cost the company $35,000 more this year than ever before on account of snow alone. He also stated that the Sunday and holiday business was not as good on the electrics now as it was ten years ago, as the automobile had proved a formidable competitor.

Edward W. Cobb, an operator of a one-man car on the local system, stated that he had been an employee of the company for fourteen years. He contended that he had not been able to save any money during his service with the railroad.

In the cross-examination that followed Judge Connolly for the company endeavored to show that Mr. Cobb was not compelled to operate a one-man car, but did so on his own wish. The witness said that his pay averaged $33.25 per week. Testimony was also offered regarding the work of spare men and their compensation.

The hearing in the Portland case is closed and the board will meet in executive session on June 12.

Strike Prevention Recommendations Go to Vote

Organization members of the Chamber of Commerce of the United States were asked on June 10 to vote on two recommendations submitted by the Chamber's Committee on Public Utilities. Those recommendations are that:

> Strikes by employees of all public service corporations, performing public service essential to the lives, health, well being and comfort of the people, should be explicitly prohibited by law.
>
> Suitable tribunals should be created by the law to adjudicate differences between employees of public service corporations and their employers, and the decisions of such tribunals should be final and binding upon both parties.

The subject came before the Chamber from the Merchants' Association of New York and the presidents of the principal business organizations of New York City. The communication from the presidents of the New York business organizations to the parent body, dated April 19, was signed by Alfred E. Marling, president of the Chamber of Commerce of the State of New York, and officers of other trade bodies.

The referendum will go before 1,300 commercial and trade organizations. It is accompanied by a report of the chamber's committee on public utilities, of which Lewis E. Pierson is chairman. Among other members are: Henry G. Bradlee, Boston; Arthur W. Brady, Anderson, Ind.; J. W. Lieb, New York.

In recommending the proposals for a referendum, the committee expressed its belief in a set of principles which included the following:

> Strikes by employees of public service corporations should be prohibited by law as conspiracies against the paramount rights of the public. It is obvious, however, that the great class of employees thus deprived of the power of self-protection by means of the strike should be otherwise protected against unjust relations with their employers through suitable tribunals empowered equitably to adjust differences, whose findings should be final, and supported by due provision for enforcement.

The committee believes that the conditions contained in the Cummings railroad bill or similar provisions against interference with the orderly conduct of the railroads should govern utilities.

Wages Before Commission

Railway Board Will Determine Whether Omaha Company Can Meet Trainmen's Demands

The Omaha & Council Bluffs Street Railway, Omaha, Neb., is endeavoring to arrive at an agreement with the local carmen's union, which has made a demand for an increase of 13 cents an hour. The men, through a committee, orally agreed to submit the case to the State Railway Commission, the understanding in conference being that if the commission ruled that the company is unable to meet the increase the men would not strike.

UNION COMMITTEE BALKS

When the company asked the union committee to sign the proposed agreement the committee unexpectedly announced that it would not subscribe to such an agreement; that if the company was unable to meet the increase, the rate of fare should be increased. Thereupon, the company officials announced that it would not be a party to another increase of fare.

The State Railway Commission has indicated a willingness to review the case to determine whether the men are receiving a sufficient wage and whether the company's financial condition warrants an increase.

W. A. Smith, president, and R. A. Leussler, vice-president and general manager, of the company, in reply to the union men, asserted that earnings and expenses, from Aug. 1, 1919, to April 1, 1920, did not yield a 5 per cent return on the preferred stock, to say nothing of the common stock. In another case now pending the State commission ruled that the company should be allowed to pay dividends equal to the average paid during the last five years.

COMPANY COURTS FINANCIAL INQUIRY

The company is agreeable to place its books before the commission, which the Nebraska Supreme Court has ruled is the only body having jurisdiction over the Omaha traction lines.

The wage scale now in force in Omaha is 53 cents an hour for first three months, 55 cents for next nine months, and 57 cents after first year of service. A year ago the men went on strike and were granted an increase of 10 cents an hour. On Aug. 10, last year, the Railway Commission allowed the company to charge a 7-cent fare, or four tickets for 25 cents. At that time the company granted the men another increase of 2 cents an hour.

During the controversy which has been in progress this week the company asserted that the men have received a total increase of 108 per cent since Jan. 1, 1917.

The Railway Commission is holding in abeyance the increased fare order issued last August, and pending a settlement of that rate the commission ordered the company to submit a physical valuation, including unit prices and costs of materials, for a period of five years. The company has been working on that report for several months.

The local union claims a membership of 961. Contrary to usual procedure, the union officers did not announce the recent vote of the men which they stated authorized them to call a strike. The company claimed to hold the signatures of 300 who were opposed to a strike.

The Railway Commission will be requested to hold a prompt review of the demands of the men and the company's plea of inability to meet the demands which have been made.

Rochester Wage Arbitration

Arguments for an increase in wages from 45 cents to 85 cents an hour and a forty-eight-hour week were advanced at the initial hearing in the wage controversy between the New York State Railways and its employees in Rochester, Syracuse and Utica, on June 7, in the Court House in Rochester.

Former Supreme Court Justice Arthur E. Sutherland presided. With him on the bench were B. E. Tilton, arbitrator for the company, and James H. Vahey, general counsel for the Amalgamated, arbitrator for the men. Attorney Warnick Kernan, Utica, appeared for the railway, with W. P. Gannon, Syracuse, and Willis A. Matson, Rochester. The Amalgamated was represented by business agents of the three branches.

The men based their pleas for an increase on the rising cost of living. They asked that their wages "be adjusted proportionately." Mr. Vahey stated that the War Labor Board had awarded electric railway employees in other cities a minimum of 51 cents an hour on May 1, 1919. Mr. Vahey said that if the theory was accepted that a man and wife and three children constitute the average family, then the decision to be made by the arbitration board would directly affect 15,000 persons.

In conclusion Mr. Vahey stated that he considered $2,500 a year to be "a fair wage, a living wage," for the trolley workers. Warnick Kernan, counsel for the company, will outline the case of the New York State Railways at the next meeting. W. J. Lauck was questioned by Mr. Vahey as to investigations conducted by him into the soaring costs of living while he was a member of the industrial investigating commission appointed by President Wilson.

Municipal Ownership Talk at Toledo

$7,000,000 Would Be Placed in the Hands of Council Under the Latest Plan Suggested

Twin ordinances providing for the municipal ownership of a transportation system at Toledo, Ohio, have been submitted by the commission appointed by Federal Judge Killits and are now in the hands of the Council committee on railroads. The ordinances provide for bond issues aggregating $7,000,000. They are worded in such a way as to be identical except that one provides $3,000,000 to acquire a transportation system and the other provides $4,000,000 for the construction of a transportation system.

THE plan of the commission calls for the sale of this amount of thirty-year 6 per cent bonds with the general tax duplicate of the city as a pledge. The money will then be expended by the Council on a plan presented within sixty days by a commission appointed by the Mayor to outline the details of Toledo's new transportation system. In the minds of the commission members the new system would be centered about the most productive lines of the present railway system, with some extensions, new lines and perhaps an auxiliary bus system.

TWO ORDINANCES PRESENTED

The two ordinances were submitted when it was thought that one covering both subjects might be a source of legal trouble later and when it seemed that there would be no agreement with Henry L. Doherty on the cost-of-service ordinance which is near completion. Only a few points remain in question on the cost-plus plan.

After five months of work the municipal ownership commission has offered no definite plan of a transportation system to the City Council, but has merely handed over a carte blanche proposal that the Council have $7,000,000 placed at its disposal with which to buy and construct a new transportation system.

The law department of the city has given Councilmen to understand that the city has the right to condemn and acquire any portion of the existing lines without reference to lines not wanted. There would probably be strong opposition to any such procedure on the part of the city because lines not bought by it would probably be rendered valueless by such action.

Some members of the Council committee on railroads, which now has charge of the bills, want the cost-of-service plan to be submitted to voters at the same time the municipal ownership plan comes up for a vote. They believe that Mr. Doherty will agree to a measure that the people may have a chance to express their preference.

AGAINST EXPENDITURE BY COUNCIL

Both plans must be passed by committees and by a two-thirds vote of the Council before June 10 if they are to be submitted, as planned, at the special election to be held in connection with the state primaries on Aug. 10.

The idea of a commission to plan the street railway system to be assembled by the city, according to the plans of the Municipal Ownership Commission, is embodied in a third ordinance. The Mayor will appoint three citizens to draw up all plans for rerouting, elimination of present lines, building of new ones and routing bus lines.

VALUATION NOT AGREED UPON

The ordinances say "that in order to provide an amount sufficient to pay the interest on said bonds and to provide a sinking fund for their final redemption at maturity there shall be, and there is hereby ordered levied, on all the taxable property of the city, in addition to all other taxes, a tax sufficient to create such sinking fund" and pay interest.

No cost-of-service measure will be submitted to the voters unless Mr. Doherty and other officials of the Toledo Railways & Light Company agree to its provisions. The valuation is practically the only question which has not been agreed upon in the private conferences held by members of the commission, business men and Mr. Doherty. Efforts are planned to try to revive the cost-of-service plan. This measure was considered dead last week.

Councilman Irwin of the committee on railroads and Councilman Dennis, an associate, are urging more time, and possible postponement, of the vote on the proposed ordinances, so that both cost-plus and public ownership plans might be submitted simultaneously.

Mr. Doherty has not given notice of his intention of pressing the 10-cent fare cross-bill in the federal court. This may come on rapidly to establish a precedent for any condemnation proceedings which might be taken if the municipal ownership plans are adopted.

Agitators Busy in California

Union organizers have been making trouble in northern California. A few weeks ago they secretly organized the railway employees at Stockton and induced them to strike and present their demands afterward, the demands including recognition of the union and certain other concessions. This strike tied up traffic for about two days.

A more serious situation developed in Fresno recently. On June 3, the sixth day of the strike, service was 90 per cent restored with some of the old men returned and a number of new men imported for operating the cars. The methods and demands of the strikers were very much the same as at Stockton. The company refused to recognize the union or make any other concessions demanded.

Seattle Has a New Sensation

Political Turmoil Over Purchase of Local Electric Railway by City—Investigation of Deal Planned

Mayor Hugh M. Caldwell's determination to inquire into the purchase by the city of Seattle of the traction lines of the Puget Sound Traction, Light & Power Company for the sum of $15,000,000 has resulted in the passage of an ordinance by the city utilities committee of the Council, appropriating $10,000 for the investigation. The Mayor himself is asked to undertake the investigation. It is expected the ordinance will be passed by the Council. The Mayor has agreed to undertake the investigation, although he preferred that it be done by the law department.

THE proposed investigation has developed a spirited exchange between Mayor Caldwell and former Mayor Ole Hanson, who was in office when the deal was made. Mr. Hanson declares that the present Mayor "seeks to break faith with the people" when he suggests that the deficit in the railway fund be made up by taxation, and that such action "should be resented by every honest man in Seattle." Mr. Hanson declares that "the street car rider must pay his fare." He declares that Mayor Caldwell, by reason of the fact that he was Corporation Counsel at the time of the purchase, knows more about the deal than any other man in the city hall.

GAVE ONLY LEGAL ADVICE

Mayor Caldwell says that his connection with the deal was purely in the matter of giving legal opinions of the city's power to make the purchase. By no means did anything that he said constitute a recommendation on his part that the city should complete the deal and pay the price named. Mayor Caldwell alleges that the lines were purchased at the company's figure without an adequate appraisal.

Mr. Hanson points out that an emergency existed; that transportation had completely broken down; that the government was compelled to run free steam trains to the shipyards, and, finally, that the proposition was approved by the people by a vote of almost four to one.

AGAINST TAX MEASURE

The board of trustees of the Chamber of Commerce has gone on record as opposing the proposal to meet the annual deficit of the municipal railway by direct taxation, declaring that to assess any part of the cost of maintaining the system against the general taxpayer would mean that thousands of home owners who pay carfare for themselves and their families would be compelled to contribute further to the support of the railway, were direct taxation resorted to, thereby being burdened for the benefit of transients and non-taxpayers. The board also expresses the opinion that such an action would be a breach of faith on the part of the city, since the ordinance for the purchase of the railway provided specifically that the railways should be operated without cost to the taxpayers.

Corporation Counsel Meier has replied to the request for an opinion as to whether the city has any legal redress in the matter of the railway purchase. The outstanding point in the opinion is the declaration that if the city of Seattle paid a price for the railway grossly in excess of its real value, the city can maintain a suit against the Puget Sound Traction, Light & Power Company, based upon allegation of fraud, either for revision of the contract or to recover the damages sustained.

J. J. Wettrick, formerly engineer of the municipal railway and removed from office when Mayor Caldwell eliminated a number of positions in the Department of Public Utilities, has started mandamus proceedings in Superior Court to compel the city to restore him to his position.

The hearing before the court on the constitutionality of the city's new jitney ordinance, regulating routes, schedules and fares, referred to elsewhere in these columns, was recently completed. Attorney for the jitney drivers asserted that the ordinance was created merely to "grab the income" of the jitneys, which had been disregarded before the deficit in railway income was brought to the attention of Mayor Caldwell and the Council. W. R. Crawford, representing the jitney men, alleged that the railway is inadequate to serve the public, and that the jitney drivers' union has received petitions from 20,000 citizens asking that the present jitney service be allowed to continue. He said the ordinance violates the fourteenth amendment as the property of the jitney drivers would be confiscated by the enforcement of the ordinance. Mr. Crawford also contended that the rules of the City Council were violated when the ordinance was passed.

Attorney Meagher, for the city, contended that the "licenses" of the jitneys are not permits to operate jitney buses, but merely authority to drive a car. Jitneys were on the streets only on sufferance by the city as jitney buses. The city had a right to discontinue that sufferance at any time.

Pocket Veto May Kill Water-Power Bill

National Measure Passed by Both Houses May Be Allowed by President to Die

Explanations that do not explain are the order in Washington with respect to the water power bill, which may become of no effect by the failure of the President to sign it before adjournment of Congress on June 5. The nearest to an official statement in the matter was made informally by Secretary Tumulty, who announced that Secretary John Barton Payne of the Interior Department was opposed to the measure and then later stated that the President had received this and other bills at too late a date to permit his final consideration and favorable action in view of a serious difference of opinion which had developed.

THE water-power bill was passed by both houses and went to the President for signature the middle of the week ended June 5. On Thursday it was referred to the Secretaries of War, Interior and Agriculture, who by the terms of the bill would have been members of the proposed Federal Power Commission. All three Secretaries reported to the President on or before June 5. It is definitely known that the Secretaries of Agriculture and War reported favorably and recommended that the bill be signed.

Mr. Tumulty's statement, however, clearly implies that the Secretary of the Interior recommended against the bill. This fact is also borne out by the general belief that Secretary Payne is personally opposed to the measure. The nominal grounds upon which he is supposed to have recommended a veto are that such an act would tend to destroy the national parks. Considerable credence may be given to the story on the ground that Judge Payne has been, since 1911, president of the Board of South Park Commissioners of Chicago, and this activity is known to have received the greatest personal interest and attention of the President.

There is no question but that the bill is still objected to by several influences, for as late as the time of the conference report to the Senate, barely a week before passage, Senators Lenroot, King and Norris all took occasion to point out their objection to the proposed regulation. Two grounds for opposition were thus cited: First, that the proposal made the development of water power a dominating influence, even with the right on the part of the Federal Commission to interfere with navigation on important navigable streams; second, that the terms for continuing a license after the initial period were such as to give practically perpetual lease to the original licensee.

It is probably the opposition thus voiced which leads to the rumor in Washington, which, however, cannot be confirmed, that either Senator Lenroot or Senator King had some influence in causing the "pocket veto." In any event, great surprise is expressed at every turn that the President should have declined to sign a bill so well known as of great importance solely on the ground that possibly some measure of damage might be done to the national parks.

Two power projects have been suggested as the possible cause of Secretary Payne's objection. It had been proposed that a dam be placed near the Idaho state line just outside of the boundaries of Yellowstone Park in such a way that the storage of water would have been within the park territory. Another dam on the Yellowstone River, within the boundaries of the park, had also been proposed. It is quite possible that these two projects, among others, may have been the cause of the Secretary's feeling of opposition. He refused to make any statement in the matter to the press.

Through pressure of interests favoring the bill, effort was made to find legal status for signature by the President after the close of Congress. Distinction between the end of a congressional session and the end of a Congress, such as occurs on March 4 at noon each second year, became a fine point in the issue. Precedent for executive approval was found in the case of an act signed by President Lincoln under similar circumstances, which act has been confirmed by Supreme Court decision holding it to be proper and effective as completion of the law. Opportunity therefore seems to be afforded for President Wilson to act on the measure at any time within the ten-day period following the presentation of the bill to him, that is, on or before June 11.

A POSSIBLE WAY OUT

The water power matter was deemed of such great importance by the Republicans that Senator Lodge, in his key-note speech at the Republican convention, made reference to it. The platform committee of the convention has also been urged to incorporate a plank in the platform on the matter by the American Forestry Association.

Official Washington has also busied itself in the matter and not a stone was left unturned in the effort to locate some means whereby the completion of the legislation could be accomplished. It was even rumored that the Secretary of the Interior was to withdraw his objection to the bill, so that there might be no ground for the charge that the administration is hostile to it. In any event it was clear that the friends of the measure refuse to lose hope in the situation, both with respect to the political aspects and the actual accomplishment of the end sought.

On June 10 it was announced that President Wilson had received an informal ruling from the Attorney-General stating that the President has ten days after the close of Congress to sign all bills and resolutions sent to him. It was said, then, that a formal opinion to this effect was being prepared. It was further said that after the formal opinion was received, the President would take up the water power bill and several other measures for final action. Up to the time of going to press at noon on Friday the measure still remained unsigned.

Seventy Cents in Pittsburgh

Compromise Wage Betterment Arranged by Receivers—Increased Fare in Prospect

The threatened strike of motormen and conductors at Pittsburgh has been averted by the receivers of the Pittsburgh Railways agreeing to pay the men a maximum hourly wage of 70 cents. The men voted June 9 almost twelve to one to accept this compromise wage settlement. The acceptance of the proposition submitted by the receivers as their ultimatum forecasts an increase in fare from 7½ cents, or four metal checks for thirty cents, to 8⅓ cents, or three checks for 25 cents. The trainmen will receive 64, 68 and 70 cents an hour, instead of 49, 52 and 54 cents an hour. This is an increase of 30 per cent. The new scale dates back to May 1. The wage increase is about half that first demanded by the men.

A tentative agreement resulting in the final adjustment was reached on June 5 at a conference in Mayor E. V. Babcock's offices, participated in by the receivers, Mayor Babcock, their counsel, and W. B. Fitzgerald, international vice-president of the Amalgamated, and the wage committee representing the trainmen.

The conference was suggested as a final effort at adjustment by Mr. Fitzgerald, who arranged for it by wire from his headquarters in Detroit. An hour after the conference convened the tentative agreement was reached. The settlement was reached solely through the efforts of the receivers, Mr. Fitzgerald and the men's committee, without the aid of the Mayor and City Council.

Receivers Fagan, Tone and George are now busy conferring with the men on the final details of the wage contract as agreed upon. In a day or two they will take up the working conditions. These, it is believed, will be finally adjusted with little difficulty; but, even if the adjustment of the working conditions is long delayed, the questions involved are not serious enough to precipitate a strike.

Back in April the men began negotiations with the receivers on their demands for a 75 per cent wage increase, or 91 cents an hour, as a maximum hourly pay. The receivers, of their own volition, had granted all the employees a wage increase of 10 per cent. This, the men declared, did not satisfy them. They insisted upon 91 cents.

Conference after conference was held in the hope of adjusting the matter before May 1, the date of the expiration of the trainmen's contract with the company. The men voted to strike on May 1. At this juncture, the Mayor and Council projected themselves into the controversy and, upon the promise that they would get the trainmen "a substantial wage increase," persuaded them to postpone strike action.

The receivers, a day or two later, offered the men a maximum pay of 65 cents an hour. Mayor Babcock handed out a statement immediately afterward in which he contended that he and Council had fulfilled their promise to the trainmen. The trainmen refused to accept this offer. The receivers then insisted that the question involved be submitted to arbitration, in accordance with the rules and regulations of the trainmen's international organization. This the trainmen refused to do. They reiterated their threat to strike without further delay. Finally, they were persuaded to submit to arbitration through the efforts of Vice-president Fitzgerald. Ignoring the action of the receivers in appointing S. E. Duff as the arbitrator to represent the company, the trainmen demanded that the Mayor and two City Councilmen constitute the board of arbitration.

Receiver Fagan declared that so far as the receivers were concerned "that would be arbitration without representation." The city of Pittsburgh took up Receiver Fagan's phrase, and there was so much public indignation over the proposal that the Mayor and Council finally told the men that they would not consider that it would be legal to act in the capacity of arbitrators under the circumstances.

The controversy now was just about where it started two months before. Mr. Fitzgerald demanded that the trainmen submit to arbitration. They were considering the naming of an arbitrator, when the receivers finally agreed to offer them 70 cents an hour, which they readily accepted.

Receivers Fagan, Tone and George will make a public announcement this week giving a thirty days' notice of the contemplated increase in fare.

Ten-Cent Wage Advance Rejected

Members of the conference committee of the employees of the Connecticut Company, New Haven, Conn., have informed J. K. Punderford that the men on the system throughout the State have voted to reject the company's offer of a 10-cent increase in wages. There have been some indiscriminate rumors of a compromise reported as coming from the men, but the attitude of the company is that the last word has been said. L. S. Storrs, president of the company, is reported as follows:

> I don't know what is meant by the employees when they talk compromise. For there is nothing to compromise unless the employees accept the company's offer. The company made an offer of a flat increase of 10 cents an hour and this is really a great deal more than the company can afford at this time. Ten cents an hour means a very great increase in the operating expense of the system and it is a question if even this increase is a safe move for the company. So how can there be any compromise? We have made a maximum offer and can do nothing further. Any greater increase is entirely out of the question.

An increase of 10 cents an hour would mean that new employees would receive 54 cents an hour and employees of five years or more would receive 60 cents. Operators of the one-man safety cars would receive 69 cents an hour for the first year with the maximum at 75 cents an hour thereafter.

Boston Wages Increased

Company Arbitrator Dissents from Pay Award—Sees Higher Fares Unless Riding Increases

Seventy cents an hour to trainmen on the surface lines of the Boston (Mass.) Elevated Railway and 72 cents to rapid transit trainmen are the maximum allowed under the arbitration award just announced. The opinion is by James L. Doherty, neutral arbitrator. It is subscribed to in full by J. H. Vahey, representing the men. H. Ware Barnum for the company agreed to most of the statements of fact in the award, although he could not agree with some of the principles enunciated, nor the increase in pay.

DETAILS OF WAGE AWARD

The employees, having agreed upon certain working conditions, submitted to arbitration to complete their relations for the period extending from May 1, 1920, to July 1, 1921, the following questions:

> 1. What rate of wages shall be given to all of the employees of the company who are members of the association?
> 2. What rate of wages shall be paid to all employees above described for work on Sundays and holidays?
> 3. Shall all of the employees above described, or any of them, be given one day off in seven, with pay?

The wages awarded to men in the train service in cents per hour are as follows:

Surface lines, motormen and conductors	
First three months	58
Next nine months	64
Thereafter	70
Rapid transit lines, motormen	
First three months	65
Next nine months	66
Thereafter	72
Rapid transit lines, guards	
First three months	62
Next nine months	63
Thereafter	65
Rapid transit lines, brakemen	
First three months	55
Next nine months	58
Thereafter	62

Allowing extra compensation for Sunday work does not appear feasible. The reasons lie in the nature of the service requiring work to be performed on Sundays as on week days and without extra compensation to the company. It was pointed out that the volume of business done by the company on Sundays was materially less than on week days.

In dealing with the question of one day off in seven the board was of the opinion that practical considerations did not allow the establishment of such a regulation at this time.

MAXIMUM EIGHTY-FOUR CENTS

Other rates of wages were established, some in excess of the maximum indicated and running as high as 84 cents an hour, higher wages being for workmen in the maintenance department.

The neutral member of the board was of the opinion that under all the circumstances the members of the association should have an increase in wages. He was not of the opinion, however, that the increase should even approximate the outside claims laid down by the men. Practical considerations arising from the conditions of the company which are of vital interest to the men themselves precluded, in his opinion, a great increase.

Mr. Doherty said that the board could not assent, without modification of the proposition, that the condition of an employing corporation was not to weigh in determining the amount of wages which should be paid to employees. He said that above a certain required level of wages, which must be paid in any event, weight should be given to the financial situation in which the company found itself, and that this situation should largely determine whether wages should be advanced to meet reasonable requirements on a more liberal basis. In this case at this time the interests of the employing company and the men, so the board held, have much in common and the financial situation of the company was entitled to some weight in settling the advance to be made.

Mr. Barnum for the company saw no evidence of hardship or privation or of an existence inconsistent with self-respect or decency at the present time under present wages. He said:

> It is my firm and honest conviction that the men under fair conditions average to make more per year than the great bulk of car riders. During the last year out of 5,000 motormen and conductors only 253 voluntarily left the service.
>
> This increase in pay must result either in higher carfares or restricted and impaired service, unless there should be a remarkable increase in riding or relief appear from some source not now in sight. The financial straits of the past years have forced the exercise of every economy. These burdens cannot go on forever increasing.
>
> I must dissent from the award so far as it grants increases in pay.

The wages which have been in force were established by an award made in July, 1919. This provided for payment of from 47 to 62 cents an hour to the "blue uniformed men," so called, on both the surface and rapid transit lines, being the active body of the organization and the men who man and operate the cars.

Wage Vote in Chicago on June 14

Union employees of the Chicago Surface Lines will vote on June 14 on an offer made by the company of 15 cents an hour increase in the wage scale. The offer, if accepted, will mean a wage scale of 75, 78 and 80 cents an hour.

This proposition was presented after several weeks of negotiations. The discussions were prolonged because of the union's insistence on a six-hour Sunday with time and a half for overtime. The company took a positive stand that there would be no change from the present arrangement of "straight time" on Sundays with time and a half for work after eight hours. Chicago has had a wage 5 cents higher than any other city for some time and the men would not consider anything less than an 80-cent maximum.

The Surface Lines' offer is contingent on securing from the Public Utilities Commission a rate of fare sufficiently high to take care of the agreed wage. Hearings in the fare case have just closed and final arguments are to be made on June 17. A decision is expected before July 1. Various figures as to the value of the properties have been submitted, ranging from $100,000,000 to $200,000,000.

Strike in Peoria Settled

Cars are again running in Peoria, Ill., after a strike of the 320 employees of the Peoria Railway, which has continued two weeks. The men have voted to accept a report by their wage scale committee providing for a scale of 53, 56 and 59 cents an hour. The company then agreed to pay this scale unconditionally and the operation of the cars was resumed. The maximum scale had been 47 cents an hour previous to the strike. The street car fare is 6 cents. While admitting the justice of the demands of the men for a higher wage, the company asserted that it could not pay an increase unless the fare was increased. The company offered an increased wage on the condition that the Public Utilities Commission would allow an increased fare. This agreement was rejected by the men. The company is now preparing a petition to the commission for a higher fare. Officials of the company have said that the increase to the conductors and motormen and the shop men will amount to about $150,000 annually.

Enjoins Denver Wage Cut

Upon application by Mayor Bailey of Denver, Col., a temporary restraining order was issued by the Federal District Court on May 29, prohibiting the Denver Tramway for a period of five days from putting into effect the announced wage reduction and the local branch of the Amalgamated Association from calling a strike. Hearing on a motion to make the injunction permanent was set for June 2. The company had planned to reduce wages from 58 cents to 48 cents an hour on June 1, as a result of the action of the City Council on May 10 in referring to popular vote at the next regular municipal election in May, 1921, the 7-cent fare ordinance initiated by the company.

One Councilman presented an ordinance on May 17 which has for its object the repeal of the present 6-cent fare ordinance and the restoration of the 5-cent fare. Another Councilman introduced, on May 24, a measure which provided for municipal ownership.

F. W. Hild, general manager of the tramway, has distributed to the citizens a twenty-page pamphlet entitled the *Tramway*, as a special issue of the company publication, *Tram-o-Grams*. In this pamphlet references are made to the reports and recommendations of the various national, state, municipal and civic bodies which have investigated and studied the Denver traction problem and all of which, without exception, have substantiated the statements of the company in supporting a higher fare.

The court hearing went over from June 2 to June 10. Meanwhile the restraining order continued in effect.

News Notes

Wages Will Be Arbitrated.—It is reported that agreement has been reached between the Asheville Power & Light Company, Asheville, N. C., and its trainmen on all points of difference except the matter of wages. That question will be disposed of by arbitration.

Toronto Wage Representatives Named.—The street railway employees' union has appointed John T. Vick as its representative and the Toronto (Ont.) Railway has named William H. Moore to act for it. The third arbitrator will be named by the Minister of Labor.

London (Ont.) Men Secure Increase.—Wages of motormen and conductors of the London (Ont.) Street Railway have been increased 8 cents an hour all around. Under the new scale they will be as follows: First year, 47 cents; second year, 50 cents; after second year 54 cents.

Five-Cent Advance in St. Joseph.—Trainmen of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., have voted to accept an increase in wages of 5 cents an hour. This is about one-third the sum they asked. The increase dates from June 1 for a period of six months.

Storm Plays Havoc with Electric Lines.—The recent storms in Middle Tennessee caused the heaviest disturbance of the past twelve months to local electric service. The distribution lines of the Nashville Railway & Light Company probably suffered more than those of any other wire using company.

Chamber Against Department of Public Works.—A proposal that the Chamber of Commerce of the United States advocate the establishment of a government Department of Public Works failed to carry in a referendum of the membership of the chamber, the result of which was announced on June 7.

Linemen Get Increase.—Negotiations which have been in progress between the Northern Ohio Traction & Light Company, Akron, Ohio, and the linemen in its employ have been satisfactorily terminated. The men have voted to accept the agreement providing for an increase of 17½ cents an hour. The proposition raising the pay from 70 cents an hour to 87½ cents an hour was made by the company and proved satisfactory to a majority of the men.

Trainmen at New Orleans Want More.—Motormen and conductors of the New Orleans Railway & Light Company, New Orleans, La., and other workers including pitmen, car repairers, carpenters and car cleaners will present a new wage demand to the company. It is understood by officials of the company that the motormen and conductors will ask 75 cents an hour. The maximum pay for motormen and conductors now is 42 cents an hour.

New Wage Scale in Hamilton.—The wage award made by the board of conciliation at Hamilton, Ont., has been signed by the local union of the employees of the Hamilton Street Railway. The new scale fixed by the board provided 38 cents for the first six months, 40 cents for the second six months, 45 cents for the second year and 52 cents for the third year. The car-house men receive increases ranging from 6 to 9 cents an hour, and a reduction from 60 to 55 hours per working week.

Four-Cent Wage Advance. — The Roanoke Railway & Electric Company, Roanoke, Va., on June 1 advanced the wages of its trainmen 4 cents an hour. For the first year's service the pay is 44 cents an hour, for the second year it is 47 cents an hour, for the third year 48 cents an hour, for the fourth year 49 cents an hour, and for the fifth year and thereafter 50 cents an hour. For work on cars on the Salem-Vinton Division the company will pay 2 cents an hour in addition to the schedule just noted.

Wants Utility Value Preserved.—Corporation Counsel H. W. Byers of Des Moines, Ia., has answered Dr. J. Edward Kirbyem on the local railway matter. The doctor made a plea for a sliding scale of fares. With this plan Mr. Byers disagrees. He seeks a permanent solution of the problems of the Des Moines City Railway. To this end he favors the remission of paving charges, special taxes and other burdens. His contention is that the utility value of the railway is seriously impaired when fares are advanced.

Trainmen Will Arbitrate.—The union trainmen of the Eastern Massachusetts Street Railway, Boston, Mass., have voted to place in arbitration their demands for a change in wage schedule calling for a maximum rate of 75 cents an hour, an eight-hour day and time and one-half for overtime with Sundays and holidays and one day in fifteen off. The committee appointed to arbitrate the demands is comprised of James H. Vahey, representing the men; Attorney Philip Carleton of the Eastern Massachusetts Street Railway, and Hugh Ogden, Boston.

Arbitration Not Compulsory.—City Attorney Harry Hartman of Trenton, N. J., has informed the striking employees of the New Jersey & Pennsylvania Traction Company, Trenton, that the City Commission cannot compel arbitration of the differences between the company and men and only has the power to appoint a fifth arbitrator in case four others are appointed. The city attorney informed the men that they had forfeited their right to arbitration by going on strike and that by reason of this action they ceased to be employees of the railway.

May Abandon Demand for Short Day.—At the first meeting of the special committee to readjust schedules on the Cleveland (Ohio) Railway, in accordance with the recent agreement, it became evident that the men are more interested in getting straight, long runs than in the length of the workday and it is probable they will abandon the demand of the eight-hour day. At the suggestion of A. R. Dittrick, chairman of the committee, the members have been allowed two weeks to study the present schedules in Street Railway Commissioner Fielder Sanders' office.

Programs of Meetings

New England Street Railway Club

Plans for the trip of the New England Street Railway Club to Montreal on June 29-30 are now so far advanced that some outline can be made of them.

Invitations to join the club on the trip have been extended to and accepted by a governor and four lieutenant-governors of New England States and by the president of the Senate in another state, who will represent his Governor.

The party will leave Boston June 28, at 7 p.m. standard time by the Boston & Maine Railroad, and will arrive in Montreal the following morning. On Tuesday the party will be entertained on a sightseeing trip by the Montreal Tramways Company and in the evening there will be a banquet at the Windsor Hotel to which prominent provincial and city officials have also been invited as guests. No special program has been arranged for Wednesday. The party will arrive in Boston on the morning of July 1.

New York Electric Railway Association

Plans are being completed for one of the largest and most enthusiastic meetings of the New York Electric Railway Association to be held at Hotel Champlain, Bluff Point, on June 26. Many delegates have signified their intention to be present and for the convenience of the Metropolitan members, there will be attached to train No. 7, leaving Grand Central Station, New York, on June 25 at 7.10 p.m. standard time two or three private sleepers which will go through to Bluff Point. The rates between New York and Bluff Point are as follows:

1 Transportation:	
Single trip	$ 9.94
Round trip	18.91
2 Sleeper:	
Upper	2.00
Lower	2.50
Section	4.50
Stateroom	7.00
Drawing Room	9.00

Those who plan to attend the meeting are urged to forward checks drawn to the order of J. R. Ellicott, Jr., 165 Broadway, N. Y., who will complete reservations and deliver tickets in due course. The allotment of space will be on the basis of first come, first served.

Financial and Corporate

Akron Value $7,604,478

City Lines of Northern Ohio System Held to Be Worth This on 1919 Price Basis

The M. E. Cooley valuation of the Akron (Ohio) city lines of the Northern Ohio Traction & Light Company was reported on by H. C. Anderson, University of Michigan, on June 1. This valuation was made in connection with the efforts of the company to secure a service-at-cost franchise.

The valuation inquiry was begun in December, 1919, and the figures were compiled on the reproduction cost new theory with two bases of prices. One value was made on the average prices of materials and labor over a period of the five years from 1914 to 1919, and another on the prices prevailing in 1919 alone. On the five-year basis the value was reported to be $6,192,657. On the 1919 price basis it was placed at $7,604,478.

These figures do not include any investment in power houses, sub-stations or terminal building, the assumption being made that these parts of the plant were a part of the property as a whole and that the Akron city lines would derive the necessary power as though purchased from the larger corporate body.

Another set of figures on the same two bases was submitted to cover the property within the Akron 5-cent zone. This embraces some mileage outside the Akron city limits over which the city service for the single fare is given. These values were set as $6,530,086 and $7,974,516.

An interesting point made by Mr. Anderson was that his estimates, which were based on a complete inventory of the property, did not take into account the decreased production efficiency of labor. This he placed at at least 25 per cent. In other words, he said one should really compute the labor cost of reproducing the property at 125 per cent of the labor cost in 1914, say, taking into account 100 per cent increase in wages and 25 per cent decrease in production.

Abandonment Case Not Decided

Decision was reserved by Justice Wheeler in Supreme Court at Buffalo N. Y., on June 3, on the application of George S. Bullock, receiver of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., for permission to abandon its traction lines between Buffalo and the Pennsylvania-New York State line. Maulsby Kimball, of counsel for the Buffalo & Lackawanna Traction Company, which owns the right-of-way between Buffalo and Lackawanna, informed the court that if the Buffalo & Lake Erie is scrapped, the Buffalo & Lackawanna likewise would have to be abandoned. The Buffalo & Lackawanna right-of-way is operated by the Buffalo & Lake Erie Traction Company.

Towns and villages along the lake shore traction line entered vigorous protest against the application of the bondholders of the company. Thomas C. Burke, representing numerous property owners along the line, asked the court to direct the receiver to operate the road as long as the revenue meets operating expenses. He argued that if the line must be let go by the bondholders it should be offered for sale in parcels. It was argued that certain divisions of the road paid.

Among those who appeared in opposition was Henry W. Killeen of counsel for the International Railway, Buffalo.

Segregation Plea Made

Rhode Island is about to pay the penalty for its inaction at the recent session of the Legislature. Only partial relief having been extended to the Rhode Island Company the officers have deemed it in the best interest of the property to cut off the non-paying lines. In consequence the receivers of the company have filed in the Superior Court a petition asking for authority to turn over to the owners the properties of the Providence & Danielson Railway and the Sea View Railroad on the ground that they are run at a loss. The opinion is expressed that the discontinuance of the lines will save $110,000 a year.

The leases of the properties of the two lines ran for a period of 999 years from June 30, 1911. The results of operating the Providence & Danielson line since the receivership began, Jan. 31, 1919, show a yearly loss of about $47,000, the receivers say, and the Sea View annual deficit is approximately $16,000, exclusive of taxation and replacement expenses.

The fare was increased 20 per cent Sept. 28, 1919, and yet the showing for a period of six months indicates that the earnings for a year from July 1, 1920, will show a sum approximately $68,000 less than the operating expenses for the Danielson line and $25,000 less for the Sea View line.

When a reorganization plan, provisional upon jitney regulation, was settled upon by the holders of the securities underlying the Rhode Island Company, it was announced that discontinuance of some of the non-paying lines would be asked because of the failure of the General Assembly to pass a bill permitting towns to contribute to cost of service of such lines.

The court fixed on June 9 as the date for a hearing on the petition.

$4,798,136 in Claims

Receiver of Shore Line Electric Railway Reports to Court—Plant Estate Principal Creditor

A total of $4,798,136 in claims against the Shore Line Electric Railway, Norwich, Conn., is shown in a report filed with the clerk of the Superior Court by Receiver Robert W. Perkins. The claims are summarized as $658,016 in common, $131,149 in preferred, $3,472,400 subordinated to general creditors and $541,570 disallowed.

In his statement the receiver detailed $266,856 in approved common claims, $131,149 in approved preferred claims and $115,910 in preferred claims recommended to be disallowed in part as common. There was $16,594 in preferred claims recommended to be allowed as common. Claims made by the executors of the Morton F. Plant estate are shown at $253,426, partly allowed as common claims, and also $3,472,400 which are subordinated to the general creditors and partly disallowed. There is a total of $40,828 in common claims disallowed.

The claims allowed as preferred claims comprise $126,962, due the State of Connecticut for taxes, $981 in taxes due the town of Hopkinton, $1,145 in taxes due State of Rhode Island, $1,922 due town of Westerly for taxes and $138 due the Westerly water department.

Executors of the estate of Morton F. Plant, by whom the road was controlled, filed as common claims several demand notes for $231,000 with interest to Oct. 1, 1919, amounting to $22,426, which the receiver recommends be allowed in the total sum of $253,426 as common claims. Another claim by the executors is for $3,472,000, which the receiver would allow as subordinate to the claims of general creditors, as provided in the text of the debentures. The Plant estate claim of $477,455, interest on debentures to Oct. 1, 1919, is disallowed as the terms fixed in the text of the debentures provide for the payment of interest only when and as earned.

A deficit of $78,506 in operating expenses for the six months to March 31 is shown by the receiver in his statement filed for that period with the court. The statement is as follows:

CASH RECEIPTS

Taken over at time of appointment	$ 6,141
Receipts in October	80,036
Receipts in November	72,839
Receipts in December	86,888
Receipts in January	87,472
Receipts in February	49,859
Receipts in March	73,203
Total	$ 456,438
Cash disbursements.	
Salaries and wages	$ 238,994
Employee's compensation liability	1,649
Injury and damage	7,219
Material and supplies	103,240
Freight and express	1,025
Taxes, federal	1,343
Rent of tracks and terminals	2,020
Groton & Ston. St. Ry. bond interest	11,875
Interest trust company fee	29
Cash on hand, April 1, 1920	29,044
Total	$ 456,438

Increased Fares Increase Revenue

Earnings, However, Are Still Below Normal — Operating Ratio Has Climbed Steadily

Tables compiled from reports made to the American Electric Railway Association during the last six years reflect sharply the trend of conditions affecting the industry during that period. For convenience the income statements of 111 electric railways for the year 1917 to 1919, inclusive, have been summarized in Table I, while in Table II the income statements of 132 companies for the years 1918 and 1919 have been summarized, and in Table III the income statements of twenty-three companies for the year 1914 to 1919, inclusive, have been summarized.

IT WILL be noted that the trend of operating conditions during the period covered by the war and the period since the signing of the armistice are reflected in the tables. Incidentally, the tables also reflect some of the difficulties which beset the association when it tries to obtain statistics covering any extended period of time. As the number of years increased the number of companies whose reports are available falls off. Thus of the more than 200 companies which have reported to the association at one time or another only twenty-three have reported without a break for the last six years. This is especially to be regretted at this time, since the past six years cover the period of the war and statistics showing the course and development of the depression resulting from the war have a special interest. Table III gives the statistics of twenty-three companies for the whole period and they reflect very clearly the effects of the war, but because of the small number of companies included no general conclusions applying to the whole industry can fairly be drawn from them.

TABLE I—COMBINED INCOME STATEMENT OF 111 ELECTRIC RAILWAYS FOR THE CALENDAR YEARS 1917, 1918 AND 1919

These data were taken from the confidential reports sent by the operating companies to the American Electric Railway Association. The reports of interurban and city railways were used.

	1917	1918	1919	Per Cent Increase 1918 Over 1917	Per Cent Increase 1919 Over 1918	Per Cent Increase 1919 Over 1917
Railway operating revenue	$191,569,500	$200,812,016	$241,059,002	4.82	20.04	25.83
Railway operating expenses	128,067,674	149,063,112	181,576,971	16.39	21.81	41.78
Net operating revenue	63,501,826	51,748,904	59,482,031	*18.51	14.95	*6.33
Net revenue from auxiliary operation	6,162,176	8,664,638	12,228,371	40.60	41.13	98.44
Taxes	12,605,681	13,672,681	15,461,941	8.46	13.09	22.66
Operating income	57,058,321	46,740,861	56,248,461	*18.08	20.34	*1.42
Non-operating income	4,068,513	5,123,576	4,471,204	25.94	*12.73	9.91
Gross income	61,126,834	51,864,437	60,719,665	*15.15	17.07	*0.67
Deduction from gross income	47,689,864	49,420,127	52,729,202	3.63	6.70	10.57
Net income	13,436,970	2,444,310	7,990,463	......	......	......
Ratio: Net income to operating revenue (per cent)	7.02	1.2	3.3	*5.82	2.1	*3.72
Operating ratio, per cent	66.85	74.23	75.32	......	......	......
Total car-mileage operating	696,076,362	607,212,434	615,571,409	*12.77	1.38	*11.57
Total passengers carried	3,901,233,364	4,173,375,377	4,374,485,429	6.98	4.82	12.13
Total miles single track	12,140	12,722	12,742	......	....	....

* Indicates decrease.

NET INCOME FLUCTUATED VIOLENTLY

The 111 companies included in Table I operated 12,700 miles of tracks or about 30 per cent of the total mileage in the United States. City and interurban companies, large companies and small companies operating in every section of the country are included. The table therefore may be taken as fairly representative of all electric railways.

Probably the most striking feature of Table I is the fluctuation of the net income. When considered in connection with the net incomes shown in Tables II and III it shows more clearly, perhaps, than anything else could the relative position of the electric railway industry as a paying business to what it was formerly. It also demonstrates the greater value of statistics extending over a period of years than the same statistics for a shorter period.

Table I shows the net income of the 111 companies in 1917 as $13,436,970. In 1918 this figure had dropped to $2,444,310 and in 1919 it had risen again to $7,990,463. The increase of 1919 over 1918 is substantial and when the two years are compared by themselves, as they are for instance in Table II, the comparison is apt to be misleading. A casual study of Table II leaves one with the impression that 1919 was an unusually good year and that prosperity has returned to the electric railways. But when the net income for 1919 is compared with that in 1917, $13,436,970, it becomes plain that electric railway earnings are still a long way below normal, and this fact is made still more apparent when reference is made to Table III, and it is seen that the year 1917 itself is far below the normal for pre-war conditions. The returns for twenty-three companies given in Table III show a net income of $3,733,537 in 1917 as compared with a net income of $10,855,721 for the same companies in 1914. When all the facts are presented in this way the truth stands out strongly that the electric railways have merely turned the corner of adversity and that they still have a long way to go before they get back to pre-war prosperity.

FARE INCREASES REFLECTED IN STATISTICS

The ratio of the net income to the operating revenue in Table I indicates that in 1917 the companies' share of the revenues, that is, the amount remaining after the payment of all expenses and charges, amounted to 7.02 per cent. In 1918, out of a gross income of $214,600,230, there remained as profits to the companies only $2,444,310, which amounts to 1.2 per cent of the operating revenue of $200,812,016. In 1919 an improvement was shown and the companies' profits amounted to 3.3 per cent of the operating revenue. It should not be forgotten, however, that this net income included the net revenue from auxiliary operations and non-operating income. If these were deducted in 1918 and 1919 there should have been deficits in both years in place of the net incomes actually shown. All of which indicates that the revenue from operation, the revenue from fares, is not yet sufficient to cover the expenses of operation, taxes and fixed charges. In other words, the business of transporting passengers is unable to pay its own way by itself.

The trend of operating revenues, as shown in Table I, reflects principally the effects of fare increases granted during 1918 and 1919. The increase of 1918 over 1917 is only 4.82 per cent while the increase of 1919 over 1918 is 20.04 per cent, and the increase of 1919 over 1917 is 25.83 per cent. That the

TABLE II—SUMMARIZED STATEMENT OF 132 ELECTRIC RAILWAYS FOR THE CALENDAR YEARS 1919 AND 1918

	1919	1918	Increase 1919–1918 Per Cent
Railway operating revenue	$281,839,834	$234,736,440	20.06
Railway operating expenses	212,563,067	174,376,391	21.90
Net operating revenue	69,276,767	60,360,049	14.77
Net revenue: Auxiliary operations	10,082,985	6,996,268	44.11
Taxes	17,629,871	15,356,345	14.81
Operating income	61,729,881	51,999,972	18.71
Non-operating income	5,017,087	5,626,006	*9.22
Gross income	66,836,968	57,625,978	15.98
Deductions from gross income	58,787,454	55,315,229	6.27
Net income (or loss)	8,049,514	2,310,749	.....
Ratio: Net income to operating revenue (per cent)	2.86	0.98	1.88
Operating ratio (per cent)	75.42	74.29	.....
Car-miles operated—total	711,052,214	699,511,740	1.65

NOTE.—Companies doing a combined railway and power business are not included in this tabulation.

* Decrease.

increase in revenues was due more to fare increases than to increased business is shown by the number of passengers carried. The increase in passengers in 1918 over 1917 was 6.98 per cent, and the increase of 1919 over 1918 was 4.82 per cent, while the total increase from 1917 to 1919 was 12.13 per cent, less than half of the amount of increase in revenues for the same year.

In spite of fare increases, however, the revenues failed to keep pace with the rising costs of operation. In 1918, while the revenues were increasing 4.82 per cent, expenses increased 16.39 per cent; in 1919, when revenues took the extraordinary jump of 20.04 per cent, expenses still went them a little better and increased 21.81 per cent; and over the two-year period the revenues and expenses increased 25.83 and 41.78 per cent respectively.

The story of the failure of the operating revenues to keep up with the increase in expenses is told in the figures for the operating ratio. In 1917 the ratio was 66.85 per cent; in 1918 it was 74.23; and in 1919 it was 75.32.

The figures for the taxes paid by these companies indicate that while having some difficulty in meeting their own expenses the electric railways continued nevertheless to contribute their full quota to the expenses of government. Their contributions to the public treasury in 1917 amounted to $12,605,681; in 1918 to $12,672,681, an increase of 8.46 per cent; and in 1919 to $15,461,941, an increase over 1918 of 13.09 per cent. The increase of 1919 over 1917 amounted to 22.66 per cent. It should be remembered also that these companies probably made other contributions to the public treasury in the form of paving, sprinkling, snow removal, bridge tolls, etc., which if considered as taxes, as might not improperly be done, would show a greatly increased total.

The amount of fixed charges of these companies does not show any fluctuations which could be called startling or even unusual, which in itself, however, is remarkable when considered in connection with the trend of other items. Amounting to $37,689,864 in 1917, they increased to $52,729,202 in 1919, an increase of 10.57 per cent, not an extraordinary increase for two years, especially when one considers the character of the period covered.

That the increase was not greater is probably due to the difficulty which electric railways experienced in obtaining new capital except on most unfavorable terms, which caused most managers to operate with extreme economy and postpone renewals and improvements to the last moment possible.

In Table II summarized income statements of 132 companies for the years 1918 and 1919 are compared. The companies include the 111 companies shown in Table I and twenty-one additional companies for which the 1917 figures are not available. It will be noted that the additional companies do not change in any way the conclusions drawn from Table I, but on the contrary confirm them throughout and lend added strength of increased numbers.

The great increase in the net revenue shown in this table, while it should not, as stated above, be taken as an indication that prosperity is being visited upon the electric railways, nevertheless is a promising sign for the future. It would seem to indicate that the worst has been passed and that from now on a steady improvement may be looked for.

Table III is interesting principally from the fact that it covers the entire period of the war and the year subsequent to the armistice. An outstanding feature of the table is the slump which occurred in 1915. If the fluctuations of such a small group of companies can properly be traced to general causes this slump was probably a reaction to the outbreak of war. It will be remembered that thousands of nationals of the belligerent companies returned to Europe at that time; exports to Germany were cut off, and other nations stopped buying in many lines, with the result that American industry was affected; shops and factories shut down and thousands of people were thrown out of work; all of which events combined to cause a heavy loss of riding to the electric railways. This is clearly shown in the loss of 72,000,000 passengers in 1915 as compared with 1914.

By 1916 the development of the munitions industries had more than taken the place of the industries that had suspended; employment was general and traffic on electric railways became normal, or perhaps one should say abnormal in the case of these twenty-three companies, since it reached a figure which has not been duplicated by them in any subsequent year to date. It was the last good year these companies had. From then on the rising costs of operation cut further and further into the net, two million men were sent abroad, several million more were confined in training camps, and traffic fell off. The worst was reached in 1918, and in 1919, after the signing of the armistice, traffic began to pick up, and the revenues, augmented by fare increases, managed with the aid of auxiliary operations to cover all expenses and charges and produce a small increase in the net income of the companies. This it is hoped the year 1920 will see continued.

TABLE III—COMBINED INCOME STATEMENT OF TWENTY-THREE ELECTRIC RAILWAYS FOR THE CALENDAR YEARS 1914, 1915, 1916, 1917, 1918 AND 1919

These data were taken from the confidential reports sent by the operating companies to the American Electric Railway Association. The reports of interurban and city railways were used. In 1916 the report forms were changed by the A. E. R. A. This change caused many companies to reclassify the items in their operating report.

	1914	1915	1916	1917	1918	1919
Railway operating revenue	$55,319,348	$51,860,660	$54,873,572	$56,613,758	$60,603,738	$70,161,810
Railway operating expenses	33,705,291	33,757,592	35,668,636	39,526,931	44,408,299	52,365,563
Net operating revenue	21,614,057	18,103,068	19,204,936	17,086,827	16,195,439	17,796,247
Net revenue auxiliary operating	975,675	929,959	1,340,642	884,171	1,008,422	882,067
Taxes	3,220,239	3,292,396	3,515,277	3,867,321	3,975,472	4,700,649
Operating income	19,369,493	15,740,631	17,030,290	14,103,677	13,228,389	13,977,665
Non-operating income	....	....	....	1,129,274	635,091	891,178
Gross income	19,369,493	15,740,631	17,030,290	15,232,951	13,863,480	14,868,843
Deduction	8,513,772	8,838,051	7,699,077	11,499,414	11,259,947	11,855,935
Net income	10,855,721	6,902,580	9,331,213	3,733,537	2,603,533	3,012,908
Ratio: Net income to operating revenue, per cent	19.6	13.4	17.00	6.57	4.44	4.3
Operating ratio, per cent	60.51	65.09	65.00	69.82	73.28	74.64
Total car-mileage operating	185,152,868	176,493,770	187,927,368	184,517,992	185,531,328	187,115,963
Total passengers carried	1,355,173,303	1,283,427,803	1,455,162,847	1,369,926,196	1,341,105,452	1,435,495.004
Total miles single track	3,069	3,157	3,256	3,494	3,241	3,228

Valuation Measure Causes Astonishment

Delos F. Wilcox, chief expert for the New Jersey State League of Municipalities in the proceeding before the Board of Public Utilities Commissioners upon the application of the Public Service Railway for emergency relief, has raised his voice in protest against the intended valuation of the property of that company as provided for under the bill passed by the recent Legislature over the veto of Governor Edwards. His attitude is one of "profound astonment." He says "the determination will be the determination of an engineering firm hired to perform a public function, without supervision, without responsibility, without public hearing and even without testimony."

Mr. Wilcox's protest is addressed to William T. Read, State Treasurer, and Newton A. K. Bugbee, State Comptroller, who under the valuation bill become members of the valuation commission. In the course of his statement Mr. Wilcox says:

> It is almost unbelievable that a Legislature representing the people of a great and enlightened State like New Jersey should have put upon the statute books such an outrageous measure. I am not a constitutional lawyer, but if there is anywhere tucked away in the articles of either the Federal Constitution or the State Constitution of New Jersey any guaranty of protection for the public in the valuation of public utilities and the fixing of public utility rates, I feel sure that this act runs contrary to that guaranty.

Tax Valuations Unchanged

Property valuations for 1920 as announced by the Indiana State Board of Tax Commissioners show that no radical changes were made in the 1919 valuations of public utilities. The total valuation of the street and interurban electric railways of Indiana was fixed by the board at $69,966,109. The 1919 valuation of the companies was $69,987,249. The assessments of large companies remain practically at the figure fixed in 1919.

Property valuation of the Indianapolis Street Railway was fixed at $16,355,570. This is $2,240 more than the combined 1919 assessment of the company, the Indianapolis Traction & Terminal Company and subsidiary companies, which were consolidated under orders of the Public Service Commission within the last year. Other properties of the company which are assessed locally will bring the total valuation of the company to about $19,000,000.

Samuel Ashby, corporation counsel of Indianapolis, had recommended that the tax assessment of the Indianapolis Street Railway be reduced to $15,000,000, but the tax board ignored this suggestion. His idea was to make the tax conform to the plan which the city had submitted to the Public Service Commission for putting the company on a service-at-cost basis. It was pointed out at the conference that it was inconsistent for the company to have one valuation for tax purposes and another for rate-making purposes. The company contends that its valuation under the service-at-cost plan should be equal to that placed upon the property by the tax board.

Valuation figures for all the electric railways of the State for 1919 and 1920 follow:

	1920	1919
Main track	$56,675,670	$56,353,060
Second main track..	3,057,750	3,522,660
Side track	584,845	557,155
Rolling stock	6,567,544	6,370,534
Improvements	3,080,300	3,183,840
Totals	$69.966.109	$69,987,249

$75,000 Will Buy Equity in Michigan Road

The Adrian (Mich.) Street Railway has been offered for sale by the Toledo Railways & Light Company, which has control of the lines. The price asked is $75,000, plus the assumption of the bonded indebtedness and obligations.

The officials of the railway declare that the city lines in Adrian have failed to pay operating expenses and that unless some new arrangement is made for their operation suspension is imminent.

It is understood that the Chamber of Commerce at Adrian is investigating the possibility of organization of a city company or providing for municipal operation of the property.

The road at Adrian was taken over when the Toledo & Western Railroad was brought under the control of Henry L. Doherty & Company, New York, N. Y.

Financial News Notes

$278,000 in Equipment Trust Notes.—Equipment trust notes in the amount of $278,000 will be issued by the Georgia Railway & Power Company, Atlanta, Ga., in part payment for twenty-seven new cars to be used on its urban, suburban and interurban lines. The State Railroad Commission has approved the company's request for authority to issue these notes. The total cost of the cars is $381,000.

Protest Against Discontinuance.—Protest against the abandonment of the Saugus Division of the Eastern Massachusetts Street Railway has been filed by the town of Saugus, Mass. The trustees of the road have announced the discontinuance of service on this line owing to the failure of the road to meet running expenses. The loss on the Melrose line for the previous year was $21,000 and for the line between Saugus Centre and Linden, $27,000.

Date Set for Hearing Cleveland Dividend Appeal.—June 15 has been set as the tentative date for hearing the appeal from Common Pleas Judge David H. Thomas's decision refusing to enjoin a referendum on the Cleveland Railway's increase in dividend from 6 to 7 per cent. Judge William Middleton of Waverly will act in place of Judge Washburn on the Appellate Court bench, as the latter is trustee for the stockholders of the Cleveland Railway and asked to be excused.

Payment of Interest Authorized.—Judge E. T. Sanford, in the federal court at Knoxville, Tenn., has handed down an order modifying the injunction in the case of the Commercial Trust Company and the Maryland Trust Company against the Chattanooga Railway & Light Company permitting the local company to pay interest in the amount of $26,250 on a loan of $750,000 secured by $389,000 in bonds of the Lookout Mountain Railway and $682,000 in bonds of the defendant company.

Memphis Earns Surplus.—The report of the receivers of the Memphis (Tenn.) Street Railway for the month of April shows that the net earnings of the company were equal to 7 per cent per annum, or one-half of 1 per cent more than was guaranteed by the city under the compromise agreement. The report shows that after setting aside the 3 per cent for the replacement reserve fund and 6½ per cent on the rate base, the investment on which the company is permitted to earn, the net profit for the month was approximately $4,000.

Houston Behind Under New Fare.—The Houston (Tex.) Electric Company during the first month of operation under the 7-cent fare has failed to earn its 4½ per cent for depreciation and 8 per cent income on its property value as fixed by the federal court. The net income of the company during the month lacked $8,619 of reaching $60,625 required to give the company its 4½ per cent for depreciation and 8 per cent on property value. The gross earnings of the Houston Electric Company during April were $185,931, while operating expenses were $122,300, and taxes were $11,626.

Key Route Would Issue $124,279 in Notes.—The San Francisco-Oakland Terminal Railways, Oakland, Cal., on June 1 applied to the Railroad Commission for authority to issue thirty-six notes, aggregating $124,279, to the American Car Company, St. Louis, in payment for twenty-five double-end safety motor cars for use on its Alameda County system. The full price of the cars is given as $161,060, the difference between this amount and the amount covered by the notes being the cash payment required by the car contract. The notes are to run over a period of three years, the date of maturity depending upon the time of the delivery of the cars.

Hyde Park Bill Passed.—The Hyde Park bill, by which the Boston (Mass.) Elevated Railway will operate over the lines of the Eastern Massachusetts Street Railway, has been signed by the Governor and approved by Mayor Peters. This bill provides that the Boston Elevated shall operate as a separate corporation on the Hyde Park lines and shall charge a fare not to exceed 10 cents. Deficits in operation are to be met by the city of Boston and expenses incurred for maintenance and construction are to be borne by the Eastern Massachusetts Street Railway and the city jointly. Such expenses are not to exceed $100,000. The Boston Elevated Railway is to pay a rental of 6 per cent and will also pay 7 per cent of the expense of rehabilitation of the property.

Deficit Diminished Slightly.—The operating revenue of the Rhode Island Company, Providence, R. I., exceeded its operating expense by $123,788 for the month of April. Other revenue made the total net income for the month $126,298, an increase of $11,995 over the same month a year ago. The increase in net income for the four months to April 30 was $169,807. On the other hand, the increase in the operating expense caused a deficit of $209,100 when compared with the income for the first four months of 1919. The statement shows a deficit for the month, after deducting rentals and fixed charges, amounting to $48,275. If the fixed charges are taken into consideration the deficit of the company as of April 30 was $536,500. The passenger earnings for the month were $633,743, an increase of $105,279. The receipts per car-mile were 53.87 cents, an increase of 7.54 cents. The receipts per car per day were $85.48, an increase of $12.46.

Traffic and Transportation

Higher Return Authorized

Virginia Municipalities, in Granting Fare Increase, Allow 8 Per Cent Return on New Capital

The Common Councils of Newport News, Hampton and Phoebus, Va., have authorized and the Virginia Corporation Commission has ratified an increase in the fare charged by the Newport News & Hampton Railway, Gas & Electric Company, Newport News, from 5 cents to 7 cents and in the rate for gas from $1 to $1.10. In approving the new scale the local authorities announced that, if the higher rates proved insufficient, the company would be free to apply for a further increase.

FACED LARGE DEFICIT

The Newport News authorities not only took into account the necessity for higher rates to meet existing conditions, but they went a step further and recognized the principle of adequate return on capital. The rate increase has been adjusted to a 6 per cent allowance on property investment prior to 1920 and to 8 per cent on capital that may be invested in the property during the two years in which the new rates are to be effective.

The company found itself this spring facing a deficit of $76,000. It required $250,000 for capital expenditures to maintain adequate service. With the ending of the war, there was a heavy decrease in patronage, particularly of the traction lines, and it was chiefly from the reduced earnings of these lines that the company faced a deficit. Net earnings from the gas plant were also on a declining scale. On the other hand, the profits from electric light and power sales showed a substantial increase.

These facts were frankly stated to the Common Councils of the three municipalities by the management. A full statement of earnings was presented, also costs of operation and materials, and the actual figures of capitalization and appraised values. The company having presented these facts asked the municipal authorities for relief, but specifically requested that such relief as was granted be granted as the local authorities thought best. No effort was made to indicate a policy or to dictate a plan. The only suggestion made by the management was that the cost of new capital probably would be about 8 per cent and that therefore such rates as might be increased should have a relation to the cost of capital.

COUNCILS' LIBERAL STAND

In meeting the situation, the local authorities showed much more than the average intelligence of such bodies and were inspired by the sentiment of fairness. They did not at any time enter any objection to the main premise of the company, that it should have a larger revenue. Their argument was entirely as to which of the different facilities should contribute most to make up the amount involved.

In the hearings that took place, there was some controversy between local representatives of labor and citizens on the question of labor tickets. At no time was there any serious objection to the principle of higher return on capital invested.

Seattle Increase Imminent

Seven-cent fares have become a definite possibility for the Seattle (Wash.) Municipal Railway. An ordinance has been introduced in the City Council of that city providing for the increase in fare and for a 1-cent transfer charge. The proposed ordinance took the form of an amendment to the existing city ordinance, which provides for the present 5-cent fare, with certain transfer privileges.

Only one member of the City Council is unalterably opposed to any increase in fare. The majority of the Council, however, express the belief that the fare should not be raised above 6 cents, with the 1-cent additional charge made up by taxation. Mayor Caldwell favors a 6-cent fare, contending that it is only fair that the taxpayers should help support the railway system, since it is a general asset to the city.

Tables prepared by David W. Henderson, Superintendent of Transportation, indicate that the proposed 7-cent fare would mean an increase in annual revenue of $2,124,371 the figures being based on a compilation of the receipts from cash fares during the last year. The added revenue on a charge for transfers, figuring that 60 per cent of the transfers would be demanded on lines other than the two cable lines excepted in the proposed bill, would be $156,166. Mr. Henderson states that the railway faces a deficit of $400,000 and is operating at a daily loss of $3,000.

As a result of an ordinance recently passed by the City Council, requiring that each bus driver file an application for permit, jitneys were ruled off the streets of Seattle for four days. Through court orders, the jitney men have been allowed to return to their runs, pending a hearing on their applications and specifications of their routes. The ordinance provides that no jitneys may operate on streets served by electric cars, and that each jitney driver must make application for permit, specifying routes, schedules, and other data.

Eight-Cent Fare Essential

Head of Railway at Portland Regards This as One Way Out—Commission Reconsiders Appeal

The Public Service Commission of Oregon is again taking up the matter of relief to the Portland Railway, Light & Power Company in considering an application of the company for permission to increase its rates. The application was filed by the company when the three measures designed to furnish financial relief to the company were defeated at a recent election. The hearing is confined to verification of allegations in the new application, and no testimony will be taken dating back of the commission's order of last March.

In the application for increase of rates, the company points out that in the tabulations, statements and estimates of operating expenses and revenues submitted at the time of the previous investigation of the corporation's financial condition, it was estimated that revenues from operation of street railways during the year 1920 would be equal to the revenues for the year 1919 based upon a continuance of the present 6-cent fare, and "in accordance with the said estimate, the evidence before the Public Service Commission demonstrated that the loss in operation of the street railways of Portland on said basis would exceed $1,000,000 a year."

REVENUE DECLINING

A comparison of the revenue of the railways of Portland for the months of February, March and April of 1920, with corresponding months of 1919, is set out in the latest application of the corporation, as follows:

	1920	1919
February	$337,885	$358,271
March	337,108	397,028
April	375,845	382,921

The first twenty-four days of May, 1920, according to the application, showed a decrease in excess of $5,000 below the revenues for the first twenty-four days of May, 1919.

The application points out that no relief has been secured through increased traffic. On the contrary, traffic has slightly decreased since the last hearing. All wage adjustments have been upward. Maintenance expenditures have been held to a minimum, the report states, and it is of vital importance to the continuity of service that there be an immediate considerable increase in expenditures for maintenance of the railway property.

One member of the commission has gone on record as favoring a 7-cent fare, with a 1-cent charge for transfers, while another member made his campaign on the platform that 6 cents was too much for a 5-cent ride. Franklin T. Griffith, president of the corporation, states:

> The sword has long been over our heads. The voters, who defeated the relief measures bringing about the rehearing in the rate case, knew through figures developed at the last rate case hearing that the company was facing an annual deficit in excess of $1,000,000. With the defeat of the relief measures prepared by the city, I personally can see nothing but an 8-cent fare to absorb the deficit.

Mitten Plan Opposed

Reported Disagreement Within Company on Fare Question—Stotesbury Threatens to Resign

Many rumors have been current in Philadelphia, Pa., during the past ten days concerning an alleged breach between Thomas E. Mitten, president of the Philadelphia Rapid Transit Company, and E. T. Stotesbury, chairman of the board of directors. According to newspaper accounts the following situation exists: Mr. Stotesbury's support of the Mitten management may be withdrawn at any time. A difference of opinion over the question of fares is the cause of the dispute.

STOTESBURY SAID TO OBJECT

Mr. Stotesbury strongly objects to the Mitten plan for extension of the 3-cent charge for exchange tickets. He is of the opinion that the $3,000,000 which, it is estimated, would be raised under this plan would yield an insufficient return. He favors a flat increase in fare to 7 or even to 10 cents.

At the meeting of the board on June 2 Mr. Stotesbury submitted his resignation as chairman. This action was taken following the indorsement of the Mitten program by the directors. Mr. Stotesbury finally agreed to withdraw his resignation provided the question of accepting the Mitten plan were left in abeyance. To this the board agreed. Thereupon Mr. Stotesbury withdrew his resignation.

The board of directors has held several meetings at which the Mitten program has been discussed. It is said that the announcement of the plan came as a surprise to a number of the board members, including the city's representatives. The latter have expressed opposition to the scheme.

BOARD FAILS TO ACT

The board failed to indorse the plan at its meeting on June 4. Instead, the matter was referred to the executive committee, which, after considerable discussion, announced that a board of experts would pass on the comparative merit of the Mitten and Stotesbury proposals. Both Mr. Mitten and Mr. Stotesbury have refused to discuss the reported differences of opinion. The following statement was issued by W. C. Dunbar, vice-president of the company, after the meeting on June 4:

> Following the meeting of the directors of the Philadelphia Rapid Transit Company held this day, E. T. Stotesbury stated that the question of increased revenue required by the company was being given careful consideration by the executive committee, to which it had been again this day referred by the board of directors.
>
> Mr. Stotesbury regrets the statements appearing in the press that he has had any difference of opinion with Mr. Mitten. The desire of both is to use their best efforts in the interest of the public and the property.

A request for a report and recommendations from the city's directors on the P. R. T. board regarding the proposed change of fares was made in a resolution adopted by the City Council on June 8. Another resolution approved by the chamber authorized the Mayor and the city solicitor to intervene in behalf of the city in petitions pending before the Public Service Commission for a reduction of rentals paid by the Philadelphia Rapid Transit Company to its underlying companies and for improvements of service by the transit company, or to file new petitions for the same purpose.

Court Fight on Buses

Public Service Railway Asks Injunctions to Halt Jitney Competition—Thirty-six Complaints Filed

Declaring the operation of jitney buses in competition with its lines to be illegal, the Public Service Railway of New Jersey on June 3 filed in the Chancery Court at Trenton thirty-six bills of complaint against as many jitney operators in different cities of the State. The bills ask that injunctions be issued against the jitney men on the ground that the operation of the buses is illegal and improper and that they also are a nuisance. Included in the action are Newark, Jersey City, Bayonne, Hoboken, West Hoboken, Orange, East Orange, Camden and other municipalities.

It is alleged in the complaints that the jitneys are a hindrance to the railway's obligations and that the damages resulting to the complainants are immeasurable in extent and irreparable in character. As a result adequate relief can be obtained only in a court of equity, the bills say. Temporary restraining orders are not sought as being of uncertain usefulness.

UNFAIR COMPETITION ALLEGED

Reciting the legislative authority under which the company was organized, the complainant sets forth in the bills that it operates 900 miles of street railways in 142 municipalities and interurban lines in eleven counties. The papers show that the railway pays annually more than $12,000,000 in wages to its employees and additional millions in interest, taxes and other charges. This includes a 5 per cent tax on the gross receipts of the company for the exercise of its franchise, and charges of a like character.

It is set forth that the business of the company represents an investment of more than $150,000,000, upon which it is not earning a fair return because, it is alleged, of the operation and interference of the defendants and other bus operators. The company also charges that the buses impede the progress of the surface cars by running on the car tracks.

Thomas N. McCarter, president of the Public Service Railway, issued the following statement after the filing of the complaints:

> We have filed these bills in chancery against certain operators of jitney buses as a matter of protecting our rights. We have refrained from acting earlier only because we thought that the business would be properly regulated, but when the Legislature failed to enact a measure putting the jitneys under the same kind of regulation and control as the street railways are subjected. to we felt that it was time to have the matter thoroughly tested out.

Six Cents in Detroit

Temporary Rate Arranged Before Court Pending Comprehensive Audit of Company's Books

The Detroit (Mich.) United Railway and the city of Detroit after conferring in the Circuit Court for two days on the subject of fares agreed upon a 6-cent fare with nine tickets for 50 cents as a temporary rate. Universal transfers will be issued. The new rate went into effect at midnight on June 8. All persons paying cash fares or buying tickets are to receive receipts entitling the holders to a refund if a thorough examination of the company's records show the proposed additional fare is not justified. A test case will probably be instituted later to prove whether the Circuit Court has the right to fix fares in the case.

PERMANENT RATE ASKED

In arguing the fare question the disputants stood apart for some time on two points. The railway insisted that Judge Jayne set a permanent fare after an audit of the company's books, this audit being one of the conditions imposed by the city. In objecting to this, Mayor Couzens maintained that the court had no legal right to set the rate of fare and he did not desire to make the present conference a rate making case. The city held out for a court order to which both parties would agree.

Failure to reach an agreement would have resulted in Judge Jayne taking up the city's petition for an injunction against the abolition of transfers by the Detroit United Railway. This injunction if granted probably would have resulted in the railway instituting its own schedule of fares based on the unexpired franchises.

CITY DEMANDS AUDIT

The Mayor stated that evidence that the accounts of the company need a very careful audit was shown in the first ten minutes of the conference when the company admitted having charged to upkeep of its roadbed and cars $685,000 more than it had spent. This the company stated had been put into increasing interurban investments and extensions in the city of Detroit. Thus the Mayor claimed it was charging up to the car riders of the city large amounts of money which it would not spend to improve the equipment and service in Detroit. Another charge branded as unjust was $90,000 for the appraisal which the company submitted some time ago to the Public Utilities Commission to enable it to issue more bonds.

No agreement was reached concerning the audit of the company's books, but the possibility of taking up the audit started by the city's accountants last year was discussed. The purpose of the audit by the city would be to determine whether the company needed the additional fare revenue to meet the increased wages it has granted the platform men.

Transportation News Notes

Higher Fares in Johnstown.—Cash fares were raised from 6 cents to 7 cents in Johnstown, Pa., on June 1. The State Public Service Commission, in permitting the increase, directed the Johnstown Traction Company to report to the commission each month on its traffic revenues and expenses for a period of one year under the new rate of fare. Four tickets are sold for 25 cents.

Forecasts Milwaukee Increase.—Intimation that fares in Milwaukee, Wis., might be raised in the near future was given recently by the Wisconsin Railroad Commission when it announced a public hearing in Milwaukee for June 11. Representatives of the city and of the Milwaukee Electric Railway & Light Company were asked to appear before the commission on this occasion. The present rate is 7 cents cash or nine tickets for 50 cents.

Will Act on Dallas Plea.—The City Commission of Dallas, Texas, will take action on the application of the Dallas Railway for an increase in fares from 5 cents to 6 cents and a 1-cent transfer charge as soon as the question of the authority of the commission to increase fares under the terms of the franchise is settled. The commission has asked attorneys for the company for a brief in support of the company's contention that the commission has authority to increase fares. A majority of the members of the commission have acknowledged the justice of the request of the company.

Injunction Halts Fare Cut.—As a result of the granting of an injunction by Judge House, the Tri-City Railway, Davenport, Iowa, is still charging 7-cent fares on its lines in Davenport. Judge House acted upon a petition of twenty-two Davenport retail merchants, who asked that the City Council be restrained from enforcing the terms of an ordinance which provided that the fare revert to 5 cents on June 1, and that the company be restrained from ceasing operation. The company is continuing to pay its employees a wage scale of 60 cents an hour. The permanent wage question will be settled by an arbitration board.

Interurban Road Wants More.—The Massachusetts Northeastern Street Railway, Haverhill, Mass., has asked the State Department of Public Utilities for authority to increase the fares over the system 38.8 per cent. The company proposes to charge 8⅓ cents each for workingmen's tickets, instead of the 6 cents now charged. The flat fare of 10 cents will remain unchanged. Operating expenses and fixed charges will amount to $1,097,000 for the year, and the new rate of fare will produce only sufficient revenue to meet expenses and take care of depreciation, but will not enable the company to pay dividends.

Wants Ban on Jitneys.—The Springfield (Mass.) Street Railway has petitioned the State Department of Public Utilities asking alteration, amendment or revoking of regulations governing jitneys in Springfield, Chicopee, Palmer and Spencer. It asks that no licenses be granted to operate jitneys on the same streets and routes as the street railway, and that jitneys be required to maintain adequate and regular service day and night, as required of street railways, to continue throughout the year. It further asks that children be carried on jitneys at half the regular fare, and that licensees be bonded at $1,000, with no licenses granted for less than one year.

Nine Cents in Youngstown.—An increase in fare from 8 to 9 cents became effective in Youngstown, Ohio, on June 1. The fare advance was opposed by the City Street Railway Commissioner on the ground that the resumption of full operation in the iron and steel mills would provide sufficient funds at the former rate to build up to stabilizing fund, which is now below the required amount. The City Council has been notified by the Youngstown Municipal Railway that it is appealing to arbitration the question of operating and maintenance allowances. Col. Joseph Alexander of the Cleveland Railway has been selected by the company to act as its representative. The city will select a second arbitrator, these two to choose a third.

Wants Six Cents in Richmond.—The Virginia Railway & Power Company, Richmond, Va., on May 26 applied to the City Commission of Richmond for permission to charge 6-cent fares on its Richmond lines. The company asked the abolition of labor tickets and the continuation of school tickets at the present rate. With the application to the commission was submitted a proposed ordinance embodying the rate changes and revocable on thirty days' notice. The employees of the company were promised an increase in wages as soon as the city had granted the higher fares. In the application it was stated that notwithstanding suspension of dividends the company has already voluntarily increased wages. However, it can make no further increase in wages without a further increase in revenue. The income which would be realized by this 6-cent fare is estimated at $125,000. The proposed increase to employees amounts to $133,000 a year.

Seven-Cent Fare Approved. — An ordinance was passed by the City Commission of Grand Rapids, Mich., on May 24, under the terms of which the Grand Rapids Railway is authorized to raise its fare from 6 cents to 7 cents beginning June 24. By the terms of the measure the company is required to sell sixteen tickets for $1 and to reroute its lines. The commission reserves the right to revoke the measure at any time, if service is not improved. The law contains a provision that whatever money the company receives on the increased rates which is in excess of the 5-cent fare stipulated by the company's franchise and not necessary to meet operating expenses, fixed charges and a reasonable depreciation shall be treated as a loan from the city and shall not be considered as a basis of return by any franchise hereafter granted. The company's franchise expires in April, 1922.

Fares Raised to Avert Strike.—The City Commission of Kalamazoo, Mich., on May 30 passed a resolution permitting the Michigan Railway to charge a 10-cent fare, sell three tickets for a quarter and carry children between the ages of five and twelve years for 5 cents. The measure was an emergency one, being the alternative to a suspension of service which threatened to take place on June 1 unless the employees were assured the wage advance allowed recently by the board of arbitration. The new rates will prevail until the primary election in August, when a contract between the city and the company will be submitted to the electors, and if it should not carry the 10-cent fare as now permitted will continue until Dec. 31 next, unless any of the other cities served by the Michigan Railway should be given a lower rate, in which case the fare will be reduced accordingly. The proposed contract to be submitted in August will probably provide for a 10-cent fare and the installation of one-man cars on the Kalamazoo lines. The City Commission of Jackson on May 28 authorized the company to collect 10-cent fares on its Jackson lines. Other municipalities served by the system have taken similar action.

Expect Rochester Rise Soon.—A 7-cent fare on the Rochester lines of the New York State Railways will become effective on July 1, unless present plans miscarry, according to an announcement made by Corporation Counsel Charles L. Pierce. Drafting of the new agreement between the city and the New York State Railways has progressed far enough to make the fare increase a virtual certainty, although the agreement will not be ready until June 22 to be presented to the Common Council. Appointment of a commissioner of transportation and provision for his assistants are yet to be made, but it is reported that the agreement will contain all those provisions. According to figures which the company submitted to the Public Service Commission for the Second District, practically one-third of the company's investment is in Rochester. A big factor in the negotiations is the value of the rolling stock, car-houses and other equipment used in the public service, as the proposed contract is to call for a fair return on this investment. It is said that the company values this property at $17,000,000. The city considers this figure too high.

Personal Mention

Mr. Faber in New Field

Aurora, Elgin & Chicago Manager Made Vice-President of Firm of Barron G. Collier, Inc.

Edwin C. Faber, vice-president and general manager for the receiver of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., has become associated with the advertising firm of Barron G. Collier, Inc., New York, N. Y., as vice-president. Mr. Faber will retain his present title with the A. E. & C. System and will continue to give some time to the company for an indefinite period, while E. F. Gould, as assistant general manager, will have charge of operation.

Although Mr. Faber expects eventually to sever his connections with the Aurora lines, he will, nevertheless, keep in close touch with the electric railway industry. The Collier Company has a national reputation in the field of electric railway advertising, and Mr. Faber's long experience as a traction manager and his wide acquaintance with electric railway men makes his addition to the organization an asset of the greatest value.

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E. C. FABER

The announcement that Mr. Faber ultimately would sever his connection with the A. E. & C. System evoked expressions of regret from every member of the company's personnel, including not only Mr. Choate, the receiver of the company, and the other officials, but also the trainmen. The Aurora and Elgin newspapers also expressed regret at Mr. Faber's leaving. The Elgin *Courier* said editorially:

> For a good many years now Mr. Faber has been administering a hard job so efficiently that those who had an understanding of the sum of his difficulties were continually wondering just how he kept things going.
>
> But he did keep the road going and the men satisfied and managed to retain the good-will of the communities that were served. The employees are his friends and even in wage controversies they remained his friends, for he has a way of inspiring confidence and respect.
>
> When the traction company was thrown into a receiver's hands, the receiver asked Mr. Faber to retain the managership, and he has justified the confidence of that office by his wholehearted efforts to place the business on a paying basis.

Mr. Faber was born in 1875. At the age of twenty-six years he became general superintendent of the Cleveland (Ohio) traction system. For many years he bore the distinction of being the youngest general superintendent of an important city electric railway in the United States. When the Cleveland property changed hands in 1902, Mr. Faber became associated with Ira A. McCormack, general manager of the Grand Central Terminal, in connection with the electrification of the New York Central lines entering New York. Upon the completion of the work Mr. Faber served for a time as assistant to Hinsdale Parsons, vice-president of the General Electric Company.

In 1904 Mr. Faber became general manager of the Aurora, Elgin & Chicago Railroad, and vice-president of the Elgin, Aurora & Southern Traction Company. A year later these two properties were consolidated with the Cook County & Southern Traction Company, and Mr. Faber became general manager of the combined properties. In 1913 he was made vice-president.

Early in the war Mr. Faber went to Washington, D. C., as traffic manager of the Traffic Bureau of the Electric Railway War Board of the American Electric Railway Association. Later he was appointed manager of the War Board. In both offices he was of great assistance to the electric railways of the country, particularly the interurbans, and through him their work was articulated in the national service. He thus performed work of invaluable service to the industry and to the public.

J. P. Barnes Heads Louisville Railway

James P. Barnes, general manager of the Schenectady (N. Y.) Railway, has been elected president of the Louisville (Ky.) Railway. Mr. Barnes succeeds Thomas J. Minary, who retired as president last February after thirty years' service as active head of the Louisville system. Since Mr. Minary's resignation the management of the property has been in the hands of a committee composed of three directors.

Samuel Riddle, superintendent of transportation of the Louisville system, has been made a vice-president of the company.

Frank H. Miller has also been elected a vice-president of the Louisville Company. Mr. Miller has been serving as superintendent of motive power.

A. Hardgrave, President

Former Traction Trainman Elected to Head Southwestern Electrical & Gas Association

A. Hardgrave, Dallas, Tex., recently elected president of the Southwestern Electrical & Gas Association at its annual convention in Galveston, has had a varied experience in traction and public utility work. Mr. Hardgrave was born in Texas in 1881. He began his career as a trainman on the Fort Worth-Dallas interurban soon after the road was built. Later he became train dispatcher, and in 1906 was appointed chief inspector for the Oak Cliff division. After serving in this position for a few months, he was transferred back to Fort Worth as chief inspector for the city division. Prompted by a desire to learn the construction and engineering end of the traction business, he resigned in 1907 to go to Memphis, Tenn., where he worked for two years with Stone & Webster.

In February, 1913, Mr. Hardgrave entered the employ of Martin J. Insull, Chicago, Ill., for whom he made engineering and valuation reports in connection with the acquisition of utility properties.

A. HARDGRAVE

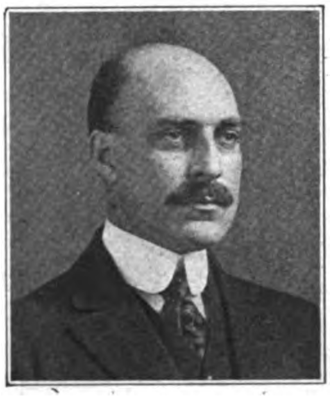
In March, 1916, with the promotion of Martin L. Olds, who had been assistant to Mr. Insull, and his transfer to the Twin State Utilities Company of Vermont, Mr. Hardgrave became engineer of operation and construction of the Mid-West Utilities Company, with headquarters in Chicago. He held this position until August, 1917. During this time Mr. Hardgrave had charge of the operation and construction of properties in the Middle West.

In August, 1917, he was transferred to Dallas. At that time the Mid-West Utilities Company decided to divide its territory and centralize control of operation and construction in branch offices. Dallas was made headquarters for the States of Texas, Oklahoma and Missouri, and Mr. Hardgrave was sent to Dallas to open the office. At the same time he was made vice-president of all the subsidiary companies of the American Public Service Company.

R. R. Potter Joins Tubes

Superintendent of Equipment of Hudson & Manhattan Railroad — His Varied Traction Career

R. R. Potter, superintendent of equipment of the New York, Westchester & Boston Railway, New York, N. Y., has resigned to accept a similar position with the Hudson & Manhattan Railroad, which operates the tubes under the Hudson River between New York and New Jersey. Mr. Potter entered railway work in connection with the electrification of the Manhattan elevated lines, supervising the installation of car equipment and later doing inspection and maintenance work. Later he served in a similar capacity on the Interborough Rapid Transit subway lines and still later with the Long Island Railroad in connection with the initial electrification of that system. He then served for a time with the Hudson & Manhattan Railroad during the equipping of that company's lines and the first period of its operation.



R. R. POTTER

Mr. Potter later became connected with the firm of L. B. Stillwell, for which he supervised the installation of the initial equipment of the New York, Westchester & Boston Railway. Upon the completion of the line, he was appointed superintendent of equipment, continuing in that capacity until receiving his new appointment. During the past year he has also served as superintendent of equipment of the Westchester Street Railroad and the New York & Stamford Railway.

Mr. Potter has been instrumental in remedying a number of weaknesses in the single-phase equipment of the New York, Westchester & Boston System. He has also furnished much data for articles on operating performance and costs which have been published in this paper from time to time.

Akron Changes Announced

The following changes have been made in the operating personnel of the Northern Ohio Traction & Light Company, Akron, Ohio:

D. A. Scanlon, formerly general superintendent of transportation, has been promoted to the position of general superintendent of railways, succeeding B. E. Parker who has resigned on account of ill health.

Harry Steele, formerly superintendent of the Akron, Bedford & Cleveland and the Akron, Kent & Ravenna divisions, has been made acting general superintendent of transportation.

J. S. Lowe, formerly assistant superintendent of these divisions, has been made acting superintendent of the divisions.

Pierre V. C. See has been appointed superintendent of equipment, as previously announced.

Mr. Scanlon began his railway work in the shops of the Portland (Me.) Railway Company. In 1903 he went to Ohio for the Tucker-Anthony Syndicate as foreman of shops of the Newark street railway. He later went to Raleigh, N. C., as superintendent of the Raleigh Electric Company. In 1909 he was transferred to Canton, Ohio, as superintendent of the Akron-Canton interurban line and the Canton City System. He remained there until last year, when he was transferred to Akron as general superintendent of transportation of the N. O. T. & L. lines.

Mr. See was formerly superintendent of car equipment of the Hudson & Manhattan Railroad, Jersey City, N. J., this connection dating back to 1910. He was born in 1879 in New Brunswick, N. J. In 1904 he was graduated from the electrical engineering department of the Armour Institute, Chicago, and shortly thereafter began his work in the electric railway field with the Metropolitan West Side Elevated Railway, Chicago, serving for three years as foreman and car building inspector in the Throop Street shops. He then became general foreman in the shops of the Twin City Rapid Transit Company, Minneapolis, Minn., serving in this capacity for three years. He was then made general foreman in the Decatur shops of the Illinois Traction System and remained there for about one year, when he resigned to join the Hudson & Manhattan Railroad.

Mr. Ahearn Promoted

James M. Ahearn, assistant superintendent and purchasing agent of the Ottawa (Ont.) Electric Railway, has been made assistant manager of the company. Mr. Ahearn will continue as purchasing agent also. He has been in the service of the Ottawa system for the past 19 years. He resigned in 1905 and worked for various electric railways in the western part of the United States and Canada until 1914, when he returned to Ottawa as assistant to the master mechanic. The following year he was appointed assistant superintendent in charge of shops. Two years later he became assistant superintendent of all departments. He was made purchasing agent of the system in May, 1919.

Will Direct City Utilities

Carl H. Reeves Made Superintendent of Public Utilities of Seattle, Succeeding T. F. Murphine

Carl H. Reeves has been appointed Superintendent of Public Utilities of Seattle, Wash., by Mayor Hugh M. Caldwell of that city. Mr. Reeves succeeds Thomas M. Murphine, who resigned following the municipal elections several weeks ago. Since Mayor Caldwell took office the Public Utilities Department has been reorganized and in its place two departments have been formed. The Seattle Municipal Street Railway has been placed in charge of D. W. Henderson, as previously announced. As Superintendent of Public Utilities, Mr. Reeves will direct the electric lighting and other public service work of the city, but will have no connection with the electric railway department.

Mr. Reeves has for a number of years been engaged in engineering work in connection with the Seattle traction system and on construction of other city utilities. A resident of Seattle for the past twenty-seven years, he served in the office of the city engineer for a number of years prior to 1906, and while serving in that capacity designed a large part of the city's sewer system and other municipal projects. From 1906 to 1916 he was assistant engineer of the Seattle Electric Company, resigning to perform special work for the State Public Service Commission, after which he took up private engineering practice.

C. H. REEVES

Mr. Reeves was the first engineer officer called from Seattle at the beginning of the war to active duty assignment in the Engineers Corps. He directed engineering work at Camp Fremont, California, at Puget Sound forts, at Camp A. A. Humphreys and at other camps throughout the country. After serving for twenty-three months he was honorably discharged as a Major, on June 4, 1919.

Seattle is one of the very few cities of any considerable size in the United States that operates both railway and lighting systems municipally.

W. H. McAloney, formerly superintendent of rolling stock of the Winnipeg (Man.) Electric Railway, is now associated with John A. Beeler, consulting engineer. Mr. McAloney resigned his connection with the Winnipeg system several weeks ago. Before going to Winnipeg he served as superintendent of rolling stock of the Denver (Col.) Tramway.

E. F. Gould, consulting engineer of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., has been appointed assistant general manager of the company. Mr. Gould will have direct supervision of the operation of the system for the receiver. He has been connected with the company since 1903. Five years ago he resigned as assistant general manager to become consulting engineer for the properties in which Mandlebaum, Wolf & Lang are interested.

W. G. Claytor, electrical engineer of the Lynchburg Traction & Light Company, Lynchburg, Va., and the Roanoke Railway & Electric Company, Roanoke, Va., has been promoted to assistant to J. W. Hancock, general manager of the companies. Mr. Claytor has been in the service of the Roanoke and Lynchburg companies since January, 1907. He was commissioned a captain in the United States Army in 1918, and was assigned to the Construction Division, with headquarters at Brunswick, Ga.

Walter S. Finlay, Jr., who recently resigned as superintendent of motive power of the Interborough Rapid Transit Company, New York City, to become vice-president of the American Water Works & Electric Company, was tendered a dinner by his former co-workers and others at the Delta Kappa Epsilon House in that city on June 9. A round hundred guests were present, including officials of the company, department heads, and representatives of other railways and of manufacturers. The speakers were Frank Hedley, president and general manager; H. H. Vreeland, vice-president; H. A. Kidder, Mr. Finlay's successor, and Mr. Finlay. G. C. Hall, electrical engineer, acted as toastmaster.

Edward J. Peartree, whose appointment as general manager of the Trenton & Mercer County Traction Corporation, Trenton, N. J., was noted in a previous issue, has been in the traction business for the past twenty-five years. Mr. Peartree was born in Troy, N. Y. In 1891 he entered the employ of the Troy & Lansingford Traction Company as an extra hand in the carhouse. He continued with the company when it became the Troy City Railway. Later the road was acquired by the United Traction Company, Albany, N. Y. Mr. Peartree was subsequently made a motorman and then a conductor. Mr. Peartree remained with the company until 1915, when he resigned to become traffic superintendent of the Trenton & Mercer County Traction Corportion. Two years later he was made superintendent of transporation. Following the death of Peter E. Hurley, general manager, two years ago, he was made acting general manager and general superintendent.

Alfred C. Jordan, superintendent of equipment of the Cumberland County Power & Light Company, Portland, Me., has resigned to become superintendent of equipment of the Elmira (N. Y.) Water, Light & Railroad Company. In his new position Mr. Jordan will have charge of the railroad shops and overhead lines of the light and railroad departments of the Elmira system. Mr. Jordan returns to Elmira after an absence of four years. He was born in Casco, Me., in 1879. Graduating from the University of Maine in 1904, he entered the service of the Westinghouse Electric & Manufacturing Company at Pittsburgh, Pa., where he remained for seven years. He then became connected with the Elmira Water, Light & Railroad Company. Five years later he entered the service of the Cumberland County Power & Light Company, on the power end of the commercial department. He was later promoted to commercial manager and, still later, to superintendent of equipment.

Frank L. Hinman, master mechanic of the Trenton & Mercer County Traction Corporation, Trenton, N. J., has been appointed superintendent of surface shops of the Philadelphia (Pa.) Rapid Transit Company. Mr. Hinman has been connected with the electric railway industry for the past seventeen years. Before joining the Trenton & Mercer County Traction Corporation he was master mechanic of the New York State Railways, Syracuse Lines. Beginning as an apprentice with the Syracuse Rapid Transit Company, he was successively a general mechanical shop and power house assistant with the Auburn & Syracuse Electric Railway, and storeroom clerk, storekeeper, general mechanical foreman and finally master mechanic of the Rapid Transit Company and its successor, the New York State Railways, with headquarters at Syracuse. He has contributed a number of articles to the ELECTRIC RAILWAY JOURNAL and has also co-operated in the preparation of several other unsigned articles.

Charles F. Scott, professor of electrical engineering at Yale University, and L. P. Ferris of the engineering organization of the American Telephone & Telegraph Company and the Western Electric Company, sailed for Europe on Saturday, May 29, on the *Adriatic*. They are going as representatives of the Western Electric Company in connection with railway inductive interference problems in telephone and telegraph work under the peculiar conditions of the Italian State Railways. They expect to be in Europe from two to four months. Professor Scott is well known in this field, having made early studies in Indiana, and later on the New Haven and the Pennsylvania systems. Mr. Ferris has been active in the California inductive interference work in this line for the past five years. Announcement was made recently that a further 60,000,000 lire had been appropriated for the purpose of electrifying the Italian railroads, making a total of more than 600,000,000 lire for this use since January. Five thousand kilometers will be operating electrically before the end of the year, the announcement said. One hundred million lire also was appropriated for construction of new railroads.

Obituary

J. Lee Penn, vice-president of the Texas Electric Railway, Dallas, Tex., died on May 23 at Johns Hopkins Hospital, Baltimore, Md., where he had gone for treatment. Mr. Penn was widely known in business circles in Texas, having been engaged in business at Waxahachie, Tex., his home for many years. He also had extensive banking holdings and was interested in other enterprises.

James M. Edwards, at one time active in the management of the Detroit (Mich.) United Railway and the Yonkers (N. Y.) Railroad, died on May 24 at his home in New York City at the age of seventy years. For many years Mr. Edwards was associated with the late Richard T. Wilson, for whom he built the Yazoo & Mississippi Valley Railroad, between Memphis, Tenn., and New Orleans. He turned his attention to the building of street railways in 1894, and was active in the construction of the Yonkers system, serving as treasurer until the sale of the property to the Third Avenue Railway.

R. D. Sefton, general manager of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., died on the night of May 22 as the result of injuries suffered earlier in the day in a rear-end collision on the company's mountain line, a few miles from Waynesboro. Mr. Sefton was acting as motorman of one of the cars involved in the wreck. The accident occurred at a curve just below a point known as Geiser Switch. A heavy car had derailed and a line crew under the direction of Mr. Sefton had gone to the scene to replace it. When the task was completed the car was started down the mountain fastened in front of the closed work car. A truck-car, loaded with tools, was fastened behind the two others. The three cars, controlled by the power of the middle car, started down the mountain behind another car carrying passengers. After rounding a curve the brakes of the three cars joined together failed to work. The cars soon were out of control and gained speed rapidly. Overtaking the car loaded with passengers the runaways crashed into it, and the four were carried for a distance of about 200 feet when the first car derailed and the other cars piled up. Ten other persons were injured.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Curtailment Seen in Waste Supply

Partial Shutdown of Cotton and Woolen Mills Is Limiting the Amount of Available Material

Demand for cotton and woolen waste continues to be strong in spite of the fact that railroads are curtailing expenditures for the summer months. The supply is reported to be short, the few dealers who have a large stock of waste on hand having contracted for their supply several months ago. Dealers say that the scarcity is due to the decreased production of the textile mills, a number of both the cotton and woolen goods factories in New England having been forced to limit operation to four, and in some cases even three, days a week. This is felt to be a result of the credit situation and the general reduction in clothing prices which has recently taken place throughout the country. Consequently, the price of cotton waste advanced about two cents a pound within the last six weeks and woolen waste jumped a cent a pound during the past month.

Colored cotton waste is quoted at 9 to 16 cents a pound, while white cotton waste holds slightly higher at 12½ to 18 cents per pound. Woolen waste is bringing from 16 to 25 cents.

Shipments are very uncertain from New England mills. One representative dealer expects the production of waste to pick up as soon as the freight situation is relieved, but any tendency toward a resultant decrease in waste prices will be more than counterbalanced, he thinks, by the poor outlook for this year's cotton crop. The government's monthly crop report issued for June places the present cotton crop at only 62.4 per cent of normal.

Good Demand in Wood Pole Accessory Market

Stocks of Poles, Cross-Arms and Pins at Mills Cannot Be Moved—Prices Hold Steady

The chief problem regarding wood poles, pins and cross-arms seems to be the difficulty of obtaining shipments from the mills. One of the largest dealers in this line says he has received no cedar poles for three months. Pins are impossible to obtain, he says, and there are no stocks in the hands of dealers. Select fir cross-arms can be shipped in two weeks, but deliveries are subject to the railroads and average for all these materials from six to nine weeks. The situation is expected to clear up soon, as large surplus stocks have piled up at the mills and a plentiful supply will be available in about a month, it is thought. Chestnut poles can be obtained in two or three weeks, but the demand and supply of these is largely a local matter.

The demand for poles, pins and cross-arms is fairly strong, heavier than in the corresponding period a year ago, but not so vigorous as earlier this year, since the railroads have curtailed expenditures for the summer months.

Prices have held steady in the past few weeks. Standard locust electric light pins are quoted at $34.70 per 1,000 in lots up to 5,000. Prices for the 30-ft., 7-in. top red cedar poles are quoted at $21.95 f.o.b. New York City, $20.40 at Chicago and $22.10 at New Orleans. Forty-foot lengths, 7-in. tops, are quoted at $22.95 f.o.b. New York City, $21.40 for delivery at Chicago and $23.10 in New Orleans.

Active Demand for Safety Cars

Deliveries Good Considering Transportation Difficulties—Embargoes on Fittings Cause Trouble

Inquiries for safety cars are increasing and shipments are now promised by one leading manufacturer in the East on the basis of three to four months' delivery. Railways hitherto showing no interest in this class of equipment are seeking quotations. It is interesting in this connection to note that the use of one-man cars on the larger city systems is growing. Their success in handling traffic on the more congested routes of medium-sized cities has awakened the managers of not a few really large properties to the possibilities of such cars on their lighter traffic lines.

Competition is acute for business among safety car makers, and in some parts of the country complaint is heard about price cutting. The railway companies are naturally the beneficiaries of this competition, so far as immediate purchases are concerned, but among some manufacturers it is felt that in the long run a broader distribution of orders would be helpful to the industry.

Embargoes upon safety car fittings, especially on air brake parts, are causing at least one manufacturer trouble in completing orders now on the books for 300 units. Labor is not as efficient as formerly and wage tendencies are still upward. However, no further price advance is forecast at present, and if the operating companies continue to come into the market, their requirements can be met reasonably well for some time to come.

Cement Stocks Pile Up at the Mills

Dealers Have No Supplies for Construction Work or Railway Repair Use

Present difficulties in obtaining supplies of cement are caused by the shortage of cars rather than by decreased production, according to one prominent manufacturer. Raw material has been coming through fairly well except for some trouble with coal. Although weeks behind on filling orders, a large surplus supply of cement has piled up at the mills, sufficient to fill orders from stock were transportation normal. Another company refuses to quote on deliveries and will accept no new orders, as it is from five to six weeks behind at present. This is in the face of a demand which is stronger now than at any time in recent years. The inability to fill the construction demand of course reflects on supplies for railway use.

Reports agree that there are virtually no stocks of cement in the hands of dealers throughout the country. Orders have been placed mainly for construction work, which is essential, and so almost no cancellations have been noted.

Prices of cement, which took a drop after the armistice, increased on an average of 20 cents a barrel last April and May. Since then the market has held steady, a condition all the more surprising in view of the fact that about 70 per cent of the cars received by manufacturers are of the open, drop-bottom type and have to be floored and roofed with water-proof tarpaulins, thus adding to the cost of production.

Supply of Line Hardware in Poor Condition

Normal Stocks of Raw Materials at Steel Mills Cut by Strikes and Tie-Up

Strikes at the steel mills are still largely responsible for the present shortage of line hardware. The freight tie-up has further handicapped steel works by curtailing their normal supplies of raw material. One dealer states that no shipments are coming in at present, and promises for future delivery range anywhere from six weeks to four months. Another company is still waiting for the fulfillment of orders given in November and December.

Existence in the field of line hardware is at present a hand-to-mouth affair, as stocks on hand are insufficient to meet current needs. This class of metal goods is particularly scarce because manufacturers are paid for such material as bolts, braces, washers, etc., on a pound basis, and there is less profit in proportion to the work concerned.

In spite of the fact that demand continues to be strong, the market has held steady since a price increase of 10 per cent about March 1. Quotations at present average approximately 6½ to 7 cents a pound.

Demand for Aluminum Conductor Increasing

Stock of Raw Material Limited Because of Heavy Call in Non-Electrical Fields

Demand for aluminum conductors for high-tension transmission has been increasing at a good rate in the last few years. The market for this metal in non-electrical trades, however, is so large and is increasing at such a high rate that difficulty is being experienced in satisfying it. In the face of this, supply is reported as becoming rather limited.

Shipments for lengths to cover small distances, say 50 miles, are being quoted at from four to six months, while for several hundred miles the time is running up to ten months and a year. Congestion is experienced in the mills, more so in the fabricating than in the drawing processes, however. Present capacity is more than booked up, and on account of the limited stocks for electrical work orders are being refused.

While domestic demand is good, the foreign market is especially so. Large orders have recently been received for this conductor for European, Japanese and Australian properties, while inquiries, particularly from Italy, France and Scandinavian countries, have been heavy. This market has been opening up rather rapidly in view of existing installations in the States. If the material is available, a good future business is anticipated in the light of the prospect held out, when the water-power bill shall come up again next winter. While no retrenchment has been seen in the purchasing of this material by industrial power companies, reports indicate a recent holding back on the part of certain electric railway properties.

Ingot aluminum prices are strong, the market for 98-99 per cent material holding at 33 cents a pound.

Trolley Shoe Market Expanding

Trolley shoes are in rapidly increasing demand and so far deliveries have been reasonably good, considering the difficulties of shipping raw material and finished products by rail. A feature of the market is the widely distributed demand, inquiries and orders coming in from many parts of the country and from overseas properties as well.

From six weeks to two months are being quoted at present on trolley shoe deliveries. Factory stocks have been practically wiped out by the demand. On May 1 an advance of about 10 per cent was put into effect, but this was the first change in prices since September, 1918.

Stocks of Insulation Materials in General Low

A recent survey of conditions throughout the country in the insulating material field reveals the fact that distributers' stocks are very low. Isolated instances occur where dealers are able to fill orders from stock, but this is usually the result of foresight in buying. There is no shortage of varnish, but manufacturers are hampered by a scarcity of cloth material, brought about by the partial shutdown of the textile mills.

Demand is strong, but has fallen off somewhat in the past two weeks. Buyers of insulation seem to be awaiting possible developments in respect to transportation, prices, etc.

Deliveries vary according to the class of insulation, but average double those of normal times. Fiber material is quoted at about six weeks, webbing two months; and varnished cloth runs from two to four weeks. The tendency of prices has been upward, though for the past two months the market has held steady. No cancellations of orders have been noted.

New Brake Construction Developed

The Ackley Brake & Supply Corporation, New York, N. Y., announces the new construction of its Ackley "No-Staff" brake. Up to the present time malleable iron has been used in its construction, but, recognizing the importance of a lighter yet reliable brake, the company will in future construct its pedestals of pressed steel and the gears and other working parts of electric steel. By the use of these materials the weight of the brake has been reduced by more than 25 lb. and a considerable saving is made on platform space.

Rolling Stock

Benton Harbor—St. Joseph Railway & Light Company, Benton Harbor, Mich., has purchased two double-truck cars with air brakes from the Cleveland Railway Company, Cleveland, Ohio.

The London & Port Stanley Railway, London, Ont., Canada, has been authorized by the private bills committee of the Provincial Legislature to purchase additional equipment through the city.

The Board of Control of Toronto, Ont., Canada, has recommended to the City Council that Works Commissioner Harris be given authority to purchase new street cars.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—The directors of the C., G. & W. Street Railway Company have authorized the purchase of a new steel car to replace one which was destroyed in a recent wreck.

Interstate Public Service Company, Indianapolis, Ind., which controls the interurban line operating from Louisville to Indianapolis, through its president, Harry Reid, reports that the company is now having built eight 62-ft. all-steel cars by the Cincinnati Car Company. These cars will be motored with four 150 hp. General Electric motors and will have General Electric control. Mr. Reid stated that it was planned to use these heavily motored cars in pulling two to four car trains when traffic is heavy, doing away with the need of running from two to five sections, as is now frequently the case. The old cars are only of 50 to 55 hp. and not sufficiently powerful to reduce time on the runs. It is planned to reduce running time by about thirty minutes with the new cars. These new cars will be equipped with baggage and smoker compartments, as well as a large seating space. The total outlay for the eight cars will run close to $200,000. Delivery has been delayed by strikes in the shops of the Cincinnati Car Company, but they are expected in a short time.

St. Petersburg & Gulf Railway Company, St. Petersburg, Fla., has ordered eight safety cars from the National Safety Car & Equipment Company, St. Louis, Mo. The company already has six of these cars in use.

Track and Roadway

Southern Pacific Company, San Francisco, Cal.—Deeds have been filed transferring to the Southern Pacific Company a right of way for an electric line from the Alameda County line through Richmond Annex into Richmond. It is reported that the company ultimately expects to extend the Ninth Street loop into Richmond.

Connecticut Company, New Haven, Conn.—The Connecticut Company will lay a second track 3,500 ft. long in Watertown Road, Waterbury. The company will also lay a single track curve at the intersection of Water Street and the viaduct, New Haven.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—The Fort Wayne & Northern Indiana Traction Company proposes to build a new electric line in Franklin Avenue and Third Street, Fort Wayne. The work of laying the tracks will begin early in 1922.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—The Trenton & Mercer County Traction Corporation will remove its rails from the side of Greenwood Avenue, Trenton, to the center of the street to allow the completion of a section of the Lincoln Highway. The tracks will be relaid for a distance of about a half mile.

Memphis (Tenn.) Street Railway.—The Memphis Street Railway will lay new rails on its Main Street line from Poplar Avenue to Union Avenue. The company will also lay new rails in

Calhoun Street between Main Street and Rayburn Boulevard.

Dallas (Tex.) Railway.—The Dallas Railway will begin work of laying track on the Masten Street line, which will be a cut off from McKinney Avenue into the retail business district at Elm and Ervay. It will be about four months before the work can be completed.

Richmond, Houston & San Antonio Traction Company, Houston, Tex.—Work of constructing the grade for the Houston, Richmond & San Antonio Traction Company's proposed interurban electric railway between Houston and San Antonio, 225 miles, will be resumed immediately. Much of the grading is done and all of the right of way obtained. H. A. Halverton, Houston, is president of the company.

Manitowoc & Northern Traction Company, Manitowoc, Wis.—The Manitowoc & Northern Traction Company has been ordered by the Manitowoc City Council to build spur tracks in Washington and North Eighth Streets.

Power Houses, Shops and Buildings

Havana Electric Railway, Light & Power Company, Havana, Cuba.—The Havana Electric Railway, Light & Power Company plans to double the capacity of its power plant. The company has ordered from the Westinghouse Electric & Manufacturing Company two 25,000-kw. steam turbo-generators. At present there are in this plant three 12,500-kw. generators, supplying the combined railway and power load. The first unit will be installed and will be in operation in 1921 and the second one will be on the line in 1922.

Boston (Mass.) Elevated Railway.—Mayor Peters of Boston has approved a recommendation of the City Transit Department for alterations in the plans for the construction of the Arlington Street station of the Boylston Street Tunnel. The changes had previously been approved by the trustees of the Boston Elevated Railway. They are expected to add $200,000 to the cost of the structure.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway has placed in operation its new power plant in Vincent Street, Boston. The power station in Washington Street has been closed.

Brockton & Plymouth Street Railway, Plymouth, Mass.—The steam generating plant of the Brockton & Plymouth Street Railway has been sold to Morris Stone of Brockton and will be scrapped.

Northern Ohio Traction & Light Company, Akron, Ohio.—A contract will shortly be let by this company for the remodeling of a section of the Kenmore carhouse to make an addition to the adjacent shops.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Northern Ohio Traction & Light Company is about to let contracts for the construction in East Akron of a five-track two-story carhouse and adjacent open storage yard with an initial capacity of seventy-five cars, the ultimate capacity to be 185 cars. The building will be of brick construction and arranged for light repairs on the first floor and trainmen's quarters and club rooms on the second floor.

Trade Notes

The Seneca Wire & Manufacturing Company, Fostoria, Ohio, is planning to build a plant extension, 167 ft. x 208 ft., to cost with equipment about $100,000.

The Ohio Brass Foundry Company, Mansfield, Ohio, contemplates the construction of a malleable-brass foundry, providing additional floor space of 80,000 sq.ft.

The Rome Manufacturing Company, Railroad Street, Rome, N. Y., has filed notice of an increase in its capital stock from $850,000 to $3,000,000 for general business expansion.

The Yale & Towne Manufacturing Company, Stamford, Conn., announces the resignation of John B. Milliken as treasurer. Mr. Milliken will be succeeded by Willard L. Case.

The Chase-Shawmut Company, Newburyport, Mass., has sold its plant to Sears B. Condit, Jr., president of the Condit Electrical Manufacturing Company, South Boston, Mass.

The Page Steel & Wire Company, Grand Central Terminal Building, New York, announces the removal of its central district sales office from 29 South La Salle Street to 208 South La Salle Street, Chicago.

The Southern Electrical Equipment Company, Charlotte, N. C, expects soon to be in a position to fill orders for substation equipment, high-tension and switchboard apparatus, which it is planning to distribute through jobbers.

George C. Eggers, has resigned as district manager for the E. T. Chapin Company and is now at the head of the Eggers Pole & Supply Company, 327 South La Salle Street, Chicago. The manufacturing headquarters are at 510 Empire State Building, Spokane, Wash.

The McGill Ticket Punch Company, Chicago, Ill., has changed its name to the McGill Metal Products Company. The company recently moved into new quarters at 1640 Walnut Street, which will afford increased space and, according to the president, enable it to fill orders promptly.

The Roller-Smith Company, 233 Broadway, New York City, announces that it has made arrangements with the W. Montelius Price Company, 524 First Avenue, Seattle, Wash., to handle the company's line of electrical instruments, meters and circuit breakers in Washington, Idaho and part of Oregon.

The Erie Electrical Equipment Company, Johnstown, Pa., manufacturer of insulator pins, pipe fittings, pole-line hardware, brackets, etc., is planning to build a malleable-iron foundry, equipped with electric furnaces, to cost about $50,000. The company also contemplates increasing its capital stock from $25,000 to $100,000.

The Doyle-Dacosta Manufacturing Company, Easton, Pa., is building an addition to its factory, providing approximately 5,000 sq.ft., which will enable the company to double its present capacity for the manufacture of coil windings. The company has recently begun the manufacture of armature and field coils for small electrical units.

William Laird Brown of Kelly, Cooke & Company, consulting and construction engineers of New York and Philadelphia, is representing American engineering interests in London at present, conferring with British manufacturing and financial houses to arrange for direct representation of English buyers in the American market. He will shortly take up the same work in Scotland, Italy and France.

D. T. Laylin has been appointed sales manager of the Adams-Bagnall Electric Company, Cleveland, Ohio. Mr. Laylin became associated with the electrical business in 1905, when he entered the service of the Western Electric Company. After being in charge of the electric sales and shop departments of the Strong-Carlisle-Hammond Company of Cleveland for five years, he became electrical engineer of the Standard Parts Company of Cleveland.

The Buda Company, Harvey, Ill., announces the appointment of H. M. Sloan as treasurer, effective June 1. He was formerly assistant to the president of the Chicago, Milwaukee & St. Paul Railway and also served upon the War Industries Board during the war. Mr. Sloan started in railroad service with the Fremont, Elkhorn & Missouri Valley Railroad, was later transferred to Chicago to the vice-president's office, resigning to enter the Chicago, Rock Island & Pacific Railroad in 1902, of which he later became vice-president.

New Advertising Literature

Oil Circuit Breakers—Westinghouse Electric & Manufacturing Company has issued six bulletins, Nos. L-3965-70, on oil circuit breakers.

Superheaters.—The Locomotive Superheater Company, New York City, has issued bulletin No. T-6, on superheaters for stationary power plants.

Car Heaters.—The Gold Car Heating & Lighting Company has recently issued a forty-page catalog supplement describing its equipment for heating and ventilating railway cars.

Steel Armored Hose—Sprague Electric Works of the General Electric Company, New York City, has issued bulletin No. 44553.1 on Sprague flexible steel armored hose for air couplings.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
L. C. PAUL, Editorial Representative GEORGE BUSHFIELD, Editorial Representative G. J. MACMURRAY, News Editor W. R. ANDERSON, Asst. News Editor

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Shop Procedure in Multiple-Unit Car Maintenance

THIS monthly issue of the JOURNAL is read by a large circle of men who do not see the weekly issues, hence the importance of directing attention once more to the comprehensive group of articles on heavy car maintenance which we printed in the preceding two issues. These contained "hand-picked" information regarding maintenance practice with multiple-unit cars in the electrified zones of steam railroads, but the information will be valuable to electric railways as well. One point stands out very clearly, namely, that this practice is automatically tending toward standardization; apparently much more so than with street and the lighter interurban cars. There is no reason why methods of inspection, of making running repairs, etc., should not be similar on different properties, whether the motors are direct current or alternating current. Costs, of course, will differ with the service demanded of the equipment. On some roads the rolling-stock has an easy time of it, on others it is frequently overloaded. And also there is track and track. But the fundamental plan for keeping after the cars can be substantially uniform, to the benefit of all concerned.

The intensive study which the editors of this paper have given to the heavy multiple-unit car during the past few weeks has inspired in us a greater respect for it. As was suggested in a recent editorial, the steam roads which will sooner or later electrify their passenger terminals have here an efficient tool ready to their hand.

Don't Overlook the Value of Prevention

WE HAVE heard complaints recently of a lack of care given to certain details of design and construction of cars by car builders. These defects may appear like minor matters when viewed by themselves, but if they prevent a car from functioning properly when it is received by the operating company, and so requires its removal to the shops for a week or even several days, it is a serious matter to the railway. A prominent railway official who has recently put a number of safety cars in service estimates that his cars earn approximately $40 a day, and if the car is not in operation the greater part of that sum of money is definitely lost. Hence, any repair which requires the car to go to the shop for a month means a possible loss of $1,200 to the company, and it would not take many delays of this kind to equal the value of a car.

What kinds of defects have occurred? Well, there was one case where on several cars the fuse boxes were knocked off as the cars rounded a curve. Undoubtedly the curve was of a shorter radius than that for which the equipment had been designed, but such circumstances should not be overlooked. In another case the brakes worked all right when there were no passengers on the car, but with a load of passengers the brake rod became pinched between the body and the truck, preventing the brake from functioning. Another cause for a good deal of trouble is loose scale and dirt or else fins and burrs in the air piping, their effect being to restrict the openings leading to the air equipment. Some suggestions on air piping are contained in an article in this issue by Joseph C. McCune, who gives much valuable information which should be helpful to maintenance men in preventing defects of this nature which are liable to occur.

A Good Omen for the Fall Convention

THE wonderful convention, just closed, of the A. R. A., mechanical section, at Atlantic City warrants the belief that the electric railway operators and supply men will be out in full force at our own convention in October. The steam railroad men and guests in attendance at Atlantic City numbered well up toward 6,000, which number, as one attendant remarked to the writer, will be the standard henceforward rather than the 5,000 which a few years ago seemed a reasonable number to hope for. We compliment our fellow transportationists on the spirit and proportions of their convention. It is now up to us to follow the admonition: "Go thou and do likewise."

Railway Electrical Engineers to Get Closer to Managers

ONE move of the railroad men which impressed us as important and significant was that which will presumably lead to the amalgamation of the railway electrical engineers with the mechanical section of the parent railroad association, the American Railroad (formerly Railway) Association. The electrical engineers of the steam roads have had their separate society. It has done good work, but needs the stimulus which can only come from association with the big men in the business. The meeting of the electrical engineers on June 14 was rather perfunctory, although several valuable reports were presented.

With the electrical engineers forming a section of the A. R. A. there would, we think, be an entirely different tone to the meetings. On the other hand, if the electrical engineers rise to their opportunity they can do increasingly important work as electric motive power comes into larger and larger use. So far, of course, they have exerted little if any influence in this direction, but the lack of discussion of the excellent report of the committee on design, maintenance and operation of electric rolling stock, presented to the mechanical section last week, shows that much needs to be done to arouse interest in the future of transportation engineering. Obviously it is natural that the railroad men should be most interested in the problems that affect their present everyday work, but as they all presumably assent to the proposition that electrification is coming it ought to be possible to interest them in talking about it. While the electrical engineers on steam roads are not primarily concerned with motive power, they ought to be studying this subject as far as it is an application of electric current.

We Are in Our Own Pit; We Must Dig Ourselves Out

"WE ourselves are to blame if we don't have now the time and labor saving devices we need," said one man charged with maintenance. As he went on, he argued that at former labor costs we thought it cheaper to have a man pry a car corner up or two men saw a rail in two by hand than to bother to buy the jack or the power hacksaw necessary. Now we reap what we sowed, for we have substituted man power for machinery so much in the past that managements don't understand the present call for tools and shop equipment. And, too, habits are hard to change.

But with wages today two to four times their former figures, labor and time saving equipment is the answer many times to the rising maintenance costs.

And it is up to us to dig ourselves out, in line with the thoughts of the speaker quoted. Have you analyzed your own situation to see if you are taking advantage of the many devices now available? An exhibit such as was shown at Atlantic City at the recent A. R. A. meetings shows the huge number of these labor-saving equipments and tools recently developed. Your managements will appreciate the facts, if you will show them and if you will emphasize the inverted conditions which now exist.

Of course, the answer most generally received, we suppose, is lack of funds, but when devices save their cost in one or two years by decreased expenditures they should be purchasable.

And, Mr. Manufacturer, have you done all you can to try to sell on the basis of getting your pay from the savings effected by the use of your device?

Now Is the Time to Get That Freight Business

IF EVER there existed an opportunity and at the same time an obligation to perform a much needed service it appears to us to exist now in this matter of transportation of materials by electric rails. Never have our industrial activities been so hampered by clogged transportation as today.

Now is the time to get in and prove the usefulness of the electric railway in freight movement. This proposition must be put across, this side of the business developed.

We hear the answer that times are hard and the extra equipment difficult to secure. To be sure, this is true in a measure, but if we wait till the electric railways are all in better shape the rest of the country will be in a similar condition and the great opportunity gone by.

The motor truck, which has a legitimate place in the transportation game, is making the most of its opportunities these days. And for the ultimate good of the whole community the electric railway should exert every effort to take its own legitimate place in this work. Nobody is going to shove our part of this business at us. We have to get it, and *we can get it* because it belongs to us, and in the long run the electric railway can do it better and more economically than any other agency.

Each company should pick out the business in its community that it can handle and go after it. This may in some cases mean permits for hauling freight over present tracks, as well as small extensions, spurs, some interconnection with trunk lines and other traction lines and probably a joining of interests occasionally with motor trucks as feeders. But the electric railway is a link in this transportation of materials, and it owes it to itself and society to perform its duty. And, we repeat, there is no time like the present to show usefulness in this direction. Business established now can be retained. But business not established now will not be easy to obtain when other lines of transportation open up more freely.

Clearness Desirable in Writing, Especially in Legal Decisions

WE LABOR to be lucid. In consequence a lot of scholastic verbiage and engineering jargon is made over by our hands. Engineers, however, are not the worst offenders against the English language. Commission documents especially are drab, dull and discouraging. A sentence from one springs to mind: "If it be contended that if a rate when fixed is fair and reasonable, that such rate is fair for all the time does not follow."

Only twenty-six words. Yet these words are so put together in a sentence that Sam Lloyd of puzzle fame would envy the ingenuity of the author. We think we know what the writer means. Still, we had to pass the thing on unsolved to the reader. In the case of a correspondent who sinned against the language, we could send back the item or sentence for interpretation. This we found occasion to do recently and lost a correspondent. But it is better to lose a correspondent than to lose a reader. This case also revolved around the interpretation of a commission statement. One of the sentences contained 124 words. Parse that we could not.

We, ourselves, are not a paragon of all the writing virtues. But we are more of a paragon of some of these virtues than a few other people that we know. We are even conscious of not always saying things in the way that carries the greatest conviction. Indignant readers have forced this unwilling confession from us by letters even less clear than the very statement they were seeking to correct.

The airy persiflage of James Huneker is all right in its way, but the linguistic trickster is out of place as the author of a technical paper or an official document. Still, such writings don't have to be ponderous to be profound. The words are all there in the dictionary for anybody to use. Play with words, if you must. But if you do, be careful that words do not play with you.

True ease in writing comes from art, not chance;
As those move easiest, who have learned to dance.

"Side-Line Johnny"—or the Need for Concentration

A POPULAR magazine has in its current issue an article which shows how salesmen hamper their progress by carrying side lines, when they ought to be giving all their attention to their main and only lines. The consequence is that often the side lines become the absorbing ones to the detriment of the others. A certain salesman carried this so far that he became known in the trade by the pseudonym used above. Each reader of the article mentioned no doubt asked himself the question, "Am I carrying any 'side lines' in my business?" Such a question is appropriate to every electric railway employee as well as to everybody else. The chap who is getting ahead is the one who carries no side lines. Don't mistake our meaning, however, for concentration can be carried too far—"all work and no play makes Jack a dull boy." Injudicious concentration also makes cranks. And every ambitious fellow is studying on the side so that he may progress. But the principle is correct, just the same, and the coming master mechanic, for example, is the present apprentice who is carrying no side lines.

Senator Harding Receives the Republican Nomination

IN THE Republican candidate for President the country has a man who understands the needs of the public utilities of the country and the vital influence which they exert on community and business life. This is proved by the address which Senator Harding gave at the midyear meeting of the American Electric Railway Association in Cleveland last January.

Loyally, the electric railways, Senator Harding said, sustained the heavy burden of the war period, and not only have they had no reward, as was given generously in many instances to big and little business, but they were penalized worse than aliens suspected of aiding the enemy. Their destroyed credits, he said, must be restored and flexible scales of charges must be provided so that a public may pay justly for that which it demands.

The field of this paper is not politics, but we are intensely interested in the adoption of a wise and broad-minded policy toward the public utilities, not only as a matter of justice but because we realize that only by such a plan can business prosper and the wheels of industry be kept going. We, therefore, welcome the nomination to high office of candidates who have shown a breadth of vision in their consideration of utility questions.

Trouble Travels to the Antipodes, Too!

IF NOT consolation, there is at least justification for American electric railways in the fact that the disease of *deficitis* has hit the transportation fraternity all over the world in the lands of victor, vanquished and neutral alike. Glasgow, scudding dangerously along under bare poles despite the absence of fixed charges; Berlin, doubling and tripling its fares or worse in desperate efforts to overtake the drop in purchasing power, and Buenos Aires, going to 12-cent fares from 10 cents, are typical examples from every classification.

And now comes Australasia, where the lack of shipping and the depredation of marine raiders had led to the storing of such vast quantities of food, hides and wool that this part of the world was at least spared those terrific increases in the prices of "eats" and dress that have afflicted all other civilized peoples. Yet even here the tramway has been hit almost as hard as on the larger continents. Coal has gone up because of the diversion of so much magnificent man power to the destructive effort of war, railway supplies coming from the other side of the globe have arrived slowly and at prohibitive expense, while most generous sums were set aside for the dependents of the unforgettable Anzacs. In the face of these handicaps most of the electric railways of Australia and New Zealand refrained from increases in fare almost to the very end of their long war. Today, however, they are obliged to follow their brethren throughout the world because they have been struck almost simultaneously by a rise in the cost of living and by the corresponding necessity to increase platform wages.

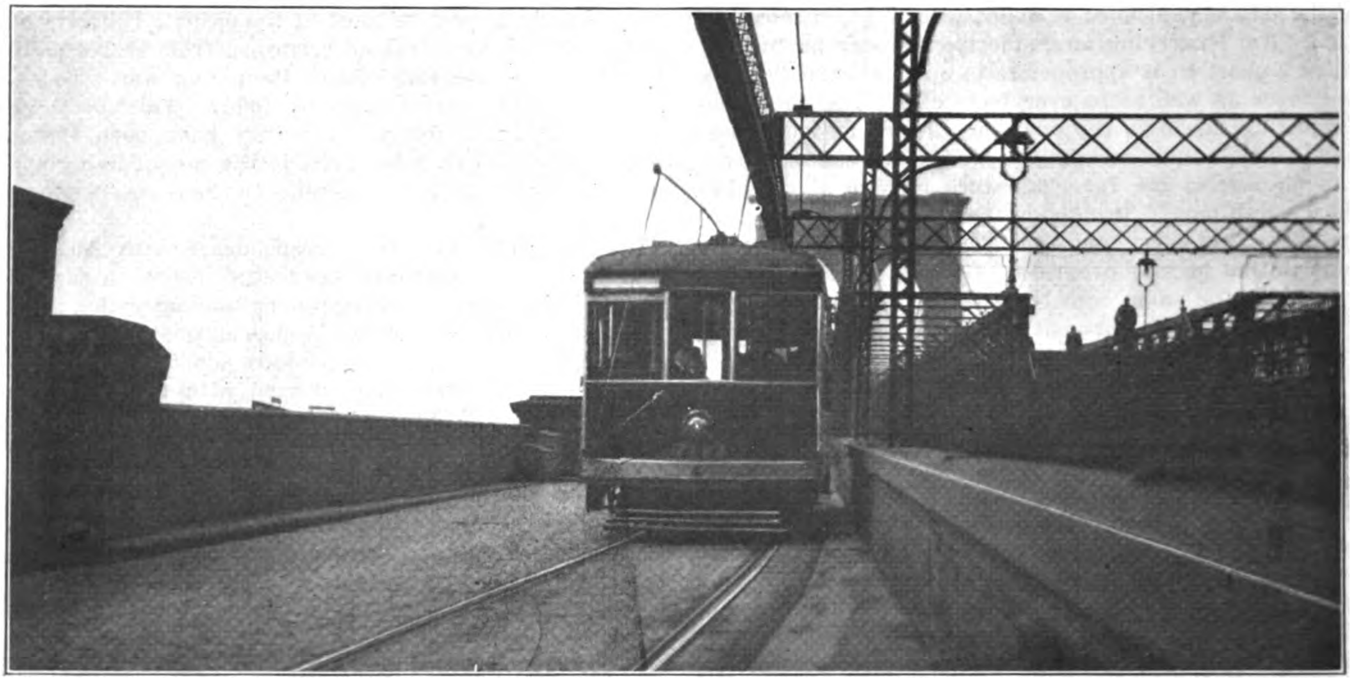
Judging from private correspondence with Australasian managers they are keen students of American technical methods. Their equipment and operation show quite a blend of British and American practices, except that in the matter of fares they have adopted the British zone fare even where they started with the American style flat fare. What they are most interested in today is how to secure more revenue without a prohibitive increase in fares. For that reason it is gratifying to have inquiries from them on the work of the safety car in giving more service at less cost and to learn that they are seriously thinking of adapting this car to "section" fare operation, as they call pay-for-what-you-get service in the Antipodes.

The Tendency Toward Greater Use of Welded Joints for Tracks in Streets

THERE is no longer any doubt that the welded joint of some form is the one toward which modern construction practice, for tracks in paved streets, is tending. Current practice includes the use of four principal forms of welds, which are the cast weld, electric bar weld, the unit weld and electric arc weld. The cast weld is included in the list as a weld by courtesy, as it were, although it is quite well known that a real union of the cast iron and the rail steel is seldom obtained. The reasons for this tendency toward welded joints are not far to seek, as they are based upon the need for the elimination of continual pavement disturbance, the noise from battered loose joints, the untimely destruction and removal of rails and the simplification of the bonding problem.

In recent years remarkable results have been obtained with the first three types of welded joint above mentioned, and each of them has become standard on many systems. Since time in plenty is required to develop defects, we may expect several more years to elapse before the industry will settle down to any single type of weld as the prevailing one. Meanwhile, the arc-weld type, though a comparative newcomer in the field, is proving a rather formidable contender for the honors, and several important companies have practically standardized them after years of experiment with the older types. One reason for this is the cheapness of the arc weld as compared with the other types of weld. Another is the simplicity of application, although at least one of the older types has this particular advantage also.

The increasing use of the newer type of weld seems to call for careful consideration at the hands of the maintenance engineers because of the dearth of information concerning the action of the heat from the electric arc upon the rail steel. Opinions vary radically as to this, and we feel certain that the industry will benefit greatly if the whole subject of welded joints could be made the object of a careful investigation at the hands of an unbiased authority such as the United States Bureau of Standards. Such an investigation would be somewhat costly, but the industry could well afford partly or wholly to finance it.



SAFETY CAR OPERATION ON BROOKLYN BRIDGE

Installing Safety Car Control and Air Brake Equipment*

Proper Installation of Equipment Has an Important Bearing on Safety Car Maintenance and the Prevention of Annoying Delays and Withdrawals of Cars from Service

BY JOSEPH C. McCUNE,
Assistant to District Engineer Westinghouse Traction Brake Company, New York, N. Y.

THE cost of maintaining car equipment is affected to a considerable extent by both the design of the apparatus and the manner in which it is installed. Consequently in discussing the maintenance of air brake and safety car control equipment somewhat extended consideration will be given to the subject of proper installation. This, if it does not concern the operating man initially, does concern him when heavy repairs have to be made.

To an equipment maintenance man the paramount consideration in railroad operation is the reduction of maintenance cost to the minimum. While the maintenance expenses are usually directly charged against the equipment or the equipment department, still there are other items which might also be directly charged against equipment. These include charges due to the withdrawal of equipment from service on account of mechanical defects and the delays incident to the same causes. These latter two items constitute a heavy charge against operation.

A careful and proper installation of equipment will produce economies in operation as well as in maintenance. In one large Mid-West city in 1919 the charge against the equipment department was 13 per cent of the total operating expenses. In another city in the same section this charge was 14 per cent. In these two cities a 10 per cent increase in maintenance expense would increase the total operating expense but slightly over 1 per cent. If this increased maintenance expense reduced the total operating expense by 2 per cent it would obviously be justified. It is thus apparent that the maintenance cost should not be the determining factor in deciding what equipment is the best for a particular situation, but all interested should strive toward the limitation of that expense in so far as consistent with high-grade upkeep. The following considerations should be of assistance in such an endeavor.

CAREFUL INSTALLATION OF PIPE PREVENTS TROUBLE

All maintenance men are familiar with the difficulties experienced with new air-actuated equipment on account of scale and dirt from the new piping collecting at undesirable points. Many of these difficulties can be avoided by a careful installation of the pipe. Before pipe is assembled it should be thoroughly hammered to loosen all scale or dirt, all fins and burrs tending to restrict the opening should be cut away and the pipe should then be blown out to remove all such matter. This treatment should be given before the pipe is in place, for otherwise it is apt to result in the deposit of this matter in some part of the pipe system or in the appliances connected thereto. Moreover, the purpose of the treatment should not be defeated, as is too frequently the case, by throwing the pipe after treatment upon the shop floor, and thus allowing dirt or cinders to enter. After the piping is complete and finally blown out, with valves removed from brackets, the system should be tested under air pressure and all leaking joints, as indicated by soapsuds, made tight. Brass-to-iron seat unions should be used, since these not only give tight joints but obviate the necessity of providing the ordinary gasket. It is good economy also to use extra quality pipe fittings on account of their freedom from leakage and their superior threads. When the pipe is assembled care should be taken that the pipe compound is applied to the entering threads so that the excess will be forced from the pipe and not into it. Disregard of this simple precaution is widespread, as are likewise the operating troubles thereby caused.

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*This is the second of a series of articles on safety car equipment. The first was published in the ELECTRIC RAILWAY JOURNAL for April 17, 1920.

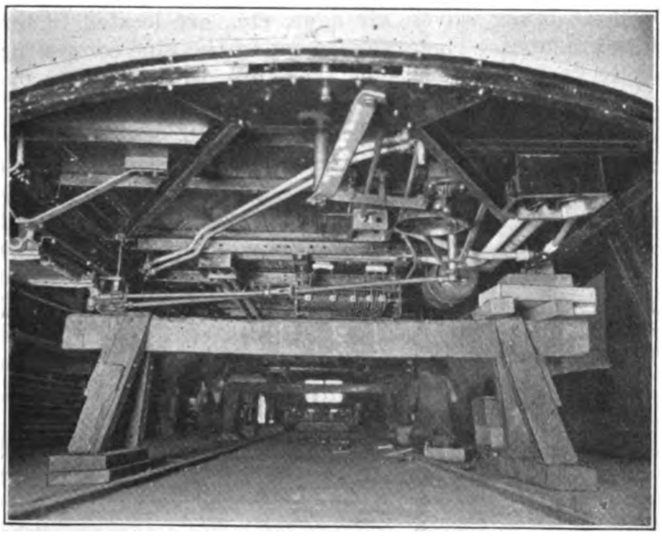
COOLING PIPES TRAP WATER

The location of the piping and the various safety devices is largely influenced by the necessity of avoiding the accumulation of water at any point other than in the reservoirs, and the desirability of entrapping in the reservoirs all the water precipitated by the cooling of the air after it leaves the compressor. Water in the brake system is extremely undesirable, not only on account of the freezing troubles which necessarily ensue when water is present but also on account of its deleterious effect on the apparatus itself and its proper lubrication. A consideration of what measures must be observed in overcoming the effects of moisture in the brake system will assist in an understanding of what has been found beneficial in the arrangement of piping and equipment.

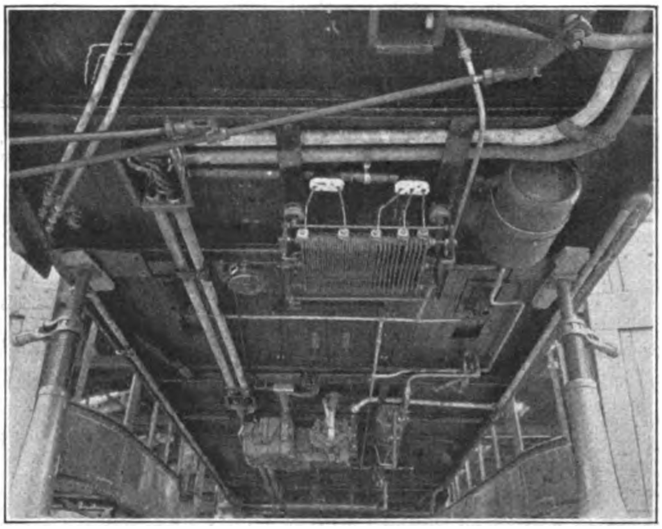
Air is a mixture of oxygen, hydrogen, nitrogen and a few other constituents, one of which is water vapor. Since oxygen, hydrogen, etc., are invisible gases there is nothing to indicate their presence in the ordinary air. Neither is the presence of water vapor indicated, since it is for all practical purposes an invisible gas, but a gas that under certain conditions will condense to form water. The ability of a given quantity of air to contain water vapor is limited. When this given quantity of air contains all the water vapor possible it is said to be saturated. The degree to which the air is saturated or the amount of water vapor it contains is indicated by its "relative humidity." Relative humidity may be defined as the percentage of water vapor which the air contains at any particular pressure and temperature as compared with the maximum amount which it can hold under the same conditions. The humidity is said to be 100 per cent when the air contains this maximum amount. As showing what this maximum amount may be, 300 cu.ft. of air at atmospheric pressure, 62 deg. F. temperature and 100 per cent humidity contains 1 gill of water. It will be noted that this volume equals the displacement of a 16-cu.ft. compressor for about twenty minutes, pumping against 100 lb. delivery pressure.

The amount of water vapor which a given quantity of air can contain is affected by two factors, its pressure and its temperature. The higher the pressure the less water vapor the air can contain. That is, if the air be saturated and be then compressed some of the water vapor will be immediately precipitated as water, since the ability of the air to contain water vapor has been exceeded. The higher the temperature the more water vapor the air can contain. That is, if the air be saturated and the temperature be increased the humidity will be decreased to something less than 100 per cent. In air brake systems the effect of temperature is greater than the effect of pressure.

Considering the action in the compressor, the air discharged on account of its compression is less able to hold water vapor than before it entered the compressor. On the other hand, the temperature of the air has been greatly increased by the work of compression done upon it. The increase in temperature more than balances the increase in pressure and the air leaving the compressor has a lower humidity than the air entering it. But as this air cools toward atmospheric temperature its humidity rapidly increases. It soon reaches 100 per cent when moisture commences to be precipitated. Moisture continues to be precipitated until the temperature of the air becomes atmospheric, since the pressure is sufficient to cause air, except in the very driest climates, to be saturated at atmospheric temperature. That is, before the relative humidity became less than 100 per cent the air would have to be cooled considerably below the ordinary atmospheric temperature. In other words, the air is in such condition that further cooling will cause further precipitation of moisture. So long as the temperature of the air remains constant, however, moisture will not be deposited. To sum up, if



PIPING TO PLATFORM (RESISTOR END)



COOLING COILS AND RESERVOIR PIPING

the temperature of the air at its exit from the second main reservoir be atmospheric and if this temperature be maintained throughout the brake system difficulties arising from the deposit of moisture will not be experienced.

From the above, the function of the cooling pipe and reservoirs (apart from their use as storage reservoirs) is apparent. This function is, first, to cool the air before it leaves the second main reservoir to atmospheric temperature; second, to entrap the water deposited during this cooling. If the water is collected in the main reservoirs it can be drained away at the necessary intervals. With this explanation of the purpose of the cooling system, the installation of cooling pipes and main reservoirs, as found desirable for cold climates, will be described. The piping installation to be described has been found desirable where climatic conditions during the winter demand especial protection against freezing. Where such protection is not required, the usual piping installation in which the pipes are located beneath the car floor has given very satisfactory service.

WHAT IS THE MOST DESIRABLE LOCATION FOR AIR EQUIPMENT?

The compressor is located approximately midway of the car, with its armature parallel generally to the car axles. The suction strainer is installed beneath the car floor as near the compressor as practicable, but should not be subject to wheel wash. From the compressor a 1-in. discharge pipe is led parallel to the axles to the right hand side of the car, looking toward the No. 1 end. Reaching the side sill, the pipe is led toward the No. 2 end and then, by means of a return bend, back toward the No. 1 end. The pipe is located at the edge of the car body to obtain the maximum cooling effect. If the pipe is located in the interior of the underbody structure, on account of the heat generated in the resistance and motors the cooling effect is considerably reduced. The main reservoirs are located at the No. 1 end, directly ahead of the wheels. The cooling pipe just mentioned is led into the first main reservoir. From the side of the car, into the main reservoir, the size of the pipe is increased from 1 in. to 2 in. This increase is to prevent stoppage of the pipes by freezing, which is generally a progressive action. That is, the moisture deposited on the pipe walls is first frozen, then additional moisture deposited upon this ice is frozen; this action continues until the pipe is eventually frozen completely over. It has been found by experience that freezing very frequently occurs just at the entrance to the first reservoir. By increasing the size of the pipe at this point, stoppage of the pipe is made more unlikely. The cooling pipe should drain toward the main reservoir so that deposited water can be drained away. The length of this pipe measured from compressor to reservoir should be not less than 25 ft.

From the first main reservoir a 1-in. cooling pipe leads out to the left-hand side of the car and then to the rear and back again as described for the right hand side of the car. This pipe connects into the second main reservoir and should be not less than 25 ft. long.

LOCATION OF EQUIPMENT DETAILS

The governor is on the inside of the car body in line with but to the left of the main reservoir. It is connected to the intermediate cooling pipe just before this pipe enters the second main reservoir. The governor pipe rises vertically from the cooling pipe and then horizontally below the car floor until a short vertical riser connects to the governor. The governor cutout cock when supplied is located in the vertical section of this pipe beneath the car floor.

The emergency valve, the double check valve and the main reservoir cutoff valve are all located inside the car body to prevent freezing. They are grouped under the third seat from the end on the right hand side of the car. It is particularly necessary that the main reservoir cutoff valve be located inside the car. When the purpose of the cooling system was explained it was pointed out that cooling of the air below atmospheric temperature would cause additional moisture to be deposited. In the passage of air through the cutoff valve an expansion occurs on account of the restrictions introduced by the valve itself. During this expansion the temperature of the air decreases and moisture is deposited. If the cutoff valve is at or near the freezing point this moisture will be frozen. It is obviously necessary to install the cutoff valve within the car so that the temperature will be sufficiently high to prevent such freezing occurring.

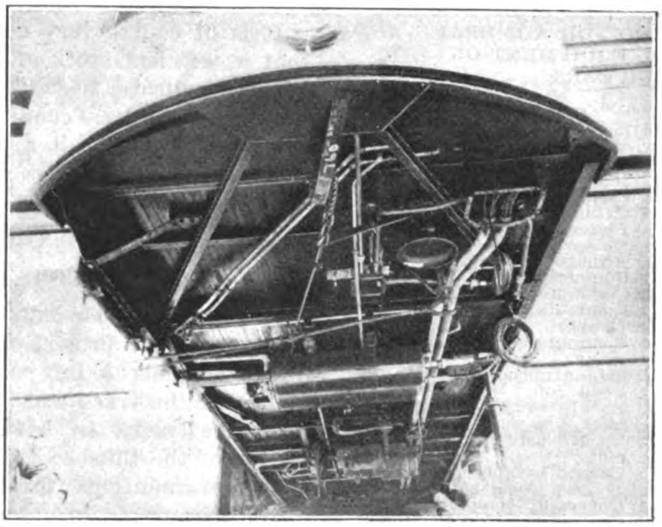
The door engines are also located within the car, one at each end under the motorman's seat. With a former type of engine frames attached to the car floor were necessary as supports. With the present type, which has cast feet, the engine can be installed directly upon the floor. The door engine can, of course, be located under the car floor, and frequently is where climatic conditions permit, but the installation described contemplates the encountering of low temperatures during the winter.

The combined foot and cutoff valve is located above the car floor by means of a circular wooden block sufficiently thick to allow the installation of the by-pass around the valve without requiring that this by-pass piping pass through the car flooring. The combined foot and cutoff valve completes the devices, the location of which demands especial explanation. Cab fixtures, such as brake valves, air gage, etc., are located in the usual manner. The arrangement of the pipe connecting these various devices will, therefore, be next taken up.

PIPING IS LOCATED INSIDE CAR WHEREVER POSSIBLE

There are five main air lines running from platform to platform; namely, (1) main reservoir pipe, (2) safety control pipe, (3) emergency pipe, (4) straight air pipe, (5) sanding pipe. In addition, there is the circuit breaker cylinder pipe, which connects the two circuit breaker cylinders with the emergency valve. All of these pipes, except the sanding pipe, in so far as possible, are located within the car and for the same reason that the emergency valve, etc., were so located, that is, to prevent their freezing.

The main reservoir and safety control pipes are laid on the car floor close against the side wall on the right hand side of the car. The emergency and straight air pipes are similarly laid on the left hand side. Since the brake valves are at diagonal corners of the car body and since these four pipes must all be connected to each brake valve it is necessary for each set of pipes to make a "cross over" at one end of the car. Since the cross-over pipes cannot be laid across the platform flooring it is necessary to drop them beneath this flooring. This is done just before the platform is reached. The vertical pipe from within the car is connected to the horizontal cross-over pipe by means of a tee, one run



CENTER PIPING AT COMPRESSOR

of which is plugged. This arrangement is employed so that in case there is freezing at this point the pipe may be thawed out and the water drained away. It is not intended that these plugs should be used as ordinary drain plugs.

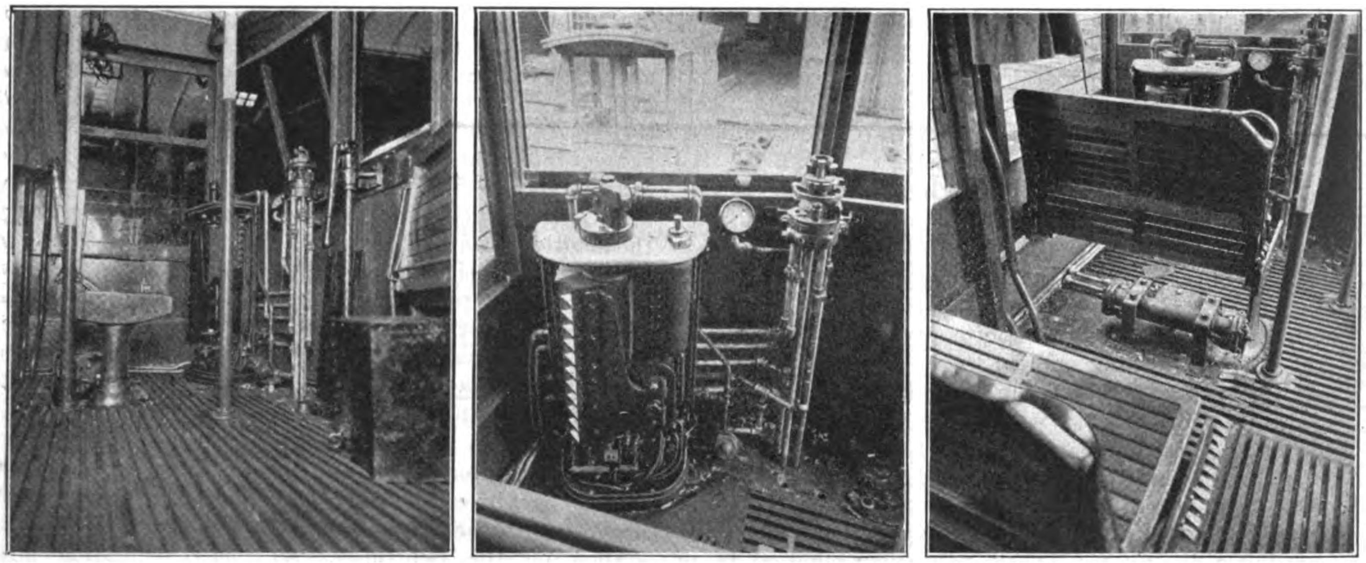
The sanding pipe is completely beneath the car floor. The ball type non-return check valves are so located in this pipe that air from either brake valve is admitted only to the sand traps of the adjacent pair of wheels. The connection from the emergency valve is made between these check valves so that in emergency air is admitted to all four traps. The circuit breaker cylinder pipe is on the right hand side of the car and is laid beside the main reservoir and safety control pipes. It crosses over at the No. 1 end of the car, just before the platform is reached. On this same side of the car and next to the three pipes just mentioned is the pipe connecting the second main reservoir to the emergency valve. It runs, of course, for only half the length of the car. The brake cylinder is connected to the emergency valve by a pipe which drops below the floor at the emergency valve. In it is included a plugged tee for thawing purposes.

The cab piping requires no particular comment. The ⅜-in. cutout cock with side outlet, by which the operator independently of the brake valve may make the door hand operated and thus may close it after his exit, should be located in such a position as to be accessible to him. The gage pipe should be taken off at such a point that the operator cannot break it off by using the horizontal section of it as a foot rest.

PROPER LUBRICATION IS MOST IMPORTANT

The piping of the safety car has been described because a knowledge of the proper installation assists in the reduction of maintenance cost and delays due to mechanical defects. But poor results may be obtained even with a well-designed installation of the equipment, if the equipment be not properly maintained. An important feature of maintenance work is satisfactory lubrication. Rules to cover lubrication in all locations cannot be given, since local conditions vary greatly. What is here given should, therefore, be considered as constituting a general guide from which departures must be made as required by special conditions.

For the lubrication of two surfaces which rub together oil is ordinarily first considered. But oil has not been found to be the best lubricant for all rubbing surfaces in air brake apparatus. It is not generally the best lubricant where one surface is held against the other by air pressure and where a portion of one surface is exposed to a lower air pressure; for example, where a slide valve is held to its seat by reservoir pressure and where an exhaust opening exists in the slide valve seat. In such a case if oil be used it will form an airtight joint about the edges of the slide valve, and since there is usually some leakage under the slide valve the pressure under the slide valve will eventually become atmospheric. As a result, since the slide valve is held to its seat with a pressure equal to its area, multiplied by the difference in pressure per square inch acting on its upper and lower faces, the slide valve may be held against its seat with a greater force than if oil were not used. For if oil is not used leakage will cause the pressure under the slide valve to be at some points that of the reservoir, at others atmospheric and at still others something between the two. The average pressure is, however, lower than in the case where oil is used. The force holding the slide valve to its seat is consequently less and the friction that must be overcome before movement likewise less. Oil may therefore be a



AT LEFT, PIPING TO BRAKE VALVE AND FOOT VALVE. IN CENTER, BRINGING PIPING BACK OF CONTROLLER. AT RIGHT, DOOR AND STEP CONTROLLER INSTALLATION

REPAIR PARTS TO BE CARRIED FOR AIR BRAKE AND SAFETY CAR CONTROL EQUIPMENT ON TWENTY-FOUR CARS

	Brake valves:
1	Brake valve, M-28, less pipe bracket and handle,
2	Brake valve handles,
6	Upper brake valve gaskets,
6	Lower brake valve gaskets,
4	Brake valve handle latches,
	No. 15 double check valves:
6	Gaskets
	Controller attachments:
2	Controller handles,
2	Controller pilot valves,
2	Controller handle base portions,
	Circuit breaker cylinder:
2	Piston rod knob covers,
	Brake cylinder:
6	Brake cylinder packing leathers.
	Door and step controllers:
1	Door and step controller,
8	Leather cups,
8	Cylinder end gaskets,
	Foot valves:
2	Combined foot and cutoff valves,
	Graphite grease:
10	lb. graphite grease.
	Compressors and parts:
1	Compressor, complete,
12	Inlet valves,
1	Cylinder head, complete,
4	Cylinder head gaskets,
1	Pinion,
	Compressor motor parts:
1	Armature, complete,
1	Commutator
1	Commutator M. band ring,
1	Commutator M. V. ring (front),
1	Commutator M. V. ring (rear),
2	Sets armature coils,
1	Field coil,
2	R. H. brush holders, complete,
2	L. H. brush holders, complete,
12	Carbon brushes,
	Governor:
1	Governor, complete,
12	Compressor fuses.

disadvantage rather than an advantage. Since graphite does not, like oil, form an airtight joint it has been found desirable for some air-actuated devices to use graphite as a lubricant for flat rubbing surfaces.

The emergency valve is one of these devices. No attempt should be made to lubricate the valve on the car, since there is great likelihood that dirt will be admitted to the rubbing surfaces in so doing. All lubricant should be applied at the bench. The valve should be taken apart and all gum and other foreign substances removed by the use of gasoline or benzine. The parts of the valve should then be thoroughly dried, using cheesecloth, not waste, since lint from the waste is apt to adhere to the surfaces. A very high grade graphite should then be employed to lubricate the slide valve, slide valve seat and that part of the bushing against which the spring bears. Occasionally a coarse flake graphite is used through error. The only graphite suitable is one in which the flakes are extremely small. To apply the graphite a paddle about 8 in. long with a piece of chamois glued to one end should be made. By dipping the chamois into the graphite a deposit of graphite is obtained which can be rubbed into the surfaces indicated until the pores of the brass are filled.

Oil is used on the bushings in which the pistons work. A drop or two of oil should be applied to the bushings and distributed around the circumference with the finger. It is the general practice to use entirely too much oil. Only a very small quantity is required. This should be spread throughout the length of the bushings by working the piston back and forth.

Graphite grease should be used to lubricate the rotary valve of the brake valve, but very little is required. The key should be lubricated with oil, poured down the opening uncovered by the removal of the oil screw. The pan in the controller base should also be lubricated with graphite grease. Graphite grease is used in the brake cylinder, being applied to the cylinder walls, the inside of the leather and the expander ring groove. It is also used in the same way in the door engines.

The oil used in the crank case of the compressor should be of fairly heavy body with high flash and fire points, high viscosity and low freezing point. Oil should be used to lubricate the circuit breaker cylinder. The remaining devices require no particular mention in so far as lubrication is concerned. How they should be maintained will be discussed in another article.

It is of course very necessary in maintenance work that a sufficient stock of spare parts be kept on hand. What constitutes a sufficient stock is largely a matter of opinion and local conditions. The tabulation given is intended to indicate in a general way what is considered necessary under average conditions.

Using Calcium Chloride to Remove Sleet from Third Rail

THE Long Island Railroad uses a protected third rail. The protection consists of a wooden cover which extends ⅞ in. past the third rail toward the center of the track and 3⅜ in. past the third rail away from the track. In driving sleet storms the sleet gets on top of the third rail from the track side and during extreme conditions this interferes considerably with train operation. In order to loosen this sleet from the third rail a solution of 2¾ lb. of calcium chloride to a gallon of water is used. For carrying the solution over the line and applying it to the third rail two tank cars have been constructed. These consist of steel-underframe gondola cars, 37 ft. 9 in. long by 9 ft. 4 in. wide and of 100,000 lb. capacity. The cars are fitted with automatic M.C.B. couplers and automatic air couplers with bus and train lines, so that these cars can be run between the regular electric motor cars or can be pulled by steam locomotives should occasion make this necessary. Two cylindrical steel tanks of 2,300-gal. capacity each were placed on the floor of each car, one on each side. One end of each was elevated 12 in., so that all the solution is readily drained from the tanks. Wooden houses were constructed over the cars, and each end has a door.

The calcium chloride solution is mixed in the tanks, In order to assist in this mixing a coil of pipe is placed in the bottom of each tank. These coils are perforated and have a connection outside the tank where air from the main reservoir of this or other cars can be connected to a valve. When air is admitted to this coil it passes up through the solution and assists materially in its mixing. The tops of the tanks are provided with manholes, which can be closed to make the tanks airtight. When necessary air pressure can be built up in the tanks to force the solution out.

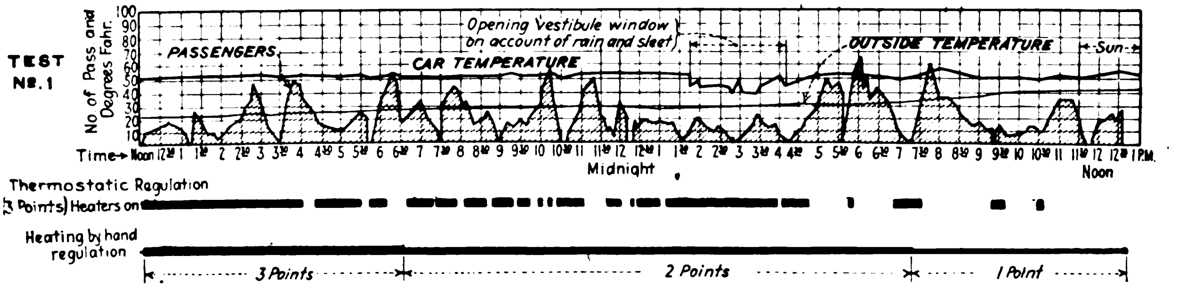
For controlling the solution as it is taken out of the tanks four valves are used. Each valve has an elbow screwed in the end and from this elbow the solution drops into a funnel. By observation of the solution as it enters this funnel the amount used can be seen and the valves adjusted to suit the conditions. From the funnel the solution is carried in a ½-in. hose to the contact shoes. The shoes used on these tank cars are of a special type which are cored out so as to carry the solution from the hose connection on the back of the shoes and deposit it on top of the third rail. When the cars are in operation the speed is adjusted to meet the conditions, which depend upon the quantity of sleet that it is necessary to remove. This method has worked out very satisfactorily on the electrified section of the Long Island Railroad.

The first automatic substation to be put in operation in the Northwest and the third on the Pacific Coast, according to the Puget Sound *Journal*, will soon be installed on the Seattle-Everett interurban line near Martha Lake. The equipment will be furnished by the Westinghouse Electric & Manufacturing Company.

Thermostatic Control Saves Energy

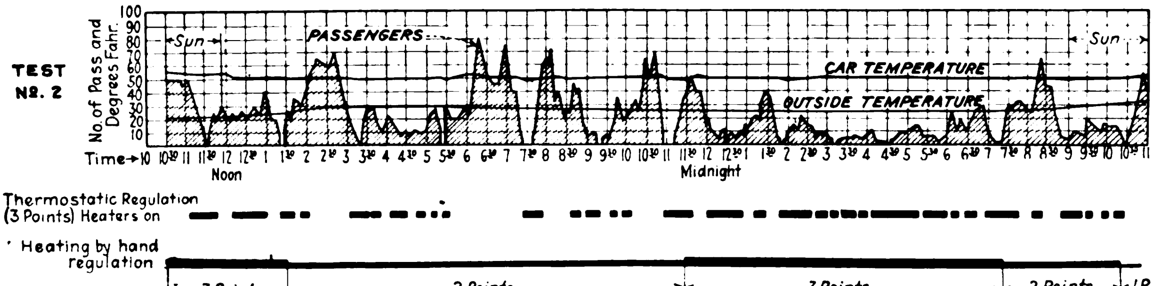
A Comparison of Results Obtained with Thermometer and Hand Control of Car Temperatures Shows the Advantages of the Former — Interlocking of Heater and Control Circuits a Factor in Preventing Waste of Heat

THE accompanying graphs show some very interesting results that were obtained in car heating tests using thermostatic control and regulation. These tests were made under the supervision of J. S. McWhirter, superintendent of equipment Third Avenue Railway, New York, and give data for some reliable comparisons with hand-controlled heating. The comparisons are based on theoretically correct hand operation, a condition much to be desired but never attained in regular operation. Consequently, the actual saving in normal operation is much greater than indicated by the results of these tests.



TEMPERATURE TEST NO. 1, USING THERMOSTATIC CONTROL

These tests were made on the Third Avenue Railway's standard convertible car, 43 ft. long over all with 30-ft. bodies and 6-ft. enclosed platforms. The car weighs 39,000 lb. light and has a seating capacity of fifty-two passengers. There are twenty cross-seats with a heater underneath each seat. Railway Utility Company's electric thermometer control, set to cut in at 46 deg. F., was used on the test cars. The Third Avenue company has 804 of its cars equipped with heat regulators, and fifty of them have the heat control circuit interlocked in the reverser in such a manner as to make the heat control apparatus inoperative when the car is not in operation. By removing the reverser handle when cars are taken out of service heat is automatically shut off.



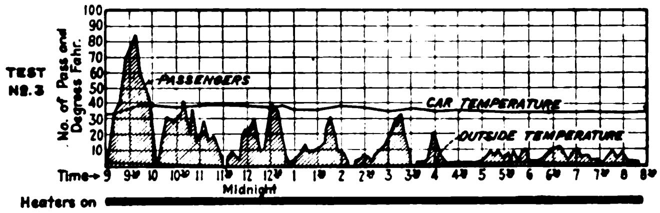
TEMPERATURE TEST NO. 2, USING THERMOSTATIC CONTROL

The first three graphs show results of tests made on car No. 886 while operating in regular passenger service. A Bristol recording thermometer was used inside the car and the outside temperature was taken at frequent intervals by means of mercury thermometers. An indicating lamp was installed in the heater circuit and the time that heat was cut on or off was taken and recorded by an observer with a stop-watch. The numbers of passengers boarding and alighting at each stop were also recorded. With this information at hand graphs have been plotted for car temperature, outside temperature and number of passengers on the car. At the bottom of these graphs shaded areas indicate the times that heat was applied and cut off with thermostatic regulation and also the degree of heat that would have been applied had hand regulation been used.

Cars equipped with hand regulation are arranged for three intensities of heat, taking 4, 8 and 12 amp., respectively, designated as one, two or three "points of heat." The instructions followed for hand regulation are to use one point for temperatures between 32 and 40 deg., two points between 25 and 32 deg. and three points below 25 deg.

The first test shows a run from noon Jan. 26, 1920, to noon Jan. 27. There was a continuous sleet storm during this period and the outside temperature was from 22 to 28 deg. on Jan. 26 and from 25 to 43 deg. on Jan. 27. During this twenty-four-hour test heat was applied with thermometer control for 870 minutes. All heaters were connected in the circuit so that they were all on while heat was being applied and were all off at other times. The product of the current taken, 12 amp., and the time, fourteen and one-half hours, gives 174 amp.-hr. used. As the average voltage was 575 the energy consumed for heat with thermostatic control was 100 kw.-hr.

If hand control had been used three points of heat would have been used for 390 minutes, two points for 760 minutes and one point for 320 minutes. At the current rating previously given the energy used with hand



TEMPERATURE TEST NO. 3 IN VERY COLD WEATHER, USING THERMOSTATIC CONTROL

control would have amounted to 115.4 kw.-hr. This test therefore shows a saving in favor of thermostatic control of 15.4 kw.-hr., or 15.4 per cent. The inside car temperature was kept uniform at approximately 50 deg. except during a period from 1:30 a.m. to 4 a.m. on Jan. 27, when a coating of sleet became so thick on the front vestibule windows that it was necessary for the motorman to open one of these to see ahead. The car temperature then dropped to 40 deg. in spite of the fact that the heaters were cut in continuously during this period. A further comparison of the results of the two types of regulation is given in Table I.

The second set of graphs shows a similar test made with the same car on Jan. 29 and 30. The outside temperature range during this test was from 22 to 30 deg. on Jan. 29 and from 25 to 32 deg. on Jan. 30. During this test current was applied for heating for 764 minutes and 87.84 kw.-hr. of energy was used. If hand control had been used, three points of heat would have been used for 660 minutes and two points for 780 minutes. The energy consumption with hand control would thus have been 135.7 kw.-hr. The saving in favor of thermostatic control would have been 47.86 kw.-hr. during this test, or 35 per cent. The inside temperature of the car was kept uniform at 50 deg.

In Table II a comparison is made of the ampere-hours used during the various periods of one and two point operation with hand regulation.

TABLE I—COMPARISON OF AMPERE-HOURS USED DURING PERIODS OF ONE, TWO AND THREE POINTS OF HEAT. FIRST TEST.

Outside Temp., Deg. F.	Time	Length of Period, Hours	Points of Heat for Hand Regulation	Amp.-Hrs. Used with Hand Regulation	Hours Heat on with Thermostatic Control	Amp.-Hrs. Used with Thermostatic Control	Per Cent Saving with Thermostatic Control
22 to 25	12 noon to 6:30 p.m.	6.5	3	78	5.5	66	15
25 to 32	6:30 p.m. to 7:10 a.m.	12.67	2	101.36	8.1	97.2	4
32 to 42	7:10 a.m. to 1 p.m.	5.33	1	21.32	0.9	10.8	49

TABLE II—COMPARISON OF AMPERE-HOURS USED DURING PERIODS OF ONE, TWO AND THREE POINTS OF HEAT. SECOND TEST.

Outside Temp. Deg. F.	Time	Length of Period, Hours	Points of Heat for Hand Regulation	Amp.-Hrs. Used with Hand Regulation	Hours Heat on with Thermostatic Control	Amp.-Hours Used with Thermostatic Control	Per Cent Saving with Thermostatic Control
22 to 25	10:30 a.m. to 1:30 p.m.	3	3	36	2	24	33
25 to 30	1:30 p.m. to 11:30 p.m.	10	2	80	2.6	31.2	61
25	11:30 p.m. to 7:30 a.m.	8	3	96	6.33	75.96	21
25 to 32	7:30 a.m. to 10:30 a.m.	3	2	24	1.8	21.6	10

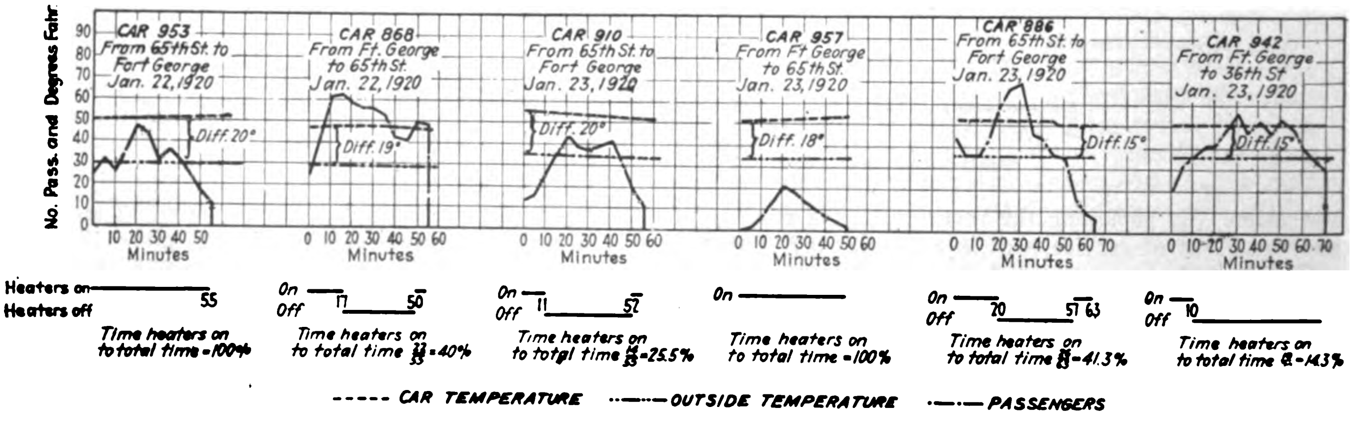
The third set of graphs shows results of a twelve-hour temperature test on the same car with the average outside temperature around zero. With all heaters cut in continuously the inside car temperature did not rise above 40 deg., but kept between 35 and 40 deg. Of course, the power consumed under such conditions is the same for both automatic and hand regulation. Such low temperature conditions seldom occur in New York City, however.

The fourth set of graphs shows a series of tests made with six different cars all equipped with thermostatic control and operating between Sixty-fifth Street and Fort George. The percentage of time that the heaters were used with thermometer control ranged from 14.3 to 100.

By comparing the results given in Tables I and II it is evident that the greatest saving from the use of thermostatic control occurs during mild weather, when the cars would be heated to a greater degree with hand control than is necessary.

New Coal Conservation Film

ELECTRIC railways desiring to encourage coal conservation among employees can have the use, without cost other than certain carrying charges, of a film which deals with good and bad methods of coal mining in transportation, firing, combustion losses, etc. The film is entitled "Coal Is King," and it was prepared from a scenario by Robert June. The pictures were taken under his direction by the Ford Motor Company. The film was originally prepared as part of the coal conservation campaign used during the war, but has just been completely revised and brought up to date, all war material being eliminated. It is in four reels, requiring approximately fifty minutes in showing. Arrangements for the use of the film can be made with the Diamond Power Specialty Company, Detroit, Mich.

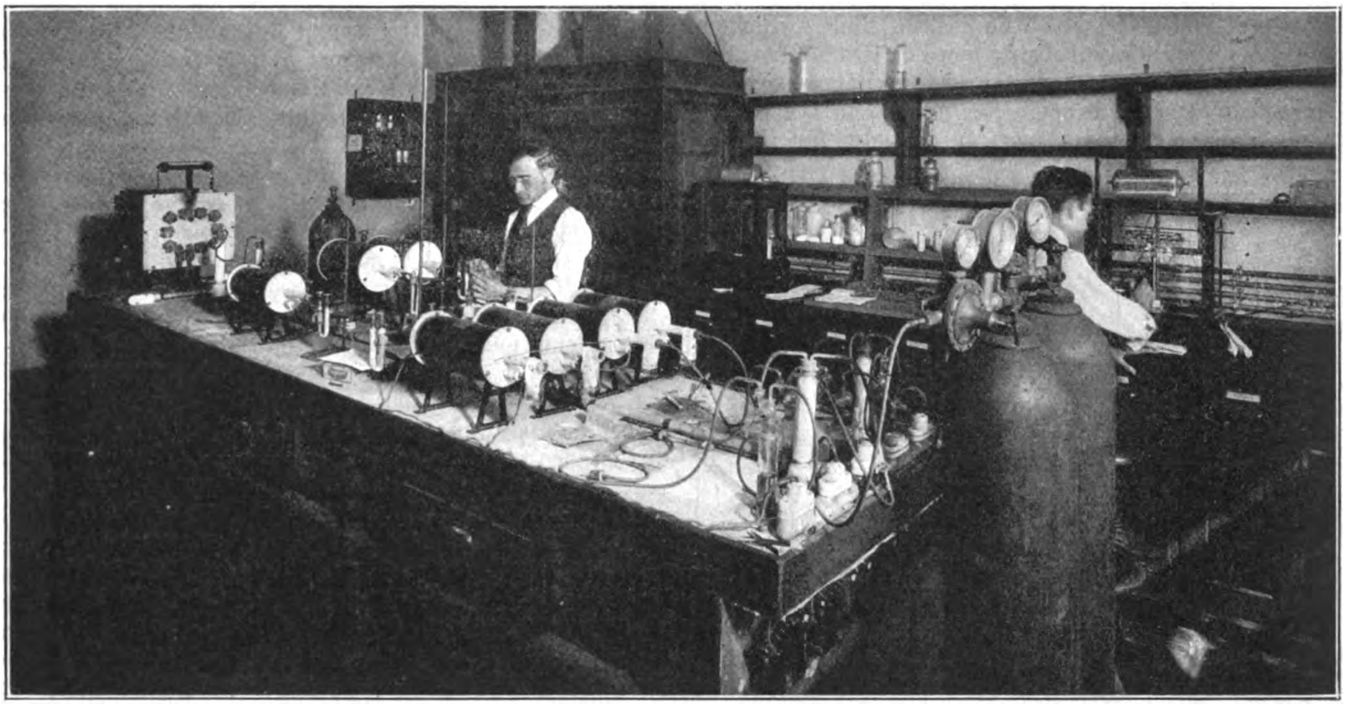


GRAPHS FOR CAR TEMPERATURE, PASSENGERS ON CAR AND OUTSIDE TEMPERATURE FOR SEVERAL RUNS

Railway Car Materials—Steel II

A Discussion of the Physical and Chemical Properties Necessary and Their Relation to Strength and Durability

BY NORMAN LITCHFIELD



CHEMICAL LABORATORY TESTS OF METALS REQUIRE SOME ELABORATE APPARATUS

Securing Desired Qualities in Steel

IN A preceding article, published in the ELECTRIC RAILWAY JOURNAL of April 17, the processes used in the manufacture of iron and steel and the elements entering into their composition were discussed. In the present article the chemical composition and some of the physical properties of steels are taken up, with the particular idea of pointing out the relation of these matters to the practical use of steel materials in car construction.

As has already been pointed out, the fundamental matter is chemical composition, and in this the preponderating influence is that of the carbon content. A rough idea of the relation between the carbon content and the ultimate tensile strength of steel of usual commercial composition otherwise, and in its normal state as coming from the rolls, is given in the accompanying graphs. These are, however, only approximations, as considerable variation will occur due to the varying percentage of manganese and to the handling of the rolls and subsequent heat treatment, but the diagrams will be found useful nevertheless in giving a ready reference between a given ultimate strength and probable carbon content, and *vice versa*.

Before considering further the effects of varying composition, alloys and heat treatment, it will be well to study the various tests to which it is customary to put steel in order to determine whether it is suitable for any given purpose and to ascertain what these various tests mean.

In the first place, therefore, what is it that a user desires to know about a piece of steel? Primarily it is that he can fashion it successfully into a given article, subjecting it to one or more of the following or similar operations: Shearing, machining, threading, punching, welding, pressing and drilling.

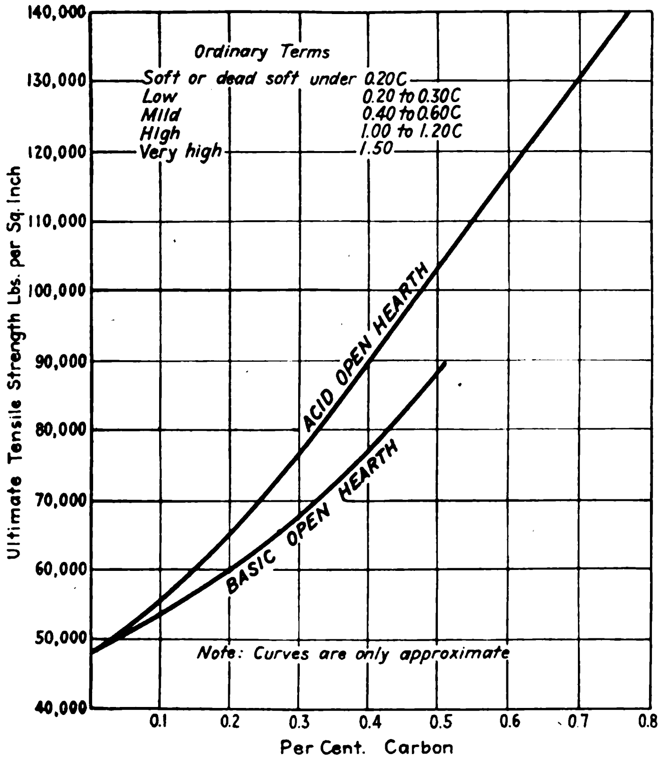
Second, he may wish to subject the finished article to some form of heat treatment so as to change the physical properties of the steel to meet some special requirement.

Third, he will wish to know what load the piece may be expected to carry, so that he can design the various parts of his machine or structure of proper dimensions.

Fourth, he will desire assurance that the piece will carry its load, not only for a short time, but also that it will continue to do so over a prolonged period without failure.

As a general thing, these points are very well covered by pulling apart a small piece of the steel in a tensile test machine, bending another piece cold through an angle of from 90 to 180 deg. and analyzing the steel to ascertain the percentage of phosphorus and sulphur.

At the risk of covering matters with which the reader is entirely familiar, it may be well to consider for a moment just what the tensile tests show us. Stripped of technical terms, the action of a piece of steel in a tension test machine is about as follows: One end is fastened in a stationary grip and a pull is applied to the other, which can be varied in amount at will. As the load is increased the piece stretches, just as a rubber band does when pulled, and it has been found that the rate of stretching is quite gradual and regular up to a certain load, at which point the structure of the metal seems to break down suddenly and the piece stretches rapidly without any increase in load. The point at which this action takes place is known as the yield point. It is sometimes confused with the elastic limit, which in reality is quite different, being more or less a laboratory value, as it were, in which the user is not particularly interested. Much confusion has existed in the past in these terms, and the American Society for Testing Materials has formulated definitions of them which are clear and explicit, and are as follows:



APPROXIMATE RELATION BETWEEN ULTIMATE STRENGTH AND CARBON CONTENT

"*Elastic limit* is the greatest load per unit of original cross-section which does not produce a permanent set. This determination is rarely made in the commercial testing of materials.

"*Yield point* is the load per unit of original cross-section at which a marked increase in the deformation of the specimen occurs without increase of load. It is usually determined by the drop of the beam of the testing machine or by the use of dividers."

If the load is continued and increased past the yield point the piece continues to stretch and finally pulls apart. The load at which this occurs is called the "ultimate tensile strength" or, more briefly, either the "ultimate strength" or the "tensile strength."

To determine the amount the piece has stretched up to the point of rupture two prick-punch marks are made on the specimen before testing, these being usually 8 in. apart or, in the case of small specimens, 2 in. apart. After the piece is broken the two halves are fitted together and the distance between punch marks is again measured. The difference between this dimension and the original length (8 in. or 2 in.) is then divided by the original length, giving the "percentage of elongation."

In addition to elongating the piece, pulling apart has the effect of reducing its cross-section at the line of rupture. This "necking down" may be gradual or it may be abrupt, as shown in two of the accompanying illustrations, this depending upon the nature of the material. The area of the cross-section of the pieces is measured at the break after pulling apart. This area is subtracted from the original area before pulling, and the remainder divided by the original gives the percentage reduction of area (also sometimes known as the "contraction").

Now as to the meanings and worth of these values to the user. In the first place, the man who is designing any part of a machine or structure determines as closely as he can what load is going to be carried by the structure. He must then make the piece large enough so that there will be a reasonable margin of strength over his calculations to insure freedom from failure. What the margin is or should be depends largely on the nature of the service to which the piece is put. This margin must be maintained at every point in the piece, for the resistance to rupture is the same for any unit of cross-section for a given character of material. Hence it is necessary to obtain all the facts possible bearing on the resistance to rupture. Experience has shown that it is surprisingly difficult to determine accurately the stress at every point in a structure. Tests made recently show a wide range of stress at various points in steel castings of not particularly intricate design, which it would be impossible to have ascertained by "figuring." Other factors enter in, such as unforeseen increases in load, etc., so that the working stress has for safety to be made considerably less than the strength of the material. The safety factor was formerly based on the ultimate tensile strength of the material, but in more recent years it has become the feeling that the yield point is the true measure of the useful strength of the material, as if this figure is exceeded the structure is likely to fail, or at least to distort.

CHEMICAL TESTS GIVE ADDITIONAL DATA

Quite apart and distinct from the question of the stability of the part to withstand the working load without immediate rupture or distortion is the resistance of the part, first, to sudden heavy shocks and, further, to a large number of repetitions of shocks of lesser character. Extended laboratory experiments and long practical experience have shown that there are certain of the chemical and physical properties discoverable by analysis and laboratory tests which throw light on the probable resistance of the metal to shock.

Closely connected with the matter of shock is that of the effect of repeated reversals of stress. A familiar case is a revolving car axle, in which at one moment one point on the circumference is at the bottom of the cross-section and so is subjected to a tensional stress, and when the axle has rotated through 180 deg. the same point on the circumference is at the top of the cross-section and so is subjected to a compressive stress. In between these two extremes this point is undergoing a decreasing tensional stress, first, down to zero, and then a gradually increasing compressive stress up to the maximum value. Reversals of stress constitute one of the severest actions to which metal may be put.

In considering these subjects of shock and reversals of stress we begin to enter a field which is more or less controversial and from which have sprung many a theory and remedy which were destined to cure all evils, and some of which have been helpful. Within the limits of this article only the more generally accepted and simpler features can be discussed.

The first point in resistance to shock is that the impurities, especially phosphorus, shall be kept low, the exact figure being somewhat uncertain, as we have already pointed out in the discussion on the joint activities of the American Society for Testing Materials and the United States Bureau of Standards. The second is that of the ratio between the extreme working stress and the yield point of the material, the historic tests of Wohler and Bauschinger having shown that as the stress approaches the yield point the life decreases rapidly. The third is that of the granular structure, to which more particular attention will be given further on.

The other features throwing light on the working qualities and the durability of the material are the percentage elongation, already described, and the cold bend test, the severity of which is varied by altering the radius around which the piece is bent in accordance with the thickness of the piece. Thus, the thicker the piece the larger the radius around which the metal may fairly be expected to bend without failure.

The final quality is that of the reduction of area already described. The value of this is not so clearly defined as that of the elongation and is generally omitted from ordinary structural specifications. It is to be noted, however, that high grade material generally shows a high percentage of reduction in area, and the better the material the more abrupt is the "necking down."

PRACTICAL FEATURES OF SPECIFICATIONS

Having touched thus briefly on the general chemical and physical characteristics as determined by test specimens, it may be of interest to review a sample specification so as to point out and explain the practical application of these features. For this purpose we have selected the American Society for Testing Materials standard specifications for structural steel for cars, A-11-16, which has come into quite general use.

The first paragraph provides for applying the specification to material over ⅛ in. in thickness. This is entirely reasonable, as pieces thinner than this amount are not as a usual thing depended upon for physical strength, and if they were a special specification would apply on account of the thinness of the metal.

It is required that the steel shall be made by the open-hearth process. This is in line with what we have already pointed out, namely, that bessemer stock is used only in places where failure is unlikely or unattended with danger.

The chemical composition prescribed is as follows:

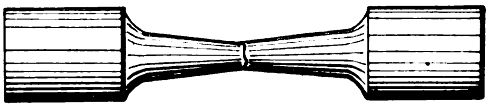
	Structural steel and Plates for cold pressing	Rivet steel
Phosphorus	Not over 0.06 per cent	Not over 0.04 per cent
Acid, basic	Not over 0.04 per cent	Not over 0.04 per cent
Sulphur	Not over 0.05 per cent	Not over 0.045 per cent

The percentages given are the normal ones and do not include the "war" tolerance of an additional 0.01 per cent in the sulphur in both acid and basic steels and 0.01 per cent in phosphorus in acid steel.

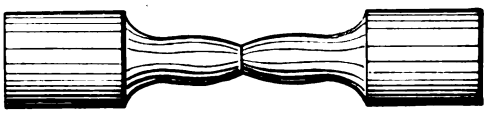
As before pointed out, it should be noticed that the percentages given in this paragraph are those found by analysis made from a small test ingot taken during the pouring of the melt of steel. In the finished article, be it plate, shape or bar, there is always the possibility that in some portions of it the sulphur and phophorus will collect together in greater amounts than in others, the action being known as "segregation," and it is felt that a reasonable amount of such action in structural steel is permissible. Paragraph 5 of the specifications provides, therefore, that the percentages of phosphorus and sulphur found by analysis of the finished piece may exceed the limits given for the ladle analysis by not more than 25 per cent. This would mean, therefore, that if the top limit given for the ladle analysis was 0.05 per cent, the permissible amount in the finished piece would be 0.063 per cent.

It will be seen that in paragraph 3 the material is divided into two groups as to chemical impurities, one for structural steel and plates for cold pressing and the other for rivets. For the rivets the percentage of phosphorus and sulphur is made less than for the other material on account of the excessive distortion the piece has to undergo in forming the head; a high phosphorus and sulphur content often causing the heads to fall off either during the riveting process or even after the part is riveted up.

Before Pulling



Pulled with General Reduction



Pulled with Local Reduction

ACTION OF TEST PIECE UNDER TENSION

Top, specimen before test. Center, gradual reduction under test. Bottom, abrupt "necking down" under test.

Under "physical properties" the materials are divided into three classes, *viz.*, structural steel, rivet steel and places for cold pressing, the difference lying in the range of ultimate strength required. Thus the structural steel is made of as high strength as is consistent with ordinary manufacturing methods and the necessity for having proper machining, punching and forging properties.

This covers shapes, such as I-beams, channels, angles, etc., and all plates except those that are to be pressed cold, in which a softer and more uniform quality is necessary to resist the strains induced by the cold working. For rivets a still softer metal is desired with the low phosphorus and sulphur content already mentioned.

The yield point, it will be noted, is given in each instance as 50 per cent of the ultimate tensile strength. Many of the older specifications specified a minimum figure for the yield point in pounds per square inch, but, as tests and experience have shown, there is a fairly constant ratio between the ultimate strength and the yield point, and it seems to express the latter in per cent of the former.

Experience has also shown that for the same class of steel there is a definite ratio between the ultimate tensile strength in pounds per square inch and the percentage of elongation, this being represented for the class of steel by the ratio

$$\frac{1{,}500{,}000}{\text{Tensile strength in pounds per square inch}}$$

This is known as the "inverse ratio," the numerator varying from 1,400,000 for some untreated high carbon steels to over 2,000,000 in the cast of alloy steels which have been subjected to a heat treatment.

For those who have much occasion to check test values of elongation against a specification based on the inverse ratio a very convenient table has been worked out which will be found on page 118 of the American Society for Testing Materials, proceedings for 1914, Vol. XIV, Part I.

The percentage of elongation given above is for standard test specimens 8 in. long between marks and does not hold for pieces of different length, as the nature of the elongation action is such that the percentage of elongation is greater for short pieces than for long pieces. This must be borne in mind in checking up the material in a finished article against the specification, for it sometimes happens that only a short specimen can be cut from the article and due allowance must therefore be made accordingly.

In addition to the effect of the length of the specimen on the elongation, there is that of the thickness of specimen, whose other dimensions conform to the standard, it having been found that on comparatively thin or thick pieces the elongation is less than on one of average thickness, and hence in paragraphs 7a and 7b allowances are made from the specified elongation to cover these cases.

These tolerances should not be considered as concessions, as they mean simply that lessened value of test qualities for different dimensions indicate the same original quality of the metal.

In paragraph 6b provision is made that "the yield point shall be determined by the drop of the beam of the testing machine." As the load is gradually applied to the test piece the latter stretches gradually up to where the load reaches the "yield point," when the stretch becomes abruptly greater. There are several ways of determining the point, the simplest of which is the sudden drop of the weighting beam of the testing machine. This method, however, is not a strictly accurate one, and for materials where an exact determination of this point is desired a delicate measuring instrument known as an extensometer is used. But for practical purposes, where a large number of specimens have to be tested, the drop of the beam is quite satisfactory, and this method is distinctly specified so that there may be no doubt either in the minds of the mill or in that of the purchaser's inspector as to exactly what is desired.

This brings us now to the questions of bend tests. The cold bend test is one of the easiest made, and, considering its simplicity, it throws a remarkable amount of light on the characteristics of the metal. And it is an important test even if full chemical and physical tests are made, for as one steel worker has said, "It is possible for us to produce a steel that will show excellent tensile properties as to ultimate strength, yield point and elongation and yet it will not bend properly." It is quite important in judging of the material by the bend test to know the radius around which the specimen was bent and the angle at which failure started.

ALLOWANCE NECESSARY IN TESTS

In the bend tests, as in those of elongation, certain allowances are made for the thickness of the material under test.

For this class of steel only one tension or one bend test is required to be made from each melt and the acceptance or rejection of the whole melt is based on this one test. It is, of course, possible that if this one test shows properties close to the lower limits of the specification, some other parts from the same melt would show properties below the lower limit, but in the interests of economy and practical production this possibility is discounted by allowing a sufficient factor of safety in the design of the finished structure. For other classes of steel to be used in exacting service, such as locomotive boilers, a tension and test piece is required from each plate, but this is not commercial practice for the ordinary run of steel and if applied generally would increase the cost to the purchaser unnecessarily and would greatly reduce production.

With the wear of the rolls the thickness of the plate or shape increases, and a practical limit has been set in paragraph 11 that the cross section or weight of each piece of steel shall not vary more than 2.5 per cent from that specified. In making any estimate of the weight or cost of any steel this allowance must be taken into consideration, as all steel is paid for by the pound, and the actual weight as delivered and paid for may considerably exceed that as figured from the nominal dimensions. This percentage figure does not apply in the case of sheared plates, these being covered in one of two ways, depending on the method of ordering the steel. If ordered to weight per square foot the variations must be in accordance with a table given in the specifications. If ordered to thickness "the thickness of each plate shall not vary more than 0.01 in. under that ordered."

It should be noted that in the latter statement no mention is made of any limit for overthickness. This naturally has quite an effect on the cost of any given number of plates and the purchaser should therefore be entirely clear in his own mind whether he needs an actual thickness or whether he can afford having plates slightly thinner than the nominal, so saving quite a lot of weight and cost.

The questions of finish, defects, etc., are ones in which the judgment of the inspector must govern, and he should if possible know the general purpose for which the material is to be used, so that he may act accordingly. Such judgment should, of course, be tempered with common sense, as a too "finicky" attitude seldom accomplishes any good to the purchaser and destroys the feeling of good will between the purchaser and the local shop people, without which it is safe to say the purchaser does not obtain as good a job as he would with it.

Having covered in a general way the main points in regard to structural steel in which the user is particularly interested it is planned in a future article to discuss in somewhat simple fashion matters relating to alloy steels and heat treatment and the field for them in railway materials.

Merchandising Transportation*

Present Conditions Have Emphasized the Necessity of Study Along These Lines—Various Methods Are Discussed, Including Means for Improving the Service, Publicity of Improvements and Securing Co-operation of Trainmen

By F. G. BUFFE
General Manager the Kansas City Railways Company

ONE of the subjects assigned by the American Electric Railway Transportation and Traffic Association for committee investigation and discussion at the October convention is "Merchandising Transportation." No doubt if some of the operators who have passed to a region where transportation is unnecessary could return to this convention they would be surprised that the association was seriously discussing this subject. In the old days street railway transportation was provided and the public could take it or walk. Such an idea as attempting to dispose of street car rides by merchandising methods never occurred. As a matter of fact, the necessity for department store methods in transportation business had not arisen. However, "necessity is the mother of invention," and under conditions today in the street railway business even stronger than necessity it is a case of self-preservation.

Those of us who in the past three or four years have gone through one nightmare after another, including every trouble to which an industry can be subjected, who have seen surpluses turned into deficits, who have watched receipts vanish in the smoke of gasoline, look back with envy and amazement at the halcyon days when labor was plentiful and wages low; when there were no coal strikes or "flu" epidemics; when our nearest competitor was the "one-horse shay" and when 5 cents could be divided into operating costs, taxes, interest and still leave something for dividends.

The war hastened the industry's arrival at the point where it had to be up early in the morning and stay up late at night to sell what it had to offer. Regardless of the war, however, we had already reached the place where salesmanship methods were necessary. The business is in some respects no longer a monopoly, and while "competition may be the life of trade," it has come mighty close to being the undertaker in the street railway field. As an example, in 1915 and 1916 Kansas City pointed with pride to its ownership of 10,000 or 12,000 automobiles. Today approximately 35,000 of them are in use. Figured at the conservative estimate of two passengers per automobile operated, this means some 70,000 people who are no longer buying their transportation at the old stand. In some cities to a greater or less extent the jitneys have hung out their shingle, and where they have done so are hurting legitimate transportation.

In addition, increased street railway fares have developed another very likely competitor, which is no more or less than the sidewalk. Not that there has been any tightness in money matters evidenced by the people, nor has it appeared that any one desired to economize on street railway rides, or on anything else, yet we have had to face the antagonism and mental stubbornness brought about in many localities by fare increases. Our riders, who very willingly pay double for food, clothing, rent, doctor bills and entertainment, have for so long coupled 5 cents and street car rides together in their minds that our raising the ante called forth a stormy protest which in many cases turned short-haul riders into pedestrians. It is some relief to know that this condition has changed. The 5-cent fetich seems to have passed. The public now is beginning to think of rides in terms of service and cost. As a result practically every city in the country with increased fares reports increased riding. Even Boston, where antagonism to a 10-cent fare almost amounted to a boycott, has overcome this feeling. There the riding habit has returned.

The above are some of the very pressing reasons why transportation will have to be merchandised if we are going to sell. The subject offers rather unlimited scope for discussion and ideas. It covers too much territory to do more than suggest some outstanding features in an article of this nature.

The subject naturally divided itself as follows: First, direct methods of selling, which include service, advertising, education of employees, methods of handling and collecting ticket fares, methods of meeting jitney competition and the safety car. Second, indirect methods, such as those dealing with opportunities of awakening public service commissions, chambers of commerce, councils and other civic bodies to the necessity of lending their aid to increase business for the traction property.

ADEQUATE SERVICE THE BASIS FOR SUCCESS

In the very nature of things, service, in a selling campaign, must come first. The service we give is not only the display of our goods in the show windows, but it is the measure of the quality of the article we sell. We cannot rightfully go to the public for adequate support unless by the same token we give the public adequate service in every sense of the word. The absolute necessity of this is too obvious to require explanation to any operating man. It is true there was a time when some operators thought increasing operating costs must be met by decreased service. That this is a fallacy that will inevitably lead to disaster has been proven time and again. Decreased service spells decreased business in more than a direct ratio. It not only loses business but it loses, too, public confidence. It results in fattening the purses of our competitors at the expense of our own. Our business is such in its very nature that expense cannot be reduced as prices increase. Our whole structure is built upon an adequate, necessary public service, and relief from increased costs must come from increased fares, which principle is of course economically sound and morally right.

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*Abstract of paper presented at annual meeting of Missouri Association of Public Utilities, Jefferson City, Mo., June 3.

There is a tendency for operation to fall into a rut. There is such a thing as obsolete methods establishing themselves by prescription. Examples of this can be seen in the tenacity with which certain routes are maintained and obsolete stop systems continued. Many of us have gone on the theory that because a certain route has become established by usage it must be continued indefinitely regardless of changed conditions. The old theory of a stop at every city block irrespective of the interval between stops is based upon custom and usage. On some lines stops are so spaced that when the time for acceleration and braking has been taken out the car runs at full speed for a few seconds only. Any one driving an automobile knows what this condition means to gears and engine, to say nothing of the loss in time. Therefore, our wares must in many cases be better displayed and better adapted to the needs of the public by revision in routes and stops. Especially are changes necessary in congested districts.

For example, in Kansas City we have for some months enjoyed the services of John A. Beeler, consulting engineer, of New York City. Mr. Beeler has acquired a most enviable reputation in the United States in straightening out traffic tangles. His work in Washington during the war, in Boston and in Philadelphia speaks for itself. Very recently Mr. Beeler has been retained by the Public Service Corporation of New Jersey and by the Chicago Surface Lines. Through a rearrangement of stops in the downtown district, by the use of the double berthing system and loading platforms, Mr. Beeler has been able to secure on many lines an increase in speed of more than 100 per cent. On one important street, in a block where formerly sixty cars an hour passed in one direction, we are now able to put through ninety-three. The effect of this is of course most significant. It means that those cars scheduled to hit the downtown district at the beginning of the rush hour are there on time when they will do the most good. Due to Mr. Beeler's rearrangement, we now find it possible to maintain our system speed at more than 9 m.p.h., and of course increased schedule speed and regular headways mean just as large an increase in service as the addition of more cars. In fact, it is more, because additional cars, if not at the right place when needed, serve no useful purpose.

I think therefore every one will admit that in merchandising transportation the first essential is to see that service is all modern operating methods can make it. Service, after all, starts in the carhouses. Clean, well maintained, well painted cars are our biggest advertisement. Very often an entire system is judged by the appearance of its cars on the street, and too much attention cannot be paid to this phase of operation. A policy of retrenchment that starts with the equipment will end in disaster if continued.

LET THE PEOPLE KNOW

Service being the first step in selling car rides, it very naturally follows that keeping the public informed of this service should be the next. There is no more practical reason for a street railway company "hiding its light under a bushel" than there is for a department store. The public is very appreciative of the printed word. The repeated suggestion that your city has the best street railway service in the country, if in any way at all backed up by facts, will very shortly meet a receptive mood in the public mind. Local pride in one's city will help bring about this mental condition. People can be educated to point proudly to their street railway service the same as to their public buildings and parks.

Advertising from the standpoint of selling transportation is a different problem than that presented by the good will and public policy advertising campaigns which have been carried on so extensively in the past five years by public service companies. A most excellent medium is the space provided by the car itself. Perhaps there is no more effective advertising than dash cards. A hanging frame on the inside from the car roof is also most desirable space. A notable example of this is furnished in Philadelphia, and each week sees a different message on Philadelphia's service in the frames. The New York Interborough uses the space on the two front windows of each car, and under the title of the "Subway Sun" communicates new data to the car riding public each week.

This direct advertising should enlarge on service changes, and copy for it should be worked out with the sole purpose of directing the attention of the rider to facilities offered by the street railway system and service given. One good feature which can be emphasized is the cost of operating an automobile. It has been demonstrated that no type of car, not even the smallest, can be operated for less than 10 cents a mile. In the larger cities to drive an automobile downtown to business and back costs from 75 cents to $1.50 a day. Another strong feature which can be utilized is the fact that the street railway system in any community is essential, that upon it the community's growth has been predicated and that system and service have both been outlined on the basis of handling all the people in the community all the time. This being the case, it is to the interest of every citizen to see that the local car line is supported, that jitney competition is not allowed and that a full measure of co-operation be given by the public. Under our present service-at-cost franchises (and in those states which have utility commissions practically all franchises resolve themselves into this type) the rate of fare depends very directly upon the amount of riding. There can be no hope for decreased fares unless the volume of riding increases and service is utilized to the fullest extent.

The moving picture theater offers a very productive field for the advertising man. Few people who ride the cars have any conception of the machinery back of their daily ride. They have but a limited knowledge of shops, power plant, carhouses, regular inspection force, track department and other branches of the organization that produces city transportation. These things can be filmed and will serve to educate the public in the rudimentary elements of its transportation.

Another essential point in selling transportation is proper education of the salesman himself. Trainmen are the company's representatives, and too often their training involves only operation of cars and not stimulation of business. I believe the greatest field ahead of street railway operators today lies in the training of transportation forces, and at the wages today being paid there is no good reason why we cannot secure the service of men's heads as well as their hands.

Such training involves courtesy, politeness, careful operation, and goes even deeper. We must first make trainmen realize that in a sense they are salesmen, that they are responsible for much more than the ordinary operation of cars. We must bring them to a realization of the importance of their own position. We must awaken in them a higher sense of their responsibility. This means education, and, like most things worth having, will take time and unceasing patience to secure. It starts at the employment office, where greater endeavor must be made to secure a higher type of employee. It means more intensive schooling and instruction. Frequent meetings of employees and talks by officials of the company help. A company publication is another good method. In Kansas City, through published articles and talks to the men, we have endeavored to get them all interested in the company's financial statement, which shows the result of their own operation. These statements, in easily understood terms, are published in the employees' magazine every month. Every wage increase we have made in the past sixteen months has been based upon such financial statements. We have succeeded in a large measure in this policy, and I believe today employees of the Kansas City Railways are better informed as to the company's financial position and its policies than is general throughout the country in traction systems.

Just last week more than 3,100 employees signed petitions addressed to the City Council demanding that jitneys be driven off the streets. In several divisions there were not to exceed a dozen employees who refused to sign the petitions. The employees themselves requested that these men be discharged.

The active interest and co-operation of the employees of any company is a most vital factor in the sale of street car rides. Although there are many other reasons why Philadelphia has been able to succeed without fare increases, the biggest factor in the success of that company has been the co-operation of its 10,000 men. This co-operation has not been the result of a month's work or a year's work, but has been secured by constant hammering along the same lines for the past seven or eight years.

OTHER MEANS OF MERCHANDISING TRANSPORTATION

For many companies a new element has been introduced from the merchandising standpoint in the necessity for ticket fares, brought about by fractional rates, which have been put into effect in many cities. It has meant in some cases the organization of a complete ticket distribution and handling system. St. Louis, according to the latest reports, has some 700 ticket agencies. There are about 450 in Kansas City. These agencies must be supplied, their interest in the work stimulated and the people induced to save money by the purchase of tickets.

There are two good merchandising reasons why ticket sales should be pushed: One arises from the fact that we have to meet daily the competition of the automobile. A purchaser of a book of tickets, having paid his fare for some days in advance, will be much less inclined to forsake the street car for its competitor. Another feature of the ticket business comes from the psychological fact that the same respect is not ordinarily paid tickets or tokens that is commanded by money itself. In other words, a stack of white chips never means as much, seemingly, as a stack of silver dollars. The tickets have been purchased and the money for them paid out. After they have passed into the pocket of the owner they become street car rides and their possession undoubtedly induces short haul business.

The rapid evolution of the safety car has brought about other possibilities from the merchandising standpoint. The principle upon which safety car operation depends is that of more frequent service. Its use allows reduced headways, and the less time prospective patrons are forced to waste at street corners the better chance we have of securing their business. Especially is this true where we have jitney competition to fight. Practically all companies who have adopted safety cars and who have followed this principle in their use report increased patronage. As one customer expressed himself some time ago in reference to safety car operation on the line on which he lives: "While the little fellows are not as comfortable in many ways as the double-truck cars, yet it seems to us that there is a car in sight on our line all the time." While not literally true, there was some merit to his statement, inasmuch as a double-truck five-minute headway had been replaced by a safety car every three minutes.

Some safety car operating figures taken from our experience in Kansas City may be of interest to street railway men elsewhere. In round numbers these figures show that on the more important lines service in car-miles has been increased from 26 to 31 per cent, headways have decreased from 30 to 37 per cent, and sixty-six safety cars have worked out an actual saving of $425 expenses per day. In other words, through the introduction of safety cars service has been very materially increased, headways reduced and the cars have saved in power and platform costs alone approximately $2,000 per year per car.

The above ideas are merely scattered attempts to present some of the more outstanding features of the subject to your attention. The details very naturally will be different on every property. The main fact, however, it seems to me, is very plain. Our business can be increased by direct selling methods. We have competition to meet, and we must meet it upon a new basis. The new order of things very naturally involves some radical changes, and in this connection what could have been more radical than the introduction of the safety car? All of us know the opposition brought to bear against the little unit five years ago, which was if anything stronger within the ranks of the industry than from the public. The car was finally taken up and adopted because it offered one of few possibilities of meeting the situation which arose with the beginning of the war. Some of us actually had to be clubbed into its adoption. We are daily seeing other innovations. The work Mr. Beeler is at present engaged in is in many respects a radical departure from old methods. It is not uncommon now to read of the appointment on many systems of traffic agents, whose duties are to stimulate and encourage travel. Without question the field covered by this subject offers many opportunities as yet hardly touched. The business has been going through a fight for its very existence, and it has existed against reverses which would have overthrown and swamped any other industry, merely because it was essential and had to "carry on." The growth and well being of every community in the United States are predicated more or less directly upon its means of urban transportation. The withdrawal of street railway service is a catastrophe which could not be contemplated in any city. For this reason therefore the industry has survived and every indication points to a more optimistic future. As operators we have had to do things we never contemplated before and we have all had to go through a mental shakeup that has been good for us individually. Ideas which formerly were regarded as fantastic have had to be taken up in dead seriousness, on the principle of a drowning man grasping at the first straw that offered itself. Many of us were surprised to find these so-called "straws" were in reality good, substantial logs upon which to swim out of some of our troubles. The struggle has sharpened the wits of the entire industry, and without doubt we have learned and are learning to sell the product which our manufacturing plant produces.

Arc Welding of Rail Joints Without Planing the Plates

Recent Experiment in Welding Old Rails Shows That a Good Joint Can Be Obtained by This Method

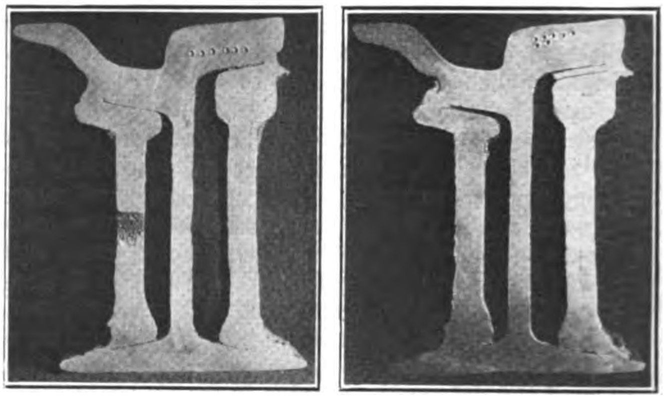
BY HOWARD H. GEORGE
Assistant Engineer Public Service Railway Company, Newark

ON THE lines of the Public Service Railway considerable experience has been had with numerous types of welded rail joints. The important requirement is to provide continuity of rails and to maintain the continuity of the return circuit at as nearly 100 per cent efficiency as possible. This is desirable not only because of the damage to rails and rolling stock from loose joints but also because of the necessity for reducing damage by electrolysis to the minimum. A type of arc-welded joint employed by this company, using beveled or planed joint plates, was described in the ELECTRIC RAILWAY JOURNAL, issue of January 26, 1918, page 190. A diversion from this method is now being employed and a description of it may be of interest.

When welding is being done on new rail it is desirable to use beveled plates, specially designed to facilitate the accomplishment of the weld, but when welding is done on old rails it has generally been the practice in the past to remove the old plates and either to furnish new beveled plates or to send the old plates to the shop for the purpose of having the heads planed. This method necessitated either scrapping the old splice bars or keeping on hand duplicate sets of the old joints and resulted in adding considerably to the cost of the joints. In the case of one particular job the cost of planing 246 old plates amounted to $184.98, more than $1.50 per pair, and this is no small percentage of the total cost of such a joint.

Recent improvements have made possible some experimental arc welding of rail joints, in which the old plates were welded without planing the heads. The plates were first removed, cleaned of all dirt and scale and then rebolted and drawn up tight with two bolts. The weld was then applied as shown in the accompanying illustration, and the penetration which was obtained is clearly indicated. A number of joints on this property were welded last fall by this method without interfering in the slightest with the operation of cars. Up to the present time these joints have given satisfactory service in spite of the unusually severe winter and average traffic conditions.

The accomplishment of a satisfactory weld by this process has been made possible by the introduction of a small carbon and short arc, as well as by the use of a flux that will produce a weld which will not crack. It has been proved that it is absolutely essential to get metal into the weld which is ductile. It is evident that the volume occupied by molten steel is greater than the volume occupied by the same steel when it is cold, and the contraction which occurs in cooling must either result in stretching or cracking the metal. Practically all of the trouble experienced with arc-welded joints in the past has been due to the fact that the metal that left the arc was so brittle that in cooling minute cracks developed, and these cracks extended and finally caused the failure of the joint. By using a small carbon and short arc together with a commercial flux which is sufficiently ductile to take up, by stretching rather than cracking, the contraction between the molten stage and the cold stage the number of joint failures has been reduced to a point where it is not more than 1 per cent, and compares favorably with that of any other rail-welding process.



SECTIONS OF RAIL JOINTS CUT THROUGH SAMPLE WELD INDICATE PENETRATION OBTAINED WITHOUT PLANING THE PLATES

Welding Hard-Center Insert Special Trackwork

ORDINARILY it is considered impracticable to repair broken-down manganese insert special trackwork by welding on account of the melting out of the spelter and the difficulty of repairing the bolts and seat for the insert. However, this type of work has been successfully reclaimed by P. S. Duenweg, engineer maintenance of way Houston (Tex.) Electric Company. This was accomplished by removing the insert and depositing metal to fill up the space occupied by the insert, using high-carbon-steel electrodes for the top layer of the deposit. One crossing was repaired in this manner at a cost of $49.34 for material and labor. It was estimated that it would cost a great deal more than this to replace the inserts. The wear on the crossing at the time of this writing gives evidence of long life.

The first spring conference of the engineering section of the National Safety Council was held in New York City on April 27. It was attended by about 100 men representing the national engineering societies, the universities, the inspection departments of insurance companies and the men in charge of accident prevention in the industries. Papers were read on the inculcation of safety principles in the minds of technical students, on safety standards and on related topics.

Final Report of Pennsylvania Association Meeting

President Pardee Reviews the Washington Hearing—General Discussion in the Meeting and Abstracts of Remaining Papers Are Given

AS MENTIONED in the issue of June 5, J. H. Pardee, president American Electric Railway Association, who spoke at the informal dinner at Harrisburg on May 27, took the opportunity to review the Washington hearings and stated what he thought would be the ultimate outcome of them. He said that what stood out at the hearings, whether the witnesses were railway men, municipal officials, state officials, labor representatives or radicals, might be listed as follows:

1. The electric railway in the social and economic sphere of the country is an absolute necessity. Other means of transportation which have been developed up to the present do not fill the place of the railway, and consequently it is an absolute necessity of the country in both urban and suburban districts.

2. The capitalization of the railways should be disregarded when determining what is best between the public and the corporation. Politicians make a great deal of the electric railway capitalization, that there was money taken in the past and that there was watered stock. But all indications at the present time show that capitalization has nothing to do with the question, but that value of the property is the real test. It was shown in the hearings that the necessity of financing sometimes makes the capitalization greater than and sometimes less than the real value, but in the last analysis value is the determining factor. In other words, the old bugaboo of capitalization is gone, largely as a result of these hearings. Those who would retain capitalization as an argument against the railways would place them in the position of a man who had been run over and injured and taken to the hospital, against whom the argument was then made that the surgeon should not treat him because this man's grandfather's uncle had stolen some money. And so in this hearing the best that even the radical opponents of the railroads could show was that in ages gone by some man had taken undue profit out of the transportation industry by present day standards, but there should be no more fear of the capitalization argument working to the detriment of the railways.

GOVERNMENT AUTHORITIES CANNOT ESCAPE RESPONSIBILITY

3. Another point established is that income should be on a parity with expense. In other words, the railways cannot stand the deflation of income and the inflation of expense, and this was admitted even by the opponents of the railways in the Washington hearing.

Two schemes were suggested to make this possible: (a) Service-at-cost franchises, or (b) action by governmental authorities which would allow rates to be raised to meet the rise in expenses.

Since the electric railway is a public necessity it is subject to government control, and this is right. But the moment the government authorities assume control of public utilities that very moment they must assume responsibility. The commissions pretty generally understand this proposition, but the people of the country do not. Electric railway men and other public utility men should, therefore, talk about this question. A few regulatory or governmental bodies do not understand this, and the most notable instance of this is in the case of New York City, where political demagoguery is the controlling factor rather than responsible government actions.

4. The fourth point brought out was that all electric railways are subject to unjust burdens, such as paving, bridges, street cleaning, snow removal and similar indirect methods of taxing the public. There is no reason for this except that it produces money. Even the opponents of the electric railway admitted this fact and, further, that on analysis these indirect taxes were ridiculous.

5. The main difficulty of controlling the situation is the lack of confidence which the public holds in commission decisions. Mr. Pardee said he was pleased to say that one outstanding example of promptness in commission decisions was shown by the Public Service Commission of Pennsylvania. There are two reasons for the Pennsylvania good record, the first being that the law is so worded as to allow increase of rate without previous formal approval by the commission and the second the realization of the necessity by the commission of dealing with things in a businesslike way.

While these five points were brought out in the Washington hearings, nothing tangible has as yet appeared as a result of these hearings. It is understood that the commission staff is preparing a digest of the testimony and a report upon the same, and some sort of an announcement is expected within the next few weeks.

CONFIDENCE IS WHAT IS MOST NEEDED

The present situation is that some of the electric railways have died, others are just breathing, while still others are able to sit up and look around a little. In some places there is a real improvement, and much would be satisfactory if it were not for the present credit situation. But lenders have lost confidence in the treatment which the electric railways are going to get. In other words, the situation may appear to be all right today, but what, says the lender, will the public do to the electric railway five or six months from now? The fact that a property is put back on a satisfactory financial basis now is no proof that it will be left alone by the public to continue its satisfactory financial condition in the years to come. Mr. Pardee indicated his belief that the whole attitude of the people is changing fast, but the lenders are still afraid of what the people are going to do.

The people must give more thought to bolshevism, to strikes and to ill-advised labor leaders, and they are doing this, and in the next twelve months many dark clouds should clear away.

Finally, the electric railway industry should use pitiless publicity of its own doings and of the doings of the public, and never cease through all this to smile. The electric railway must exert its best efforts and try to solve this situation.

PUBLIC POLICY TALK

One of the interesting discussions of the meeting was by Capt. J. C. Gredler, formerly with the Harrisburg Railways, who stated that his connection with the railway industry had been so short that he appeared more as a layman or as a member of the much-discussed public than as a railway man. Mr. Gredler urged publicity of the most complete and intelligent kind as an assistance to the industry through the gaining of the confidence of the public. He mentioned the method of publicity used by the Holstein cattle people, the California Fruit Growers' Association and many banks of today who place the true nature of their businesses before the public and urge general programs or give general publicity, the particular result, he said, being an indirect consequence of general familiarity on the part of the public with their particular fields.

By calling attention to the recent indictment of Mr. Wood, president of the American Woolen Company, and the public attitude with reference to high prices of sugar and the sugar industry, Mr. Gredler emphasized his point that the railway industry, as other industries, should conduct its business in such a way that the public may be invited to give it confidence.

As to other means of publicity, the first circle for real effective publicity is within the organization itself. And further, while it has always been urged that the railway companies should tell the public the goal toward which it is striving, an additional reason for doing this is that a published platform is much easier to live up to than one which is unpublished. But even plain facts are not enough. What is wanted is the whole truth, and the whole truth is the sum of facts and imagination.

PULVERIZED COAL ELIMINATES ASH TROUBLE

In his discussion of Mr. Rau's paper,* T. A. Wright of the Wilkes-Barre Railway indicated that one of the valuable results of using pulverized fuel was that the ash was carried up the flue. In one test the entire residue of 120 tons of anthracite burned in the pulverized form consisted of three wheelbarrows of ash. As a result of this situation, fuel which contains 25 per cent of ash may be used with satisfaction as pulverized fuel when it could not be used at all burned in the usual way on grates. The silt, which is the form the ash takes when it goes up the flue, is so fine that it is impossible to locate it in the atmosphere, and it is not deposited to any noticeable degree in the surrounding territory. It is of the nature of the dust such as one sees in sunbeams, being broken into extremely fine particles by the final explosion of the combustion.

Most installations of pulverized fuel at the present time use bituminous coal, and what anthracite will do under similar conditions is so far undetermined. It is doubtful if installations of less than 1,000 kw. will prove to be economic. Mr. Wright mentioned that he was going to make a further silt test of pulverized anthracite by burning anthracite in the pulverized form for a period of one week. The test will be conducted at Lima, Ohio, and 1,000 tons of coal will be used.

In discussing Miss Roadifer's paper on "Mutual Safeguards," C. B. Fairchild, Jr., of the Philadelphia Rapid Transit Company stated that previous to 1910 6 to 8 per cent of the gross receipts of the company were paid out for claims, whereas the present claims account requires not more than 3 per cent of the gross receipts. Expressed another way, the total number of accidents has been decreased 50 per cent, while during the same period there has been an increase in traffic of 53 per cent.

Mr. Fairchild indicated that in the Philadelphia Rapid Transit Company the questions of accidents and claims receive the same careful study and analysis as all other parts of the business. A very complete cross-index card catalog system is followed, by which automatically causes of accidents, or at least facts regarding accidents, are indicated to show whether the accidents occur on a particular car, at a particular point, for some particular reason or on rolling stock driven by some particular motorman.

The papers by C. L. S. Tingley, H. B. Megargee and O. M. Rau were abstracted in the issue of May 29. Abstracts of the other papers follow.

Safeguarding Against Intangible Accident Hazards*

By LAURA M. ROADIFER,
Philadelphia Rapid Transit Company

CLOSE study into accidents and their causes leads us into a field filled with human interest, the safeguarding against the intangible or "inherent" hazards. On the accident-prevention problem the street railway industry has worked perhaps longer and more diligently than any other individual industry, for the reason that upon its operation the pulsebeats of a city's economic life depend. In street car construction unquestionably the first consideration is to comply with all the natural laws evolved by accidents and their material causes, but while modern machinery seems to meet every requirement of prevention that has been made possible for human inventiveness to create, the greater number of accidents occur from intangible causes.

A difficult step in the problem of reducing accidents is the inculcation of the preventive spirit among the employees. By arousing a spirit of emulation among them a natural desire for a clear accident record can be created and accentuated. Recognition of careful service ignites the spirit of emulation readily. One Philadelphia Rapid Transit motorman has operated a car for the past twenty years and holds a "no accident" record. His fellow workers know that this is not merely a stroke of luck, but indicates careful application to his duty at all times.

The development of overzealousness must be guarded against, however, for an industrial organization must have for its foundation "co-operation for continuous mutual benefit." It is very important that each individual understands where the mutuality of interest lies.

One of the most remarkable evidences of the result of industrial co-operative effort in Pennsylvania is furnished by a manufacturing concern which reduced accidents almost 80 per cent in four years. In 1916 this plant averaged the loss of one and one-eighth days per man per year, while in 1919 it was one-third day. This represented a monetary saving of $50,000 per year.

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*See abstract in issue of this paper for May 29, page 1094.

*Abstract of paper read at meeting of Pennsylvania Street Railway Association, Harrisburg, May 27, 1920.

Educating the public to share in accident prevention is the hardest task of all. The American public has been made familiar with the staggering toll of accidents on our highways, but every year the numbers increase. Hence the reason for our extensive work among the juvenile public of Philadelphia. As a small boy observed to me, "You can pound anything into a fellow's head while it's soft." Encouraged by this cheerful truth, we have been pounding vigorously on the heads of Philadelphia's junior public for several years, with the following compensating results: During the past four years our records show thirty-two fewer children fatalities as compared with the previous four-year period, in spite of the tremendous increase in vehicular and pedestrian traffic. Last year only four children of school age were killed by our cars and not one of these had come under the direction of our safety work. More than 200,000 children pledged their support to our safety plans last year and 300 boys from the upper grades volunteered to patrol the dangerous school crossings to protect the small scholars from injury. The recognition that has been given these boys by permission to assemble monthly the "Junior Safety Council of Philadelphia" in the Chamber of Commerce, where reports and suggestions as to further work are made, has been such an incentive that there is now a long waiting list of applicants for patrol duty.

Hazards of the Electric Railway Field*

By Edward C. Spring
General Superintendent Lehigh Valley Transit Company, Allentown, Pa.

The accident problem of the electric railways is a serious one, enhanced by the demand of the public for speed, and this over tracks poorly protected by inclosed right-of-way and with countless grade crossings not always guarded. The electric railways have been aware of the fact that there is but one expenditure in their accounts which brings no return—the settlement for accident claims. It would seem only logical that an expenditure of this type should demand the closest vigilance on the part of those interested.

Pennsylvania plays an important part in the electric railway operation of the country because it stands first in number of companies (119), second in electric car mileage (4,477), second in number of cars operated (9,280) and second in invested capital ($757,000,000). The State is, therefore, vitally interested in the matter of accident reduction.

Of the several classes of car accidents, those occurring during boarding and alighting amount to 15 per cent of the total. The prevention of accidents of this class is "up to" the conductor, who must be eternally vigilant.

Collisions between cars have been unusually numerous during the past winter on account of bad rail conditions. The general responsibility for this class of accident rests with the company, and the motorman is the one individually responsible. Such accidents need not occur, as practically all are due to carelessness and disregard of orders.

Of the many problems associated with hazards in the electric railway business, the most important relates to collisions with vehicular traffic, or to accidents on highways. A recent estimate shows that of the nearly 8,000,000 automobiles in the world, 6,500,000 were on July 30, 1919, in the United States. The present output of American automobile factories is 10,000 daily. The increasing importance of the automobile as an instrument of injury and death is being viewed with increasingly greater alarm by electric railway managers. Nearly 65 per cent of all such accidents are reported as due to the negligence of chauffeurs.

The grade crossing hazard is a perplexing problem, due to the fact that the public is careless in crossing railway tracks. An investigation made by the Southern Pacific Railway at two grade crossings, involving a study of the operation of 17,000 automobiles which passed over them, showed that 62 per cent of the drivers did not look up or down the tracks, 2 per cent looked in one direction and 17 per cent looked both ways. Of the total, 19 per cent of the automobiles ran wild. An analysis of 20,000 grade crossing accidents involving electric railway cars and automobiles shows that electric railways were wholly responsible for but 4 per cent.

The problem of the pedestrian in regard to accidents is complicated, and there must be regulation of the pedestrian traffic as well as the automobile traffic. An interesting study made by the Police Department in New York City exemplifies the gross neglect on the part of pedestrians. At Fourth Avenue and Twenty-third Street in that city, between 4:45 p.m. and 5:15 p.m. on a certain day, 924 persons crossed on the south side of Twenty-third Street going east and west after the traffic officer's whistle had given the right-of-way to north and south bound traffic. At Fifth Avenue and Thirty-third Street, between noon and 12:30 p.m., 610 persons crossed Fifth Avenue going east and west after a similar signal had been given.

As to accidents to passengers carried, we find that on the electric railways one person is killed for every 4,393,572 carried and one is killed for every 831,637 miles operated. The average percentage of cost of settling for injuries and damages of the electric railways of the country is 3.68 per cent of the total operating revenue.

By way of summarizing briefly the points which occur to me as being important in preventing accidents in the electric railway field, I submit the following: (1) Systematic education of our own employees; (2) systematic education of the public; (3) teaching safety in public and parochial schools by the adoption of Dr. Payne's system; (4) uniform traffic regulations and safety laws and their rigid enforcement; (5) proper training and licensing of all automobile drivers; (6) enactment of laws requiring the traveler on the highway to give due regard not only to his own safety but to that of those who entrust their lives to his care; (7) prosecution of violators of existing regulations; (8) continuous following up of all activities.

Accidents and Casualties

The following table, taken from the eighth annual report of the Connecticut Public Utilities Commission, gives in detail the accidents and casualties reported pursuant to law:

ACCIDENTS ON ELECTRIC RAILWAYS IN CONNECTICUT

	1919	1918	1917
Number of accidents..........	1,757	2,018	2,376
Killed	39	59	77
Injured	2,029	2,361	2,867
Without personal injuries......	85	70	30

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*Abstract of paper read at meeting of Pennsylvania Street Railway Association, Harrisburg, Pa., May 27, 1920.

Modern Methods of Prolonging Track Life[*]

One of the Most Important Is a Lavish Use of Arc Welding Followed by Grinding—This Gives a Joint Life Equal to That of the Rail—Careful Attention Also Must Be Given to Bonding, Roadbed Construction and Tie Treatment

By E. A. HOFFMAN,
Engineer of Way the Wilkes-Barre (Pa.) Railway

IN MODERN methods of prolonging track life there are two divisions which naturally present themselves; first, the prolongation of the life of present tracks, and, second, the methods to adopt in the construction of new track to lengthen its life. The first is the more urgent and is now and has been a very serious problem for many roads during the past three or four years.

Consideration will be given first to a section of double track laid with heavy rail and substantial plain or continuous joints on a substructure apparently in good condition and surrounded with a paving also in fair shape, but with the receiving rail slightly depressed, so that a slight "pound" has developed, which if allowed to continue will surely destroy the joint; the joint plates, however, are still tight.

A few years ago the method of treating this condition would have been to grind off the high rail for a distance of a foot or more from the joint, thus forming a gentle incline to the low rail. The modern treatment consists of applying steel with an arc welder to the head of the low rail, building it up slightly higher than the high rail for a foot or more from the joint and then grinding flush with the high rail at the joint and gradually sloping to the low rail. This avoids grinding away the rail head and, if the welding is skillfully done, requires much less grinding.

Sections of track on our property treated in this manner four or five years ago are still in excellent condition, and the remarkable fact is that the receiving rail has not again become depressed. Apparently, the rails have "found" a bearing on the continuous joint plates. These tracks are from twelve to fifteen years old and subjected to a ten-minute headway of heavy suburban cars running at comparatively high speed, yet this treatment, costing not more than $100 per mile, is practically the only maintenance which has been required during that time.

Again, consider a somewhat worse condition where the joint plates are loose, the rail ends down and the paving at each joint badly shaken but otherwise good for several years. The joints have been tightened from time to time, perhaps new bolts have been installed, but the joint is soon as bad as ever. In this case surface welding alone is of little use.

If the rails are not unevenly worn on the fishing surfaces the application of new joints, followed by surface welding and grinding, may be the most economical remedy. Otherwise, the joint plates may be removed and built up with an arc welder and ground to a good fit on both rails with a suitable grinder. After the plates are reapplied the surface of the rail should be built up with the arc welder and ground to a true surface. If possible, in addition to bolting, the edges of the plates should be welded to the rails. Joints thus treated will stay "put." If there is a large number of such joints the substitution of a Lorain or Thermit joint may be preferable, or joint plates especially adapted to arc welding may be used.

In an extreme case where the rail ends are badly battered or broken out for several inches and the joint plates are hopelessly worn but the ties and the pavement between and outside the rails are in fair condition and good for several years it is certainly most desirable that the life of the track be prolonged until such time as the paving is renewed.

In this case the most satisfactory plan is the application of one of the several types of joints especially adapted to arc welding, the low joints first being raised to as true a surface as possible by the use of metal or wood shims. After the joint plates are applied the battered or broken portions of the rail can be restored by the arc welder and the whole surface ground smooth. In this manner on our property, track which a few years ago would most certainly have been scrapped has been restored to a very fair operating condition with practically negligible maintenance during the past two years and is apparently good for three or four more years.

As another example, consider a section of open track which, having been in service for many years, is now difficult to maintain and noisy owing to the loose parts of the joints. The fishing surfaces of the plates and rails are worn so badly that the plates come in contact with the web of the rail, and the joints when tightened or even when newly bolted become loose again in a few weeks. Before the advent of the electric welder new joints would have been purchased and applied to remedy this condition. Now the joints are removed, built up and ground to a proper fit and replaced.

On a mile section of track where the joints had been restored in this manner nearly five years ago a recent inspection revealed not a single loose joint, although the only maintenance this track has received, aside from tie renewals, was that given to it by the trackwalker. In this instance the rail ends were built up where battered and surfaced with a flexible shaft grinder. The rails have been in service nearly twenty years and under present traffic, consisting of a ten-minute headway, are apparently good for twenty more years. Another method of treating open track is to weld the joints, expansion joints being provided at intervals of about 500 ft.

BY USE OF WELDING AND GRINDING LOOSE JOINTS ARE NO LONGER SERIOUS PROBLEM

In the past loose joints have been the bane of the maintenance man's life, but on roads which have consistently followed the above practices loose joints have ceased to be a serious problem. Defective joints have been the cause of the removal of many miles of track long before the remainder of the rail, ties or the paving were worn out. It has been accepted almost as an axiom among street railway engineers that the life of the joint was the life of the track. The life of the joint today can be made nearly or quite equal to the life of the rail.

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[*] Abstract of paper presented before the Pennsylvania Street Railway Association, Harrisburg, Pa., May 28, 1920.

In the restoration of special work the worn surfaces of cast or rolled steel pieces can be built up an indefinite number of times and their life greatly prolonged by skillful welding. The welding of broken or worn manganese steel, however, is very uncertain. After six years of experimenting our policy is to avoid heavy or repeated welding of manganese steel.

Some of our most successful special work repairs have been those on built-up railroad crossings of steam lines. When the knee braces and fillers become badly worn it is practically impossible to keep them in good operating condition. By the use of the welding machine the worn knees can be restored to their original dimensions and when bolted up they will remain tight for a considerable time. If the steel fillers become so worn that the gage of the steam track becomes tight they too may be removed, built up and ground to a good fit and the crossing brought to proper gage. It is a good plan when thus repairing a crossing to have the steam gage a trifle wide, as the tendency is for the parts to take up somewhat under service. The battered intersections, after reassembling, should be built up and ground to surface on both the steam and electric runs.

Another innovation which has been practiced with considerable success is to weld the knee braces along the top and bottom edges to the crossing arms, with a heavy fillet of metal at the intersection of the arms built up flush with the surface of the crossing. If this is done it is desirable to let the crossing remain unwelded under traffic for two or three weeks until the different parts have found a bearing. It will then be found that the bolts will take up considerably and when thoroughly tightened the crossing may be welded. The bolts and nuts, however, should not be welded, as there is a movement between the central and outer sections of the crossing around the steel fillers. These will of course wear slightly as a result of this motion and the crossing bolts must be drawn up occasionally to take up this wear. It is not desirable to attempt to eliminate this movement, for then the crossing would be too rigid.

By the methods just described crossings which a few years ago would have been relegated to the scrap heap have been restored at very moderate cost so as to give several additional years of good service. The extent to which this process may be economically applied must be determined by each company. It will depend upon the comparative cost of track labor and new material and in a great measure upon the skill of the welding operator.

WELDING WILL INCREASE THE LIFE OF CROSSINGS 30 PER CENT

As an indication of the extent to which the life of such crossings may be prolonged, the experience of our company may be interesting. We have 110 crossings of steam roads on our system and our normal renewals averaged about nine crossings per year. During the past four years our renewals have averaged two crossings per year and the general condition of this class of special work is better than it was four years ago. This indicates that the welding process has increased the life of crossings at least 30 per cent.

Due to the stress of war conditions, we have undoubtedly applied this process to an extent which would not be economical in normal times, but it is conservative to say that the life of rails and special work can be economically prolonged 25 per cent by the skillful use of welding and grinding machines.

The corrugation of rails under traffic is another serious evil with which the track departments of some railways have to deal. Experiments with rails having a curved surface to conform more nearly to the contour of the wheels indicate that this at least mitigates corrugation. A rigid foundation such as concrete ballast is said to aggravate the trouble. The property of which the writer has had charge during the past nine years comprises more than 100 miles of track and we have no rail corrugation on our system. The track is constructed of some twenty different sections of rail, ranging from very light tee and tram sections to the very heaviest tee and Trilby shapes. The cars are of various types and vary in weight from 12 to 27 tons. There is a headway of approximately one and one-half minutes on some tracks, increasing to fifteen minutes on the lightest routes. The motor and other equipment are substantially the same as on other roads and we have practically the same conditions as many roads throughout the country which have a large amount of corrugation. In one respect only do our conditions differ; we use anthracite cinder ballast exclusively both in open and paved track. This produces a resilient track, and while one example is of course not conclusive, yet it certainly seems to confirm the theory that a rigid track is one of the contributing causes of corrugation.

CAREFUL ATTENTION SHOULD BE PAID TO BONDING AND ROADBED TO PREVENT CURRENT LEAKAGE

Rails in paved track often fail through corrosion of the web and base long before the remainder of the rail is worn out. Joint plates, braces, spikes and other fastenings are also badly affected. The writer recently had occasion to remove about ½ mile of track which had been embedded in a dirt and macadam roadway for more than twenty years. The track had never been used and was disconnected from the other tracks of the system. The rails, joints and spikes were in practically perfect condition. The theory has been advanced that rail corrosion is caused by leakage of the return current to the surrounding soil or ballast. The tremendously destructive effect of electric current leaving a metal conductor amounts to about 20 lb. of iron per year for each ampere of current, and when the large number of defective bonds ordinarily found on electric railways is considered the theory appears very plausible. With this in mind the proper bonding of track and the leakage resistance of roadbeds assume a new significance.

A recent report of the Bureau of Standards on this subject brings out the following interesting facts:

> Roadbeds with solid concrete ballast and vitrified brick or other non-porous pavements have a low resistance. Insulating layers of bituminous materials are not of practical value in reducing current leakages from such roadbeds. Roadbeds constructed with a foundation of clean crushed stone under a concrete base have a much higher resistance than roadbeds with a solid concrete ballast. The resistance of earth roadbeds in which the ties are embedded and therefore kept in moist condition is much lower than that of open construction roadbeds. Cinders, gravel and particularly crushed stone when used as ballast in open track produce very high resistance roadbeds. Zinc chloride and other chemical salts used as preservatives greatly increase leakage currents from tracks.

The following suggestions made in the same report, while applying directly to the prevention of electrolysis of pipes and similar underground structures, are equally significant to the track engineer, for in leaving the tracks the current must be just as destructive as it is when it leaves the pipes.

> Solid concrete ballast should be abandoned and clean crushed stone should be used as a foundation under ties. Where crushed stone or gravel is used it should be kept clean by proper covering or pavements. Salt which is often used to prevent frogs and switches from freezing will greatly reduce the resistance of roadbeds and should be avoided if possible. In open construction rails should be kept out of contact with the earth. The roadbed should be well drained to prevent fine material from washing into the ballast and to keep the ties as dry as possible. Vegetation should be kept down, as this tends to keep the roadbed moist and to fill the ballast with foreign materials.
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> Zinc chloride and similar chemical preservatives should be avoided where the escape of stray currents is objectionable. A treatment of creosote and gas oil improves the insulating properties of wood ties.

Another important part of the track structure upon which the life of the track and the surrounding pavement is just as dependent as it is upon the rail is the tie. Ten or fifteen years ago there was a plentiful supply of good tie timber available and the preservative treatment of ties was of doubtful economy. Today there is no question but that, with the grade of ties now available, it pays and pays well to treat ties.

TREATING TIES INCREASES LIFE ABOUT 250 PER CENT

Investigations show that a well treated tie on open track has a life of approximately twenty years, as against eight years for untreated ties. Preservation treatment also opens up a much broader field in the production of ties, in that red oak, beech, maple, gum, elm, sycamore and a dozen or more other species which, due to a life of only about four years, were always rejected as unsuitable for tie timber will, when treated, have a life of about twenty years in open track. If a treated tie will resist decay for twenty years in open track it should give a much longer service in paved streets, for the cause of decay when in open track is due to the fact that the sun and wind and rains eventually remove the preservative, while in paved track the tie, being protected from such actions, should retain its preservative almost indefinitely. While no data are available as to the life of ties in paved streets, a well creosoted tie should last at least thirty years.

It is probable that the rails of a modern, well constructed track in paved streets will under ordinary traffic, if well supported, last twenty-five years. The ballast ordinarily does not deteriorate seriously. If untreated wood ties are used they will begin to decay at the end of eight or ten years, and tie cutting and rail motion with resulting destruction of joints and pavement will follow. If the full life of the rail is to be obtained it soon becomes necessary to renew the ties. Modern heavy track and pavement cost approximately $10 per lineal foot. The use of creosoted ties instead of untreated ties would add about thirty cents, or 3 per cent, to this cost.

While commercial pressure treated ties are preferable, a very satisfactory treatment may be given by the open tank method, using a high boiling oil, such as carbolineum, for exposed ties. Owing to the expense of framing and replacing bridge ties they should, in addition to the open tank treatment, receive a brush or spray coat of carbolineum every four or five years.

Briefly, then, in the construction of new track, having in mind as long a life as is consistent with economy, we should first select the rail, and in so doing the standards and specifications of the A. E. R. A. are the best guide. The rail and special work should be of ample weight to carry the traffic and it is desirable to be liberal in this respect.

When the weight of rails is selected one point very often overlooked is the amount of return current that the rail has to carry. If the current density of the rail is too high it aggravates leakage into the surrounding soils and consequent electrolysis troubles. While negative feeders may be used to relieve this condition it should be borne in mind that steel forms as cheap a conductor as copper, besides furnishing, through the increased weight of rail, a more substantial track structure and lower maintenance charges.

Welded rail joints have now been perfected to such a degree that the number of failures per annum on the best types of joints is less than 1 per cent. On open track a substantial plain joint with heat treated or high strength bolts will require but little care if the rail is of sufficient weight. Treated ties should be used both on open and enclosed track where wooden ties are used. Enclosed track should have frequent tie rods or rail braces to insure proper gage.

A liberal amount of ballast should be used to provide drainage and distribute the load over the sub-grade. Tile drains should be laid where the subsoil is wet or of impervious material; frequent drains should be provided to carry off surface water and every effort made to make the pavement surface as nearly waterproof as possible. This requires attention to details, so that only the finer portions of the aggregate of the concrete foundation are allowed to come in contact with the rail, preferably with a surplus of mortar, care being taken that the pavement grouting is liquid enough to penetrate any voids and that the paving against the web and under the head of the rail is carefully placed.

Handy Shop Torch

THE Indiana Railways & Light Company, Kokomo, Ind., has experienced considerable annoyance when cars are brought in for inspection by finding the brake rigging frozen full of snow and ice. A kerosene torch was formerly used for melting the ice, but it has proved preferable to use a gas burner which has been devised by M. S. Ferguson, master mechanic.

The burner is made of standard box-type fittings and is very simple in construction. A 2-in. pipe plug is drilled and tapped for a $\frac{3}{8}$-in. pipe that serves for a handle. From this, 25 ft. of $\frac{3}{8}$-in. hose leads to a gas main in the inspection pit. The $\frac{3}{8}$-in. pipe handle is reduced to a $\frac{3}{16}$-in. opening by inserting into the handle a brass tube extending $1\frac{7}{8}$ in. beyond the 2-in. plug. Over the 2-in. plug is a 2-in. pipe coupling, with four $\frac{11}{16}$ in. holes drilled $1\frac{1}{2}$ in. from the rear end of the burner. These holes are for a free air intake.

Into the coupling is screwed a 2-in. x $2\frac{1}{2}$-in. standard nipple and another 2-in. coupling that has been heated and drawn down to a $1\frac{5}{8}$-in. opening to form a nozzle. The gas consumed at 75 cents per thousand feet has proved far cheaper than the kerosene needed to furnish the same amount of heat to the kerosene torch. There is also a large saving in the cost of labor, as the gas torch is always ready for instant use. In addition to being used for melting ice from brake rigging, this torch has proved very satisfactory in thawing out frozen air pipes.

High Spots in A. R. A. Exhibits

Shop Equipment and Tools Were Centers of Particular Interest at the Atlantic City Convention and Welding Exhibits Were More Extensive Than in Earlier Years

IN LAST week's issue of this paper a preliminary account was given of the exhibit features of the convention of the mechanical section of the American Railroad Association held at Atlantic City. Much of the equipment shown was of particular interest to electric railway men, and while space limitations will not permit of extended discussion, a general summary is given to show the advances made.

Industrial trucks and tractors attracted particular attention from railway shop men. A new type with a raising and lowering platform was exhibited by one manufacturer. A storage battery is used to furnish the power for propelling the truck and raising the load. The propelling motor operates at 24 volts and takes 50 amp. when hauling a 2-ton load. The hoisting motor is also a 24-volt motor and takes 20 amp. when operating light and 40 amp. when lifting a load of 2 tons. The storage battery and all equipment and control are installed over the front pair of wheels. The platform for receiving the load is 26 in. wide by 54 in. long. In the "down" position it is 12 in. above the floor and elevates to a height of 64 in. above the floor. The dimensions of the truck are such that it can operate satisfactorily in a 5-ft. aisle, and the turning radius is made very short to accommodate cramped conditions. This type of truck is particularly adaptable to use in shops of electric railways. The platform of the truck can be run underneath the car body, and compressors, switch groups, resistors or other heavy pieces of car equipment can be readily removed and lowered to clear the car body. The apparatus can then be quickly transported to the overhauling bench or placed in racks at any height up to 64 in. without additional handling. For reinstalling the equipment the truck platform can be run underneath the car body and the apparatus raised into position and secured without removal from the truck.

Welding sets and equipment were very much in evidence and the samples and descriptions of the various classes of work accomplished showed an increasing field of usefulness for them. Thirty manufacturers had exhibits of welding equipment.

One manufacturer devoted a large part of his space to arc-welding apparatus. An automatic arc welder was installed in an inclosed booth with colored windows for observation and was kept going almost constantly in demonstrating the various classes of work to which it is particularly adapted. Two sizes of compact portable outfits were also shown. Both single and two operator constant-energy arc-welding sets were mounted on wheels for movement to different locations.

Welding torch exhibitors had sections and details of their equipment to illustrate its construction and advantages. Some special features were: The use of long mixing bores, which assist in maintaining a perfect mixture of the gases and prevent flashback; an interchangeable swivel head for use of the same torch at different angles, and a balancing of the material so as to make handling easier. To prevent flashback one manufacturer has a torch with a chamber surrounding the gas mixer. The chamber is automatically filled with mixed gas through a small hole leading from the bore of the mixer. If the gas in the tip and in the flashback chamber is ignited the carbon dioxide from combustion is driven ahead of the fresh gas coming through the gas inlets and the flame is blown out. The mixed gas flowing through the gas mixer refills the flashback chamber automatically and thereby prevents sustained flashbacks. The gas at the tips is instantly relighted from contact with the hot material without change in the flame.

An exhibit of special interest to shop men in connection with the safety first movement was one of a large variety of guards to cover moving machine parts, also tool room partitions, railings, racks and window guards made of "steelcrete mesh." This material is of a form commonly known as expanded metal and heretofore has been used chiefly in building construction. In appearance it resembles woven wire screen with diamond-shaped mesh, but its construction is such that one entire sheet is an integral piece with no mechanical joints. Various sizes of mesh can be supplied as desired. Some special advantages claimed for this material are: It can be easily cut, bent and attached to supporting frames; it is stiffer and stronger than an equal weight of sheet steel; it is free from rough edges or projection, and it provides accessibility, ventilation and visibility of parts guarded and withstands effects of fire, heat, etc., and allows fire extinguishers to be used on parts guarded.

A reversible driving chuck for driving straight shank reamers and taps was a feature of one exhibit. The chuck has two symmetrically placed jaws with an oval aperture so that the size of the opening can be readily altered by changing the jaws. It is claimed that this chuck will always run central and that it will not lock no matter how hard the pull.

A new type of ball-bearing screw jack was also shown, with the operating mechanism in the base instead of the head of the jack. Advantages claimed for this design are that a greater portion of the weight is concentrated at the bottom so that danger of the jack being top-heavy is eliminated and the point at which the operating lever is pivoted does not rise with the load. Two sizes, respectively of 50 and 75 tons capacity, are furnished. The 75-ton jack has wheels permanently attached to the base and the 50-ton jack has a removable buggy by means of which it can be wheeled about.

TRUCK EXHIBITS WERE COMPREHENSIVE

While the complete trucks shown were intended for steam road service, still many interesting details of truck side-frames, bolsters, journal boxes, brakeshoes, brake rigging and slack adjusters were adaptable to electric railway service.

A rack exhibit with a complete set of foundation brake rigging and both pneumatic-cylinder slack adjuster and truck-lever bottom-rod slack adjuster was of particular interest to electric railway men. The pneumatic type of adjuster was applied to the brake cylinder and adjusted the piston travel while the brakes were applied.

An exhibition of brakeshoes with cast-steel backs embodying several new features that could be used with electric railway equipments to advantage also attracted attention. The backs are reinforced lengthwise by ribs dovetailed to engage the cast wearing portion of the shoe. This eliminates the bolt holes that are ordinarily punched through backs of the pressed-steel type and provides a means for reinforcing the backs. A new type of end-hung brakeshoe was shown in which a lug is cast integral with the back so that it will fit into a hole in the brakehead where ordinarily a bolt is required to fasten the lower end of the brakeshoe to the head. When this shoe is in place a clip is bent over so as to engage the top of the brakehead.

A new form of journal brass lubricator exhibited makes use of wicks attached to the sides of the journal brasses. These are soaked in regular journal oil and are attached to the outside lower edges of the brasses. These wicks are held in place by brackets screwed to the ends of the brass on its sides. The wick is threaded from the rear or high end of the brass through a hole in one of the rear brackets, then through a hole in the front bracket on the same side. It then goes through the bracket on the opposite side in the same manner. When the brass with its wick is installed it is first dipped in oil and then pushed into the journal box over the journal, the looped-back end of the wick being allowed to pass under the journal so that it will lie in the bottom of the journal box. The wick then feeds oil to the edges of the brass as long as there is any oil in the journal box.

Other A. R. A. Convention Items

In addition to the numerous exhibits covered in the general account given above there were a number of items of special interest to electric railway men. A few of these are treated in the following short articles.

CONVENIENT BOOKLET DESCRIBING EXHIBIT

At the A. R. A. convention the Gold Car Heating & Lighting Company passed out a little booklet entitled "What I Saw at the Gold Exhibit." This gave a list of the various products shown, with a short description of the interesting features. The equipment shown included several types of panel, cross-seat, truss-plank, cab and vestibule heaters, heater switches and thermostatic regulating equipment. A special feature was made of the truss-plank heaters and method of installation used for equipment supplied to the New York Central Railway for a recent order of fifteen cars. These heaters are equipped with Fahnestock connectors, which greatly facilitate installation and repair. The New York Central equipments consist of thirty-four truss-plank and two vestibule heaters per car. All types have interchangeable heating elements. A demonstration equipment arranged with thermostatic control was in operation.

STORAGE BATTERY CAR FOR DEMONSTRATION

The Railway Storage Battery Car Company had an electric storage battery car in operation between Atlantic City and Ocean City during the convention. The car is 52 ft. 2 in. long, arranged with one baggage and two passenger compartments. Thirty-four persons could be seated in the main passenger compartment and sixteen in the smoking compartment. The car weighs 30 tons without load and is equipped with four 25-hp. 220-volt motors and has a maximum free running speed on tangent level track of 45 m.p.h.

Power is furnished by 240 Edison type A-12 alkaline storage cells, capable of propelling the car 125 miles from one charge. The average energy consumption per car mile is stated to be 2¼ kw.-hr., measured on the basis of input at the charging station. Ampere-hour meters are provided to insure proper charging.

The car has two Brill 69-E trucks with axles run in Gurney ball bearings. Couplers, axles, wheels and other interchangeable parts are built to M.C.B. standards.

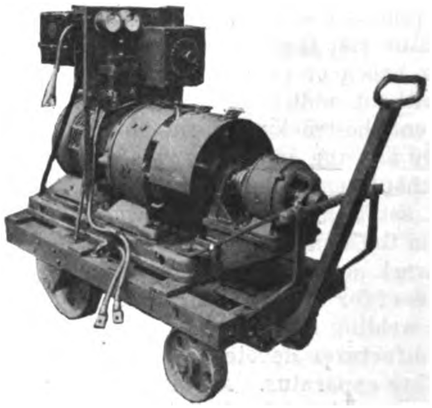
The heating equipment is Peter Smith forced draft, similar to the equipments usual in electric railway service. The car is arranged for double-end operation, duplicate control equipment being installed in both vestibules. This type of car also can be arranged for train operation by use of the multiple-unit system. General Electric straight and automatic air brakes are used.

SINGLE-OPERATOR ELECTRIC WELDING OUTFIT

The Westinghouse Electric & Manufacturing Company, as a part of its electric arc-welding exhibit, had its new type of single-operator electric arc welding equipment, for which exceptional efficiency is claimed because the generator operates at arc voltage and no resistance is used in series with the arc. The generator is designed to stabilize the arc and thus automatic devices, such as relays, solenoid control, resistors, etc., are rendered unnecessary.

The generator of the set has a capacity of 175 amp. and is provided with commutating poles and an exceptionally long commutator which enables it to carry the momentary overload at the instant of striking the arc without special overload protection.

The design of the control is such that very close adjustment of current can be quickly made, and when once set the current at the weld will remain fixed within reasonably close limits until changed by the operator. There are twenty-one steps provided, from 50 to 225 amp. This gives a current regulation of less than 9 amp. per step, which makes it easy for the welders to do vertical or overhead work when necessary.



SINGLE-OPERATOR ELECTRIC WELDING OUTFIT

Although the generator is strictly a short-arc machine, the arc produced is very tenacious and causes the deposited metal to penetrate deeply into the work.

The generator is mounted on a common shaft and bedplate with the motor. A pedestal bearing is supplied on the commutator end which carries a bracket for supporting the exciter, which is coupled to the common shaft. Motors can be supplied for either direct or alternating current circuits. Where an alternating-current motor is used leads are brought outside the motor frame for connecting to either 220 or 440-volt circuits, a desirable feature on portable outfits.

Where the equipment is required for portable service the motor-generator set, with the control panel, is mounted on a steel truck equipped with roller bearing wheels. This equipment can be easily hauled about the shop or yards by one man. Suitable plugs and receptacles for three-phase, three-wire or two-phase, four-wire alternating current motors allow the set to be quickly and conveniently connected to supply circuits at any desirable points. Only one plug is required for the motor, but the number of receptacles required depends upon the number of points at which it is desired to do welding work. These plugs and receptacles are supplied on special order.

The control for the single-operator equipment consists of a small ebony asbestos panel, mounted upon angle iron framework. The field rheostats for regulating the welding current, voltmeter, ammeter and a two-pole knife switch are mounted upon this panel.

In using the multiple-operator equipment each operator is provided with a separate control or outlet panel, so that each may take current from the same generator without interference. For convenience, multiple-operator equipments are divided into classes 1 and 2, depending upon the type of control supplied. Class 1 equipment has the main control panel arranged for the control of the generator and one welding circuit. The class 2 equipment has the main panel similar to class 1 except that it controls the generator only and separate outlets are used for all operators. A metal or graphic electrode holder is supplied with each welding panel, according to the work for which the panel is designed. The holders are of light weight, well balanced, and are designed so that they may be used continuously without overheating. Hoods or shields provided with colored lenses are supplied for the protection of the operator.

DIRECT-CURRENT SERIES-WOUND MOTOR FOR CRANE AND HOIST SERVICE

For severe, intermittent, varying-speed service, as in crane operation, where heavy starting torque is required, the Westinghouse Electric & Manufacturing Company has developed its type "HK" direct-current series-wound motors.

D.C. SERIES MOTORS FOR CRANE SERVICE

These motors are of inclosed construction with small openings in the lower part for ventilation. Covered openings in the top half of the frame give access to the brushes and the commutators. The most prominent feature is the compact construction, resulting in small over all dimensions and light weight.

The motors are of 3-hp. rating and equipped with commutating poles, so that high momentary loads can be carried without serious sparking at the brushes. Oil lubrication is used. The brushholders are clamped to insulated rods mounted on the front brackets, which are doweled in place. The position of the brushes is thereby fixed for both directions of rotation.

A blower is placed in the rotor, which effectively ventilates both armature and field windings and allows a small diameter armature to be used. In order to utilize to advantage the ventilating feature these motors have been rated on the quarter hour basis. On this basis these motors are said to have a larger continuous rating than non-ventilated motors of the same half hour rating.

Electrically operated shoe-type brakes are supplied when ordered. They are bolted to machined lugs on the motor bracket, making a compact unit. The brake is simple and rugged and provision is made for adjusting the wearing of parts.

Method for Packing Journal Boxes*

A Description of Methods Recommended for Cleaning and Packing Journal Boxes and Renovating and Applying Waste Packing

THE following practice was recommended for adoption as standard by the A. R. A. committee on standard method of packing journal boxes.

Preparation of New Packing: The waste must be loosened, placed in a saturating vat and kept completely submerged in car oil, at a temperature of not less than 70 deg. F., for a period of at least forty-eight hours to insure thorough saturation. It shall then be drained for the purpose of removing the excess oil until the packing is in a resilient or elastic condition.

Prepared packing in storage should be turned over at least once each twenty-four hours, or the oil which accumulated in the bottom of the container shall be drawn off and poured over the top of the prepared packing.

Preparation of Renovated Packing: All packing, when removed from journal boxes for the purpose of periodical repacking or renovating, should be pulled into a container, avoiding contact with the ground or any other place where it may pick up dirt, and taken to the waste-reclaiming plant. This packing must not be reused until renovated.

In reclaiming packing it should be first picked over carefully and dirt, metal, etc., shaken out, the knotted strands of waste pulled apart, and then placed in hot oil in renovating tank for a short time, working it with a fork for the purpose of thoroughly washing and loosening it. It should then be rinsed in clean oil, then drained for the purpose of removing the excess oil.

Cleaning Boxes: Before packing a journal box the oil well shall be thoroughly cleaned of all dirt, sand, scale and grit, and if water is present it must be removed. When new journal boxes are applied or when reapplying journal boxes the interior of the box, including the dust-guard well, shall be so treated, and close-fitting dust guards and lids should be applied.

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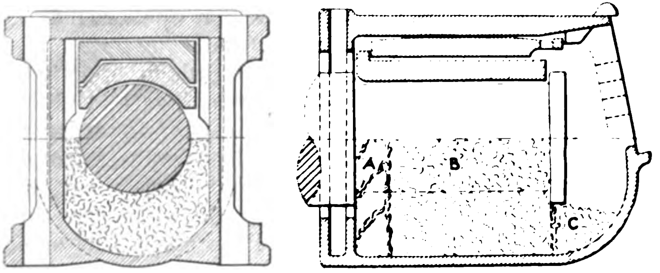
*Abstract of report of committee on standard method of packing journal boxes presented at Atlantic City convention of American Railroad Association, mechanical section.

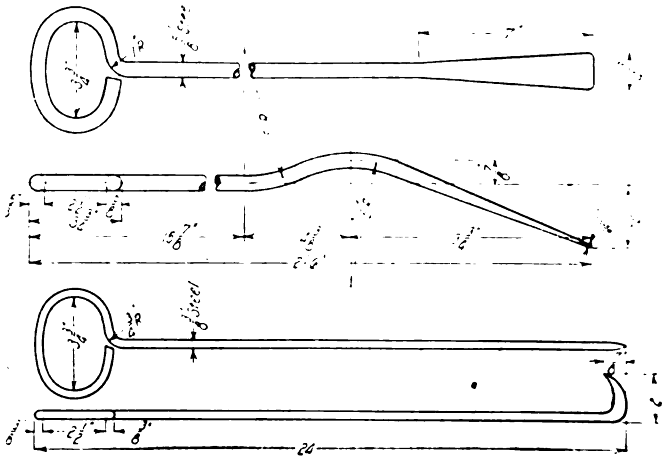
Cleaning and Applying Bearings: Before applying journal bearings they shall be thoroughly clean, have a smooth bearing surface, free from irregularities, and shall have a proper bearing. Under no circumstances is it permissible to use sandpaper, emery paper or emery cloth for the purpose of removing irregularities from the bearing surface. A half-round file or scraper should be used. Care must be taken that the wedge has a good contact on the crown of journal bearing. The surface of the journal should be smooth and thoroughly clean before bearing is applied. When applying a journal bearing a coat of lubricating oil must be applied to the bearing surface of same. Never wipe the bearing surface of the journal bearing with waste.



RECOMMENDED METHOD OF PACKING JOURNAL BOXES

Application of Packing: (a) Inner—In packing a journal box twist somewhat tightly a rope of packing and place it in the extreme back part of the box, as shown at *A* in the accompanying drawing. Make sure that it is well up against the journal so as properly to lubricate the fillet on the journal and keep out the dust.

(b) Main—Apply sufficient packing (preferably in one piece) to fill the space shown at *B*. Take care to have this packing bear evenly along full length of the lower half of the journal. The packing should not be too tight, but should be tight enough to overcome any tendency to settle away from the journal. The packing should extend to approximately the center line of the journal, but not above at any point, and should be pressed down evenly at sides so that no loose ends may work up under the journal bearings.

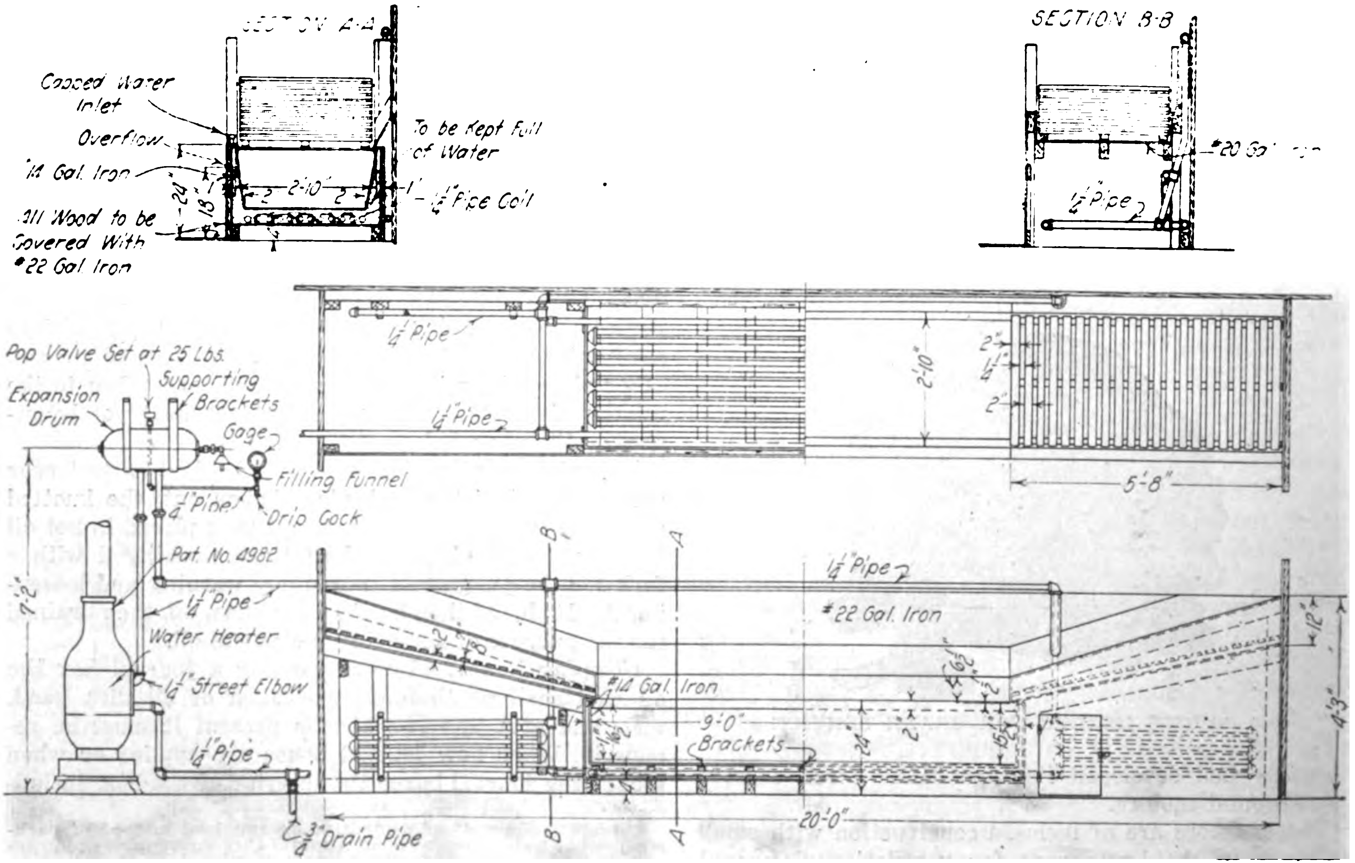


JOURNAL BOX PACKING TOOLS

(c) Outer—Apply a third piece of firmly twisted packing, as shown at C, and pack tightly in order to prevent displacement of the main packing. There should be no loose ends hanging out of the box, as they would tend to draw out the oil.

General Remarks: In addition to the above recommended practice the committee desires to emphasize the importance of causing the observance of several other factors as follows, with the view of reducing hot boxes to the minimum:

It is very essential that journals, after being turned,


SECTION A-A
Capped Water Inlet
Overflow
#14 Gal. Iron
All Wood to be Covered With #22 Gal. Iron
To be Kept Full of Water
1¼" Pipe Coil
2'-10"
24"
18"
SECTION B-B
#20 Gal.
½" Pipe
Pop Valve Set at 25 Lbs.
Supporting Brackets
Expansion Drum
Gage
Filling Funnel
¼" Pipe
Drip Cock
Pat. No. 4982
1¼" Pipe
Water Heater
1¼" Street Elbow
1¼" Pipe
¾" Drain Pipe
7'-2"
1¼" Pipe
1¼" Pipe
2'-10"
5'-8"
1¼" Pipe
#22 Gal. Iron
#14 Gal. Iron
9'-0" Brackets
20'-0"
12"
4'-3"
A
A
B
B

WASTE-RECLAIMING PLANT, USING STOVE TO HEAT WATER should be cylindrical, free from taper, tool marks, ridges, corrugations and other defects. In other words, a turned journal should reflect first-class workmanship, which is only possible of attainment through the use of machine tools, in good condition, of a design suitable for the nature of the work and capable of producing same with precision. The committee feels that an attitude of indifference prevails in many quarters with respect to the necessity of providing suitable heavy-duty lathes for the machining of axles, especially the larger sizes, and, as a result, many obsolete and worn-out axle lathes that have outlived their usefulness are being continued in service, whereas a close examination would disclose defects in the machining of the axles that would prove such lathes incapable of meeting the requirements.

It is suggested that the attention of all concerned be directed to the necessity of fully protecting journals against rust and corrosion during storage and that due care should be exercised in the handling and shipment of mounted wheels to guard against the damage which journals are subjected to through coming in contact with flanges of wheels as a result of improper loading or careless handling around shop yards.

It is also highly desirable that rigid instructions be issued to effect a more careful practice in the handling of journal bearings, especially for shipment, to prevent the indiscriminate tossing of journal bearings against each other, thus nicking and needlessly damaging the smooth bearing surface of the babbitt metal lining.

Drawings showing a representative waste-reclaiming plant and a representative set of journal box packing tools are shown herewith.

New Carhouse in Akron

A SAVING of about 400 car-miles a day is expected to result when the new carhouse in East Akron planned for immediate construction by the Northern Ohio Traction & Light Company is completed. At present all the cars in Akron are stored at the Kenmore carhouse, to the south of Akron and just beyond the city limits. One of the heavy rush-hour lines is that serving the Goodyear Tire & Rubber Company, which is located in the east section of the city, necessitating a dead mileage haul of about 5 miles for the extras and trippers across the city to take care of the peaks occurring with changes in shifts at the rubber plant. The new carhouse will be located very near the rubber plant, thus eliminating this dead mileage to a large extent and further eliminating the source of tie-up and delay which now results from the fact that these extra cars must traverse the central business district on their way out to the rubber plant.

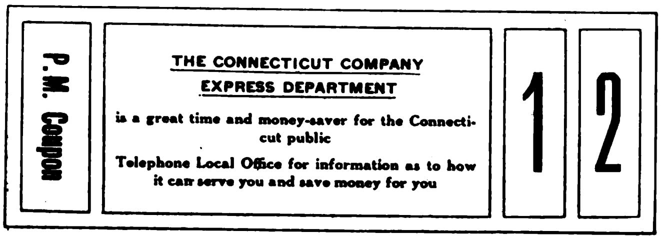
There are now 137 base runs operating out of the Kenmore carhouse. It is planned to put sixty-five of these in the new carhouse, which will be built for an initial capacity of seventy-five cars and planned for an ultimate of 185 cars. A five-track two-story brick building will be provided, with facilities for light repairs on the main floor and trainmen's quarters on the second floor.

With the East Akron carhouse completed it is planned to remodel two bays of the Kenmore carhouse into an addition to the Kenmore shops, adjacent. A floor will be put in to make the building two stories, providing an addition to the wood shop below and an armature shop above.

Advertising the Express Department

THE Connecticut Company, New Haven, does an extensive express business in its territory, as was covered in an article in the issue of this paper for Nov. 3, 1917, page 802. The express service is advertised in numerous ways, some of the most recent being illustrated in accompanying cuts. One shows the legend carried by the company's express trailer cars, and in another can be seen the straight-line map which is now being placed on all of the express cars. V. S. Curtis, general traffic agent, states that other signs probably will be used, including one showing the points of origin and destination of the car and another carrying the legend: "The capacity of this car is 40,000 lb. It saves five motor trucks and ten men."

Transfer backs are also being utilized, as shown by the one reproduced.

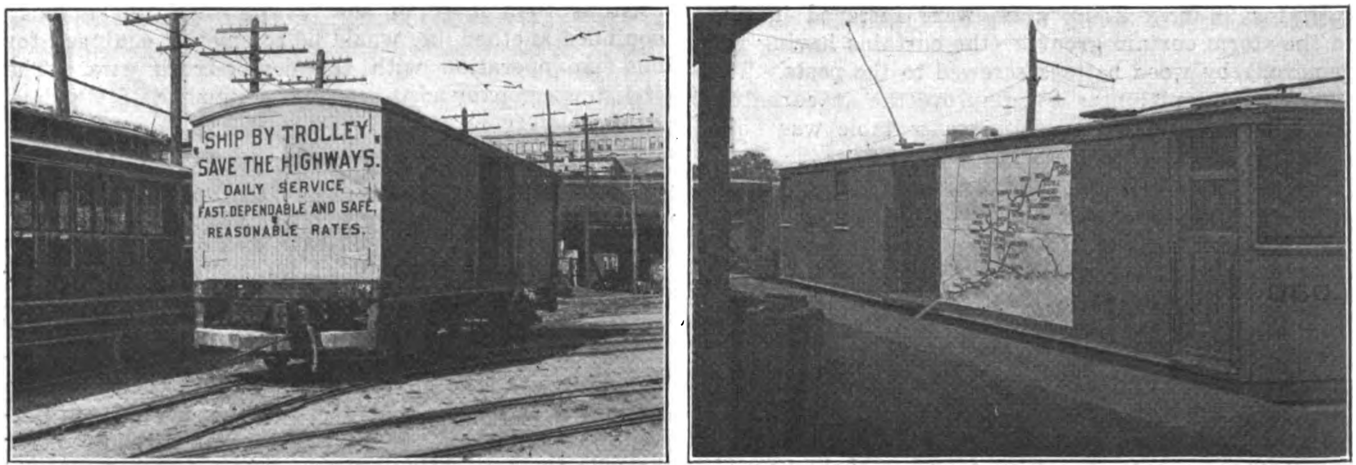

P. M. Coupon

THE CONNECTICUT COMPANY
EXPRESS DEPARTMENT
is a great time and money-saver for the Connecticut public
Telephone Local Office for information as to how it can serve you and save money for you

1

2

TRANSFER BACK USED FOR POPULARIZING EXPRESS SERVICE



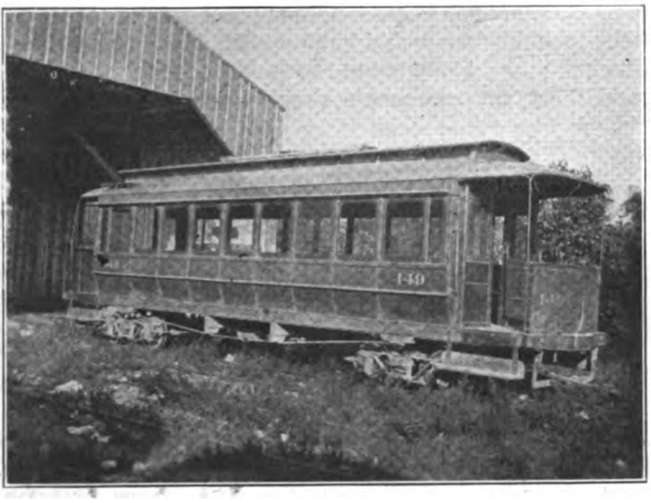
AT LEFT, ADVERTISING LETTERING ON REAR OF EXPRESS TRAIL CARS. AT RIGHT, STRAIGHT-LINE MAP SHOWING SCOPE OF CONNECTICUT COMPANY'S EXPRESS SERVICE

Converting Old Summer Trailers Into Closed Cars

Imperative Need for Additional Equipment Met at a Small Cost by a Few Changes in Open Car Bodies

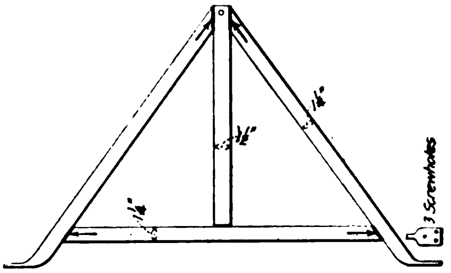
THE extensive war activities around Hampton Roads and Newport News, Va., forced the Newport News & Hampton Railway, Gas & Electric Company to press into service a number of old open cross-seat trailer cars which had been practically discarded. These cars served satisfactorily in their original condition to handle the shipyard workers until the winter months came on. Unable to secure additional cars quickly, and feeling the uncertainty as to how long the war business might continue, the company endeavored to make these old cars suitable for winter travel. The object was accomplished by a simple reconstruction of the body, which involved only a small expenditure per car.

The first step was to remove the running board and place 30-in. wide plates of No. 20 steel over the side posts. This side plate was made in one piece, extending from corner post to corner post, and bolted to each side post. A window sill was then installed along the top edge of the plate and, by notching it to fit around the posts, it was made continuous for the full length of the body. Removable wood window sash for 26-in. x 27-in. glass were fastened in place in the storm curtain grooves (the curtains having been removed) by wood battens screwed to the posts. Then to relieve the plainness and improve the appearance of the side construction, a false water table was bolted near the center of the steel side plate.



CROSS-SEAT SUMMER CAR REMODELED TO MAKE CLOSED WINTER CAR

As the next step the middle window was cut out of each bulk-head to make a door 24-in. wide in which roll doors were hung. These doors were taken from old cars which had been removed from service. The long cross seats were then sawed in two places through the center, taking out a piece long enough to give a 20-in. aisle when the seats were in their new position. The outer ends of the seats were then squared off and pushed over against the steel side plates and notched to straddle the side posts. New aisle legs for the seats were cast in a local foundry, these being of the walkover type. The old seat backs were used by cutting them down. The old seat-back fixtures were also used with the aid of seat brackets which were made in the local shops. These were made from four pieces of ¼-in. x 1¼-in. and 1½-in. strap iron placed edgewise to each other and welded together electrically at the five points of contact to form a triangular support. These brackets were fastened to the seats with six screws and the seat-back fixtures carried at the apexes. This construction is shown in an accompanying sketch. The company has reconstructed nine cars in this manner, some of which were formerly fourteen-bench cars seating seventy passengers, and the others, twelve-bench cars seating sixty passengers. The seating capacity with the new arrangement in the closed car is forty-eight and forty, respectively. The cost of converting the fourteen-bench cars was $650 each and of the twelve-bench cars $550.



SEAT BRACKET USED ON CONVERTED CARS. ARROWS INDICATE FIVE WELDED JOINTS

One-Man Operation of Double-Truck Cars

THE Houston (Tex.) Electric Company is having unusual success in operating some of its double-truck cars with one man. Fourteen cars with 28-ft. bodies between bulkheads, equipped with maximum traction trucks and weighing 31,000 lb., have been equipped with safety devices and the rear platform closed up and seats installed, bringing the seating capacity from forty-three up to fifty-three passengers. The bodies being of the open bulkhead type, no other changes were made. Of these cars six form the regular equipment on one line, and the others are used as extras during rush hours. In the latter case these one-man cars seating fifty-three people are mixed in with the same type of cars operating with two men and seating forty-three people, and even when handling loads of seventy-five to ninety people on a heavy line with close headway it was stated they maintain the same schedule speed as the two-man cars, and this speed has not been reduced over what it was for all two-man operation. At the time of this writing it was understood that as soon as four more of these cars could be similarly equipped another line would be completely equipped for one-man operation with the double-truck cars. The Houston company also operates a number of standard Birney safety cars.

Indianapolis Converts Summer Cars to Pay-as-You-Enter Type

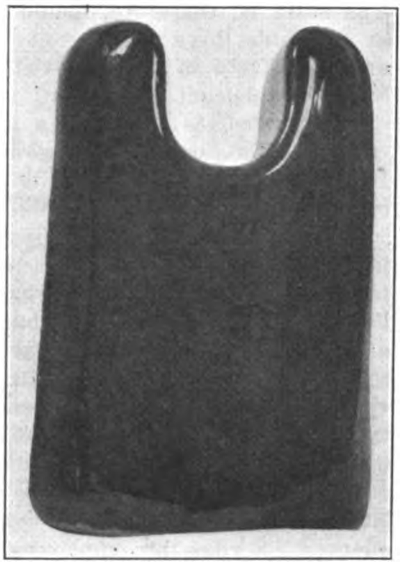
SEVERAL months ago the Indianapolis Street Railway sent ten of its summer cars to Dayton, Ohio, to be converted into the pay-as-you-enter type. Five of these have now been returned for service. In remodeling the cars special attention has been given to providing as large a platform space as possible, to prevent crowding and to reduce the time required for boarding and alighting. New routing signs of a transparent type have also been added.

New Porcelain Feeder Insulator

Porcelain Insulator Is Now Being Tried in Brooklyn for Supporting 500,000 Circ.mil Direct-Current Feeders

BY G. H. MCKELWAY
Engineer of Distribution Brooklyn (N. Y.) Rapid Transit Company

THE accompanying illustration shows a porcelain feeder insulator which is being used on the lines of the Brooklyn Rapid Transit system. Insulators of this type support the 550-volt direct-current feeders of 500,000-circ.mil. section and, so far as the writer knows, are the first porcelain insulators to be designed for such service. They are made of wet-process porcelain and are of approximately the same dimensions as the ordinary composition tree-top insulators used for similar work. They are 5¼ in. high, with a diameter at the base of 3¾ in. and at the top of 3⅜ in. At the bottom a single petticoat extends down ¾ in., while the pinhole has a drawn-steep thimble of the Hubbard type cemented into it and is large enough to take the 1-in. tapered steel pin which is standard on the lines of the Brooklyn Rapid Transit system. The outside of the insulator is covered with a brown glaze.



PORCELAIN FEEDER INSULATOR

The reason for the decision to try out the new type of insulator was that it was believed it would last longer than the composition type, would be just as satisfactory, if not better, and would certainly be no more and probably be less expensive in first cost. Some composition insulators have been found not to "weather" well and to deteriorate quite rapidly, especially in hot weather. With such insulators the threads in the composition often become soft, causing the insulator to "freeze" to the pin, from which it can be removed only with considerable labor and by damaging the insulator so much as to render it valueless for reinstallation.

Another point in which this insulator would appear to have an advantage over the ordinary type of feeder insulator is that the prongs which hold the wire in place are of porcelain and integral with the rest of the insulator. This does away with the metal saddle used with most of the composition insulators, which is a factor of danger to unskilled men working near such insulators owing to the fact that the saddle may be alive due to the movement of the wire, causing the insulation to be worn through at the point where it rubs against the saddle. This is of very little importance where the feeders are installed on poles, as there the only men working near them are linemen, who are accustomed to the risks of their trade and who are taught to consider no insulation as affording complete safety. Where the wires are hung from bridges or elevated structures there are, on the contrary, painters or iron workers often working near the wires, and they are apt to consider anything but a bare wire as being safe to touch. Such men are occasionally shocked or burned by coming into contact with or letting their tools touch live parts that are normally safe.

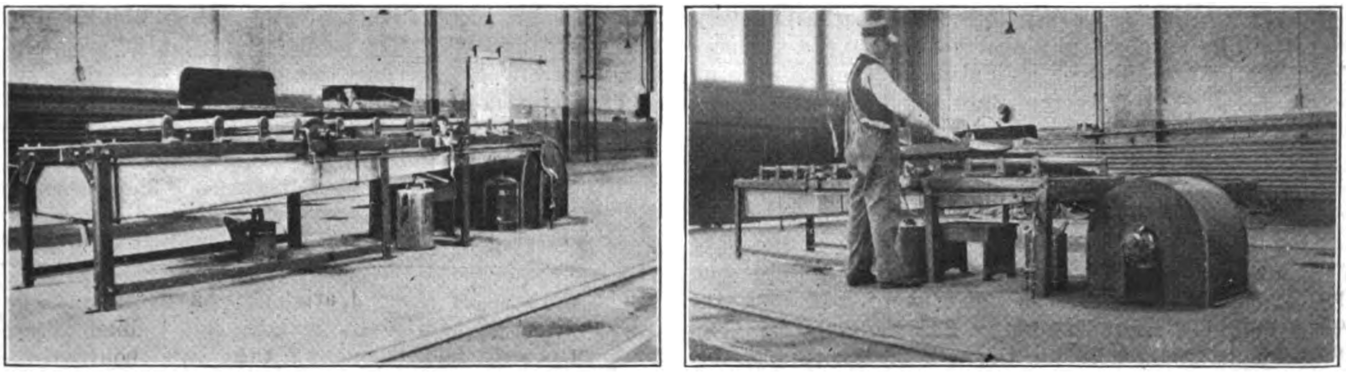
So far as cost is concerned there is very little difference at present between the two types of insulators, but the porcelain insulators should be cheaper if there is ever a demand for them sufficient to warrant the makers turning them out in large quantities, especially after the development charges have been absorbed.

Seat-Cleaning Machine Used in Cleveland

BY R. C. SOHL
Cleveland (Ohio) Railway Company

THE cleaning of rattan seats by the Cleveland Railway Company is accomplished by means of the cleaning or scrubbing machine furnished by the Wilson Imperial Company, Newark, N. J. The seats are first run over the steel brush, through which a small stream or spray of Wilson's O.N.C. imperial emulsion is forced. This solution is contained in a 2½-gal. can which is fitted with a small hand pump for putting the contents under pressure. It is made by mixing one part of hot water with one part of emulsion. One filling of the 2½-gal. can is enough to clean the seats of one car, whether of the cross or longitudinal type.

After the seats have been scrubbed with the steel brush they are run over the broom brush, through which is sprayed a generous supply of water for rinsing. Thereafter, the seats are thoroughly dried and given one coat of Wilson's imperial cane glaze, which is put on with a varnish brush. This preserves the cane, so that the seats are thereafter more easily washed and kept clean.



TWO VIEWS OF RATTAN SEAT-CLEANING MACHINE WHICH HAS A STEEL AND A BROOM BRUSH, MOTOR DRIVEN, FOR SCRUBBING OFF THE DIRT

In putting cushions through the scrubbing machine the small cross-seats are handled by one man, but two men are required for the larger longitudinal seats. The latter, ranging from 8 to 16 ft. in length, require from five to seven minutes for a thorough scrubbing, using two men, whereas one man can put a smaller cushion through the machine in from three to five minutes.

In reference to the maintenance of curtains, we do not use any cleaning material on our curtains, but there is a preparation manufactured by the Standard Oil Company, called Matchless Gloss, which has been found satisfactory for renewing and brightening the colors in the fabric when it becomes faded.

To Vote Upon Strikes

United States Chamber of Commerce Issues Full Text of Report of Public Utility Committee on Strike Legislation

DURING the past week the United States Chamber of Commerce has issued its blanks for referendum No. 32 on the subject of anti-strike legislation. Each member is asked to express his opinion before July 24 on the following two points:

1. Should strikes by employees of all public service corporations performing public service essential to the lives, health, security, comfort and well being of the people, by law, be explicitly prohibited?
2. Should suitable tribunals be created by law to adjudicate differences between the employees of public service corporations and their employers, and the decisions of such tribunals be final and binding upon both parties?

The committee on public utilities of the United States Chamber of Commerce was appointed about a year and a half ago, with Lewis E. Pierson, chairman of the board Irving National Bank, New York, as chairman. The other members are:

Henry G. Bradlee, Boston; Arthur W. Brady, Anderson, Ind.; F. B. DeBerard, New York City; E. K. Hall, New York City; Albert W. Harris, Chicago; Charles L. Harrison, Cincinnati; James S. Havens, Rochester, N. Y.; J. W. Lieb, New York City; H. L. McCune, Kansas City; P. N. Myers, St. Paul, and John W. Van Allen, Buffalo.

The report of the committee consists for the most part of a series of principles by which, it says, in its opinion, the relations of employer and employee engaged in the service of the public should be regulated. These principles follow:

PRINCIPLES ENUNCIATED BY COMMITTEE

No corporation or person individually or collectively may lawfully or rightfully obstruct or impede the performance of any duty or obligation of the state or of any agency created by the state for the performance of a public service.

The state is sovereign. Its will is expressed through the government created by it. That will cannot be given effect if the servants of the government refuse to obey its behests. Therefore, no servant of the government has either moral or legal right to obstruct the lawful processes of the government. If such assumed right were successfully asserted, the will of the servant would override the will of the people, the government would be subverted and the servants would become the masters.

It is the obligation of the state to protect the lives, health, security, rights and property of all its people.

These depend upon the uninterrupted operation of the agencies which provide transportation, water, light, heat, power and means of communication. It is, therefore, the right of the people that such uninterrupted operation be guaranteed by the power of the state.

These agencies are created by the state for the performance of services of a public character; they are devoted exclusively to the service of the public; they operate by virtue of public powers delegated to them by the state, and they are thereby public agencies employed by the state to perform public services indispensable to the well being, comfort, security and often to the health and the lives of all the people. The state is, therefore, bound so to exert its powers as to enable these agencies and instrumentalities fully and effectively to perform the public purposes which have been delegated to them.

The immediate result of a strike is to compel the suspension of the industry against which it is directed. When directed against a public utility it is an invasion of that which is indispensable to the community.

The effect of a strike against a public utility is to inflict great harm upon the community. It often entails widespread suffering, seriously endangers the public health, deprives large populations of a sufficiency of food, fuel and other necessaries of life. It deprives the people of the instrumentalities of commerce, thereby causing widespread suspension of industry and taking from many the means of livelihood, and in many ways inflicts great distress upon all.

We believe it the duty of the state by suitable legislation to protect the people against these dire consequences. Strikes by employees of public service corporations should be prohibited by law as conspiracies against the paramount rights of the public. It is obvious, however, that the great class of employees thus deprived of the power of self-protection by means of the strike should be otherwise protected against unjust relations with their employers, through suitable tribunals empowered equitably to adjust differences, whose findings should be final and supported by due provision for enforcement.

The recently pending Cummins bill regulating railroad transportation contained a provision (adopted by the Senate but discarded by the House) which made it unlawful for any two or more persons, being employees of any common carrier or carriers, "to enter into any combination or agreement with the intent substantially to hinder, restrain or prevent the operation of trains or other facilities of transportation for the movement of commodities or persons in interstate commerce or, in pursuance of any such combination or agreement and with like purpose, substantially to hinder, restrain or prevent the operation of trains or other facilities of transportation," etc., under penalty of a fine of $500 or six months' imprisonment, or both. A similar inhibition was laid against aiding, abetting or procuring such interference. The Cummins bill also contained provisions whereby the employees were protected against imposition of unjust conditions of labor.

The purpose of these provisions was to prevent the interruption of service by strikes and compel resort by both parties to settlement by the legal boards proposed for that purpose.

We believe that these or similar provisions should be made law not only as to railroads but as to all public utilities.

In view of the proposed denial of the right to strike by employees, the committee does not at this time consider it necessary to adopt the proposal of the Merchants' Association as to contractual relations.

Applying the principles stated above, we are of the opinion:

1. That strikes by employees of all public service corporations performing public service essential to the lives, health, security, comfort and well being of the people should, by law, be explicitly prohibited.
2. That suitable tribunals should be created to adjudicate differences between the employees of public service corporations and their employers, and that the decisions of such tribunals should be final and binding upon both parties.

Letters to the Editors

The Electric Railway Must Not Become Anti-Social

NEW YORK, May 18, 1920.

To the Editors:

The report of the Boston Elevated Railway for the year ended Dec. 31, 1919, published in your issue for May 8, shows that while the 10-cent fare is placing the company on a sounder basis this surplus of income over expenditures is still being obtained at a decided decrease in the usefulness of the Boston transportation system to the public. Here we are brought face to face again with the question whether a straight-out increase in flat fare is really the best solution.

According to the official report, the total number of revenue passengers for the year ended Dec. 31, 1919, was 324,758,685. This was 6.86 per cent less than the 348,664,700 passengers carried for the year ended Dec. 31, 1918. Yet the latter part of the year 1918, according to official statements, was an exceptionally bad one from the traffic standpoint. The public had been unsettled by the inauguration of the 7-cent rate in August, 1918; by the arrival of the influenza epidemic in September and by the increase to the 8-cent rate on Dec. 1 of 1918. It follows, then, that if the public had accommodated itself to the 10-cent rate inaugurated June 10, 1919, the passengers carried during the year 1919 would have exceeded the disturbed year 1918.

Now checking portions of the year 1918 against the preceding year will show us still more vividly how much the public usefulness of the Boston transit system has been impaired since the arrival of the increases in rate of fare. Here are the figures for four months of 1918 and 1917, the former covering the period of the 7-cent fare and the start of the influenza in September, while the latter is for operation in 1917 at the 5-cent fare:

For August, 1918,	shows 11.49 per cent less travel than 1917
For September, 1918,	shows 20.02 per cent less travel than 1917
For October, 1918,	shows 26.48 per cent less travel than 1917
For November, 1918,	shows 13.64 per cent less travel than 1917
For these 4 months, 1918,	shows 17.38 per cent less travel than 1917

In December, 1918, came the 8-cent rate, and this showed a decrease of 14.86 per cent in traffic as compared with December, 1917.

The total traffic for the year 1917 appears to have been 381,017,338, as compared with the 348,664,700 passengers of 1918. Hence, while the traffic of 1919 was 6.82 per cent less than that of 1918, the year 1918 in turn was 9.3 per cent short of the record for 1917. In contrast to this, we find that in 1916 the traffic was 363,477,041, or 4.96 per cent increase over the 346,316,584 passengers of the year 1915, just as 1917 had shown an increase of 5 per cent over 1916. Available figures for earlier years cover fiscal periods ended June 30. While these do not compare fairly with the calendar periods, that for the year ended June 30, 1914, covers the carriage of 343,181,049 passengers, which was given as an increase of 5.16 per cent, or 16,828,186 passengers, over the fiscal year ended June 30, 1913. To summarize:

324,758,685 passengers were carried Jan. 1—Dec. 31, 1919
348,664,700 passengers were carried Jan. 1—Dec. 31, 1918
381,017,338 passengers were carried Jan. 1—Dec. 31, 1917
363,477,041 passengers were carried Jan. 1—Dec. 31, 1916
346,316,584 passengers were carried Jan. 1—Dec. 31, 1915
343,181,049 passengers were carried year ended June 30, 1914
326,352,863 passengers were carried year ended June 30, 1913

From these figures we have to draw the conclusion that, despite the growth of the community, the absence of jitney competition and comparatively unimportant losses to private automobiles, the Boston Elevated Railway carried last year no more traffic than six to seven years ago. Since the normal annual increase in traffic in 5-cent years seems to have equaled at least 5 per cent, the actual traffic for 1919 should have been in excess of 400,000,000 instead of approximately 325,000,000. The difference between these figures represents 75,000,000 rides that would have been taken otherwise for purposes of business or pleasure. Their absence means just that much slowing down of community life, because in any large city the index of activity is furnished by the car-riding statistics.

In presenting these figures I intend no criticism of either past or present managements of the Boston Elevated Railway. The necessity for more revenue goes without saying, and in view of the pointless objections raised to trying the principle of a short fare for the short rider the trustees cannot be blamed for going up and up until they found a fare which brought in enough revenue to meet expenses and to permit modernization throughout.

But what I do wish to point out is that the policy at present being followed is forcing the electric railway to become of declining, instead of rising, value to the citizens of Boston, because it maintains a system of fare charges which discourages the short riders at all times and also those long riders, like women shoppers, who are desirable because their riding is largely of off-peak character. Instead of making the car rider carry all the burden of increased costs these communities would be doing a wiser thing from the social and business welfare standpoints if they returned to the old fares and made up the deficits by a direct tax on all the citizens—both the car riders and the limousine riders whose factories, stores and apartment houses are bound to drop in value with every impairment of electric railway service. In short, the electric railway is too important to the well being of the modern city to be forced into a position of declining usefulness. The Boston 10-cent flat fare may be getting the money, but the possible effect on the longevity of the street railway may be described by that famous phrase: "The operation was successful but the patient died." CONSULTING ENGINEER.

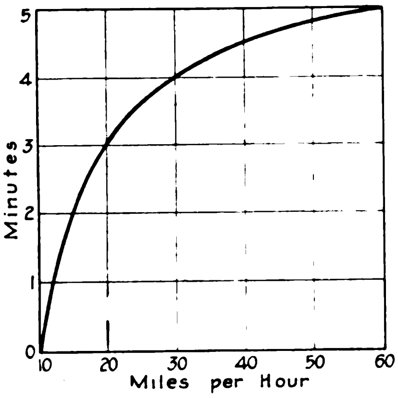
Why Take a Chance?

L. HEYNEMANN
Consulting Engineer

SAN FRANCISCO, CAL., June 8, 1920.

To the Editors:

Allow me to call your attention to a matter which I think should be driven hard into the minds of all automobile drivers. It is the folly of speeding in driving automobiles on short runs in city streets. Here the risk of accident is very great and, as I shall show by means of a simple diagram, the time saved per mile of run, on short runs, between moderate speed and very high speed is quite small. Unless your readers have studied the matter, they will probably be surprised to note the small time saving, per mile run, between a high speed and a relatively low speed. This is due, of course, to the fact that at high speed it takes much less time to cover one mile. The accompanying diagram shows the time saved between speeds of 10 m.p.h. and higher, the minutes saved being represented by the vertical spaces on the chart. The data for the curve were calculated as follows:



CURVE SHOWING TIME SAVING AT DIFFERENT SPEEDS AS COMPARED WITH 10 M.P.H.

At 10 m.p.h. one mile is covered in six minutes and at 60 m.p.h. it is covered in one minute. The difference of five minutes is the time saved per mile as between the two speeds. On the chart this saving is plotted against the speed of 60 m.p.h. Similarly at 30 m.p.h. one mile is covered in two minutes, a saving of four minutes as compared with the six minutes required at 10 m.p.h., etc.

I trust that the above will be interesting and useful to the readers of the ELECTRIC RAILWAY JOURNAL.

L. HEYNEMANN.

Association News

Fare Systems Discussed

THE committee on fare systems of the American Association met at headquarters on May 24. There were present, in addition to the chairman, W. H. Sawyer, East St. Louis; Thomas Conway, Philadelphia; W. J. Flickinger, New Haven; L. H. Palmer, Baltimore; A. S. Richey, Worcester, and C. L. S. Tingley, Philadelphia.

The replies received to the questionnaire which had been sent out by the committee requesting specific information on fare systems upon analysis failed to prove statistically that any one system was the "best seller." Existing local conditions at the time of the fare changes, the committee believed, greatly influenced the amount of traffic handled. To obtain facts about these conditions a further letter is to be addressed to the railway executives asking their personal opinion as to the effect of fare changes and to enumerate in detail the reasons advanced for their conclusions.

A method of analyzing the various kinds of zone fare increases was prepared for the guidance of committee members in their preparation of data to appear in the final report. It is essential that such studies should be made upon a uniform basis so that comparisons can be made of the details existent in each system.

The committee plans to meet again on Tuesday, June 29, at association headquarters.

Busy Month for Bureau of Information and Service

DURING May the American Association bureau on information and service prepared for the benefit of member companies the following compilations and reports:

Trackless Trolleys. Dated May 28, 1920—Theoretical comparisons under assumed conditions of the relative efficiency of the street railway, the motor bus and the trackless trolley together with actual statistics of trackless trolley operations in Bradford and Leeds, England.

Cost-of-Living Studies. Dated June 1, 1920—Summary of reports of following agencies showing present, compared with last year's and pre-war prices: National Industrial Conference Board, Bureau of Labor Statistics, Annalist Food Index, Gibson's Food Index, Dun's Wholesale Index, Bradstreet's Wholesale Index.

Summary of Opinions of Railway Executives on Effect of Increased Rates on Their Properties. (Based on data sheet No. 199.)

Supplement to Wage Bulletin No. 124—Bringing information on trainmen's wages up to June 1.

Supplement to Cities Having Increased Rates of fare. Dated April 14—Bringing information up to June 1.

Supplement to "Methods of Interurban Companies in Increasing Rates of Fare" of Jan., 1920—Bringing information up to June 1.

Association Publishes Important Work

THE American Association is issuing a book by Harlow C. Clark, entitled "Service-at-Cost Plans." The work is reviewed elsewhere in this issue. It is an octavo volume containing 315 pages, in cloth binding. The present plan of the association is to furnish each company member with one copy free and to sell copies to individual and company section members at $2. The association expects a wide distribution of the book, and hopes that companies will order extra copies for local distribution. To encourage this practice the association will furnish such copies at $1.85 each in lots of twenty or more. The price to the public is $2.50.

Chicago Safety Committee Activity

DURING the first four months of activity of the new safety organization of the Chicago Elevated Railway the safety committees considered more than 800 safety suggestions, of which 75 per cent were approved. More than 65 per cent of the approved suggestions have already been carried out. This excellent record is due in a great degree, it is said, to the consideration and study given each suggestion by the employees' committee before passing it on to the division committees.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

New Orleans Men Ask More

Trainmen Want Seventy-seven Cents an Hour—Receiver Sees No Escape from Increase in Fare

The public of New Orleans, La., is between two horns of a dilemma; it faces either a car strike or higher street car fares. The fare is now 6 cents, with no charge for transfers. The trainmen of the New Orleans Railway & Light Company working under a scale of wages accorded them by the War Labor Board in July, 1918, have demanded of Receiver J. D. O'Keefe an increase of wages from 38 and 42 cents an hour, according to length of service, to 77 cents an hour flat for platform men and 35 cents an hour for all other employees. They also ask that all overtime shall be paid at the rate of time and a half, Sundays and holidays being considered overtime. They also demand an eight-hour day.

PUBLIC DISCUSSION PLANNED

Previous to the contract under which they are now working, and which expires on June 30, the platform men were paid 24½ cents, maximum, per hour. Overtime was granted only after ten hours' service and Sundays and holidays were paid regular time.

Receiver O'Keefe frankly conceded that the men should receive some increase, but contended he could not increase their pay without additional revenue. He further pointed out that he is being asked to surrender his management of the railway to the union, and that this would conflict with his responsibility to the federal court, to the creditors of the company and to the interests of the public in general.

Receiver O'Keefe is in great doubt whether a 10-cent fare would be sufficient to produce enough revenue to meet the demands of the men. It is estimated that the additional expense for wages would be $3,000,000 a year.

The officials of the union have asked and have obtained Receiver O'Keefe's consent to discuss the matter publicly and a conference was arranged to be held on June 14.

Ordinance Passed for Seattle Purchase Inquiry

Hugh M. Caldwell, Mayor of Seattle, Wash., has accepted the $10,000 offered him by the City Council to be expended in an inquiry to determine whether the city paid an excessive price when it acquired the railway lines of the Puget Sound Traction, Light & Power Company for $15,000,000. The Mayor approved the bill after he had been informed that the City Council has permanently "filed" his request that Corporation Counsel Walter F. Meier be directed to conduct the proposed inquiry into the matter.

In a letter to Corporation Counsel Meier on May 20, the Mayor asked Mr. Meier to state whether the city has any ground for action against the former owners of the railway to recover damages for misrepresentation, or to void the transaction.

When Mr. Meier declined to pass on questions of fact in the case, Mayor Caldwell asked the Council to direct the city legal department to make an investigation of the transaction. Councilman Moore then introduced the ordinance authorizing the Mayor to conduct the inquiry personally, and appropriating the sum of $10,000 to cover expenses involved.

Publicity Planned for Nebraska

A committee on public utility information has been organized in Nebraska along lines similar to those in Illinois, Indiana and Kentucky. The committee has headquarters in the Brandeis Theater Building, Omaha. Its chairman is W. B. Roberts, president of the Union Power & Light Company, Omaha. Horace M. Davis is actively in charge as director. Members of the executive committee include James B. Harvey, Continental Gas & Electric Company, Omaha; Thomas H. Fritts, vice-president of the Central Power Company, Grand Island; J. E. Harsh, vice-president of the Lincoln Gas & Electric Company, Omaha; Leroy Corliss, Waterloo Creamery Company; W. H. Wood, Peoples Ice Company, Omaha.

It is interesting to note that other states in which preliminary organizations along similar lines have been effected are Ohio, Wisconsin and Iowa, and that action looking forward to committees of this kind has been taken in Michigan, Missouri and Texas.

Chile Electrification Proposed

Reports through banking circles indicate that the long deferred electrification of the Valparaiso-Santiago Railway is to be prosecuted. A double track would be laid on certain portions of the system and a large number of sheds, side tracks and bridges provided. At the same time electrification of the entire system of State Railways is under consideration, the estimated cost being $13,500,000, and new equipment to the extent of 214,000 pesos, gold, is to be bought for the Arica-La Paz Railway. A railway line is planned from Galvarino to Quinoa to join the branch of the Naiguero between Temuco and Carahue.

Eighty Cents in Chicago

New Pay Arranged in Conference Accepted by Men—Surface and Elevated Men Included

By referendum vote the employees of the Chicago Surface Lines on June 14 accepted the new wage scale offered by the management. The radical element in the union was routed by a vote of eleven to one. Thus the possibility of a strike was removed. The only doubtful element in the situation now is whether the Illinois Public Utilities Commission will fix a rate of fare sufficient to cover the new wage scale. This will not be known until about July 1.

INCREASE FIFTEEN CENTS AN HOUR

The new wages will be 15 cents an hour over the former rates, that is, 75 cents for the first six months, 78 cents for the next nine months and 80 cents after one year. Night car men will receive 82 cents an hour. There will be no change in working conditions except that the management agrees to make the runs on Sundays and holidays as near six hours as possible, but to pay only straight time until after eight hours, when the rate is on the time and a half basis. Other classes of employees will receive increases ranging from 10 to 20 cents an hour.

The Chicago wage scale is now said to be the highest in the country for surface lines. These employees have usually had an hourly wage higher than in other cities, their contention being that working conditions are more difficult in Chicago. Discussions between company officials and the union committee lasted about one month. The original demand was for a $1 hourly maximum wage. The men had previously rejected the company's offer of 75 cents an hour. The new wages will be effective from June 1.

ELEVATED WAGES ALSO INCREASED

The Chicago Elevated Railways has agreed to an increase in wages for its employees practically identical with that granted by the surface lines. Motormen, conductors, guards, platform men, switchmen, switch-tenders, car couplers, towermen and bridgemen will receive an increase of 15 cents an hour. This will make the maximum wage for motormen 82 cents an hour. Increases to other employees will range from 5 to 15 cents an hour.

Neither company is earning sufficient now to pay the higher wage scales and inasmuch as the new rates of fare probably will not become effective until July 1 the officials have agreed to make up the back pay in installments.

More Tolerant Attitude in Birmingham

City Shows Disposition to Co-operate with Railway Toward Orderly Settlement of Utility Problem

Seeking to work out a plan by which the receivership may be lifted and the Birmingham Railway, Light & Power Company may be put on a sound financial basis, a series of conferences between the City Commission, Lee C. Bradley, receiver, and officials of the company will be held. Several preliminary conferences have been held between J. Ellis Brown, Commissioner of Public Utilities; Mr. Bradley and J. S. Pevear, general manager of the railway. Just what results may be obtained from the conference none of the interested parties will forecast. The officials of the city of Birmingham have formulated some plans and are making efforts to co-operate in the matter. In the meantime the receiver and officials of the company are using every effort to improve the railway system and the entire plant of the company and give better service.

On the part of the public there has been a marked change in attitude toward the company since the latter part of the year 1918 and the first of 1919. Hostility, which reached a climax when car windows were broken in several instances, has been allayed by a policy of publicity and by the recognition of the fact that the company was making improvements in its service as rapidly as conditions would permit. Since the receivership $1,500,000 has been spent on improving the service, rebuilding equipment, and making necessary repairs.

Reorganization the Object

A general reorganization of the company is the object which will be sought by the City Commission in its negotiations with the receiver and officials of the Birmingham Railway, Light & Power Company in the conference to be held. City officials hope that their plan may be worked out so that the receivership may be lifted and the company may be put on a sound and paying financial basis with guarantees as to extensions and several other matters now in an unsettled condition.

Plans advocated by the city officials call for a reduction of the capital stock of the Birmingham Railway, Light & Power Company to a figure representing the real and actual value of the plant and equipment of the company, maintaining that the company is at present overcapitalized. Two plans are suggested for arriving at the actual value of the plant and equipment and the figure at which the capitalization may be fixed. An agreement as to the value is favored by city officials. The alternative plan is for an appraisal of the property, but the latter plan is opposed because of the cost. City officials believe that it should be possible to reach a basis of agreement as to the value without a formal engineering inquiry.

Division of Earnings Planned

Of first importance in the city officials' plan is an agreement as to the fair return the company may make on its investment. It is proposed that this agreement be made, and that the city under the agreement shall share in any earnings the company may make over and above the return contained in the agreement. It has been suggested, further, that the president of the City Commission and the Commissioner of Public Utilities of the city shall be members of the board of directors of the company, and shall care for the interests of the public in the operation of the affairs of the system. Definite understandings as to all extensions, both of street railway lines, electric and gas lines, form a part of the general plan. The matter of extensions has, for some time, been unsettled.

Dates for the opening of the conference have not yet been fixed. Commissioner Brown and officials of the company state that the conferences will probably be taken up in a short time. Neither city nor company officials has indicated any detail of plans.

Every effort is being exerted by the officials of the company to get the plant and equipment in the best possible condition. Tracks are being repaired, numbers of new crossings, frogs and switches have been installed where old ones were worn out.

New Cars Purchased

Twenty-five new one-man safety cars have been purchased and are now in operation. These cars cost $150,000. Fifteen additional safety cars of the same type have been ordered at a cost of $100,000. All of the old cars are being overhauled and in a number of instances they are being practically rebuilt. A total of 144 new motors was purchased for installation by the company in the old cars.

In the gas department, the company has installed a new water gas set at a cost of $100,000. This additional equipment practically doubles the capacity of the plant and makes much better service possible.

Electric light service has been maintained, throughout, at a higher standard than either the railway or the gas service. In this department a new rotary converter was installed at a cost of $30,000. Lines have been renewed and other repairs and improvements made. Current for the lighting system and operation of the cars comes from the water power plants of the Alabama Power Company. This power is used exclusively. The old steam plant of the Birmingham Railway, Light & Power Company is maintained as an emergency plant.

Six-cent car fare went into effect in Birmingham on Sept. 4, 1919. The City Commission waived the 5-cent fare clause in the franchise of the company. A petition was filed and the increase in fare to 6 cents was granted by the Alabama Public Service Commission at Montgomery. Added receipts, from the increase of the fare, amount to approximately $300,000 a year.

Shortly after the increased fare went into effect, a new wage scale for employees was put into effect. This new scale, it is stated, increased the pay roll of the company by about $350,000 annually, and amounted to an increase for the men varying from 40 per cent down.

During the sixteen months the company has been in the hands of a receiver there has been a marked improvement in the service. The City Commission waived the fare clause of the franchise to enable the company to improve the service. City officials state that their object in the conference is to secure a complete reorganization and put the company on its feet financially, so that it can function properly, make a fair return on its investment, and give the people proper service.

Strike Lasts One Hour

The strike of the employees of the Toledo & Indiana Railroad threatened for June 1 was settled after the men had been out one hour. The men accepted the terms laid down by the railroad.

Suspension of light and power as well as traction service in six towns along the Toledo & Indiana Railroad was imminent last week when employees threatened to strike for higher wages. The organization includes both platform men and powerhouse operators.

The company offered a 15 per cent increase to the men. The wages paid ranged from 36 to 43 cents an hour. The new scale demanded was 51 to 55 cents an hour.

President L. R. Schenk's statement follows:

> The aggregate of the bonds and stocks of the company, outstanding, is approximately 80 per cent of the value of the property as fixed by Henry E. Riggs, now professor in the University of Michigan, upon the reorganization of the company.
>
> This valuation was made in 1909 at a time when unit prices were the lowest in the history of construction. Since that time several hundred thousand dollars have been expended for necessary improvements to the property. The stock outstanding has never received more than 4 per cent yearly dividends and no dividends have been paid to stockholders since Dec. 31, 1916.

Republicans Against Interruptions to Utility Service

Messrs. Harding and Coolidge stand upon a plank in the Republican platform which in the case of public uitlities favors the establishment of an impartial tribunal to make an investigation of the facts and to render a decision to the end that there may be no organized interruption of service necessary to the lives and health and welfare of the people. On industrial relations the Republicans say:

> There are two different conceptions of the relations of capital and labor. The one is contractual and emphasizes the diversity of interests of employer and employee.

> The other is that of copartnership in a common task.
>
> We recognize the value of collective bargaining as a means of promoting good will, establishing closer and more harmonious relations between employers and employees and realizing the true ends of industrial justice.
>
> The strike, as a means of settling industrial disputes, inflicts such loss and suffering on the community as to justify Government initiative to reduce its frequency and limit its consequences. The extent and character of Government action must, however, be determined by the nature of the industry.
>
> We deny the right to strike against the Government; but the rights and interests of all Government employees must be safeguarded by impartial tribunals.
>
> In public utilities we favor the establishment of an impartial tribunal to make an investigation of the facts and to render a decision to the end that there may be no organized interruption of service necessary to the lives and health and welfare of the people. The decisions of the tribunals should be morally, but not legally, binding, and an informed public sentiment be relied on to secure their acceptance. The tribunals should, however, refuse to accept jurisdiction except for the investigation, as long as the public service be interrupted. For public utilities we favor the type of tribunal provided for in the transportation act of 1920.

No general plank was adopted appreciative of the conditions which confront the public utilities.

Vast Improvement in Kansas City Morale

A brief review of conditions on the Kansas City (Mo.) Railways offers encouragement with reference to relations between employers and employees. In the fall of 1918 there was a strike. Only 180 of the 2,000 employees remained with the company. Since that time, about 300 of the former employees have been reinstated—so that the personnel is mostly of new men.

The struggle to build an organization was exceedingly difficult. Numerous conditions intervened to prevent the company from securing men of the type it desired. In the past few weeks, however, the number of applicants for places has been beyond the company's needs, and it is now able to pick exactly the men it wants and retain those best fitted to the organization. Increased wages have, of course, proved an important element in the improvement with reference to labor supply. The company has raised the pay of the men three times since Jan. 1, 1919, the date from which the operation without connection with a union is counted. On June 1, 1920, a fourth voluntary increase was given, making a total of about 20 cents advance to the men in eighteen months. Many of the employees earn from $150 to $190 a month.

Another gratifying improvement is in the smoothness of operation. This has resulted in providing high-type service to the public. The car mileage per day is greater than ever before, but there are proportionately fewer accidents. Definite accident-prevention work in the organization has something to do with this result, but the spirit of the men is the potent factor. Operation has, of course, been improved by following the suggestions made by John A. Beeler, but again the interest taken by the men in their work has much to do with the gratifying results.

Toledo to Vote August 10

Plan to Authorize Two Bond Issues Aggregating $7,000,000 to Acquire Local Railway

When the City Council at Toledo during the week ended June 12 passed unanimously a resolution thanking the cost-of-service and municipal ownership commissions for their half year of labor in attempting to get a settlement for the Toledo railway problem another chapter in a quarter century story was completed. The twin municipal ownership measures submitted by the commission appointed by Federal Judge John M. Killits were promptly ratified by the Council at its regular meeting last week and will be submitted to the voters of the city at the time of the August primaries. The voters will be asked on Aug. 10 to authorize two bond issues aggregating $7,000,000 to acquire and construct a municipally owned railway system.

WHEN these measures passed Council it was by a vote of thirteen to three. The minority wanted to submit both municipal ownership and service-at-cost plans at the same time so that voters might make a choice.

To satisfy these members it was agreed that should the commission and Henry L. Doherty reach an agreement within the next week both plans should be submitted at the same referendum and it would be held two weeks later in the fall. Mayor Cornell Schreiber presented this plan.

The matter was taken up immediately by the commission and Mr. Doherty and the final draft was whipped into shape. Practically every point was yielded to Mr. Doherty with the exception of valuation. He steadfastly held out for a $9,000,000 price and the commissioners would approve nothing in excess of $8,000,000.

COST-OF-SERVCE PLAN DEAD

At that point the cost-of-service plan met its death. When the latest draft, together with all the compromises, was read before the commission Mr. Doherty declared it was the "best ever drawn." He was commenting upon the general features of the plan. He said it was the finest method to obtain ultimate municipal control of a street railway system that he had ever seen. But he disagreed on the valuation. He offered to present a plan of his own, however, after he refused to accept it without the commission's approval when he had his own valuation figures in the ordinance.

Undoubtedly he will offer a cost-of-service plan ordinance or the one which the company now has signed up ready to submit directly to the people by the initiative provisions of the city charter. In either event it is probable that Mr. Doherty will submit a newly drawn plan within a few days.

Mr. Doherty claimed that the commission had not given him time to submit figures on the valuation. He said he could prove that the lines and equipment were worth $12,000,000 at the present time, but would still offer them at $9,000,000. His suit in federal court on an amended cross-bill to the order which now establishes the right for the cars to operate contends that the property is worth $15,000,000.

The commissioners wanted to change the arbitration feature of the original Tayler plan idea from appointment of the third arbitrator in any settlement of a dispute by the judge of the District Court of Appeals—a federal court—to the elected judge presiding over the State Circuit Court of Appeals for the Toledo district. It was thought such a plan would secure popular support for the ordinance. Mr. Doherty would not agree to any change in this provision of the measure.

COURT MAY INTERVENE

Judge Killits when advised of the final closing up of the work of the commission declared he would not attempt to offer his services further in the matter of getting a settlement of the railway problem. It is quite probable, however, that he will have to take a hand in the proceedings now instituted in his court to restrain the city from interfering with the collection of a 10-cent fare. This matter will come up for some disposal before the end of the present term of court, which is the last Monday in October.

Pending the vote on the municipal ownership ordinances in August, the Toledo Railways & Light Company is keeping its stocks of materials low and is not buying supplies in large quantities.

Before the ordinances are put into effect, at least the one which provides a fund with which to purchase parts of the existing railway system for $4,000,000, a new proposition in street railway condemnation will have to be settled, probably in a court. The commission which drew up the ordinance planned to take the paying parts of the system and leave the parallel lines and other low earning lines. The poorer paying lines in the present system have become a part of the Toledo system by the historical plan of competition and absorption.

LOSS TO CITY ESTIMATED

It is the opinion of company lawyers and many legal authorities in the city that such a plan could not be put over without damages being awarded to the company as to make it profitable to the city to take the system as an entirety.

It is estimated that the city will lose in taxes paid by the company about $250,000 annually in addition to an additional levy of nearly $750,000 for interest and sinking fund payments on the thirty-year indebtedness.

Detroit's New Railway Ordinance Upheld

District Court Dismisses Detroit United Railway's Plea — City, However, Cannot Condemn Existing Lines

Suits brought by the Detroit (Mich.) United Railway and the New York Trust Company against the city of Detroit to restrain the city from proceeding with construction of a municipal railway system have been dismissed by Judge Arthur Tuttle of the United States District Court. The court ruled, however, that before the city could acquire by purchase or condemnation any lines now operated by the Detroit United Railway another vote of the people must be taken. Counsel for the railway at once declared intention of appealing to the United States Supreme Court. The validity of the railway ordinance adopted by the voters on April 5 was upheld by the court, against the contention of the Detroit United Railway, and it was denied that the company had acquired any new rights on Fort Street since the Fort Street decree giving the city the right to compel the company to remove its tracks. This same right to order the company off the street was held to apply on other streets where franchises have expired.

IT WAS further stated by the court that although the city has the authority to move the company off the streets, it has no power to purchase, lease or condemn any of the company's holdings against its will. It was held that to establish such authority would require a three-fifths vote of the people.

CONFISCATION CLAIM DISALLOWED

Inasmuch as the ordinance adopted on April 5 gave the city no right to buy, lease or condemn any Detroit United Railway property, but only to construct a municipal railway, Judge Tuttle stated that the company could not claim that it was intended to confiscate its property. Attorneys for the company in arguing the case claimed that the city had forfeited its right to oust the Detroit United Railway from Fort Street, because instead of taking advantage of the decree, it had allowed the tracks to be rebuilt and had provided for continued operation of the line as well as others by entering into the day-to-day agreement of 1913 and had passed the Kronk ordinance in 1916, fixing the rate of fare for continued operation of non-franchised lines.

On the contrary the city attorneys claimed that the city could not be stopped from availing itself of the right to order the company off Fort Street and Woodward Avenue because the city lacked the authority to surrender this right. It was held that no rights in the street could be granted the Detroit United Railway without submitting such rights, in effect a franchise, to the people for a three-fifths vote of approval.

RIGHTS DEFINED BY STATUTE

In assenting to this view, Judge Tuttle states:

> Methods for acquiring new rights in the streets of the city are so well and clearly defined that I cannot reach the conclusion that a public service corporation can acquire rights in any other way than those defined in the statutes.

In reviewing the decision of the United States Supreme Court in the case of the Kronk ordinance, the statement was made that the city must regulate justly if it assumed to regulate. The company has the right to terminate operation of the lines and remove its tracks upon the expiration of contractual rights and on the other hand the city has the right to require the tracks removed, giving the company a reasonable time in which to do it. The Supreme Court held that the passage of the Kronk ordinance was an invitation to the Detroit United Railway to continue on the street, and that the rate of fare to be charged must be sufficient to pay the company a reasonable return on the reproduction cost of its equipment.

The judge stated that the situation was not changed by the day-to-day agreement. His decision was not based on the decree in the Fort Street case, but on the law in that case and on the Supreme Court's decision in the Kronk case.

It was held by attorneys for the Detroit United Railway that the ordinance of April 5 was invalid because it did not specifically state to the voters that it was intended to construct a new street railway system. The Mayor and Council, it was claimed, misled the voters through the Mayor's speeches and the sample ballots into believing that it was intended to force the company to sell certain lines to the city at confiscatory prices.

The court ruled that the ordinance as submitted gave the city no right to purchase, condemn or lease Detroit United Railway lines and therefore there was only one course for the city under the terms of the ordinance—to acquire a railway system by construction. The ballot was held legal in that it properly submitted the question to the people, inasmuch as it is not necessary under the law that the entire ordinance be on the ballot.

Judge Tuttle said that if the City Council or the Mayor made any agreement with the company for the purchase of the lines without a vote, they were guilty of a violation of the city charter.

Wage Crisis in Twin Cities

The trainmen of the Twin City Rapid Transit Company gave the company until June 15 to put in a wage increase of 20 cents an hour, time and a half for overtime and holidays and an eight-hour day. The company announced that it would refuse to make this advance because of its inability to grant the increase without getting more than the 5-cent fare which prevails in Minneapolis and St. Paul. The men will appeal to the City Councils for permission for an increased fare by July 1. Meanwhile the City Council of Minneapolis has ordered public hearings beginning June 14 and the Council of St. Paul has considered the subject behind closed doors.

Horace Lowry, president of the company, addressing the men, urged against drastic action.

The Car Riders' League, which opposed the referendum franchise that was defeated in Minneapolis last December, announces it will propose a new franchise. In St. Paul the people at the May election voted an amendment to the ordinance which places the matter of fare increase in the hands of the Council, but that body insists on better service before it will grant the increase.

A request made by the Minneapoils Street Railway two years ago for permission to charge a fare of 6 cents is still a live matter in the Council and can be revived. The situation is complicated by the fact that it will be practically impossible for Minneapolis and St. Paul to have different rates of fare, as the fare limits overlap on four interurban lines.

Mr. Lowry has submitted to the Councils of both cities a request for a 7-cent fare with tickets at the rate of four for a quarter.

Railway Speakers' Handbook Issued

The Illinois Committee on Public Utility Information, 203 S. Dearborn Street, Chicago, Ill., has issued *Speakers' Bulletin No.* 1, which presents a compilation of authoritative definitions, facts, statistics, statements of experts and similar data for use in public addresses. The bulletin also contains outlines of a number of different speeches, suggested introductions for addresses, and a sample 15-minute speech. The contents cover electric railway, gas, electric light and telephone utilities, and form a prolific source of information and suggestion for the use of any one who may have an opportunity to assist in the work of enlightening the public on the services of public utilities and their relation to the economic progress of any community.

This is the first of a series of pamphlets which the committee plans to issue, and it bears the title: "The Nature, Development and Service of Public Utility Companies." Subsequent issues of the bulletin will cover the topics: "The Prosperity of Communities and of Public Utilities"; "Fair and Just Methods of Regulation"; "Increase of Public Service Rates Compared with That of Other Commodities"; "Stability of Investment in Utility Securities"; "The Fixing of Rates on a Fair Basis"; "Conditions of Work, Wages, Welfare Agencies," etc.

Akron Wage Findings

Award for Non-Paying City Lines Made Contingent Upon Increased Rate of Fare

An award of a maximum rate of pay of 65, 66 and 67 cents an hour for city, suburban and interurban trainmen, respectively, was announced June 10 by the board of arbitration which has had under advisement since May 20 the matter of wages of employees of the Northern Ohio Traction & Light Company, Akron, Ohio. The arbitrators were S. D. Hutchins, Ernest E. Zesiger and Charles Currie. The board was directed to fix three scales of wages based on an eight-hour, nine-hour and ten-hour minimum day. The findings on these three bases are as follows:

INTERURBAN

Comprising Akron-Bedford & Cleveland; Canton-Akron; Massillon, New Philadelphia and Ulrichsville Lines

Present Scale:	
First year	45
Second year	48
Third year	50

Awarded Scale:	First Year	Second Year	Third Year
Eight hours minimum	61	64	67
Nine hours minimum	56	59	62
Ten hours minimum	54	57	60

SUBURBAN

Comprising Akron, Kent and Ravenna Line, and Akron, Barberton & Wadsworth Line

Present Scale:	
First year	44
Second year	46
Third year	49

Awarded Scale:	First Year	Second Year	Third Year
Eight hours minimum	60	63	66
Nine hours minimum	55	58	61
Ten hours minimum	53	56	59

CITY

Comprising Akron, Canton and Massillon City Lines

Present Scale:	
First year	43
Second year	45
Third year	48

Awarded Scale:	First Year	Second Year	Third Year
Eight hours minimum	59	62	65
Nine hours minimum	54	57	60
Ten hours minimum	52	55	58

The board also included in its findings the statement that in view of this substantial increase, the rate applying to the city lines is also to prevail for safety car operators.

The board was given jurisdiction over the wages to be paid employees of the Akron, Canton and Massillon city lines and the interurban and suburban lines of the company, comprising contracts with four locals of the Amalgamated.

CITY INCREASE CONTINGENT ON FARES

In its findings the board of arbitration reviewed the fact for the year ended Dec. 31, 1919, the company had a deficit of $30,169 in Akron, $46,364 in Massillon and a net revenue of only $25,107 in Canton. These figures are without taking into consideration any return on the value of the property and without any allowance for depreciation. Making allowance for a 4 per cent depreciation account, there was a deficit of $925,260 in Akron, $254,893 in Canton, and $116,363 in Massillon. Continuing, the finding read as follows:

> However, the fact remains that the employees are asking for an increased wage; the public is asking for improved car service and the cities for improvements and extensions; all of which, owing to the fact that the company is operating at a deficit, are financial impossibilities.

The board then said that the present wages of the employees are inadequate, but that since Akron, Canton and Massillon have not afforded the company any improvement in its revenue by way of increased passenger fares, any increase of wages which the board might impose would inevitably create larger deficits to the great detriment of the company and the public. The award then reads:

> As a matter of equity and justice, we cannot increase the deficits resulting from such operations and are obliged to make an award as to wages which shall be granted to the company's employees in the cities of Akron, Canton and Massillon, conditioned and contingent upon the company and these municipalities solving the problem as to the source of increased revenue to defray the additional burden placed upon the company by our award. To this end we may add that the rates of passenger fares on the railway lines in Akron, Canton and Massillon are lower than in any other cities in the United States so far as we have been able to ascertain.

The arbitrators also point out that the revenue must not only be sufficient to care for the increased wages, but that the cities must take into account the fact that there is a deferred maintenance account of $1,110,000.

MEN EXPECTED TO ACCEPT

The awards on the interurban and suburban lines were made without contingencies, since it was admitted by the company that these lines were earning sufficient to warrant the payment of a just and reasonable scale of wages. The contract with all the locals is for the year ending May 1, 1921. The awards are retroactive to May 1 of this year, though the city increase is contingent upon an increased rate of fare.

At the time of this writing it is understood that the men will probably accept the award, though it is considerably below the amounts which they demanded. It is not yet known which minimum day basis will be accepted. It is also understood that the company will undertake immediately the work of entering into some temporary arrangement with the municipalities to secure an increased fare which will permit the new wage scale to be put into effect.

Connecticut Wage Offer Accepted

The wage offer made by the Connecticut Company to its platform employees on June 14 that it would change the six-year system of establishing the wage scale and substitute for it a system whereby employees get the maximum of pay at the end of three years was accepted by the men by vote on June 17.

The men had previously voted not to accept the offer of the company for a wage scale which provided 54 cents an hour for those entering the company's employ, with 1 cent a year increase up to the sixth year, and with 60 cents as a maximum. The new offer makes the first year wage 54 cents, the second rate is 57 cents and the third and succeeding years is 60. One-man car operators are to receive 15 cents an hour more than these respective amounts. The new contract dates for one year from June 1.

Water Power Bill Signed

President Wilson has signed the water-power bill. This was learned from Washington by telephone at 4 p.m. on June 18. At one time it was thought that this important legislation had been lost in a pocket veto. It was later stated that an informal ruling had been made by Attorney-General Palmer that the time had not expired in which the President was authorized to act on this and other measures.

The effort to secure comprehensive water-power legislation really dates back to 1890. Vetoes of water-power bills in 1908 and 1909 by President Roosevelt put an end for the time to the introduction of water-power bills. Other measures followed in 1914 and 1916.

Attractive Program for Bluff Point Meeting

William B. Wilson, United States Secretary of Labor; John A. Barhite, Public Service Commissioner of the Second District of New York, and Douglas Malloch, president of the Press Club, Chicago, Ill., are to be the speakers at the banquet at the thirty-eighth annual meeting of the New York Electric Railway Association at the Hotel Champlain, Bluff Point, New York, on June 26. The toastmaster will be Edward A. Maher, Jr., president of the association. Dancing will follow the banquet.

The subjects for discussion at the business session on June 26 are as follows:

"The Collection of Revenue," by Thomas P. Whelly, New York State Railways, Utica, N. Y.

"Reducing Transfer Abuse," by Charles A. Coons, general superintendent of the United Traction Company, Albany, N. Y.

"Cost of Interurban Freight Service," by W. K. Zinsmeister, auditor and treasurer of the Rochester & Syracuse Railroad.

Mr. Whelly's subject is a particularly live one just at this time, in view of the fact that the volume of revenue taken in has increased tremendously, since increases in fares have become general.

The following committee reports will be presented: Military Operations, by James P. Barnes, chairman; Standards, by W. G. Gove, chairman; Membership, by H. B. Weatherwax, chairman.

The program of entertainment is an unusually attractive one. There will be a handicap golf tournament for novices, a baseball game between the supply men and the railway men, ladies' bridge tournament, and water sports. Many delightful short motor trips can be made from Bluff Point. Especially attractive is the steamer trip across Lake Champlain to Burlington, Vt.

Requests for hotel accommodations should be made to James P. Greaves, 243 Fifth Avenue, New York City. Arrangements for transportation can be made through J. R. Ellicott, Jr., 165 Broadway, New York City.

News Notes

Franchise Vote on July 15.—The qualified voters of the city of Houston, Tex., will vote on July 15 on the new franchise for the Houston Electric Company.

Men in Albany Prepare Demands.—The trainmen of the United Traction Company in Albany, N. Y., have decided to ask for an increase in pay calling for a minimum of 81 cents an hour and a maximum of 85 cents an hour. It is expected that the men on the Troy and other divisions will approve this proposed scale.

Men at Levis Strike.—Following upon the decision of the Public Service Commission to decline an increase in wages, the employees of the Levis (Que.) County Railway declared a general strike on June 10. The company claimed before the commission that it could not pay any increase in wages at the present rates of fares.

Men Gain 1 Cent an Hour by Arbitration.—The board of arbitration appointed to settle the controversy of more wages between the conductors and motormen and the Cumberland (Md.) Electric Railway has decided upon an increase of 9½ cents an hour to 52 cents. The increase dates from May 1. The company endeavored to compromise the demand for 60 cents an hour by offering the men 51 cents.

Service Resumed After Three Weeks Suspension.—The Butte (Mont.) Street Railway resumed service on June 1 under the arrangement made the previous day by Manager J. R. Wharton by which members of the workingmen's union in the employ of the company will receive $5.50 a day. The union was on strike to enforce a scale of $6. Butte had been without electric railway service for three weeks.

London Employees Strike.—During the week ended June 5 it was announced that the employees of the London (Ont.) Street Railway had been granted an increase of wages. It appears, however that the increase was contingent upon the City Council passing a by-law providing for an increase in fares. On June 6, the Council refused to pass the necessary by-law. As a result the men struck the next day.

Five-Cent Increase in Brockton.—An increase of 5 cents an hour has been granted motormen and conductors of the Brockton & Plymouth Street Railway, Brockton, Mass., by Receiver Gleason, on recommendation of C. W. Gifford, superintendent, the increase being dated from May 19. The raise affects about 50 men and makes their pay 52 cents an hour maximum and 46 cents minimum an hour.

Five-Cent Advance at Evansville.—The Public Utilities Company, Evansvill, Ind., has granted increases to trainmen of practically 5 cents an hour, effective June 1, when the old agreement expired. Regular employees will receive 50 cents an hour instead of 45 cents and operators of one-man cars will draw 54 cents an hour instead of 49. Interurban men will get 52 cents an hour instead of 47 cents.

Five-Cent Wage Increase.—A contract has been signed between the Little Rock Railway & Electric Company, Little Rock, Ark., and its union employees, whereby the present wage schedule was raised 5 cents an hour. The new schedule runs 46, 47, 48, 49 and 51 cents an hour for the men who have been employed one, two, three, four and five years, an increase of 5 cents an hour over the old schedule.

Compromise Offer at Bloomington.—D. W. Snyder, superintendent of the Bloomington & Normal Railway & Light Company, has suggested a new scale of 46, 48 and 50 cents an hour for the trainmen of the company. The employees are holding for a scale with a top of 57 cents an hour. This is 2 cents under the settlement arrived at with the employees of the Peoria Railway, also included in the Illinois Traction System.

Closed Shop Demanded.—A demand for a closed shop has been made on Manager E. C. Deal of the Springfield (Mo.) Traction Company by the railway union. There are nine men running on the lines who are not members of the union. Mr. Deal stated that the demand would be forwarded to the New York office with the recommendation that it be refused. The demand is separate from the one for higher wages now pending before the Public Service Utility Commission.

Wage Award Accepted.—The trainmen of the Boston (Mass.) Elevated Railway have ratified the wage award of the arbitrators granting them an increase in pay of 10 cents an hour. The award is retroactive to May 1. The company is allowed until Aug. 15 to settle the question of back pay. Extra compensation for Sunday work and one day off in seven with pay were refused to the workers. The conditions of the award were reviewed in the ELECTRIC RAILWAY JOURNAL for June 12, page 1222.

Power Station Not Affected by Strikes.—Despite a strike of members of the steam and operating engineers' union at the Rivesville, W. Va., power plant of the Monongahela Valley Traction Company, on June 1, the station is being operated. Office engineers and other employees of the company were called upon for emergency service. Negotiations between the members of the union and the company in regard to an increased wage scale have been pending since March 15. No disorder marked the break. An increase of 15 cents an hour was the demand made by the union.

Toronto Wage Arbitrators Chosen.—Justice F. S. Maclennan of the Supreme Court, Montreal, has been chosen by the Minister of Labor as chairman of the board of conciliation in connection with the wages, hours of service and other matters now in negotiation between the Toronto (Ont.) Railway and the employees. The board, which is composed of Justice Maclennan, acting as chairman; William H. Moore, general manager of the Toronto & York Railway, for the Toronto Railway, and John T. Vick, representing the railway employees, is now taking evidence on all matters in question preparatory to making an award.

Increase in Wages in Ottawa.—A general increase of 10 cents an hour to motormen and conductors and an increase of 20 per cent to all other employees with time and a half for overtime and time and a quarter for Sundays and legal holidays has been awarded by the board of conciliation which investigated the dispute between the Ottawa (Ont.) Electric Railway and its employees. The new rates for motormen and conductors will be 49, 51, 53 and 55 cents an hour for first, second, third and fourth year men respectively. Other employees will receive between 53 and 65 cents an hour. Spare men's wages are increased from $75 to $85 a month provided they report regularly.

Massachusetts Companies Propose Arbitration.—Arbitration has been offered the employees of the Springfield (Mass.) Street Railway and the Worcester Consolidated Street Railway by President Clark V. Wood of the New England Investment & Security Company, after three conferences had failed to bring a solution of the employees' demands for a 40 per cent increase in wages and an eight-hour day. Mr. Wood named Bentley W. Warren, Boston, as the representative of the companies. Officials of the railways declare that it would cost each corporation about $1,000,000 a year to meet the wage demands, and that neither company is in a financial position to carry this burden. James Vahey will represent the men.

Open Shop in Grand Forks.—The employees of the Grand Forks (N. D.) Street Railway have accepted the open shop agreement. The company will not discriminate against any employee because of union membership and the trainmen are not to discriminate against any person in the employ of the company because of his refusal to join their association. The company offered its men an increase of 10 cents an hour, effective June 1, with the open shop. This increase was offered for a period of one year, inasmuch as the system will be operated entirely with Birney safety cars after Sept. 1. The men asked for an increase in pay of 15 cents an hour, but after a meeting held on May 24 the wage scale offered and the open shop principle were accepted by the trainmen.

Financial and Corporate

Service-at-Cost Charges

Matter of Increasing Youngstown Operating and Maintenance Allowances to Be Arbitrated

In accordance with the provisions of the service-at-cost franchise now operative between the city of Youngstown, Ohio, and the Pennsylvania-Ohio Electric Company, arbitration is about to begin on the application of the company for an increase in the operating and maintenance allowances. There have been deficiencies in these allowances since the franchise went into effect which have been deducted from the stabilizing fund in accord with the provisions of the contract.

CITY ALLOWANCE INADEQUATE

The City Council recently passed a resolution which in effect stated that the company must keep within the allowances for operating and maintenance expenses. As this seemed to the company to be impractical, application was made for an increase. This the Council disapproved. An arbitration of the matter was therefore undertaken.

As its representative, the company selected J. H. Alexander, vice-president Cleveland Railway, and the city chose John Ruffalo, a local attorney. These two men finally agreed upon L. B. McKelvey, a prominent Youngstown merchant, as the third member of the board. The allowances fixed by the original draft of the contract are 22 cents per car-mile for operating expenses and 8 cents per car-mile for maintenance, renewal and repairs for motorcars, and 60 per cent of these sums respectively for the operation and maintenance of trailers.

ARBITRATION DECISION BINDING

There has been some talk in Youngstown that in case the arbitrators award an increase in these allowances to the company, the Council will not abide by the decision. The contract seems to be specific on this point, however, for it states that after delivery to the company and to the city, "the finding of the board of arbitration shall be binding and operative," apparently without any conditions.

The contract of the company also provides that in case of any failure on the part of the company to perform fully and in good faith any direction or award made by the board of arbitration, the rate of return on the capital value shall be reduced by such amount as the arbitrators may determine, but not to exceed 1 per cent below the 6 per cent rate set up by the contract, or on the other hand, in case of failure of the city, that the return on the capital value shall be increased not to exceed 1 per cent, these orders to continue only until, in the opinion of the board of arbitration, its order or direction has been carried out.

The contract provides that the board of arbitration shall make its finding within a period of twenty days, so that it is expected that a decision will be reached not later than the first week in July. Meantime, the stabilizing fund in Youngstown, with an 8-cent fare in force, has diminished to a sum below the minimum of $50,000, and the company has in effect the next higher rate of fare. This calls for a 9-cent cash fare. Presumably this will build up the stabilizing fund.

City Appoints Valuation Representative

William H. Weiss, Kansas City, Mo., has been appointed by the city of Knoxville, Tenn., as its representative in the joint appraisal of the property of the Knoxville Railway & Light Company ordered by the Tennessee Railroad and Public Utility Commission. The appointment of representatives for the company and the commission had been made previously. These appointments have been referred to before in the ELECTRIC RAILWAY JOURNAL.

Under the terms of his contract with the city Mr. Weiss is to put in such time as in his judgment is practicable and consistent with the best interests of the city. The city is to furnish a suitable work room, typists, local transportation and reasonable assistance from its engineering department to the end that the best interests of the public may be conserved.

The contract also provides that the cost of the appraisal work shall not exceed $7,000, and shall be paid in semi-monthly installments. Mr. Weiss is to be paid $75 a day for the first sixty days and $50 a day thereafter. His first assistant is to receive $40 a day for the first thirty days and $35 a day thereafter. Assistant engineers and computators will receive $20 for the first thirty days and $15 a day thereafter.

In addition to the per diem compensation the city agrees to pay traveling and reasonable hotel and living expenses while the engineers are engaged in the work. It will also pay for local transportation, stationery, printing, postage, etc.

The city has the right to retain 20 per cent of the semi-monthly estimated expenses until the completion and delivery of the appraisal report, whereupon it agrees to pay any balance that may be due. As stated previously, the contract provides that the total of such payment, however, must not exceed $7,000.

Complications in Dividend Case

Judge Willis Vickery of the Appellate Court on June 8 addressed a letter to Chief Justice Hugh Nichols of the Ohio Supreme Court, in which he recommended the assignment of another judge to hear the appeal of Edwin D. Barry from the Common Pleas Court in its decision sustaining the right to a referendum on the ordinance granting the Cleveland (Ohio) Railway authority to increase dividends to stockholders from 6 per cent to 7 per cent.

On June 4 attorneys filed affidavits of prejudice in the Court of Appeals against Judge Vickery, because of certain statements he is alleged to have made in regard to the justice of the referendum decision. Attorney Thompson stated that Judge Vickery had criticised him for having anything to do with the referendum suit.

Attorney Fisher said that Judge Vickery had told him that Judge Cull's decision was erroneous. This referred to the first decision when the referendum was enjoined for lack of a proper number of signatures to petitions. Another charge made was that the court did not furnish desired information about the docket.

In his letter to Supreme Judge Nichols, Judge Vickery said he was convinced that the attack of the attorneys was against him rather than the court and that he was receding from his position for this reason. He made a reply to the affidavits of the attorneys in which he denied being prejudiced in any way. He gave reasons for what was said in the conversations.

The following appellate judges have been assigned by Chief Justice Hugh L. Nichols of the Ohio Supreme Court to hear the appeal in the case: Judge William H. Middleton, Waverly; Judge James I. Allread, Columbus, and Judge Frank Patterson, Canton. The case was called on June 15.

Small Roads Do Better

According to the annual report of the Northern States Power Company, Chicago, Ill., for the year 1919 the electric railways operated in Fargo and North Fargo, N. D.; Moorhead and Dilworth, Minn., and serving an estimated population of 29,500 earned $126,395 as against $91,153 in 1918, equivalent to an increase of 38.8 per cent. Net earnings increased 295 per cent or from $805 to $3,186 in the same period. These gains were the result of additional business, there having been no rate increases during the year.

The railways have a total of 15.58 miles of track, of which 0.93 miles are sidings and turnouts. About half of this trackage, 7.26 miles, is paved, mostly with brick on concrete. The rolling stock consists of seven closed cars, five semi-convertible passenger cars, nine open passenger cars and twenty-one trailers, a total of forty-two passenger cars, one freight car and four service cars.

Indianapolis Doing Better

Company Meeting Current Interest Obligations on Time—Situation Now Appears Improved

All deferred coupon interest on the Indianapolis (Ind.) Street Railway and the Indianapolis Traction & Terminal Company's bonds has been paid. The company is now meeting its current interest obligations on time. These facts are pointed out in the annual report of the Indianapolis Street Railway (Inc. 1919). This report shows separately the results of the six months' operation Jan. 1 to June 30, 1919, under the lease to the Indianapolis Traction & Terminal Company, and the result of six months' operation July 1 to Dec. 31, 1919, under the operation of the new consolidated Indianapolis Street Railway, which took over the properties of the old Indianapolis Street Railway and the Indianapolis Traction & Terminal Company. The income account for the year ended Dec. 31, 1919, is shown in the accompanying table.

Total assets of the company are given as $23,442,206. Liabilities include $7,500,000 capital stock; $13,948,802 in bonds; current liabilities, $346,636; deferred liabilities, $404,932; reserve for injuries and damages, $164,346, and total surplus, $1,077,489.

The report reviews the steps leading up to the consolidation of the properties in Indianapolis, the validity of which was affirmed in the United States District Court of Indianapolis on Aug. 29, 1919, and the action of the Public Service Commission authorizing the consolidation. Quarterly dividends at the rate of 6 per cent per annum were shown to have been paid on the preferred stock Dec. 1, 1919; March 1, 1920, and June 1, 1920. The report reviews various improvements to roadway and track extensions made during 1919.

The report states that the new company has consistently followed the policy that the public should be fully informed as to its affairs. Comment is made on the courtesy campaign among car service employees in 1919. The report calls attention to the twenty-five double-truck closed cars purchased during the latter part of 1919 and the ten open cars which were rebuilt into closed cars during the winter.

The necessity of providing additional freight terminal facilities in Indianapolis in the near future is commented upon, and it is suggested that as soon as the service-at-cost plan is established, new terminals will be provided.

It is suggested that the financial status of the company should be established whereby the company would be permitted to earn sufficient revenue to provide for much needed improvements and obtain necessary loans from banks to make extensive additions and betterments. The company requires fifty additional double-truck pay-enter cars. The present car shops are totally inadequate, and new modern shops and equipment with additional storeroom capacity should be provided as soon as finances will permit. Additional carhouses will also have to be provided. The company has contemplated since 1912 the installation of substations throughout the city in order to effect saving in power distribution from the two main power stations, and these will probably be installed as soon as the necessary finances can be provided.

Increases in the wages of motormen, conductors, shop men and track men aggregated about $300,000.

SERVICE AT COST STUDIED

Attention is called to the service-at-cost plan drafted by the Corporation Counsel of the city of Indianapolis, which is now before the Indiana Public Service Commission and which it is hoped will be placed in operation in the near future. The chairman of the Public Service Commission, the Corporation Counsel of Indianapolis, and officers of the railway recently visited in Cincinnati and Cleveland for the purpose of studying the practical working of the service-at-cost systems in these cities.

An inventory of the combined properties which were consolidated in the new Indianapolis Street Railway was made as of June 30, 1919. It shows physical property to the value of $18,641,151. These figures do not include expenditures for engineering supervision, insurance, interest during construction, legal expenses and taxes during construction, etc.

STATEMENT OF EARNINGS OF INDIANAPOLIS STREET RAILWAY

	Jan. 1 to June 30	July 1 to Dec. 31	Total for Year
Gross Earnings from Operation:			
Passenger receipts—city lines	$1,957,615	$2,244,435	$4,202,051
Track rentals interurban passenger cars	111,152	113,382	224,534
Track rentals interurban freight cars	9,177	10,463	19,641
Chartered cars	266	1,393	1,659
Advertising	13,914	13,914	27,828
Dog permits	98	123	222
Rent of land and buildings, miscellaneous	9,104	9,106	18,211
Rent of terminal building and stations	110,518	120,919	231,438
Rent of equipment	2,397	2,769	5,166
Miscellaneous income	5	5,566	5,572
Interest, discount, etc.	1,299	1,314	2,614
Total gross earnings	$2,215,550	$2,523,390	$4,738,941
Operating expenses:			
Maintenance of way and structures	$176,922	$252,648	$429,571
Maintenance of equipment	242,787	277,152	519,940
Operation of power plant	322,400	334,976	657,376
Operation of cars	601,790	679,591	1,281,382
General expense	203,653	166,274	369,927
Total operating expense	$1,547,554	$1,710,642	$3,258,197
Total net earnings	$667,995	$812,747	$1,480,743
Less taxes	162,000	239,806	401,806
Total net earnings less taxes	$505,995	$572,941	$1,078,936
Deductions:—Bond Interest:			
Interest on $4,000,000 Citizens Street Ry. 5's	$100,000	$100,000	$200,000
Interest on $4,987,000 Indianapolis St. Ry. 4's	99,740	99,740	199,480
Interest on $3,833,000 Indianapolis Traction & Terminal 5's	95,825	95,825	191,650
Interest on $200,000 Broad Ripple Traction 5's	5,000	5,000	10,000
Interest on trust equipment notes	5,658	4,941	10,600
Interest on Indianapolis car equipment pref. stock		2,500	2,500
Interest on notes	19,814	1,769	21,583
Office maintenance Indianapolis St. Ry. (1899)	1,776		1,776
Total deductions	$327,814	$309,776	$637,590
Surplus	$178,181	$263,165	$441,346
Deduction from Surplus:			
Indianapolis Street Ry. sinking fund not paid but expended for construction year 1919			$60,000
Indianapolis Trac. & Term. Co. sinking fund not paid but expended for construction year 1919			60,000
Dividend paid Dec. 1, 1919, on $5,000,000 preferred stock for quarter June 1 to Aug. 31, 1919			75,000
Dividend accrued on preferred stock not paid in 1919			100,000
Total deduction			$295,000
Balance			$146,346

Grafton Property Ordered Sold

At a meeting of creditors in the bankruptcy proceedings of the Grafton (W. Va.) Traction Company and its affiliated company, the Grafton Light & Power Company, in the office of Referee in Bankruptcy O. E. Wyckoff, it was ordered that the property be sold without delay free and clear so as to close up the case.

John M. Peary, representing the Central Union Trust Company, New York, and Nicholas Brady, New York, representing holders of mortgage liens upon the properties for large sums of money, insisted that the sale be made subject to these liens. Mr. Peary petitioned Judge A. G. Dayton of the United States District Court for an appeal from the decision of the referee.

At the meeting of the creditors it was brought out that there is an accumulation of $20,000 in the hands of the trustee derived from the operation of the two plants during the pendency of the present proceedings. It was also disclosed that both the railway and electric equipment is badly in need of rehabilitation.

An appraisal of the two properties made at the beginning of the proceedings nearly two years ago fixed the total value of the properties at that time at $232,634 without including the franchise. So materially has the valuation decreased since then that the referee has ordered an amended report to be filed showing the present value of the property, before it is offered for sale.

$100,690,962 Detroit Value

Dean Cooley of the University of Michigan has completed the appraisal of the property of the Detroit (Mich.) United Railway which he made for the Michigan Public Utilities Commission. This appraisal covered the properties as they existed on July 1, 1919, since which time and up to March 31 this year the company has expended in addition $834,113 within the one fare zone and $689,692 outside the one fare zone.

According to the appraisal at 1919 prices it would have cost $100,690,962 to reproduce all these properties, of which $55,840,184 would have to be spent in the city of Detroit. Upon the average of prices prevailing between the time of the previous appraisal and this one the cost of reproduction is fixed at $81,538,136 for all the properties and of $46,202,235 in Detroit.

Two other forms of appraisal were made. One took the existing properties of 1915 and prices prevailing then, except in the item of real estate, with all added property at the 1915-19 average of costs. This gave the value of $63,303,962 for all the properties, of which the city part was $36,228,918. The other form was to take the actual appraisal of 1915 and add to it the additions made at the costs as shown by the vouchers, bills and reports of the company. This gave the system a value of $57,969,062, of which the city's part was $33,050,255. The report points out that the value of the same land in 1915 had increased by more than $4,000,000 in 1919, due to the greatly increased land values in Detroit and Flint.

These figures cover merely physical property. Intangible values, such as organization, going concern, etc., are to be reported upon later.

The appraisers in no case found the property to be in a condition less than 83⅓ per cent. In some cases the condition was more than 90 per cent. The average was better than 88 per cent.

Emergency Fleet Railway Seized

Deputy Sheriff James Hewitt of Gloucester County, N. J., has levied on the railway line of the Emergency Fleet Railway Corporation of New Jersey, which runs from Gloucester to Yorkship Village, where the government built 1,500 homes during the war for shipyard workers. The levy was made to collect a judgment of $9,810 plus $56.70 costs obtained by Mary B. Chew and Martha M. Brown, Philadelphia, for land seized by the government corporation when the railway was built. The levy, however, will not affect the operation of cars over the railway, which is leased by the Public Service Railway operating from Gloucester to the shipyard village. Deputy Sheriff Hewitt seized the rails, ties, stringers, poles, wires, apparatus and personal property of every kind of railway, including the bridge which spans the tracks of the West Jersey & Seashore Railroad. Unless the judgment is satisfied the railway will be sold on June 18.

Financial News Notes

City Elects P. R. T. Directors.—Colonel Sheldon Potter and Ernest T. Trigg have been elected by Council as the city's representatives on the board of the Philadelphia (Pa.) Rapid Transit Company.

Taxes in Default.—The time allowed by the city treasurer of North Adams, Mass., to the Berkshire Street Railway for the payment of its 1918 real estate tax to avoid having its property sold at public auction has expired without the company having made a settlement.

Road at Valdosta Sold.—D. A. Finley, Valdosta, Ga., has purchased the Valdosta Street Railway from C. M. Killian, who bought the system some time ago, and under whose management improvements were instituted and the line placed on a paying basis. Mr. Killian expects to reorganize the company with the aid of local capitalists and further improve and expand the line.

Colorado Road Suspends—The Colorado Springs & Cripple Creek District Railway, Colorado Springs, Col., suspended operation on May 17. Abandonment of service followed a plea by Judge Horace G. Lunt, attorney for the company, to the federal court for permission to discontinue. Service was abandoned primarily because of lack of freight shipments and consequent loss in operating revenue.

Line in Camden Abandoned.—The Public Service Railway, Newark, N. J., has filed plans with the Common Council of Camden, N. J., for the abandonment of tracks on Ferry Avenue, Camden, the dividing line between Camden and Woodlynne. The company will now divert the cars to the Haddon Heights line. The Ferry Avenue line is in poor condition and the company does not care to rebuild it.

Car Trust Certificates Authorized.—The Empire State Railroad Corporation, Syracuse, N. Y., has been granted permission by the Public Service Commission to issue $28,000 in 6 per cent equipment bonds under a car trust lease agreement with the Osgood Bradley Car Company. With the proceeds of this sale and with $9,016 from the treasury the company is to purchase six one-man cars for use on its city lines in Oswego.

Court Approves Segregation. — The Superior Court at Providence, R. I., has decreed that the properties of the Providence & Danielson Railway and of the Sea View Railroad shall be turned over by the receivers of the Rhode Island Company to the owners of those lines on Sept. 7. The receivers told the court that the two leased lines had been operated at a loss and they did not care to burden the Rhode Island Company with their maintenance. The plea to the court in connection with this matter was referred to in the ELECTRIC RAILWAY JOURNAL for June 12, page 1224.

One New Indianapolis Director.—At the annual meeting of stockholders of the Indianapolis (Ind.) Street Railway, held on June 9, all of the directors of the company were re-elected with the exception of Charles S. Becker, who was succeeded by Henry H. Hornbrook. Following the stockholders' meeting the board of directors re-elected the officers. Dr. Henry Jameson was re-elected chairman of the board. The directors chose the following executive committee: Dr. Henry Jameson, chairman; Henry C. Thomson and Winfield T. Durbin. Dr. Jameson and Mr. Thomson were re-elected to the executive committee and Mr. Durbin succeeded Mr. Becker, the retiring director.

Financial Readjustment Indicated.—The Montgomery Transit & Light Company, Montgomery, Ala., recently filed a notice increasing its capital stock from $1,000,000 to $1,500,000. This is taken to presage a financial readjustment for the company. Jay R. Grier, C. P. Sterner and Frank A. Harrigan, Philadelphia, are acting as a committee to look after the bondholders' interests. It is stated that funds deposited with the trustee were not sufficient to pay all of the coupons due on Dec. 1, 1919, on the $200,000 of 6 per cent bonds. It is said that in order to meet the operating and financial conditions which confront the company those in control of the property plan to offer the bondholders in exchange for their bonds an equal amount of 7 per cent preferred stock with a bonus of half the number of shares of common stock.

Terminal Railway Sold.—Attorneys for Hyney, Emerson & Company, Chicago, Ill., said to represent the committee of bondholders of the Springfield Terminal Railway & Power Company, Springfield, Ohio, on June 5 purchased the property of that company at receiver's sale at the upset price of $300,000. It is stated that new bonds in the sum of $250,000 and $125,000 of preferred stock will be issued under the reorganization plan. The bonds, it is understood, will go to the former security holders, while the stock will be sold to residents along the line. The road connects Springfield and Troy. It was built by the late Governor Asa S. Bushnell in 1903. Cars are taken from the steam roads some distance outside of Springfield and switched through the streets to the various industries. It was Governor Bushnell's intention to extend the road to Fort Wayne, Ind. The Bushnell estate disposed of its interest in the property four years ago. There are four grain elevators on the line. It has physical connections with the Baltimore & Ohio Railroad at Troy.

Traffic and Transportation

Mr. Witt Praises Springfield

Traction Expert, Reporting for City, Suggests Some Changes, but Finds Road Ably Managed

The City Council of Springfield, Mass., on June 14 accepted the report of Peter Witt, transportation expert, on his recent investigation of the Springfield Street Railway system. Mr. Witt completed the investigation during the week of June 7-12. His report recommends several drastic changes in the traffic system of the city during the rush hours of the afternoon. The report was accepted.

Vehicular traffic on Main Street would be prohibited between 4:30 and 6:30 in the afternoon under Mr. Witt's scheme. During those two hours he would route southbound traffic through Cypress to Water Street to State and back again on to Main, making State Street a one-way thoroughfare during the time. Northbound traffic he proposes to send east of State Street through Dwight to Liberty to Main, making Dwight and Liberty Streets one-way streets during these two hours.

MR. WITT'S REPORT

Practically all of the detailed suggestions made by Mr. Witt with respect to rerouting are only of local interest. His report, except for these changes, follows susbtantially in full:

The investment in road and equipment, including land and buildings, was on Dec. 31, 1919, $7,534,067. Reducing this to a mileage basis, it means a capital charge of $42,000 per mile. This is remarkably low.

Paradoxical as it may seem, it is nevertheless true that while all cars operating on base schedules are over-seated, most of the lines are under-serviced. The headway of fifteen minutes must be reduced. Such a reduction will not only improve the service for the car rider but will, in my opinion, give the company what is most sorely needed—more revenue.

The company must cease wasting the car riders' money in the employment of conductors on cars carrying so few riders per trip. A fare box placed beside the motorman and making an entrance and exit at the front door of the car is all that is needed or required to make possible the change suggested.

The company has not only met the requirements so far as the extension of its lines are concerned, but also with few exceptions, has its tracks in a good state of upkeep and repair.

DOUBLE-TRACK LINES NEEDED

Improvements nevertheless can and must be made, for the city is too large in numbers to be properly served with single-track operation. All streets having width sufficient to carry double tracks must be so provided. In all streets the width of which makes double tracks impossible, additional turnouts must be installed not only in order to reduce to a minimum the nuisance the car rider now endures in long waits on present turnouts, but to make possible the increased service the needs of the future will require.

The purchase of additional cars when needed and the replacement of its present cars when the same become imperative, should be restricted to smaller cars for base table operation and large center-entrance trail cars for peak load requirements. The use of smaller cars for base table operation will make possible a more frequent service without a corresponding increase in operating expense.

The use of trail cars means a smaller capital investment and has the additional advantage, by reason of its construction, of being able to carry more passengers than a motor car of equal length.

A speed of 9 m.p.h. is shamefully slow. It should be changed at once and at least to 11 m.p.h. for base table operation and not less than 10 m.p.h. during the morning and evening tripper service.

To accelerate the movement of the cars and at the same time make easier the payment of fares the system of fare collection should be changed from pay enter to pay leave.

Total receipts for last year amounted to $3,064,636. There was paid out for operation, plus interest on funded and unfunded debt and taxes, $2,818,355, leaving a net for dividend purposes, but not paid out, of $246,281, approximately 5 per cent on its capital stock. * * *

COMPANY WELL MANAGED

The company is properly officered, conservatively managed and its employees wisely directed in the discharge of their duties, and all at an insignificant cost to the car riders. The item covering expenditures for officers' salaries as apportioned to the property here under investigation totaled last year $25,364.

If all the recommendations of car rerouting are carried out all cars will reach the car riders' objective—Main Street. I know it will be argued that Main Street, as it is, is too much congested to permit the bringing in and through it of more street cars. I will grant that in the evening rush perhaps there is congestion to the extent of unduly slowing down of traffic movement. Removing the street cars will not remove the trouble for, to the extent that street cars are removed, other vehicles will be invited to take the place of the removed street cars. What is the remedy? Remove the flexible traffic, the autos and horse-driven vehicles. * * *

Last, but not least, is the car rider; don't blame the company for everything that happens. Most of the interruptions to the regularity of the service are beyond its control. In the rush period don't stand on the platform when there is plenty of room inside. Move quickly and promptly and try always to have the exact fare ready.

Company, city, car riders, co-operate, for it is only through co-operation that it will be possible to give Springfield what Springfield is entitled to, a system and service equaling the best and superior to most to be found anywhere.

Better Traffic Regulation Proposed

Action taken by the local transportation committee of the City Council of Chicago, Ill., on June 3 has paved the way for better traffic regulations in Chicago. The committee decided to recommend to the Council an amended ordinance which would prohibit all parking of vehicles along car lines in the congested district from 7 a.m. to 7 p.m. At present this prohibition extends from 7 a.m. to 10 a.m. and from 4 p.m. to 7 p.m. In the non-rush hours vehicles are permitted to stand at curbs 30 minutes. The result has been that many of them remain stationary all day. Even in the rush hours the police have found it impossible to clear the streets It is hoped that the amended ordinance would make it possible for cars to make better schedule time and for all moving vehicles to clear the loop district more quickly. The Council committee is also considering the advisability of one-way traffic on certain streets.

Jitney Regulation Upheld

Federal Court Holds a License Is Not a Franchise—City Has Control of Its Streets

The city of Seattle's jitney ordinance, attacked in the federal courts by the Jitney Drivers' Union, has been upheld in all respects in a decision filed in the federal court recently by three United States federal judges, who heard the case on May 31. As a result, the city may fix schedules, routes, terminals and fares for jitneys.

Drivers contended that the real purpose of the ordinance was to run them from the streets, as the council was likely to fix routes on which they could make no money, outline impossible schedules, and limit fares to 10 cents at all hours.

COURT DENIES INJUNCTION

The ruling of the three federal judges holds that the city has control of its streets, and can legislate with relation to their use in a reasonable manner. The ordinance is held to be reasonable and proper. The decision also denies the petition for an interlocutory injunction, brought by a representative jitney bus owner, and grants a motion of City Attorney George A. Meagher to dismiss the action brought by the jitney driver in the form of complaint in equity.

The decision states, in part:

The labors of this court upon the issue before it are simplified by the decision of the Supreme Court of Washington, whose decision upon construing a municipal ordinance are binding upon this court. The exclusive control of the streets of the city vest in the defendant is provided by Sec. 11, Art. 11 of the State Constitution.

There is no merit in the contention that the city, being the owner of the railway in the city, acts in relation to this issue in its proprietary or business relation, and that in such relation it has a status as an individual or private corporation, and may not for the purpose of advancing its proprietary or business interest legislate with relation to the use of its streets by the plaintiff, where the results of such legislation would affect beneficially its proprietary interest.

No right was acquired by the plaintiffs by reason of establishment of route termini, and the operation of jitney buses over such routes; nor did privilege accrue by reason of the fact that he invested money in jitney buses, nor is there force in the contention of the plaintiff that the issuance of a vehicle license for permission to operate a vehicle for hire confers upon the plaintiff the right to operate such jitney bus in violation of the ordinance of the city. A license is not property, or is it franchise.

DEATHBLOW TO JITNEYS

It is conceded that if the regulations now outlined are approved by the Council, they will result in, if not actual elimination, certainly a large reduction in the number of jitneys now operating on all lines. Downtown terminals limited to points outside the business districts, making it impossible for jitneys to traverse the business district, are regarded as almost a deathblow to the jitney business.

The attorney for the jitney drivers' union states that he cannot say whether the jitney drivers will accept the provisions of the jitney ordinance, although a number of drivers have signified their willingness to try operating under its restrictions.

Seven-Cent Fare in Seattle

City Council Acts to Relieve Municipal Railway—Deficit Estimated at $83,428 Monthly

The City Council of Seattle, Wash., has adopted by a vote of 7 to 1 a report of the committee of the whole, recommending for passage the 7-cent fare ordinance introduced by Councilman R. H. Thomson. Mayor Hugh M. Caldwell has announced that he will sign the bill, which contains an emergency clause making it effective immediately. The ordinance provides that transfers shall be issued without charge, and that fifteen tickets or tokens may be purchased for $1. School children will pay a 3-cent fare, going to and from school, and two will be permitted to ride for one nickel.

In view of the prospective fare increase the municipal railway fund was not placed on a warrant basis on June 10, as City Treasurer E. L. Terry had notified the Council would be necessary if fares remained at 5 cents. At a recent conference attended by Mayor Caldwell, the city advisory board, members of the Council, D. W. Henderson, general superintendent of railways, and officials of the Seattle Clearing House Association, called to consider the railway finances in connection with the proposed warrant basis, the decision to increase the fare was reached.

WILL YIELD 40 PER CENT MORE

Superintendent Henderson presented figures to show that the fare increase would result in an added revenue of approximately $164,078 a month, a gain of 40 per cent over the present income of the railway. The estimated monthly operating revenue is placed at $574,261 under the new fare. Mr. Henderson presented the following figures showing the monthly income under various fares: Revenue at 5 cents, with free transfers, $410,186; at 5 cents, no transfers, $475,255; at 6 cents, with free transfers, $492,224; at 6 cents, with 1-cent transfer charge, $50,238; at 7 cents, with 1-cent transfer charge, $587,275.

Mr. Henderson estimates that it will require $513,428 a month to operate the railway during the remainder of the year, or a total sum of $3,594,001, exclusive of the sum set aside to redeem bonds. The various monthly cost items as estimated by Mr. Henderson are as follows: Maintenance, $45,000; equipment, $55,000; power, $60,000; transportation, $210,000; traffic department, $250; general and miscellaneous, $27,750; interest on bonds, $71,562; depreciation, $43,886. Mr. Henderson estimates the deficit under which the system is at present operating at $83,428 a month.

MAYOR CALDWELL'S ATTITUDE

Mayor Caldwell, who had championed the plan to increase the fare to 6 cents, charging the other 1 cent needed to general taxation, stated that he had reconsidered his views, and was wholly in favor of the 7-cent fare, dispensing with an increase in taxation. In discussing the matter, he said:

> Regardless of what we ought to do in theory, the rate of taxation makes it inadvisable to place an additional burden on the tax rolls. According to statistics furnished me by the county assessor, the tax rate this year was over 70 mills. Next year it will be 80 and 85 mills, without including any provision for a street car deficit. The assessed valuation of the street railway has been $5,640,000. The 1920 assessment will sustain this as a loss. The amount so lost in taxes is about $400,000. The argument that the street railway is a benefit to the entire city and therefore a part of the burden should be borne by taxpayers is offset by the fact that we lose that $400,000 in taxes, which will have to be spread on the general tax rolls.
>
> Furthermore, the residents of Rainier Valley pay a 7-cent fare in addition to their taxes, and if they paid taxes to support the street railway, they would receive none of the benefits of the general tax rolls.

The Mayor outlined his position more fully in the following letter:

> The holders of the fifteen millions of bonds must now look to the receipts from the operation of the street cars for their money, both principal and interest. I am unwilling to place these bondholders in any better position than they now are. Should we undertake to transfer the payment of the principal as an obligation on the general fund, it would make the bonds gilt-edge security and would probably enhance their value $1,000,000 or more.
>
> Under present changing conditions in modes of transportation no person is able to say that ten years from now transportation on our surface railways will not be as obsolete as horse-car transportation is now. Under the ordinance consummating the purchase, the city obligated itself to charge a sufficient rate to pay the principal and interest.
>
> Beyond this, however, its obligation does not extend. Consequently, if ten years from now—to use an arbitrary date for purposes of illustration—the present mode of travel is so obsolete that people are unwilling to use it, it may be necessary to continue the increase of rates in an effort to obtain enough receipts to make the payments, until ultimately the rate charged would further deter the use of this mode of transportation.
>
> We could then no longer operate the lines; the operation supplying all demands would be so limited as to produce insufficient revenue to make the payments to the bondholders. Under such a contingency the bondholders would doubtless be in a precarious position, and I know of no way in which they could enforce the collection of the amount due on the bonds. Consequently I am unwilling to adopt any course now that would transfer their obligation to the general fund, making it gilt-edge security.

Court Halts City Buses

Three municipal bus lines operating in competition with the Brooklyn (N. Y.) City Railroad discontinued service on June 12 as the result of a decision handed down by the New York Court of Appeals. The court sustained the action of Supreme Court Justice Cropsey, who some time ago issued a temporary injunction against the buses, holding their operation to be unlawful. Supreme Court Justice Callaghan recently announced that he would make the injunction permanent.

The Brooklyn City Railroad brought suit against the City of New York several months ago in an effort to have the buses halted. Grover A. Whalen, Commissioner of Plant and Structures, in charge of bus operation, contended that an emergency existed for the installation of the bus service. The Court of Appeals decision leaves only the Lafayette Avenue line operating in Brooklyn. The railway did not seek an injunction against this line as it did not regard it as a competitor.

The Appellate Division of the Supreme Court heard argument on June 11 on the appeal from an injunction granted by Justice Lydon restraining the operation of buses on routes paralleling the Eighth and Fourteenth Street crosstown lines of the New York Railways. Decision was reserved.

Seeks Milwaukee Rise

Company Presents Case for Higher Fare—President Beggs Points Out Need of Extensions

That an increase in fare would be necessary to enable it to pay increased wages to its railway employees was the claim made by representatives of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., at a hearing on June 11 before the State Railroad Commission. A wage increase was recently recommended by the State Board of Conciliation and under the Wisconsin law the Railroad Commission must now determine the need of additional revenue to meet the increase.

Testifying for the company John I. Beggs, president, called attention to the great increase in the cost of labor and materials, to the difficulty of raising the capital needed and to its present high cost. He testified that the 1920 budget of the company called for the expenditure of over $9,500,000, a large part of which is to be spent in connection with the construction of a new and much-needed power plant. "We have got to spend that much whether we raise it or not," Mr. Beggs replied when questioned on this subject.

MANY EXTENSIONS NEEDED

He also called attention to the vital need of extensions to certain industrial plants. These, he said, could not be made under present conditions unless the industries affected purchased sufficient securities of the company to pay for the cost of construction. Incidentally, Mr. Beggs pointed out that the suburbs of Milwaukee are an integral part of the city and should therefore be annexed to it. "They are receiving the benefits and they should not be selfish and remain outside," he said.

Testimony was introduced by the company to show the probable cost to it of the wage increase recommended. Testimony was also given regarding the difficulty of obtaining a sufficient coal supply and regarding the present high cost of coal.

The city of Milwaukee was represented at the hearing by City Attorney Williams and his staff. The hearing was adjourned until June 21 to permit the outlying towns and villages to be heard, as it is contended that a change in fare in Milwaukee would in all probability affect the rates on the suburban lines.

Court Scores D. U. R.

Judge Jayne Says City Met Company More Than Half Way on Fares —Informal Agreements Urged

The Detroit (Mich.) United Railway's announced plan arbitrarily to sell five tickets for 30 cents, which arrangement was not part of the agreement reached by the company and the city in Judge Jayne's court, caused a split in negotiations and Mayor Couzens declared that all negotiations were off and that the city would withdraw its acceptance of the new agreement. The Mayor saw in the plan to sell five tickets for 30 cents a device to avoid selling the strips of nine tickets for 50 cents, the ticket rate agreed upon.

PLAN ENCOUNTERS OPPOSITION

The announcement concerning the sale of five tickets for 30 cents appeared in the cars the day before the 6-cent fare was scheduled to go into effect. After city officials were advised of the plan, communications were sent to the attorneys of the railway and after unsuccessful attempts to have the five-ticket strips dispensed with, Judge Jayne returned from Chicago and went immediately to the court room.

The five for 30 cent strips were finally withdrawn after the Judge had denied having stood sponsor for the issuance of such strips or even having heard of them until after the company had put them on sale. It was claimed by the Mayor that in some instances people who boarded the cars and asked for the nine for 50 cent tickets were offered the five for 30 cent rate instead by the conductors, who said they did not have any of the cheaper tickets.

The court agreed with the contention of the city that the five for 30 cent tickets were confusing to the public. It was held by the Judge that the city in receding from its demand for a rebate slip on cash fares, and asking only for rebate slips on tickets, had more than met the company half way.

Both sides agreed that the fare determined as the proper one to give the company a reasonable return, if it is found that the court has jurisdiction, would merely be a recommendation by Judge Jayne which neither side could be forced to accept and that all the legal rights of both sides would be preserved, the city making no grant of fares but simply announcing it would not oppose the rate fixed.

INFORMAL AGREEMENTS SUGGESTED

The Judge said he understood that his court was to be available as a sort of permanent, but informal forum where the matter of fixing proper fares could be thrashed out at any time. The agreements could be reached, he said, in the same manner as the present one with both sides retaining their legal rights by making the agreement wholly informal.

Rebate slips are attached to the nine-ticket strips and will be redeemed by the company if the permanent rate should be set lower than the temporary rate now in force. There will be no refund coupons with cash fares.

In commenting on the situation the company states that a tie-up of the city's transportation facilities with attendant disorder and inconvenience and suffering was avoided by the company agreeing to continue operations at a very substantial loss. This was done by assenting to put into effect a maximum fare of 6 cents and a minimum fare of nine tickets for 50 cents with a continuation of existing transfer regulation. The company agreed to this because of the assurance that in or connected with the pending suit before Judge Jayne it would have a just and lawful rate of fare determined.

Transportation News Notes

Traffic Survey for Kansas Side.—A survey of traffic conditions in Kansas City, Kan., is now under way, under direction of John A. Beeler. Mr. Beeler has been making an exhaustive study of the traffic situation in Kansas City, Mo.

Ten-Cent Jitneys in Atlantic City.—The City Commissioners of Atlantic City, N. J., have issued an order allowing jitneymen to raise fares from 5 cents to 10 cents. School teachers and students will be allowed to ride for 5 cents.

Approves Glen Cove Rise.—The City Council of Glen Cove, N. Y., has adopted a resolution approving the modified franchise of the Glen Cove Railroad permitting an increase in fare to 7 cents. The franchise has been accepted by the Nassau County Supervisors.

Hearing on Atlanta Plea. — The Georgia Railroad Commission convened on June 8 to hear the petition of the Georgia Railway & Power Company, Atlanta, for permission to charge an 8-cent fare on its city and suburban lines. The company also seeks permission to increase its rates for light and power.

Three Cents a Mile on Ohio Line.—Fares on the lines of the Columbus, Marion & Bucyrus Railway, Marion, Ohio, were raised to 3 cents a mile on May 25. No reduction is made for round trip tickets, making the fare from Marion to Bucyrus, terminals of the railroad, 54 cents. The fare was formerly 45 cents.

Seven Cents in Helena—A 7-cent cash fare with four tickets for 25 cents will go into effect on the lines of the Helena Light & Railway Company, Helena, Mont., on July 1. The increase was authorized in an order handed down by the State Public Service Commission on May 24. At the same time the company was authorized to increase lighting rates. The present fare is 6 cents.

Eight Cents in Kewanee.—The Illinois Public Utilities Commission on May 28 issued an order authorizing the Galesburg & Kewanee Electric Railway to charge 8-cent fares on its lines. The company was ordered to sell five tickets for 35 cents. The new rate applies to the lines in Kewanee and Wetherfield. The company has been charging 7-cent fares in these cities since August, 1919.

Wants More in Portsmouth.—A petition has been forwarded to the New Hampshire Public Service Commission by the Portsmouth Electric Railway, Portsmouth, asking for permission to increase its fares from 7 cents to 10 cents, effective July 1. The Portsmouth Electric Railway is a subsidiary of the Boston & Maine Railroad.

Voters Approve Higher Fare.—At a referendum on May 28 the voters of Moorhead, Minn., approved an increase in the fare charged by the Northern States Power Company, Fargo, N. D., from 5 cents to 7 cents. The company operates in Fargo and Moorhead. Some time ago it applied to the City Councils of these cities for financial relief.

Seven-Cent Fare in Peoria.—The Peoria (Ill.) Railway began charging a 7-cent fare on June 3. The new rate was authorized by the State Public Utilities Commission as a temporary measure of relief for the company, which had asked for a 10-cent cash fare. It will stand pending the fixing of a permanent rate. The fare was formerly 6 cents.

Asks More in Colorado Springs.—A 7-cent fare was asked by the Colorado Springs & Interurban Railway, Colorado Springs, Col., in a petition filed recently with the City Council. The Council requested the company to furnish operating figures before acting on the fare plea. The company stated in its petition that it could not raise trainmen's, wages unless fares were increased. It now charges a 6-cent fare.

Seven Cents in Rutland.—Cash fares on the lines of the Rutland Railway, Light & Power Company, Rutland, Vt., were raised from 6 cents to 7 cents on May 20. The commutation tickets which sold in books of 50 tickets for $2.70 now cost $3.15 and the school books which also contained fifty tickets, and which formerly sold for $1.25, have been raised to $1.50. The company has also raised its express rates.

Uniform Fare Collection Sought.—A meeting was recently held by the patrons of the Cumberland County Light & Power Company, Portland, Me., in regard to the adoption of a uniform system of fare collection on the various lines. On some lines the fares are collected when the passengers leave the car, while on other lines the fares are taken up as riders board the car.

Asks 8 Cents in Wilmington.—The Wilmington & Philadelphia Traction Company, Wilmington, Del., has petitioned the Wilmington Board of Public Utility Commissioners for permission to charge a straight 8-cent fare and to discontinue the sale of commutation rates. The company is now charging a 7-cent cash fare with four tickets for 25 cents. In its petition the company contends that to procure the revenue to which it is entitled it would require a fare of 9.049 cents.

Denies B. R. T. Plea.—Public Service Commissioner Lewis Nixon of the First District has denied the petition of Lindley M. Garrison, receiver of the New York Consolidated Railroad, New York, N. Y., for a hearing upon the application for an increase in fare from 5 to 8 cents, made to the commission some time ago. When the application was filed with the commission its formal filing was directed by Commissioner Nixon, and no other action was taken. The company has announced that it will appeal to the courts for a decision as to the commission's power to act upon the application.

Wants More in Waterloo.—The Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, has applied to the Waterloo City Council for an increase in fare from 5 to 10 cents. The company agrees to furnish twenty-five work tickets for $2 and twenty children's tickets for $1. It also agrees to purchase twenty safety cars as soon as the increase is granted and to take other steps to improve the service. The company presented a statement showing the receipts and expenditures during the past year. The City Council has authority to grant an increase in fares.

New Transfer for Albany.—The United Traction Company, Albany, N. Y., is now using the "line to line" transfer system. Each line has its individual transfer, upon which is printed a list of all the lines to which it is possible to transfer. The names of these lines are printed in separate blocks and when a passenger requests a transfer to a certain line the conductor punches the block in which that line is printed, thereby making the transfer good for transportation only on that line. The company has also introduced the "near side" stop on its lines.

Must Obey Traffic Rules.—All cars of the Portland Railway, Light & Power Company, Portland, Ore., will hereafter be required to travel at the same speed as automobiles in all sections of the city, except where the company has exclusive right of way, according to recent announcements of the traffic department. Patrolmen are instructed to arrest all motormen caught exceeding the speed limit. The new ruling limits car speed to 20 m.p.h. Electric car operators will also be compelled to adhere to the low speeds provided for automobiles in passing schools, crossing bridges and in other similar restricted districts.

Six Cents in Little Rock.—A 6-cent fare became effective in Little Rock, Ark., on June 3. The Arkansas Corporation Commission on June 1 issued an order granting the petition of the Little Rock Railway & Electric Company. On May 17 the City Council adopted an ordinance amending the contract of the company with the city so as to permit the company to charge a 6-cent fare, as far as the city was concerned. The assent and formal order of the Arkansas Corporation Commission was necessary before the ordinance could be put into effect. The company thereupon filed a petition with the commission.

Hears Springfield Plea.—Judge D. E. Blair, representing the Missouri Public Service Commission, held a hearing recently in Springfield on the application of the Springfield Railway & Light Company for permission to increase its revenue in order to grant a wage increase to its employees. The application requested permission to increase fares from 6 cents to 7 cents, with a 2-cent charge for transfers. Employees are to receive an increase of 4 cents to 6 cents an hour. Tickets are to be sold at the rate of five for 30 cents. Sanderson & Porter, consulting engineers of New York, are now making an appraisal of the property of the company.

Seeks Rise for Shore Line.—R. W. Perkins, receiver of the Shore Line Electric Railway, Norwich, Conn., has applied to the Public Utilities Commission of Rhode Island for an increase in the rate of fare on a number of the company's Rhode Island lines. Since October 1, when the property passed into the hands of the receiver, the lines in Rhode Island, as well as some in Connecticut, have been operating at a direct loss, exclusive of any question of taxes or interest. Mr. Perkins states that he has several times been on the point of asking the court to suspend operation on these lines but that, appreciating the importance of a continuance of transportation service to the communities affected, he has decided to test the property through an increased fare.

Galveston Hearings Concluded.—Hearings on the application of the Galveston (Tex.) Electric Company for an injunction restraining the city of Galveston from interfering with collection of a 7-cent fare have been concluded before Judge J. C. Hutcheson of the United States District Court. Judge Hutcheson has taken the application under advisement, intimating that he will appoint a master in chancery to held further hearings on questions of valuation and equitable return on the property. The company in its petition and in argument before Judge Hutcheson contended that the present 5-cent fare imposed by the City of Galveston is confiscatory, in that on a valuation of $1,096,000 for the railway department it provides a return of between 1 and 2 per cent. Segregation of the railway and lighting departments is asked by the company in order that each may hear its true relation to the other.

New Publication

"Service-at-Cost Plans"

By Harlow C. Clark, Editor of *Aera*. Published by American Electric Railway Association, 8 West 40th Street, New York, N. Y., 1920, 315 pages.

Nothing could more clearly show the great changes which have taken place in the conceptions of the functions of an electric railway during the past twenty years than Mr. Clark's book on service-at-cost franchises. The popular view of an electric railway a decade ago, both in and out of the industry, was that of a private enterprise whose use of the public streets was merely incidental.

The modern view is that an electric railway is a public enterprise, and the fact that its management is in private hands is purely incidental. That is to say, private management is preferred because it is conducive to economy and good service, but the service supplied is just as necessary to a community as many activities under the direct management of the public. From this modern point of view, some service-at-cost plan is the only logical form of franchise, whether it is the indirect system represented by commission control of rates or the direct plan with automatic methods for determining fares and rate of return. It is this fact that makes Mr. Clark's book a welcome addition to the literature on the electric railway.

SIX PRINCIPLES LAID DOWN

"Service-at-cost Plans" is divided into three parts. The first, or that up to page 67, consists of nine chapters in which the author discusses under such chapter headings as "Risk of Supercession," "Risk of Termination" and "The Investor's Requirements" the fundamental considerations by which private capital can be secured to develop public utilities. In this part of his book Mr. Clark lays down six essential principles governing the relations between communities and private enterprise engaged in local transportation. An excellent feature of these chapters is the enumeration at the end of each of the conclusions reached on the topic considered.

The second part of the book gives the salient features of existing service-at-cost franchises in Cleveland, Youngstown, Cincinnati, Boston, Montreal, eastern Massachusetts, Westerville, Dallas and Memphis. This analysis is made under subject headings, such as general conditions, public purchase, control, etc., so that comparison of the different provisions can easily be made.

The final or third division of the contents of the book gives a similar analysis of the principal service-at-cost franchises which have been proposed but have not gone into effect.

The volume is well written and should be of great assistance in popularizing the knowledge, and in helping the adoption, of new service-at-cost franchises.

Personal Mention

Mr. Mortimer Retained by Bondholders as Consultant

James D. Mortimer, until recently president of the North American Company and its subsidiaries, has been retained to represent the protective committee of the security holders of the Kansas City (Mo.) Railways. This committee, of which Arthur Reynolds, Chicago, is chairman and H. L. Stuart, Chicago, is vice-chairman, has assumed active participation in the management of the affairs of that company. Mr. Mortimer will devote a portion of his time to assisting the company management on the ground.

Mr. Mortimer is by training and profession an engineer. Many conspicuous things along engineering lines were done by the North American Company and its subsidiaries during his connection with them, but most important of all the duties which Mr. Mortimer was called upon to perform while associated with the company were those relating to finance. Especially in the councils of the American Electric Railway Association has his advice always been highly valued. Mr. Mortimer's career in public utility work was reviewed at length in the ELECTRIC RAILWAY JOURNAL for April 3, page 731.

Mr. Caldwell Honored

Edward Caldwell, treasurer of the McGraw-Hill Company, publisher of the ELECTRIC RAILWAY JOURNAL, was tendered a dinner by his business associates on June 15 on the occasion of the thirtieth anniversary of his connection with that organization. Mr. Caldwell was graduated from the University of Michigan in 1886 with an A.B. degree and two years later as mechanical engineer from Cornell. For two and one-half years Mr. Caldwell was assistant editor of the *Electrical World*, and in January, 1893, he went to Chicago as editor of the *Street Railway Gazette*. In June, 1894, he became business manager for the *Street Railway Journal*, the predecessor of the ELECTRIC RAILWAY JOURNAL, and he continued in this work until January, 1897, when he became associated with Hugh J. Grant, former Mayor of New York City, in street-car advertising.

After a year spent in this work he devoted a year to trade-paper advertising agency work. In January, 1899, he returned to the McGraw Publishing Company and took charge of the book department. At that time the department had to its credit between thirty and thirty-five book titles. In 1909 this department was consolidated with a similar department of the Hill Publishing Company, thereby forming the McGraw-Hill Book Company. Since that time the company, of which Mr. Caldwell is treasurer and a director, has grown until it now has more than 1,000 titles on its lists. Two years ago Mr. Caldwell became treasurer of the McGraw-Hill Company, retaining his connection with the book company.

Professor Harding Joins Staff

C. Francis Harding, head of the School of Electrical Engineering at Purdue University, Lafayette, Ind., will serve as a special editorial representative of the ELECTRIC RAILWAY JOURNAL for the summer months, with headquarters at the New York office. Professor Harding is well known in the electrical engineering profession in general and in railway circles in particular.

PROF. C. F. HARDING

For two years following his graduation at Worcester Polytechnic Institute, he was electrical engineer of the Worcester & Southbridge Street Railway, Worcester, Mass. He devoted one year to instructional and graduate work at Cornell University, and later served as assistant electrical engineer, principally upon electric railway projects, with Stone & Webster.

During his connection with Purdue University he has acted in a consulting engineering capacity upon many utility projects in the Middle West, including several in connection with the Public Service Commissions of Wisconsin and Indiana. He is the author of a text book entitled "Electric Railway Engineering," published by the McGraw-Hill Book Company, which has been extensively used in many of the leading universities of the country.

A. D. Knox has also joined the editorial staff. He will devote most of his time to the statistical work of the paper. Mr. Knox graduates this year from the electrical engineering course of the Sheffield Scientific School at Yale.

R. R. Loening has been elected first vice-president and general counsel of the Havana Electric Railway, Light & Power Company, Havana, Cuba, to succeed the late David T. Davis. Mr. Loening was formerly an Assistant District Attorney in New York City.

Frank H. Renninger, general manager of the Montoursville (Pa.) Passenger Railway and the Montoursville Electric Light Company, has resigned to accept the position of shop foreman of the Central Pennsylvania Lumber Company, Laquin, Pa.

H. W. Price of Martinsburg, W. Va., has been appointed manager of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., to succeed the late R. D. Sefton. Since returning from fourteen months' service with the A. E. F. in France, Mr. Price has been acting as superintendent of the Potomac Light & Power Company, Martinsburg. He was formerly connected with the Edison Electric Illuminating Company and the Cumberland & Westernport Electric Railway, Cumberland, Md.

Henry Stanley has retired from the Detroit (Mich.) United Railway after twenty-five years of service to return to England to live. Mr. Stanley is the father of Lord Ashfield, well known in the United States as Albert Stanley. Lord Ashfield was connected with the Detroit United Railway and the Public Service Railway of New Jersey for many years before becoming connected with the underground electric railways in London. Henry Stanley had been a statistician in the schedule department at Detroit for the last twenty years. Five years previous to that he was in the mechanical department. He intends to spend the remainder of his days in Derby in which city he resided before going to Detroit some forty-five years ago.

Joseph S. Goodwin, manager of the Bridgeport lines of the Connecticut Company, New Haven, Conn., has resigned to become associated with the firm of Charles E. Morse, Inc., Boston, Mass. Mr. Goodwin will make his headquarters in Hartford, Conn. He entered railway work in 1895 as a motorman on the Gloucester, Essex & Beverly Street Railway, now a part of the Eastern Massachusetts Street Railway. He was subsequently employed as a motorman for a short time with the Rhode Island Company, Providence, R. I. In 1901 he entered the employ of the Hartford & Springfield Street Railway as a motorman. He was later appointed a dispatcher of the company. In 1906 he was advanced to chief dispatcher and served in that capacity until February, 1914, when he was made secretary and superintendent of the company. Later he was made general manager of the road. He resigned three years ago to become manager of the Connecticut Company's Bridgeport lines. Mr. Goodwin won for himself in all of his positions popularity with his men and the public.

Louisville Executives Are All Practical Operators

To J. P. Barnes, the New President, and Messrs. Riddle and Miller, the New Vice-Presidents, Will Fall the Important Task of Rehabilitating This Southern Road

THREE practical operators of proved ability as traction executives have been chosen to manage the electric railway system of Louisville, Ky. James P. Barnes, the new president of the Louisville Railway, takes up his duties at Louisville with the fresh point of view and the keen understanding of railway problems gained from many years' experience with properties in the North, most recently as general manager of the Schenectady (N. Y.) Railway. Samuel Riddle and Francis H. Miller, who become vice-presidents, are, by reason of their long connection with the Louisville system, thoroughly familiar with the company's needs and hence well qualified as aides and advisers to Mr. Barnes.

F. H. MILLER

The task which confronts the new management is one of considerable magnitude. The company for some time has been in need of financial relief. Early in the present year it applied to the City Council for an increase in fare, but its application was denied. Shortly thereafter Thomas J. Minary, who had directed the company's affairs for thirty years, retired as president to become chairman of the board. The management of the system was then placed in the hands of a committee of three of the directors, W. S. Speed, W. H. Kaye and John W. Barr, Jr.

This committee has discharged its duties in a highly efficient manner. Many questions, however, have been left unsettled pending the selection of a new president. These matters will now come before Mr. Barnes for settlement. In reaching his decisions he will profit by the advice of Messrs. Riddle and Miller. These men, steeped in the traditions of the company, will be in a position to make clear many points necessarily unfamiliar to a newcomer.

Mr. Barnes is a native of Syracuse, N. Y. For six years following his graduation from the Massachusetts Institute of Technology in 1905, he served in various capacities with the Oneida (N. Y.) Railway and the Syracuse Rapid Transit Company. While associated with the latter company he was responsible for the layout and construction of the Wolf Street shops in Syracuse and he also assisted in the electrification of a division of the West Shore Railroad in central New York.

In 1912 he resigned the position of chief engineer of the Syracuse Rapid Transit Company to become general manager of the Syracuse & Suburban Railway. Later he was appointed general manager of the Buffalo, Lockport & Rochester Railway. Three years ago he became general manager of the Schenectady Railway.

J. P. BARNES

Mr. Barnes is among the most active workers in the interest of the American Electric Railway Association, rendering valuable service as a member of various committees of the national organization. He has also been prominently identified with the activities of the New York Electric Railway Association, of which he served as the president in 1916. In his work for both the national and state organizations he has demonstrated a breadth of vision and a grasp of the industry's problems which place him in the forefront of electric railway executives.

Mr. Riddle is forty-two years of age. He was graduated from Swarthmore College, Pennsylvania, in 1897, with the degree of Bachelor of Science and Engineering. In the fall of 1897 he became associated with Dr. W. A. Drysdale, consulting and mechanical engineer, Philadelphia, Pa., and continued in that position for five years. He then went with the engineering department of the United Gas Improvement Company, Philadelphia. In 1903 he was in charge of the erection of buildings and installation of equipment, power stations, etc., for the Connecticut Railway & Light Company, in New Britain, Waterbury and Cheshire. In March, 1904, Mr. Riddle entered the service of the Rhode Island Company, Providence. He served this company in various departments, finally becoming superintendent of transportation in the spring of 1906. In February, 1907, he became general manager of the Chicago, South Bend & Northern Indiana Railway, with which he continued until March, 1909. He next entered the service of the transportation department of the Philadelphia Rapid Transit Company, where he remained until February, 1910. He then became superintendent of transportation at Louisville.

S. RIDDLE

Mr. Miller was born in 1874 near Louisville. He was graduated at Rose Polytechnic Institute in 1895 and afterward by post-graduate work at Rose took the degrees of E. E. and later M. E. He has been with the Louisville Railway since the fall of 1895, starting in the car repair shops and occupying the positions successively of timekeeper, store-room man, car tester, truck repair man, assistant shop superintendent, superintendent of wire work, assistant and then superintendent of power station.

Under his direction the electric features of some 100 miles of suburban and interurban lines have been installed. He has rebuilt and enlarged an existing power station, and has recently designed and built a modern steam turbine station.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Extreme Shortage in Wooden Tool Handles

Inferior Hard Wood Handles Substituted for Firsts, with Shipments Eight Months Behind

Demand for wood handles for boiler room and track tools has been so heavy all this year that manufacturers are up to six and eight months behind on their shipments. Particular reference is made to scoops and shovels, but all construction tools have suffered because of the shortage of first grade ash and hickory. In one case wood which was ordered in February is just coming in to be made up into handles.

As a consequence of this shortage in first grade material customers have been forced to use second and more inferior grade wood and have not received the customary service from the utensils.

At this time there is no hope held out of a substantial clearing in the situation, as it will take months to fill back orders before anything like normal conditions of shipment can be met. Prices are stiff and generally steady for the present, but the tendency for the last three months has been upward.

High Tension Insulator Shipments Long

Manufacturers Are Booked Up for Several Months in the Face of a Heavy Demand

Demand for porcelain high-tension insulators continues to rule strong. One representative manufacturer states that he is booked up solidly with orders until January and February and cannot promise deliveries of present orders before then. He further says that the volume of insulator buying on the part of the railroads has increased greatly since the government relinquished its control. Foreign demand is also beginning to make itself felt strongly, coming especially from the Scandinavian peninsula, Italy and France. Producers were looking to the hydro-electric field as a source of demand which would result in heavy orders, but the President's failure to sign the water-power bill has put off the development of this market. Agents report practically no stocks on hand, while manufacturers are from five to seven months behind in orders, compared with normal shipments of from four to six weeks.

An important factor in checking production has been the general shortage of raw material. This is reported as caused by the irregularity of shipments rather than by an actual dearth of sand, clay, etc. In the light of these conditions the general trend of insulator prices has been upward, although since March and April the market has held steady. One of the largest dealers in insulators in the country reports that he is unable to obtain any quotations on the porcelain high-tension types, while another company says it is now able to get quotations for six months ahead, but the prices listed are high enough to guard against any fluctuation within that period.

In view of these facts the number of order cancellations has been exceedingly small, a local manufacturers' agent reporting only one cancellation within the past year. This would seem to indicate the continuance of construction programs.

Foreign competition is spoken of in many quarters, but is not greatly feared, For one thing, American models of porcelain insulators made rapid strides while European production was at a standstill during the war. These countries have not sufficiently recovered from their industrial chaos to provide sufficient insulators to affect the market very seriously at this time.

Critical Coal Situation Foreseen in New England

Electric Railway Properties Likely to Suffer if Embargoes Are Not Placed on Coal Exports

Overseas shipments of bituminous coal are threatening New England industries with serious curtailment next winter and electric railway purchasing agents are disturbed about the outlook, even with preferential shipments likely for public utility uses. Nothing in the supply market situation in the northeast is so fraught with danger as the inadequate flow of coal now under way into that section of the country. A prominent electric railway coal buyer from Massachusetts who has spent most of his time since early spring at the Virginia tidewater ports informed a representative of the ELECTRIC RAILWAY JOURNAL last week that an industrial coal famine is entirely within the probabilities in the coming winter, at least in New England; and the primary cause is unquestionably the successful competition of foreign buyers.

The increasing cost of coal to the railway companies, growing out of the shortage, has become so great a burden that in some cases vigorous appeals to the public and to governmental authorities have been made. Further increases of fare or suspension of service are threatened in some cases. With soft coal selling around $15 or $16 per ton, an advance of at least $3 or $4 within the past two weeks, the situation has become painfully acute. It would be worse in the interior of Massachusetts were it not for the service rendered by the hydro-electric companies, still favored with unusually satisfactory water conditions for this time of year.

The demand for central station and wholesale electric energy now exceeds the available supply in this district, and unless something like a normal flow of bituminous coal can be assured at fair prices transportation service in eastern New England, especially on suburban and rural lines, will be hard hit. Personal attention to purchases and close follow-up methods on the ground are the best assurance at present of securing deliveries. The purchasing agent who sits back in his office and anticipates smooth sailing in regard to coal shipments this summer bids fair to be "out of luck" before snow flies.

Meanwhile a great wave of public opinion is forming to demand that until domestic requirements are met the President or the Interstate Commerce Commission shall put an embargo upon foreign shipments of coal, or at the very least greatly restrict these in the interests of American industries. These are now threatened with a disaster whose extent cannot be fully measured, but which may yet be warded off if prompt and energetic steps are taken by those in authority.

Use of Hand Fare Registers Increasing

Raw Material Receipts Below Normal So Shipments Are Advanced to About Two Months

A steadily growing market for hand registers is a feature of the electric railway supply business today. In a leading manufacturing plant producing these equipments the statement was made a few days ago to a representative of the ELECTRIC RAILWAY JOURNAL that the volume of business this year is about double that of last year to date. The indorsement by the American Electric Railway Association of methods of collection, illustrated by the fare box and by the portable register, has been a potent factor in increasing the number of inquiries and orders for leased service. Roads, which formerly manifested no interest whatever in portable registration, are now asking for figures. The development of improved equipment has also been influential in stimulating new business.

The growing use of the fare box has accustomed the public and car service men alike to "counting the fare" rather than counting the passenger. It is common practice today to "tie in" the passenger in connection with fare recording, and much of the earlier opposition of car crews to portable registration has disappeared with the larger and larger use of the fare box. Heretofore, the limitations of hand registration equipment as regards multiplex fare service have somewhat restricted its use, but today devices are on the market for recording nickels, dimes and quarters, and they may be adapted to tokens. Interurban inquires are coming in rapidly and the growth of this business is expected to be continuous.

Manufacturing conditions in this field are unsatisfactory on account of the difficulties encountered in securing raw material. No serious curtailment of output has been necessary so far, however, and labor conditions are in pretty fair shape. No recent change has been made in leasing prices, except that a slight advance on three-coin machines accompanied the entrance of these new units into the operating field. Deliveries are a little slow at present, about two months being required to establish a new installation in view of orders which are now on the books.

1920 Railway Material Prices Far Surpass 1919

Middle Western Utility Compiles Table Showing Relative Prices on Traction Supplies Most in Use

In the general desire of electric railways for higher rates to enable them to perform better their function of giving service to the traveling public, the question of maintenance and operating costs has figured largely. One of the representative Middle Western electric railway interests has just compiled a table giving comparative cost data on the items which that railway is constantly using. This covers present prices in relation to those existing last year and in 1914 and gives percentages of increase. It can readily be seen that even down to office supplies virtually every item has increased since last year, when prices were thought to have about reached their maximum level, and to date no tendency toward retrogression is apparent, from all reports that have come in.

The smallest increase since 1914 is shown in brake shoes, which have advanced only 13.75 per cent, while 6-in. trolley wheels are next at 22.31 per cent. Against these is found a rise in steel castings of 525 per cent.

COMPARATIVE PRICES OF MATERIALS

Name of Material	Prices 1920	Prices 1919	Prices 1914	Percentages 1920 Over 1919	Percentages 1920 Over 1914
Axles, each	40.50	28.13	16.54	4.12	145.53
Bonds, rail, each	1.11	1.06	.68	4.72	63.24
Brake shoes, per lb	.364	.364	.32	.....	13.75
Bearing, axle, each	4.80	4.27	3.40	12.41	41.18
Bearing, journal, each	3.60	2.70	1.72	33.33	109.30
Bolts, machine, each	.0238	.0162	.009	46.91	164.45
Brooms, per dozen	7.50	6.50	2.50	15.39	200.00
Brushes, carbon, each	.255	.195	.12	30.76	112.50
Cable for cars, per cubic foot	.186	.098	.0515	89.80	261.17
Controller rep. coils, each	13.20	9.75	7.70	35.38	71.43
Controller rep. segments, each	.65	.52	.29	25.00	124.14
Controller rep. finger, each	.24	.21	.16	14.29	50.00
Castings, steel, per lb	.15¼	.13½	.026	12.96	525.00
Cement, per sack	.72	.68	.42½	5.88	69.41
Coils armature No. 68, per set	42.50	37.00	18.00	14.86	136.11
Coils armature No. 67, per set	35.00	29.00	17.30	20.69	102.31
Ears, trolley, 2/0, each	.550	.544	.300	1.10	83.33
Ears, splicing, each	1.72	1.396	1.25	23.21	37.60
Envelopes, 3½x7½, per thousand	.....	2.40	1.00	.....	140.00
Gears, each	56.00	48.80	26.25	14.75	113.33
Glass, 26x40, each	2.55	1.78	1.20	43.26	112.50
Gravel, per yard	2.25	1.63	.95	38.04	136.84
Headlights, each	7.50	6.40	3.90	17.20	89.19
Lamps, each	.28	.245	.21	14.29	33.33
Leather cord, bell, per foot	.052	.044	.00875	18.18	494.26
Limestone, per yard	2.56	1.56	.715	64.10	258.04
Lumber, oak, per foot	.15	.12	.045	25.00	55.56
Printing letter heads, per thousand	4.18	4.90	1.25	.....	234.40
Pinions, each	10.14	7.27	4.00	39.48	153.50
Paint, gray, per gallon	2.25	1.75	1.25	28.57	160.00
Paint, yellow, per gallon	3.50	2.75	2.50	27.27	40.00
Rattan, per square foot	.505	.39	.21	29.49	140.48
Rails, steel, per ton	64.00	48.00	29.50	33.33	116.95
Retrievers, each	20.35	14.85	10.00	37.04	103.50
Steel, sheet, 14 g., per pound	.15	.10½	.04	45.00	275.00
Steel, bar, per pound	.04	.032	.0173	25.00	131.21
Steel, pike, 1 g., per foot	.95	.75	.21	26.67	352.38
Shovels, track, each	2.15	1.58	.89	36.08	141.57
Sand, per yd	2.75	1.69	.60	62.72	358.33
Screws, per gross	1.07	.68	.44	57.35	120.45
Ties, steel, each	7.75	5.57	4.40	39.14	76.14
Ties, wood, each	1.78	1.33	.60	33.83	196.00
Trolley harps, each	1.80	1.45	.60	24.14	200.00
Trolley poles, each	3.25	2.55	1.10	27.45	195.45
Trolley wheels, 6 in., each	1.59	1.56	1.30	1.92	22.31
Tickets, city, per thousand	.30	.16½	.10	81.82	200.00
Transfers, city, per thousand	.24	.24	8.75	.....	174.29
Trolley rope, per pound	.95	.75	.21	26.67	352.38
Wheels—33 in., each	36.75	23.75	14.50	54.74	153.45
Waste cotton, per pound	.125	.11	.065	13.64	92.31
Waste wool, per pound	.305	.20	.....	52.50	......
Wire, guy, per pound	.0135	.0092	.0069	46.74	95.65

Southern Pacific Plans $22,500,000 Issue

Listing Includes 118 Motor Cars and Two Locomotives for Roads Leased by Company

In an application filed with the Railroad Commission a week ago, approval is asked by the Southern Pacific Company of its $22,500,000 equipment program. Of this amount there have been listed twelve motor cars for the Fresno Traction Company, fifteen for the Stockton Electric Railroad Company, twenty-two for the San Jose Railroads, all of which are leased by the Southern Pacific, and sixty-nine for the Pacific Electric Railway. In addition, there are plans for two electric locomotives.

The application asserts that the company understands that the Railroad Commission has authority only to pass upon that portion of the financing which concerns intrastate commerce, and the approval is sought in order that the financing which shall be conducted outside the state may proceed.

Rolling Stock

Androscoggin & Kennebec Electric Railway, Lewiston, Me., has placed an order with the Wason Company for ten double-truck interurban cars to be delivered early in the fall.

Recent Incorporations

Cleburne Interurban Association, Cleburne, Texas.—Judge J. D. Goldsmith of Cleburne, Texas, has been elected permanent chairman of the Cleburne Interurban Association, which is promoting the building of an electric interurban line from Cleburne via Stephenville, Dublin and Desdemona to the West Texas oil fields. The line will be approximately 100 miles in length and will traverse a section of country now practically devoid of railway transportation.

Power Houses, Shops and Buildings

Alabama Power Company, Anniston, Ala.—It is reported that the Alabama Power Company plans shortly to begin the construction of a large hydro-electric dam and a power station on Little River 7 miles from Fort Payne. The company several years ago made a survey of the river and purchased several thousand acres of land above the site of the proposed development.

Connecticut Company, New Haven, Conn.—The Connecticut Company is reconstructing its express buildings and yards at Silver Street, New Haven. The yard trackage is being relaid.

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway has begun work on the construction of a fireproof carhouse and office building at Fields Corner. The wooden carhouse now occupying the site is being torn down to make room for the improvement.

Ohio Electric Railway, Springfield, Ohio.—The Ohio Electric Railroad is building a new power line from Toledo to Lima so that it may secure power from the Acme Power Company, without enlargement of its own facilities at the present time. The Acme Company is serving several of the interurbans out of Toledo at the present time.

Tacoma Railway & Power Company, Tacoma, Wash.—The power station of the Tacoma Railway & Power Company was damaged by fire on June 2. The loss is estimated at $50,000. Service was suspended for several hours.

Track and Roadway

Connecticut Company, New Haven, Conn.—The State Public Utilities Commission has approved a petition of the Connecticut Company to construct a single track curve at Elm and College Streets, New Haven. The commission has also approved a petition of the Connecticut Company to construct a crossover track on East Chapel Street, New Haven.

Connecticut Company, New Haven, Conn.—The Connecticut Company is putting in new ties and rails on its line in West Chapel Street, New Haven, from York to Norton Street.

Tampa (Fla.) Electric Company.—The Tampa Electric Company will double-track its line in Tampa Street from Michigan Avenue to the city limits. The company will also pave its share of the roadway.

United Railways of St. Louis, St. Louis, Mo.—The United Railways plans to extend its Tower Grove line from Arsenal and Fifty-ninth Streets to Jamieson Avenue. The Board of Aldermen has passed an ordinance granting the company the use of the streets through which the proposed line will run. The line will be double-tracked throughout part of its length.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—The Lincoln City Council has passed an ordinance authorizing the Omaha, Lincoln & Beatrice Railway to construct and operate a switch at the intersection of its line with that of the Lincoln Traction Company at Fourteenth and R Streets.

Trade Notes

The Electric Controller & Manufacturing Company, Cleveland, Ohio, has opened an office at 208 North Broadway, St. Louis, Mo., in charge of R. J. Ehrhart.

The Ingersoll-Rand Company of Illinois and A. S. Cameron Steam Pump Works, Chicago branch, announce the removal of their offices to 709 Fisher Building Chicago, Ill.

Willard S. Sisson has resigned as secretary and treasurer of the D. & W. Fuse Company, Providence, R. I. He will continue in the electrical business, but has not announced his plans.

The Electric Storage Battery Company, Nineteenth Street and Allegheny Avenue, Philadelphia, has filed plans for a two-story addition to its plant, 82 ft. x 160 ft., to cost with equipment about $125,000.

C. A. Eggert, Western sales agent, Consolidated Car Heating Company, Fisher Building, Chicago, has resigned. Mr. Eggert has been with the company for nineteen years and has been the Western sales agent since 1916.

The Buda Company, Harvey, Ill., has completed an additional foundry for casting small engine parts. Only thirty days elapsed from the leasing of the ground to the complete construction and equipment of the building.

The Electric Hammer Corporation has been organized with a capital of $1,000,000 to take over the business and property of the Reciprocating Electric Tool Company, St. Louis, Mo. James K. Jarvis is president.

The American Chamber of Commerce in France, 32 Rue Taitbout, Paris, has established a catalog file system for the benefit of French purchasers seeking American goods, where catalogs of business houses may be placed on file.

W. J. Jeandron, sole selling agent for the "Le Carbone" carbon brushes, has been in France for the past month visiting the factory in order to obtain a larger supply of carbon brushes to care for the great increase in demand that it expected in this field.

The Electric Storage Battery Company, Allegheny Avenue and Nineteenth Street, Philadelphia, has removed its Cleveland offices from 1217 Citizens' Building to Chester Avenue and East Twenty-fourth Street. H. F. Sauer is acting manager of the Cleveland office.

The Westinghouse Electric & Manufacturing Company authorizes the statement that the Westinghouse Union Battery Company is owned and controlled by the Westinghouse Air Brake Company, Wilmerding, Pa., and the Westinghouse Electric & Manufacturing Company is not in any way connected with the manufacture, sale, distribution or service of its product.

The Bayer Steam Soot Blower Company, St. Louis, has recently completed its new plant at 4067 Park Avenue, to provide for the increasing business in soot blowers, as well as the business of its subsidiary companies, the Bayer Valve Company and the Bayer Brass Foundries Company. The main machine shop building is 200 ft. x 120 ft., and the foundry building is 175 ft. long, the latter providing space for thirty molders on brass and aluminum castings.

New Advertising Literature

Punches.—Bonney-Vehslage Tool Company, Newark, N. J., is distributing a 32-page illustrated catalog on its various types of ticket punches.

Gears.—R. D. Nuttall Company, Pittsburgh, Pa., is circulating Bulletin No. 27, on "Nuttall Gears for Steam Road Electrification and Multiple-Unit Cars."

Triplex Pumps.—The National Transit Pump & Machine Company, Oil City, Pa., has issued bulletin No. 302-A, in which it describes its Transit power pumps.

Insulators.—Catalogue No. 2 has just been received from the Lapp Insulator Company, Inc., Le Roy, N. Y., on high-voltage insulators and power line appliances.

Hydro-Electric and Steam Power Plants.—Viele, Blackwell & Buck, New York City, in bulletin No. 9, reproduce photographs of some of their engineering and construction work.

Combustion.—The General Fuel Saving Corporation, Rochester, N. Y., is issuing a small booklet describing the use of its "Oxy-Blast" in connection with gaining complete combustion of fuel.

Drinking Cups.—Individual Drinking Cup Company, Inc., New York City, has issued an illustrated booklet on its cup vending machines and Dixie paper drinking cups for railway and station use.

Flexible Armored Hose. — The Sprague Electric Works of the General Electric Company, New York City, has issued bulletin No. 44553.1, on Sprague flexible steel armored hose for railroad service.

Emery Grinders.—A bulletin on "Challenge" emery wheel grinders, polishing machines and emery wheel dressers has just been brought out by the Challenge Machine Company, Inc., Philadelphia, Pa.

Jacks. — The Duff Manufacturing Company, Pittsburgh, Pa., has just issued bulletin No. 303, describing Duff trip jacks, including various styles and sizes of jacks used for constructing, surfacing, ballasting and repairing railroad track.

Data on Insulating Varnishes.—The characteristics of insulating varnishes are explained on five loose-leaf sheets published by the Sherwin-Williams Company and entitled "Efficiency Information on Sherwin-Williams Ajax Insulating Varnishes and Compounds."

Equipment.—The Electric Service Supplies Company, Philadelphia, Pa., has issued a new 608-page catalog, No. 6. It lists and illustrates material for railroads, mines and industrial organizations, including steam and mine locomotive headlights, marine searchlights and projectors, turbo-generators and headlight switches, contact rail material for cranes and haulage systems, armature repair machinery and coil winding machinery.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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A. R. A. Convention Dry Literally, but Not Metaphorically

AT THE recent convention of the American Railroad Association, mechanical section, two things were noticeable, one being that the absence of old King Alcohol did not seem to interfere with the pleasure of the delegates. We hold no brief for prohibition, but certain it is that a good time was had by the large majority without the Red King's presence and his death was more talked over than mourned. The other point of note was the large attendance at the committee meetings and the highly technical character of the reports. Time was when the technical, analytical type of report was unusual, but it would seem that now is the day of the technical man in the mechanical departments of our railroads. Much information of value was presented in these reports and we give elsewhere in this issue some additional excerpts therefrom. These are supplementary to the reports of the convention printed in earlier issues and they have been related, by means of appropriate comment, more particularly to the electric railway field.

Business Men Come to the Aid of the Utilities

CHICAGO business men have set an example which should be the signal for a like movement in every other community. Through their several associations, they have subscribed to a statement addressed to the Illinois Public Utilities Commission, which makes acknowledgment of the difficulties and handicaps under which the public utilities are functioning and urges that tentative orders be entered into to provide increased rates and immediate relief. They recognize that the paramount issue is service and that it is high time that politics be adjourned if the welfare of the public in its business and in its social pursuits is honestly to be fostered.

Not only is this statement a timely expression of guidance for the commission, but the latter will undoubtedly welcome such direct support of its recent action, though perhaps unpopular with the unthinking masses. For it has had too much of the clamor of adverse criticism and too little of the commendation from those who know.

This is the second great step that has been instigated in Illinois and may well be emulated elsewhere. Only recently the Illinois Commission held a series of general hearings on the financial difficulties of the utilities, at which a number of prominent bankers and business men made statements and submitted to cross-examination by attorneys representing the city of Chicago. The keynote of those hearings was that the lamentable condition of the utilities is very largely chargeable to the politicians, who have misrepresented them until nearly every one has lost faith in their securities and in their honesty of purpose. These hearings had a distinctly beneficial effect on the attitude of the newspapers and public toward the utilities—a new appreciation of the true situation having apparently dawned.

Chicago business men are to be complimented for their progressive and original action in these two instances. They are in the right. They have come to realize that the utility companies have not had a square deal. Looking out wisely for their own interests, they are taking active measures to correct the situation to the good of every one. They have realized that the well being of the utilities is to their own advantage. Now for an awakening to this realization elsewhere.

Facts About Figures—Figures About Facts

EVERY executive in the electric railway business deals with figures or compilations of figures. There is very evident self-interest in the figures to the men in the industry. There is also very evident self-interest in them to the man in the street. Expression of opinion to the contrary notwithstanding, such figures can be interpreted to the general public. Of course, the task isn't easy. Few men in managerial positions in the industry are capable of doing it. That isn't their job. They are not publicists. On occasion the job has been done and done well.

The point is that it isn't done often enough. Few people are followers of Dryasdust. History may be history, but as between the romanticist and the realist, we choose the romanticist. Facts untouched by art make dull reading. They fall on sterile ground. If you have a story to tell call in a man who can tell a story. Check up this man's work if necessary, but don't throttle his imagination. Publicity that involves the use of figures must be approached in the light of facts about figures and not figures about facts.

Entertaining an Angel Unawares

THE Fifth Avenue (New York) Coach Company employee who recently loaned a dime to the daughter of the President of the United States, when she was caught in the awkward predicament of finding her purse empty, performed a gallant act. He deserves the satisfaction which will be his and his descendants as they gaze on the gilt-framed note of thanks and returned dime reposing on the family parlor mantel. If he had been aware of Miss Wilson's identity, which he was not, he would have been merely lucky; as it was, he was fortunate. But this conspicuous act of courtesy is not exceptional; the vast army of electric railway platform men contains as large a proportion of gentlemen as any business or profession. Possibly the proportion is larger than in most businesses because service (in which courtesy is a large factor) is what these men deal in.

And to every chivalrous platform man is potentially due as tangible a reward as came to this bus conductor, although few will ever realize on this obligation so conspicuously. The stream of letters of appreciation of good treatment which flows from the public to the mail baskets of most electric railway managers shows that patrons know when they are well served.

The Water-Power Bill Becomes a Law

WHETHER urged by political expediency or convinced by further study that an earlier opinion was wrong, or whether he meant to do it all the time, President Wilson has tardily signed the water-power bill and, according to Attorney-General Palmer, negatived the pocket veto. We hope he has thus made this much-desired legislation a law.

The bill will provide a long-sought-for opportunity to develop economical power for our electric railways and industries. This legislation has had twelve years of rocky travel and there have been legitimate differences of opinion as to some provisions, but the result which is now the water-power bill provides a basis upon which water-power development may begin. If some details of the bill are unfortunate they can be changed as experience proves them so.

Most important, the bill gives recognition to the principle that the integrity of the legitimate investment in a utility of public service, such as water-power development is, will not be impaired if the public decides to take over the business. At the same time, by the fifty-year lease provision, the public is protected in case of future changed conditions.

This legislation should encourage and invite capital which is seeking an investment field rather than a speculation. The result will be a hydro-electric power business, on a sound basis, which will be a factor in the electrification of trunk lines, in economical power production for existing railways and industries and in coal conservation.

President Pardee Calls Attention to Some Live Facts

WE HAVE all heard and read a great deal and the ELECTRIC RAILWAY JOURNAL has printed much about the present condition of the electric railways. It might seem a bit unnecessary to say much more, but we believe President Pardee has presented so vivid and complete an analysis of the situation in his address before the National Electrical Credit Association that we are giving this week an extended abstract of that address. Every electric railway man should know the situation as portrayed here, be he shop man or president.

There are two new points which Mr. Pardee reports and which deserve special mention. These are the census figures on municipal lines, included for the first time in the 1917 census, and the New York commission's decision on service and its relation to fare in the Rochester case.

There should be no rejoicing over failure of municipally owned or operated roads, but it is a healthy situation for the industry as a whole to have the facts thus baldly portrayed. The writer recalls a discussion with a successful commissioner of public works in a town where municipal ownership held forth. He argued that any community has the right to fix such rates as it desires on its municipal utilities and to make up any deficit by taxation if it considers this the best policy. Was his own utility making money? No. Did the people know that fact? No. Why? Politically inexpedient! In other words, while this man was really operating the property economically and well, the people were paying deficits by taxation, *but without knowing it.* His theory may have a logical foundation, but his practice has none except his own answer of political inexpediency. It is thus fortunate for the whole community that the facts with reference to municipal electric railways are impartially analyzed.

In the Rochester case the New York Public Service Commission, Second District, has given pronouncement to a principle long believed right by electric railway men. This is that service and rates should be proportional; that it is impracticable as well as unfair for municipalities to demand a service costing more than is paid for it. Public and utility are both fortunate to have their interests in the hands of a commission which sees facts thus clearly and acts as fearlessly. A second and equally important fact here emphasized is that the commission states it cannot order expenditures unless it is given the power to allow proportionate returns. In other words, here is one governmental agency which follows the recommendation of the London Advisory Committee, that governmental agencies should not assume to give orders unless they have the right to assume responsibility for the results.

New Coins Will Be of No Help to Railways

THE Senate bill proposing the coinage of a 2-cent piece, as well as other bills which may be or have been introduced to provide for 6¼, 7 or 8 cent and other odd coins, can very well be opposed by the street railway companies. The demand for these coins has probably come from a desire to mitigate the inconvenience of multiple coins now required in the many business transactions which were formerly covered by the 5-cent piece. The street car fare is one of the most common cases of this kind, and there is evidence aplenty that rates of fare between 5 cents and 10 cents produce an inconvenience to street car patrons and in some cases have actually delayed traffic. For example, it is understood that in Chicago the benefits of speeding up traffic resulting from the skip-stop system were just about offset or lost by the installation of a 7-cent fare. Nevertheless, there are other means, better than the adoption of new coins, to overcome this handicap, and there are actual disadvantages to an increase in the number of varieties of small coins.

The question of fare collection, wherein the rate involves multiple coins, was thoroughly investigated and discussed at the annual convention of the American Electric Railway Transportation and Traffic Association at Atlantic City last fall, and it was the consensus of opinion of the transportation and traffic men present who had had experience in the matter of fare collections that the most effective means of handling fares involving more than one coin was the adoption and use of metal tokens. Upward of 100 of the more important properties throughout the country have acted upon this recommendation and are now using the metal tokens with satisfactory results.

Moreover, there are several marked objections to the adoption of one or more new coins. One of these is the large number of registering fare boxes, aggregating now some 20,000 on more than 200 street railway properties, not to speak of the larger number of coin counting machines in use in the accounting offices of railroads, both steam and electric; banks, telephone companies and industrial concerns. Most of these machines would be seriously affected through the issue of a new fractional coin, since they are built to handle coins of the present denominations only and would have to be supplanted by new designs.

Again, the establishment of a 6, 6¼, 7 or even 8 cent coin would probably tend to identify that coin in the mind of the public as being adequate for a fare on an electric railway in somewhat the same way that the nickel was formerly considered as the standard fare, whereas the new coin might be suitable in some cities but not in others. The more modern conception of a carfare is that it should vary with the cost of production rather than be inflexible. Briefly, then, present conditions favor the use of a metal token, the value of which may be changed to meet a changing rate of fare, rather than an attempt by government to issue one or more new coins to serve as substitutes to the obsolete nickel as a standard carfare.

Are Commutation Tickets Desirable?

ONE of the recommendations made in the somewhat elaborate report on electric railway service in Camden, N. J., by the committee on public utilities of the Chamber of Commerce in that city is this:

> We cannot lay too much stress upon the advantages to the company that will accrue from the issuing of strip tickets sold at a slight reduction on the straight cash fare and the selling of school and commutation tickets at a competitive rate with the railroad fares from suburban towns.

There is some advantage, as we have said before, in the wholesaling of tickets, partly because the plan induces riding and partly because it is a convenience in collection, when the fare has to be paid by two or more coins. The advantages to the company of both of these points, however, are often exaggerated, especially in the minds of the public, and no railway can afford to give more than a few per cent reduction in the wholesaling of tickets to secure these benefits.

But the second claim of the committee of the Camden Chamber of Commerce is based on an entirely erroneous premise. However profitable it may be for a steam railroad, commuter traveling is not so desirable to an electric railway that the company can afford to make concessions to get it. The reasons for this are not far to seek. The business has to be done during the peak hours, and it is one-way business; that is to say, the cars travel one way full and the other way practically empty. On a steam railroad, where the coaches can be left in the terminal yard during the daytime and used on the outgoing trains at night, the same objection does not hold. But from every point of view on an electric railroad commuter transportation is about the most expensive that can be undertaken, and if an electric railway is so situated that this travel will naturally go to the steam railroad, so that the electric railway does the all-day off-peak business, such a division should be encouraged. There is absolutely no reason for an electric railway to reduce fares during rush hours in order to get peak-load business.

The Stormy Petrel of the Pacific

HUGH CALDWELL has taken the lid off of Hell out in Seattle. Mr. Caldwell is Mayor. He is that strange anachronism—a politician who threatens to carry out a pre-election promise. His promise was to inquire into the conduct of Seattle's municipal railroad. This he is doing with a vengeance. Among his shots there are some verbal duds, but there have been enough hits to cause considerable carnage. In consequence Seattle has a new sensation. The papers are full of it.

Mr. Caldwell, formerly Corporation Counsel, knows a real deficit from a paper profit. He said the municipal railway was being run at a loss when others contended differently. When he became Mayor, Mr. Caldwell set out to prove this. So well has he succeeded that Seattle is preparing to go to a 10-cent cash fare or 6¼-cent ticket fare on its municipal line.

But that isn't all. Far from it. Mr. Caldwell began to inquire into the jitney. He found that that pest was taking about a thousand dollars a day away from the electric railway by sniping passengers. To all practical intents and purposes he has eliminated the jitney. Some harsh words were passed in this war, but Mr. Caldwell has won. When the roads in Seattle were privately owned, liberty was license for the jits. With the roads under the city, the jitneys have license but no liberty.

Mr. Caldwell has taken still another step. He thinks that under municipal ownership at $15,000,000 for the railway properties of the Puget Sound Traction, Light & Power Company the city paid $5,000,000 or $6,000,000 more than the property was worth. On this issue he and former Mayor Ole Hanson, during whose administration the road was taken over, have crossed swords. Mr. Caldwell seeks to know whether there is any legal redress for the city. Mr. Hanson has said that he considered the $5,000,000 about which Mr. Caldwell is doing so much talking to be the price he paid to get rid of a nuisance. It seems that Mr. Hanson now considers the road worth only $10,000,000. Anyway, says Mr. Hanson, the people by vote approved the purchase price. The railway management says the city offered the company a certain amount for the road, that the company accepted the offer, that it delivered the road to the city, and that it has lived up to its contract.

Now Mr. Caldwell's alibi is that as Corporation Counsel under Mr. Hanson he passed only on the legal formalities of the municipal ownership deal. His idea is to make the municipal road self-sustaining out of the earnings. Deficits are not to be made up out of taxes, and he is unwilling to increase the security back of the bonds so as to make them a direct charge against the city. In the event that the roads cannot be made to pay, then the city can apparently turn them back to the bondholders. A nice little game of heads I win, tails you lose.

Seattle has had a little more than a year of municipal ownership. Enthusiasm there ran high in the spring of 1919. Enthusiasm is again running high. This time, however, it is running in the opposite direction. As a famous advertiser once said, "there's a reason." The reason is that economic necessity plays no favorites. A road that starved to death at a 5-cent fare under private ownership will most certainly starve to death at a 5-cent fare under municipal ownership. A 5-cent piece is a 5-cent piece. If it was inadequate in private hands, it surely will prove so in public hands. The American political King Midas has yet to make his appearance.

This Is Number Four of a Series of Articles on Salient Phases of the Electric Railway Situation

Cleveland's Tayler Grant—After Ten Years of Trial

By Edward Hungerford

CLEVELAND and the Tayler franchise are the subjects of this week's article by Mr. Hungerford. He tells how, by the adoption of a service at cost franchise ten years ago, co-operation has followed contention to the benefit of both public and company. Problems there have been, including questions of labor and finance, but they have been successfully overcome.

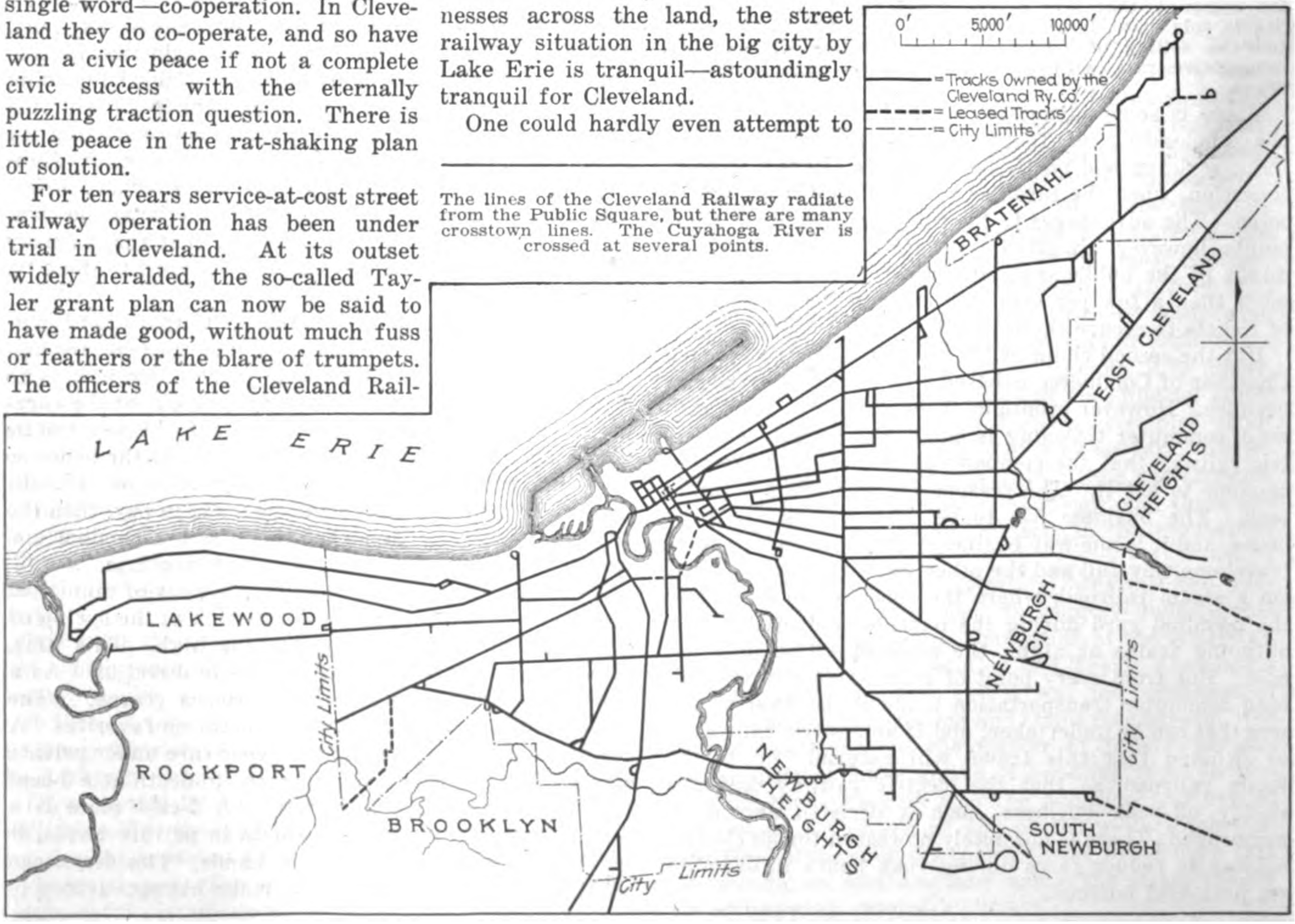
Can you take a trolley company, no matter how big or how strong it may seem to be, club it over the head for six years, catch it by the scruff of the neck and shake it, as a dog shakes a limp rat, and still have that trolley company render faithful and efficient and willing service?

Ask Cleveland that question. Cleveland has been through all of these remarkable processes of giving herself good urban transportation service—and somehow seems to have arrived at a definite conclusion that there is another way, infinitely better.

That way can be reduced to a single word—co-operation. In Cleveland they do co-operate, and so have won a civic peace if not a complete civic success with the eternally puzzling traction question. There is little peace in the rat-shaking plan of solution.

For ten years service-at-cost street railway operation has been under trial in Cleveland. At its outset widely heralded, the so-called Tayler grant plan can now be said to have made good, without much fuss or feathers or the blare of trumpets. The officers of the Cleveland Railway say that the plan has made good. The local newspaper men, sharpest critics at all times of the local traction situation, concur unreservedly in this opinion. The men, more or less expert, who have come in from outside to study it are also in agreement. And today, when the traction business is perhaps the most disordered of the many disordered businesses across the land, the street railway situation in the big city by Lake Erie is tranquil—astoundingly tranquil for Cleveland.

One could hardly even attempt to make a bird's-eye picture of the perplexing traction situation across the land without having one's eye alight—almost at the very beginning—upon Cleveland. In the days when the street railway industry in America was in the very first flush of its strength and popularity that big town was already a trouble center. Mayor Tom L. Johnson had begun to mix things up. So, perhaps, after all, it is hardly more than fit and proper that today, while traction men all over the land are bemoaning their lot and the future of the industry is terribly beclouded, the Cleveland street railway men, barring an occasional bump with their labor, are



The lines of the Cleveland Railway radiate from the Public Square, but there are many crosstown lines. The Cuyahoga River is crossed at several points.

having a reasonably happy time of it. John J. Stanley, the president of the Cleveland Railway, looks ten years younger than when I first met him—more than a dozen years ago.

Those were the days when the head-clubbing and rat-shaking performances were in full sway, with the late Tom L. Johnson as the head devil in charge of the inquisition. There were no half-way measures about the Honorable Tom. He came into the office of Mayor of Cleveland on the promise of gaining 3-cent fares for the folk of the town and he intended to keep his promise—give him full credit for that. It was as far back as 1903 that he was reelected as the Big Watchdog of the Sixth City and hardly a month thereafter before he started his second and real campaign for actual 3-cent fares on Cleveland trolley cars. The old Cleveland Electric Railway opposed him, of course. It was giving 5-cent fares with practically unlimited free transfers and priding itself that the service it rendered was without a superior in any other city of the land.

I shall not try to repeat here all the processes of the head-clubbing and the rat-shaking. Mayor Johnson was aided greatly in his campaign by the fact that many of the original franchises of the street railway company were beginning to expire. He had nine-tenths of public approval and the press on his side—one might almost say "of course" once again. And he had all the arts and resources of the skilled politician, plus a tremendously active brain and a winning personality. That was a hard combination for Horace E. Andrews (then president of the Cleveland Electric Railway), John J. Stanley and the other traction folks to overcome. And overcome it they never did—entirely.

Tom L. Johnson's methods were the methods that have been used in traction squabbles before and since. One of his pet clubs was that of competitive service. The Hylan scheme of establishing competitive motor buses had not then come into being, so Johnson established a rival trolley system on the west side of the town—the Forest City Street Railway company. His experience in Brooklyn and other communities in operating street railways here stood him well. He had nothing to lose and everything to gain in this experiment. And without a future to harrow his thoughts 3-cent fares on the Forest City cars became an easy concession.

In the meantime he had forced the older company into an experiment on 3-cent fares on about twenty routes, each about 2½ miles long. This experiment was abandoned after a fortnight of disastrous trial, and two days later (Feb. 6, 1905) a combination fare of 4 cents without free transfer and 5 cents with that privilege was inaugurated by the Cleveland Electric Railway. In that same month the federal courts began to inject themselves into this highly political situation. They came to the protection of certain vested franchise rights of the old company, which, even before their decisions, had announced its desire to surrender all its existing rights for a new limited contract covering all the lines.

John J. Stanley, president the Cleveland Railway, seated at the end of the directors' table at which he does all his office work, in preference to a desk. The bronze bell paper weight on the blotter before him is lettered on the rim, "Broadway & Newburg R.R. Co.," with which road it, like Mr. Stanley, saw service in the "mule power, horse power" days, more than thirty years ago. Mr. Stanley's first job was that of "hill boy."

But such a sane and sensible and immediate solution apparently could not be reached in 1905. Contention followed contention, lawsuit led upon lawsuit, for more than two years, until an organization known as the Municipal Traction Company, with Mayor Johnson as a prominent director, arranged to take over and operate the Cleveland Railway, which simultaneously was granted the so-called "security franchise"—twenty-five years for all of its existing lines at an established fare of 5 cents or six tickets for a quarter, while in exchange for its lease the Municipal Traction was to guarantee the Cleveland Railway 6 per cent on its stock.

For a time it seemed as if the Cleveland Traction troubles were at a rest. But, like Banquo's ghost, the thing would not down. This leasehold solution on being placed before the voters of Cleveland on initiative and referendum—oh, how those Ohioans do love initiative and referendum — was promptly voted down and the whole mess again thrown into the hands of politics. Once again, however, the federal courts intervened, and this time with force and definiteness and a thorough plan, which finally developed into the Tayler grant, of which more hereafter. Mayor Johnson died—he finally suffered the bitterness of defeat at the polls—and Cleveland mourned sincerely and turned for the moment from tractions to other engrossing things.

For fifteen years now I have been going to Cleveland at intervals of from three months to two years apart. It has been my fortune in all that time to study her street railway problem, not merely as one having a little more than a passing interest in transportation questions in general, but as a patron of her system—at all times and under practically all conditions. And fifteen years ago I can recall Cleveland's as even then a particularly good organism. Her cars seemed bigger, better ordered and more frequent than those of her less fortunate sister cities. The quality of the men who operated them was high indeed. The most of these had come as young men from the small Ohio cities and villages roundabout and they made the very best human material for the upbuilding of a traction force, strong in energy, in discipline, in loyalty, in enthusiasm—those things that in wartime we learned to call morale.

Recently I spent almost an entire day upon the street cars of the town. I rode early in the morning, in the middle of the day, late at night. They carried me south, east, west. They carried me in the hours when the great shops and offices of the town were receiving their workers and again in the evening when they were debouching them into the trolleys once again. The night time conditions of crowding were particularly abominable. These were bad enough in Euclid Avenue, but infinitely worse in both Broadway and in St. Clair. For Euclid Avenue is and will remain Quality Street for Cleveland, and so will continue to receive a special consideration, both from the city authorities, which are in actual operating control of the situation, and from the Cleveland Railway, which is the city's servant, and so, of course, must carry out its orders. Both St. Clair Avenue and Broadway come far from being Quality Street. Each is lined with the great industries which go so far toward the making of wealth upon Euclid, and when these industries in the late afternoon turn out their thousands of workers for the ride home there comes quickly a fearful problem of transport which one must say almost any traction company would find difficult to solve.

The Cleveland Railway does not seek to minimize this problem or the difficulties of its solution. After I had ridden upon his cars I went straight to the offices of Mr. Stanley and asked him to tell me quite frankly about these very conditions of overcrowding.

"They are very bad," he said, "and steadily getting worse. We are very proud of our cars here, proud of the men who operate them. But we realize, as any trolleyman who has made a study of the situation must realize, that the service today—in the dull hours as well as in the rush—is not only very bad but that it cannot easily be bettered. It is the non-rush hour service, however, that distresses us the most. In the old days it was the boast of this company that its service in the so-called dull hours was at least 50 per cent of that in the rush hours. In fact this was such a good ratio that it was officially recognized by Judge Tayler in making the city's contract with the railway company.

"But see now what really has happened," continued Mr. Stanley. "We have 900,000 people in Cleveland today, as against a bare 500,000 ten or eleven years ago, and so have doubled our rush-hour service to keep pace with this great growth. But our dull-hour service remains exactly the same as when the city was one-half its present size, when much of it was established as a minimum of effective headway in many streets, and, as a result, people hang upon the straps all day long. We are carrying ten or eleven passengers to the car-mile as against seven before the coming of the Tayler grant, while the service ratio between the dull hours and the busy ones is as four to one. And the service suffers very greatly in consequence."

Actual figures bear out this statement on the part of the president of the Cleveland Railway. In ten years up to July, 1919, the population of Cleveland increased 57 per cent, its area 40 per cent, the miles of track operated 52 per cent, but the number of car-riders 178 per cent. Yet the midday service of the thirty-four lines that make the city system has had practically no increase in this time. I asked Mr. Stanley if the company was short of cars. He said that it was not; that it was building new equipment almost all the time—it is his particular pride that the Cleveland Railway has no car in its service today that is more than fourteen years old—and that his maximum service in rush hours was now well in excess of 1,250 cars. These are all cars of large seating capacity, operated on the pay-as-you-enter principle as they are bound down town and as pay-as-you-leave cars on the outbound trips—seemingly a most sensible sort of practice. The company has no single-truck cars whatsoever and does not contemplate buying any, even of the one-man, safety-car type. Mr. Stanley set it down as his very frank opinion that, good as these are for smaller communities, they are hardly suited to the great metropolitan cities of America.

Cleveland Is Not a Cheap Labor Town

From the one-man car to the labor problem is a short and an easy step. Cleveland is not a cheap labor town; not at any time—particularly not at this time. With Detroit it shared for long the honor of having the highest-priced platform men in the land and motormen and conductors in both cities now receive 75 cents an hour after one year of service. These two lakeside cities have led in car wages for many years past, and with the enormous development of war industry and after-the-war industry in each of them are not apt soon to lose this distinction.

"Will the wage scales of this town ever come down so that the people will ride again at anything like their old riding costs?" I asked the big chief of the Cleveland trolley cars a little later when we were going over the various rates of fare that had obtained under the Tayler grant. He answered unhesitatingly:

"I doubt it very much. In all the traction history of Cleveland I can recall only one instance where we ever reduced pay. That was on a small unimportant line, at that time independent, where the wages once were actually brought down one cent an hour. When the line consolidated with us a few months later they quickly returned to standard."

Yet in this big industrial city of the Great Lakes district, where labor of every sort is at a very great premium and a lady complained to me that she had to pay her washwoman 40 cents an hour on the basis of a minimum eight-hour day and two meals on the house kitchen thrown in, the Cleveland Railway reports no labor shortage for its cars. True it is that its platform men are not of the small-Ohio-town type that first I saw when I began going out there. It is doubtful if these will ever come back to it again; the fascinations of the automobile and kindred manufacturing industries are far too great to be overcome in a moment. Yet they are of a type that is by no means to be scorned—a large proportion of them second-generation Americans, of Slavic blood, yet in their ability and their willingness paying high tribute indeed to the excellence of the public schools of Cleveland. They move the cars—and move them very well.

And if the Cleveland cars move very well how much credit shall one rightfully give the now famed Tayler grant—the all important document upon which the fundamental if not the very first service-at-cost plan was based? We are not going to take the time or space here to go into the details of this agreement between a traction company and the great city which it serves. It is enough here and now to recall that it first guarantees the stockholders of the property 6 per cent annually upon their holdings; second, that it creates an

interest reserve fund—a sort of barometer or gage which regulates the rate of fare, protecting thereby not only patrons in "fare-at-cost" but the company in the dividends guaranteed to it—and, third, permits the City Council, under the advice of the city-employed traction expert, Hon. Fielder Sanders, to supervise the operation of the cars. Nor is this last any empty privilege. The city of Cleveland has actual control of the operation of the great surface system in its streets. It makes both minimum and maximum schedules and holds the railway company to the proper operation of these schedules. It is the city government of Cleveland which in the long run determines that the dull-hour service shall be today but 25 per cent of that in rush hours, as compared with a much more generous 50 per cent a decade ago, and accepts full responsibility for such service.

In a word, it may be said that the city's control is positive upon all operating matters, but negative on every other question. It audits the company's accounts, approves all of its requisitions and may veto any of these. It does not merely content itself with schedules but even goes so far as to approve the type of cars to be used in its streets. If the Cleveland Railway should decide to use motor buses to supplement its present services either in the downtown or the outlying districts the city could veto such a step. Or, by silence, sanction it. As a matter of actual fact, it is not very apt to have this particular opportunity in the near future. John J. Stanley is not any more of an enthusiast for the use of motor buses in city transport than he is for the use of the one-man safety cars. He recalls rather distinctly an experiment which he once made with a bus line in a rapidly growing outlying district which was not ready for immediate trolley installation. He was quite satisfied when the district built itself to the point where the buses could be abandoned and regular honest-to-goodness trolley cars substituted for them.

1920 Answering 1910

Here, then, is the bridge upon which big and busy and perplexed Cleveland crossed from traction uproar into traction tranquillity, not at the time with entire confidence in the supporting structure. Federal Judge Robert W. Tayler, its architect and chief engineer, said at the time he first laid it down, ten long years ago:

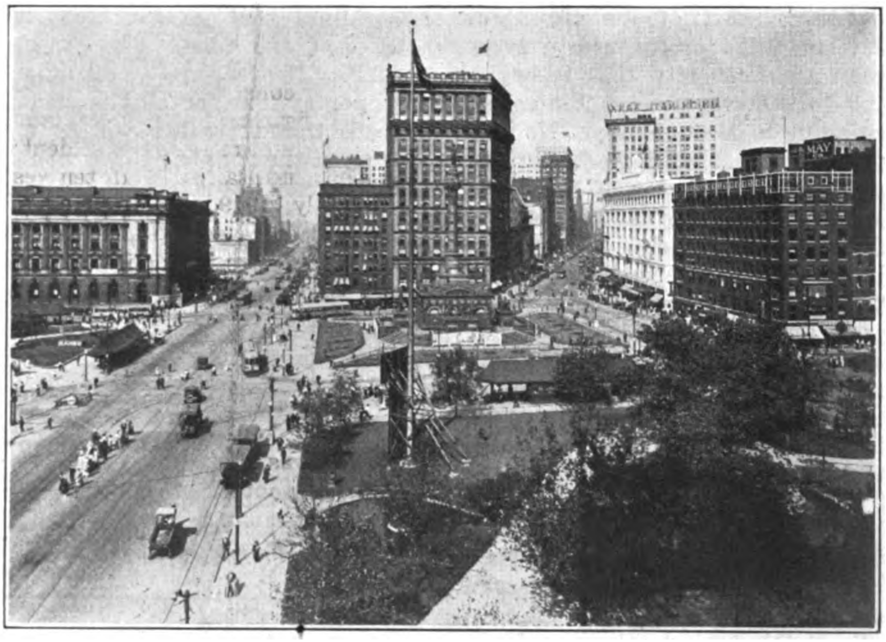
"Who knows what the cost of service in the city of Cleveland will be ten years from now? Three cents may be as extravagant a rate of fare as 10 cents would be now; 5 cents may be as low a rate of fare as 2 cents would be now. It all depends upon the cost of furnishing that thing which the people demand . . . Who can say that we now see the limit of the cost of the thing that is thus furnished? . . . What is the limit by way of added expenses to the furnishing of the thing that we must have. . . . ?"

That was 1910 asking a question of 1920. It is 1920 now, and we can answer the question—with the marvelous prescience of hindsight. We can answer in percentages—in fuel and in materials doubled and tripled in cost, in the average wages of the employees increased 142 per cent in a decade; the company had no difficulty whatsoever in getting all the small-town Ohio boys it wanted in 1909 at 24 cents an hour. Today, as we already have seen, they are getting 75 cents an hour, with a minimum day increased on May 1 from five hours to six, and no one is more glad of that than John J. Stanley and his fellow officers of the once-loathed "con-con," as the newspapers used to love to dub it.

But the fares have also risen—of course. From a long and apparently tightly fixed period of 3-cent fares —a charge of a penny being made for transfers, with the penny rebated in case the transfer was actually used—the fare has steadily advanced by carefully regulated steps until today it is 5 cents, with a penny for a transfer and no rebate, and without any definite prospect of remaining at that figure. In fact, there is abundant margin for increase. Cleveland's fares today are low—decidedly low as compared with most of her sister cities.

"Municipalities, the press and people generally believe that the Cleveland street railway system is the result of low fare," avers Mr. Stanley, "when as a matter of fact low fare is the result of the system."

Some other things as well are the result of the system. When I was in Kansas City on the same trip which took me to Cleveland I heard Colonel Kealy's plaint as to the tremendous bridge and bridge rental costs that had been heaped upon the Kansas City Railways. Long years before in the offices of the Brooklyn Rapid Transit system I had heard similar complaints of the annual imposts laid upon it for the use of the bridges spanning the East River to Manhattan, a service of inestimable value to the borough of Brooklyn. It is common enough practice. Yet the Cleveland Railway crosses the Cuyahoga ravine close to the heart of the city on one of the finest via-


The Public Square, at Cleveland, showing "Monument" loop in exact center, "Federal Building" loop on the left, and the "Forest City" loop in direct foreground. Street shown at left center is Superior Avenue, widest of Cleveland's thoroughfares. Note six tracks are laid in this street and people waiting between tracks at loading station. Street at right center of picture is the world famous Euclid Avenue.

duct bridges in the world at a total annual rental of nothing a year! It occupies for itself all of the four tracks in the sub-surface deck of the structure and so shortens the running time of its west side lines—each by a fractional time average and all in an aggregate impressive enough to be spread upon the pages of the Sunday supplements.

The Problems of the Future

Nor is it planned to charge the railway for its sole occupancy of the proposed subway terminals in the downtown heart of the city. For Cleveland, like pretty nearly every other American city that is beginning to achieve metropolitanism, is beginning to covet subways. No such scheme as that of New York, but rather a modified plan of Boston or Philadelphia underground railways—designed almost exclusively for terminal uses. With her exceptionally wide streets Cleveland need have but little fear for many years of congestion conditions, save in her downtown sections. It is worth recording, in fact, that the average speed of her trolleys reaches as high as 11 m.p.h., which is comparable with the 15 m.p.h. of the local trains in the New York subway. It is a factor which has saved her traction system from any extensive jitney competition.

Even the taxicab service of the city is a meager thing. And why not? One can leave the door of the Hollenden Hotel, downtown, step over to Euclid Avenue, board a car and get to the important Euclid Avenue station of the Pennsylvania Railroad, 2 miles distant, in less time than a cab can be called and taken there, and at a saving of from $1.45 to $1.95.

But downtown Cleveland's problem of congestion is quite as bad as that of any other rapidly growing American city. Her wide streets avail her but little there. So she has planned, radiating from her ancient civic center, the Public Square, a series of underground loops for her trolley system and the interurbans which shall almost completely relieve the streets of them—at a cost of some $15,000,000.

It was the most natural thing on earth to choose the Public Square for this terminal, just as it was chosen some years ago for the surface loop terminals of the various trolley lines that go out from it, south, east and west. The strong probability that the city's new union passenger station for all the steam railroads that serve her will be located upon the Public Square would seem to mean the retention of that open place as the actual as well as the titular civic heart of Cleveland.

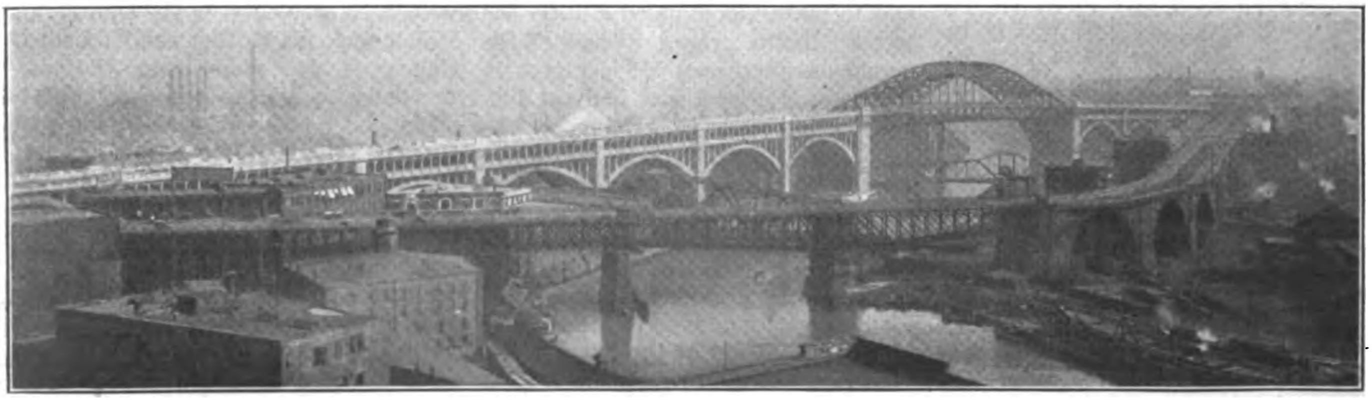
Yet Cleveland, like most other American cities, is gradually moving her business district—in her case distinctly eastward. Already the records of the Cleveland Railway show that 65 per cent of the passengers of her west side cars alight at the Public Square as against but 17 per cent of those from the east side, and better judgment would seem to show that any subway loop system that would best serve the transport needs of the entire city should embrace a territory as far east as East Ninth Street as well as the Public Square.

THE NEXT ARTICLE *in this series by Mr. Hungerford will relate to Detroit. Although a neighboring lake city to Cleveland, Detroit has recently rejected the service-at-cost plan in operation in Cleveland and is providing a municipal system. Mr. Hungerford's comments on the situation there should prove most interesting.*

The Tayler Grant Satisfactory and Effective

These things are, however, in comparison with the main fact mere details. The main fact is, it seems to me, that the Tayler plan has worked — and worked exceedingly well. The city and the railroad company are satisfied. The fact that the grant was extended within the twelvemonth for another decade would seem almost of itself to indicate this. Not that the Tayler grant is without defects; some conservatives, however, still are a bit skeptical as to its complete success. It would have been well, for instance, if the Youngstown provision for permitting a return on capital expenditures equal to the actual cost of obtaining the money for them might well have been written into the contract at the time of its extension. But the point is that Cleveland pays for the service that she gets and saves a tremendous amount of time and energy by not quarreling over every detail of it.

If folk hang upon the straps of Cleveland's cars at mid-day it is because she herself has so willed it. She can change that condition at any time she so wishes by the very simple process of paying for the privilege. She can see to it that her trolleymen are as well paid as those of Detroit —or much better paid—by the same simple process. It is the city that decides. The railway company is merely the agent for the execution of its desires. Its job is competency in that agency, and seemingly it measures up very well indeed to that job.



New High Level bridge spanning the Cuyahoga Valley, just west of the Public Square, Cleveland. In the foreground is the old Superior Viaduct. There were two tracks on the old viaduct, which were in the center of the roadway; there are four tracks on the new bridge, on a deck separate and apart from the main roadway. The old viaduct had a swing draw to permit the passage of shipping in the river; the new bridge has sufficient clearance for the passage of the largest boat on the lakes.

Condition of the Electric Railways*

The Electric Railway Essential, but Credit Poor—Census Shows Municipal Ownership Not the Answer—Transportation Salesmanship Should Be Encouraged—New York Decision on Sound Basis—Optimistic as to Future

BY J. H. PARDEE
President American Electric Railway Association

THE electric railways of this country have suffered during the past three years a particularly severe accident. They have been run over by a long train of economic conditions, war requirement conditions and war price wage and inflation conditions. Some succumbed and passed away almost immediately, others lingered in severe pain for a short time and then gave up and were buried in the Potter's Field of wrecked business, but a great majority have exhibited a strength of will power and latent energy which have up to this time preserved functioning powers. They are scattered about this country in the hospitals of business, undergoing treatment by state commissions, municipal officials and public doctors and nurses of varying degrees of experience and motives.

Lack of credit is the basic cause of the present condition of electric railways and the restoration of credit is the major task of those engaged in the stupendous job of rehabilitating this essential industry. By the term credit I mean credit in its broad sense, the credit springing from resources and stability which attracts capital for expansion and economical operation of business. You will notice that I have used the word "essential" in referring to this industry. This is because all the evidence goes to show that the street railways are an absolute necessity to all American cities of any considerable size and that their function cannot be performed completely or well by any other form of local transportation.

This fact was particularly and clearly brought out in the evidence presented last year in Washington to the Federal Electric Railways Commission appointed by President Wilson; all witnesses of whatever leanings testified that the electric railways were a necessary and indispensable part of the economic and social scheme of our country. It is further evidenced by the action of Mayor James Couzens of Detroit, himself a motor manufacturer and fully familiar with all the possibility of motor transportation, in inducing the city of Detroit to bond itself for $15,000,000 to be spent, not on motor buses, but in providing electric railway track and equipment.

And if they are a necessity, they must in some way and by some method be continued. There is no lack of those who proclaim in strident voices that the system of private ownership and operation of these roads has broken down under the conditions imposed upon it and that the only salvation for the service is that the state or the municipality shall take them over and operate them. Now, I am not so sure but that, from the selfish standpoint of the owners, public ownership is the easiest way out. I am, however, firmly convinced that from the standpoint of the public it is the worst way. The owner, surrounded by the protection of the law, would be assured of realizing a fair price for his property, and this sum, whatever it might be, could without question be readily invested in enterprises many times more profitable than electric railways have been or have any likelihood of being.

CENSUS BULLETIN SHOWS MUNICIPAL RAILWAYS OPERATE AT DEFICIT

But what of the public? Would it be assured of better service? Would it be assured of more economical and efficient operation? Would it be assured of the development of these local transportation systems in pace with the public requirements? There is nothing in the history of our government to show it. I have just been looking over, with more than ordinary interest, the report of municipally operated electric railways for the year 1917, included for the first time in the *Census Bulletin* of the United States Bureau.* It makes interesting reading for the electric railway executive used to the strict accounting methods imposed upon him by the Interstate Commerce Commission and the various state utility commissions, and it would be most interesting for you gentlemen to scrutinize the devious methods of accounting, which if employed by business concerns would ruin credit with you and bring disaster to the factory employing such methods. The statistics of some nine roads are given, but the figures for one—and this one is operated by the State of North Dakota and not by any small municipality—are excluded in figuring the total because information was not available. Of the remainder, two report no charge because of interest on funded or unfunded debt, and but three report taxes, two in such small amounts as to indicate that they are but a pittance compared with what a privately owned company would have paid, although in each and every case the public treasury is being deprived of a substantial sum through public owernship. And with all of these favorable omissions the eight lines show a deficit for the year of $141,000 out of total operating revenues of $1,682,000, while the ninth road, not included in the total because of lack of information, had a deficit in operating expenses. But two of the nine roads had any net income. In the case of the Tacoma line this paper surplus is accounted for by a "donation" of $5,100 from general taxes and by the failure to include any adequate sum as the road's contribution toward taxes. The famous San Francisco Municipal Railway was among the roads reporting, and, separated from its cloak of municipal ownership propaganda and put into the bald and incontrovertible figures which the United States Census Bureau insists upon, the result of the year's operation shows a deficit of $103,908. Seattle's latest venture, the operation of the city's principal street railway system, is not among the nine roads. Had it been an even worse showing would have resulted, since the report of the City Comptroller, made at the Mayor's instance, shows a deficit of something more than $500,000 for the first year's operation of this property.

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*Abstract of address before the National Electrical Credit Association, New York, June 17, 1920.

*Page 168.

There is nothing here to indicate improved economy and improved efficiency in public operation of electric railways. There is nothing anywhere to show that they are better managed or run at less cost. The truth is that the high cost of labor and materials and of money, which have made it impossible for the privately operated railways to continue to furnish service at the old price, are just as potent in the case of the public operated lines and that the effect of these higher costs is the same in both cases. Because the great majority of railway mileage is privately owned and privately operated the public has in fact been receiving service for a number of years at very much less than its cost. This is obvious. Were the utilities publicly owned the entire investment charge could be represented by obligations of the communities or by obligations secured by the properties themselves, represented by bonds. The interest on such bonds must be paid in some way or a default would result. If revenue was insufficient, then the communities would perforce, if they continued to operate the property, make up the deficiencies from the public treasury. You cannot expend money unless you receive it from somewhere. The old adage is true, one cannot lift himself by his own bootstraps. The private owner has no such recourse. A large part of present capital is represented by stock and not bonds, and when revenue was insufficient the first charge to be lopped off was the owner's return, so that in the case of practically all electric railways return is anything connected with the past but unconnected with the present.

It is very evident that there must be a new deal before the investor will again sit in the game. It is not enough to point to the growing number of electric railway companies that have been permitted to increase their fares. These increases have in almost all cases come long after the time when they were first needed and have only been sufficient to meet operating costs. They have been granted to prevent financial and physical collapse of the service. Many of them are possible only through the waiving of contract provisions, and in only a few instances is there any real assurance that they mark a new attitude by the public toward the utility.

DAY OF SPECULATION IS PAST

Electric railway transportation has been withdrawn from the realm of speculation and is now hovering in midair, preparatory, I trust, to a landing in the fields of assured investment. The original electric railway investor took a chance of the loss of his money, because there was nothing in the law of the land, or in the code of business ethics, or in the thought of the public, which denied him the right to enjoy the full profits of the enterprise. He has since been denied the profits but compelled to maintain the risk. The inevitable has followed. Warned by the experience of the original investor, the prospective investor has declined a risk when denied a profit. The development of public utility regulation has been along biased lines. It has operated to squeeze what have become known as undue profits out of the business, but it has done nothing to eliminate the risk. No one now wants the undue profits put back, but it is certain that if investment is to be again attractive the risk must join undue profit in the limbo of forgotten things, and safety of investment and assurance of return must in some manner be provided.

Government securities are non-speculative, not because of any fiat of the Congress, but because they are safe. Similarly electric railway securities cannot be made non-speculative because of any law or ordinance, but must become so because they, too, are safe.

Fare increases are a necessary palliative to keep the electric railway patient alive until his case can be properly diagnosed, the real seat of the trouble located and a cure effected. By themselves they are not enough to restore the industry's credit. The same power, be it a public service commission or be it a city council, which has increased fares can decrease them, and there is nowhere assurance that such decrease will bear any relation to the needs and necessities of the enterprise. There must be a surer foundation for future relations between the public and public utility enterprise than this if private capital and private enterprise are to be retained. Ultimately the inexorable economic laws that govern all industry will prevail, in spite of anything that may be written into the statutes or contained in the pronouncements of commissions. Regulation is good or bad and will be good or bad as it follows or deviates from these economic laws, and it is because they have been violated that the utility is today lying supine after a social and financial storm, from which unregulated industry has emerged erect and unharmed. The fundamental error has been in the attempt to fix the price of a product without regard to its cost.

Deteriorated service has been the inevitable result and deteriorated service has led to a state of antagonism between the utility and the public, which is making the problem of readjustment doubly hard.

NEW YORK COMMISSION TAKES FIRM STAND

The Public Service Commission of the Second New York District handed down a decision the other day which expresses clearly and unequivocally this principle which I am trying to put before you. The commission has not as yet been given power to increase rates named in street railway franchises in the State of New York. This is the ruling of the New York State Court of Appeals, made in a case brought by the city of Rochester. The franchise of the company operating in Rochester contains a 5-cent fare provision, which the city consistently refused to waive. In consequence the service furnished by the company was substantially decreased in an effort to preserve a margin between income and outgo. The city complained to the Public Service Commission, which ostensibly has, under the law, the power to compel service, and the reply that the city received was in effect that the kind of service furnished must depend upon what was paid for it and that for the commission to attempt to prescribe service without being able to permit earnings sufficient to cover what it had prescribed was on the face of it a confiscation of property under the Fourteenth Amendment to the Constitution of the United States.

I think that in this decision we have in a nutshell the foundation principle of a new relationship between these public utilities and the public that they serve. It is unquestionably and properly the right of the communities to prescribe the service that shall be furnished by an electric railway company serving them, but there never has existed and never will exist a right which does not imply a duty upon the part of the person exercising it. If any community prescribes service it is its plainly indicated duty to see that the revenue to pay for it is provided, either through the fares of the passengers or through some form of public contribution. And to "pay for it" means to pay all the costs, the cost of labor and the cost of supplies and the cost of taxes and public imposts, and the cost of maintenance and the cost of and return to the capital which created and which expands and extends the service. It is because this principle has been disregarded and the community exercised the right to prescribe and disclaimed any obligation to pay that the electric railway situation is today so tangled.

It is in putting the principle into practice that we run foul of that bugaboo of local conditions. I do not believe that any man, or any body of men, can sit down in a room and formulate any detailed franchise or agreement, law or commission order that will apply to all electric railways and all communities. When most people talk of "service at cost" they unconsciously or consciously, as the case may be, call to mind the Tayler agreement under which the Cleveland railway system is being operated. Underlying this agreement is the principle to which I have called your attention. Upon it has been built up a structure which has worked admirably in Cleveland. Cleveland has had service which was satisfactory to the car rider and has had low fares. But the Tayler agreement is not responsible for the fares; local conditions have permitted them. In a recent interview John J. Stanley, president of the Cleveland Railway, said: "The fares charged in Cleveland are no criterion of the fares that should be charged in other places." Similarly, it may be said that just because the particular details of the Tayler plan have worked well in Cleveland is no reason to believe that those provisions and no others must be included in all settlements. The much-heralded ability of the Philadelphia Rapid Transit Company to maintain service on the old rate of fare has just been disproven, as shown by a report of the Mayor's commission and the effort of the company to have the fares increased.

Let me say this: Personally, I do not believe that private enterprise has ever had a full opportunity to show what it could make of the electric railway as a helping factor in social and civic life and development. We talk of private operation of public utilities, when, in so far as electric railways are concerned, there is now, and has been for some time, no such thing. The power to regulate has always existed and it has for years been exercised, with constantly increasing rigor and severity, first through franchise agreements, then through the police power of the states delegated to the municipalities or to specially organized commissions, and the public has assumed more and more of the functions of management.

When the rate of fare was first written into a franchise, when the first service ordinance was passed, the incentive to a wholesome and improving spirit of merchandising was encroached upon, and under the stringent regulation now almost everywhere prevailing the opportunity to sell this service to the public, in the way that the merchant and the manufacturer sell their commodities so as to further their greatest use and distribution, has been withdrawn.

It should be restored! The electric railway industry is no longer a non-competitive business. It has always competed with pedestrianism. It is now competing with a new form of transportation—the motor vehicle. It is not in "unrestricted" competition with the latter, as has so often been said. The competition is, on the contrary, highly restricted, but with the restrictions all upon the electric car, and the motor vehicle free to do what it chooses, how it chooses. I am not here to decry the motor vehicle or to suggest that any obstacles whatever be placed in the path of its development. If it is a better and cheaper means of furnishing local transportation to the communities of this country, then the sooner this fact is known, the electric railways scrapped and the motor vehicles substituted the better. The same energy and brains and initiative that have developed the country's magnificent system of electric railways, with an investment of $6,000,000,000, can be depended upon to weld the motor bus into a properly organized and properly conducted "system" of transportation. For it is a "system" of transportation, and not isolated units of transportation, that every community needs.

TRANSPORTATION ON RAILS IS THE CHEAPEST AND MOST EFFICIENT YET DEVELOPED

But the motor vehicle cannot take the place of the electric railway unless the motor vehicle is competent to do the work, and all the work, that the electric railway does. This it has not done so far, and so far there has been no attempt to have it do so. The service now performed by motor vehicles is not the service performed by electric railways and the conditions under which motor vehicles operate are not those under which the electric railways operate. If, then, there is to be a test of the two means of transportation with the view to the elimination of one of them, the test should be conducted under the same terms and conditions. Most important of all, the motor vehicle should be compelled to provide *all* transportation, and not confine itself to that which is admittedly profitable and easy to handle. I have no fear of the results of such a test. Transportation upon rails is the cheapest and most efficient transportation that has yet been discovered. That leading apostle of gasoline, Henry Ford, in his much-heralded solution of the local transportation problem, retains the rails at the same time that he discards electricity, and if his contention as to the relative merits of gasoline and electricity be correct, then it is time to call a halt upon all the stupendous projects for steam road electrification that are under way and all the carefully thought out and extensive plans for hydro-electric development, sponsored by the nation, the states and private enterprise, and make gasoline furnish all motive power.

I have departed for a moment from my text to discuss this question of the motor vehicle, which is a most important one to the industry because it is so little understood either by the public or by the public authorities. At the first glance there seems to be no good reason why motor vehicles should not be allowed to compete how and where they will with electric railways, but an examination of the situation shows that this competition acts to favor a few at the expense of the many. Thus in one of New York's neighbor states, where jitney competition is rampant, 325,000,000 passengers paid an extra cent on every fare in order that 105,000,000 passengers might ride in a jitney at a lower fare.

Motor vehicle competition is but incidental to the point that I am trying to drive home. No matter what may be done in the matter of regulating those vehicles which are competing in the business of a common carrier, the private automobile is undoubtedly here to stay, and its operation still further removes the electric railway from the non-competitive field.

Every inhabitant of the country is a *prospective* customer of the electric railway. Whether he or she will become an *actual* customer depends, first, upon whether the service is a necessity, and, second, the degree to which it can be made a convenience. The time has come when the electric railway must "go out after business," just as the merchant and manufacturer must "go out after" it. It has got to make its goods attractive and it has got to sell them at a price which the customer will pay. This means that it must be given much the same freedom of action that the merchant and the manufacturer enjoy. It means that latitude must be given both in the matter of the fare to be charged and in the matter of the service to be given. Somewhere there is a fare and there is a service that will attract the greatest number of passengers and at the same time provide the full cost of the service. It may or may not be 5 cents. It may or it may not be 10 cents. It is certain that it won't be the same in all communities. Local conditions as to cost of labor and cost of power and cost of materials and as to difficulties of operation and as to the kind of service required forbid a standard, universal carfare.

FLEXIBLE RATES OF FARE ARE ECONOMICALLY SOUND

There are today in effect on the electric railways of this country more than seventy-five different rates of fare, while for the companies operating under service at cost agreements, with fares fixed upon the actual cost of the service, there are no two with the same fare. Furthermore, the base upon which the fare structure is erected shows a wide variation. Flat fares, ticket fares, the zone system with its many variations, distance traffic, commutation rates and the wholesaling of transportation are all being tried out and experimented with. Out of these many attempts to find a fare which, while paying the cost of the service, will attract the maximum of riders is coming a mass of information that is bound to make the task before the industry easier. To restrict the companies in their efforts by rigid fare provisions in laws, ordinances or even orders is to end an experiment that I firmly believe will prove to be for the ultimate good of both the public and the industry.

The interest of the public will be furthered and not jeopardized by the giving of this increased freedom of operation which I have urged. There is not and should not be prospect of speculative profits in the conduct of so vital and so necessary a public utility as an electric railway. But there should, in addition to assured returns upon the investment, be a reward for good management and good operation sufficient to attract the best kind of management and merchandising talent to make it worth the companies' while to furnish service and to inaugurate fares that will induce the greatest use of the facility. The fundamentals of the solution of the electric railway problem are simple enough. The capital in the properties entitled to a return must be ascertained by a process which will take into consideration all the various factors that have gone toward making these properties living and useful enterprises. The right of that capital and of capital afterward invested to an adequate and continuous return should be insured by a plan which provides for the recognition of return upon the capital thus ascertained as a legitimate cost of the service, for the right of the communities to prescribe the service and the public's correlated duty to see that the cost of service is paid from fares or from public contributions In addition, if this plan is to be workable, so as to secure the best service and the cheapest fares, then there must be an additional reward for management based upon its success in selling service.

PRESENT SITUATION ENCOURAGES OPTIMISM

Without public recognition of these fundamentals it will, in my opinion, be impossible to restore electric railway credit. I do not believe that the investor can be induced to loan his money upon any such basis of relations as that which now exists. I do not believe that he can be persuaded to assume all of the risks if he be denied the chance of profits properly coincident to such risks. The future of the electric railways as a privately owned and privately operated industry is in his hands and it is his requirements that must be met. It will little avail the public seeking his capital to evolve plans for the settlement of the problems which do not meet the investor's demands. Their approval by social reformers, professional and political "friends of the people" and experts of whatever kind and whatever inclination will not suffice. For the man with capital, and that applies to the workingman and rich man, wants either safety and assurance of return or he wants a speculative chance to reap a big reward. And because the electric railway utility cannot offer him speculative advantage it must offer him safety and assurance.

I believe that these facts are becoming known not only to the student of the electric railway problem but to the general public, and for that reason I am an optimist as to the future of the industry. The investigation conducted by the Federal Electric Railways Commission has done much to open the eyes of the people to the seriousness of the situation as it affects their interest and has given to them some knowledge of the disease and the methods that must be adopted for its cure. This process has been continued in the numerous supplementary investigations that have been made both as to particular roads and as to groups of roads. The country is ripe at this time for a lasting settlement of the electric railway problem.

What is needed is cool-headed, unselfish leadership and a still better understanding of the principles involved. It is the civic duty of all right-minded citizens to insist upon it that their representatives in legislative halls, in state commissions, in municipal councils and in all regulative bodies shall approach this problem with free and fair minds and shall cast aside all political petty prejudices which now befog many situations. The public wants sane and fair treatment of the problem, and as soon as officials are made to understand that the solution will come quickly. It is up to you gentlemen and gentlemen like you, interested in the future welfare of the public and the state, to do your part in insisting upon such a reasonable and fair course of action. The fact that your organization, that the Chamber of Commerce of the United States, that commercial and civic bodies all over the nation are interesting themselves in the state of the electric railways and are pressing for a settlement that will be removed from the realm of politics and prejudice and antagonism is to me indication that the clouds are breaking and that the sun of better days is soon to shine for a utility that is still vitally essential to the welfare of all our people.

The Engineer and the Right-of-Way

This Article Relates in Detail to the Steps Necessary in Locating Particularly a Transmission Line, but More Broadly It Is a Plea for the Utilization of the Training of the Engineer in Keeping Down Legal Costs

BY CHARLES RUFUS HARTE
Construction Engineer the Connecticut Company,
New Haven, Conn.

THE charter of a company, "its excuse for existence," is so largely a matter of law that the engineer as a rule has little to do with it until it serves as the legal authority for the actual work. But while the charter sets out in more or less detail, among other facts, the location and the construction to be followed, in most if not in all the states there is required in addition the approval of the public utilities commission, or its equivalent, or of the municipalities affected, before what may be called offensive construction can be started, and with this approval the engineer is greatly concerned.

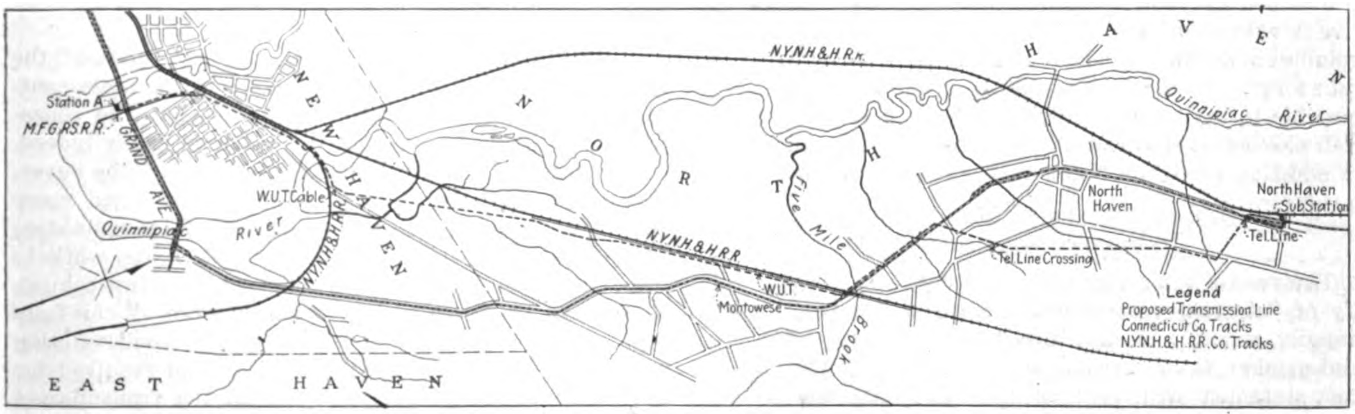
> That is an excellent old adage which warns the shoemaker to stick to his last, but it should not be taken too literally, for while the shoemaker ought not to do much surgery, for example, some knowledge of first aid may well make easier work for the surgeon.
>
> **So** in overhead construction, while it is highly desirable that the legal matters should be the care of the lawyers, it is quite necessary for the best results that the engineer have some general ideas as to the legal situations with which he is more or less concerned.

Of course any person or group of persons may buy land or rights, and so long as they do not interfere with the rights of others may do on such lands or under such rights anything not unlawful they may choose without any legal formality. But they cannot lawfully use public land, nor can they exercise the rights of condemnation, nor in most states can they supply the public with their product until there has first been obtained a charter. And secondly, there is necessary the detailed approval of their plans, the latter generally requiring a public hearing, at which all persons interested may appear and be heard in opposition if they so choose. Provision is also made in this case for a possible review of the finding.

This matter of detailed approval is of vital importance, and the petition for it, the accompanying plans and the testimony to be given should have the most careful attention of both engineer and counsel. As a general proposition the facts presented should be as broad as practicable, for the finding works both ways. The elaborate detail so desirable in the eyes of a certain class of lawyers and engineers does, it is true, fix the character of the work so that it cannot be interfered with. While this may be excellent in its effect upon the outsider it becomes a serious matter if, as is so frequently the case, it is desired to make changes before the work is completed. The extent of detail that is best must be decided by the probable conditions. If the general sentiment is unfriendly, so that court proceedings are likely, the location should be very thoroughly tied up to fence corners, buildings and similar definite references. In proportion as the likelihood of suits becomes small the "ties" can be made less exact. This does not mean that the line should be left entirely free, by any means, and after its definite location, and the positions of supports and the like have once been shown to the owner, no change whatsoever should be made except with the consent of the latter. Difficulties with the adjacent owner or other troubles often make desirable if not necessary some modifications in the layout to which the land owner may be perfectly agreeable, but if the hearing plan showed locations definitely fixed, any change without another hearing or the written consents of all concerned by it may lay the foundation for annoying if not serious lawsuits at a later date.

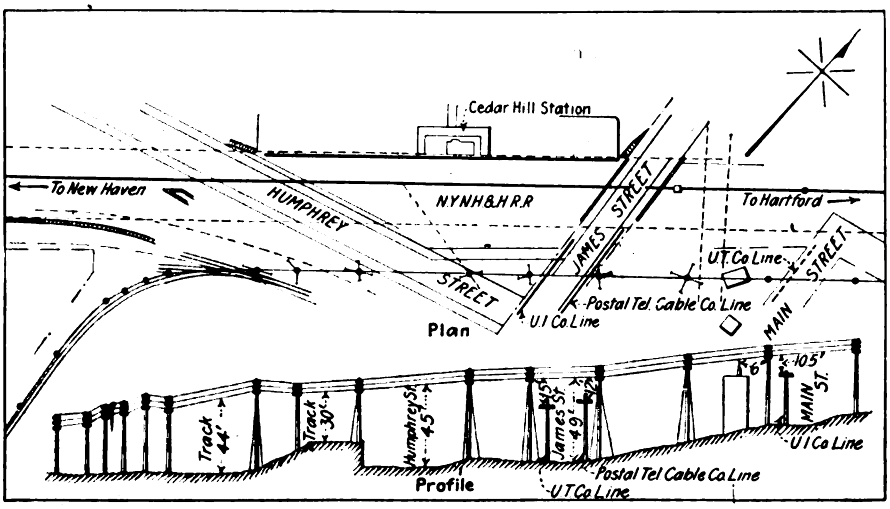
HEARINGS REGARDING A PROJECTED LINE

The details vary somewhat in different states, but the general procedure consists in filing with the proper body



GENERAL PLAN OF TRANSMISSION LINE LOCATION
This and accompanying illustrations show samples of drawings useful in securing right-of-way.

a petition setting out that the company, being duly chartered, is entitled to locate and construct the line which is then described; that it has complied with the requirements, if there are any, such as securing the assents of abuttors, or approvals of towns, boroughs and cities, etc., giving the facts in detail, and that it therefore prays a hearing be held and the plans be approved. The hearing can always be helped, and often can be reduced to a merely formal reading of the petition, by seeing the parties affected and explaining just what it is intended to do. The average citizen doesn't hanker after court proceedings, and is only too glad to avoid them when, as is the case if he has no objection to the location, his absence does not affect his rights. If on the other hand he does object, and his objection cannot be met by some minor change, the objector should be made clearly to understand that he should go to the hearing. If the company is justified in its stand it can always secure a favorable decision from a fair commission. If the objector has had a chance to present his case, and has been ruled against by third parties, he will usually accept the decision in good part. If he does not, his "crabbing" does not begin to have the disturbing influence on the neighbors as the complaints of the man who has been "done" by the company.



DETAIL PLAN OF TRACK AND WIRE CROSSINGS

The hearing is usually started by reading the petition, after which the company is called on to explain its plans, and then the remonstrances are heard. The less said by the representatives of the company, outside of answers to direct questions, the better. The petition should have stated the general facts, and the company representative is wise to offer to explain anything not clear, but to volunteer no information outside of that specifically called for. This requires tact, for while it is entirely possible to say almost nothing and yet leave all hearers well pleased, it is easier to tell altogether too much, and in addition leave the listeners wishing for horse whips.

LACK OF DISCRETION MAY RESULT IN "STARTING SOMETHING"

The reason for stinginess as to detail is the possibility of "starting something." Many a hearing, all but happily ended, has suddenly developed into a "parrot-and-monkey time" because of an apparently most innocent statement which served to remind some one present of that which otherwise had been forgotten. Very often this refers to the misdeeds of some other company, and has no real relation to the case except to throw doubt on the honesty and good faith of companies generally, but creates in the minds of others suspicions as to the project and drags out the hearing in consequence. Such rows can usually be straightened out eventually, but they are apt to cause delay and cost money, and too often provoke personalities which make bitter enemies for the company.

Objections are of all sorts. The great increase in the number of transmission lines in recent years has largely removed the fear, at one time fairly common, that a transmission line in the neighborhood necessarily meant full graveyards. There are still many who look on the line as on a boil, much better on the other fellow. Neither towers nor poles are unduly ornamental at best, but if there are good reasons for the location first of the line and second of the individual supports the layout will generally stand. In at least some of the states the fact that another or even a better location is possible is of importance only when it appears that the proposed location causes an actual and serious injury which another line would avoid without causing equal or greater injury to some one else. Here, as in all conferences, much tact and discretion are needed, and it is particularly unwise to attack a suggested line unless it is obviously too bad. If, as sometimes happens, you have to shift the line later on, it may be embarrassing to ask permission to locate on what you had previously argued was impossible. The best ground to take is that the location has been made after a careful study of the entire situation; that it is designed to meet the requirements of the company, and that it should not be altered unless it is clearly shown that the change is a material improvement. If in spite of this a change is ordered, an appeal can generally be taken to the courts, although the time lost in getting a decision will offset the advantage of holding to the original layout unless the new line involves considerably greater expense in construction, operation or maintenance.

With the location and construction approved, the work of securing the necessary rights-of-way can be actively pushed. The successful right-of-way man should be several kinds of genius, but the ordinary variety of man can do very well if he has a little trading ability, is a reasonably good "mixer" and—a matter of particular importance—plays a clean game.

A shrewd, unscrupulous buyer may get much of the property desired at a very low figure, but the unpleasantness and ill will which are almost certainly the consequence are likely to prove in the end very costly indeed. For example: On a certain power line project the buyer, who was a pretty good judge of men, frightened many of the farmers by tales of the terrors of condemnation into practically giving away the desired rights, while to those whom he judged would not be bluffed were made all sorts of promises which, however, were all carefully kept verbal. As a matter of fact the condemnation rights of the company applied only to land required for the water power proper, and not to the transmission line. One wealthy owner who refused to be fooled or scared was gone around by a shift in the line and on the face of things the work had been little short of wonderful. With the construction of the line, however, the facts began to get about. The company refused to recognize the promises, many of which in fact it could not fulfill if it had wanted to, for a favorite promise was one of light, heat and power for farms far away from any center where a substation might have had some economic excuse. The opportunity to begin evening up soon came. The company applied to the legislature to permit a necessary bond issue. It was granted the right, but with it came an amendment to the charter which provided that "neither said company nor its successors shall have or acquire by any purchase, lease or consolidation the right to condemn land for a pole line." Meantime a farm on which the line rights were apparently open to question because of the method by which they were secured had been bought by a man who at once notified the company to vacate and, as was later learned, since the neighbors were pledged not to sell a new location, this would force a relocation for ten or twelve miles at least. Luckily the title was better than it looked, but the ensuing lawsuit went to the supreme court of the state and cost all kinds of money.

A SQUARE DEAL IS ESPECIALLY ESSENTIAL

While the buyer should be absolutely fair in his treatment of the seller, he should be equally careful to protect himself and his company. Only a horse trade offers a better opportunity than a real estate deal to buy gold bricks. Without intentional malice a slip in the matter of legal practice may make necessary at a later date all sorts of court actions, and a "friendly readjustment" of the location without engineering supervision may literally put a serious kink in the line.

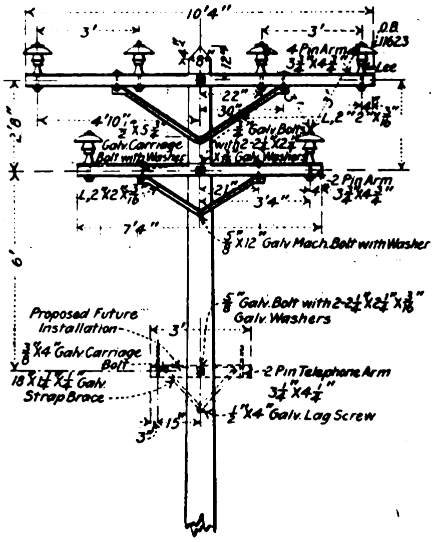
The customary practice in securing the location is to furnish the right-of-way man with plans showing the exact locations of towers, poles or other supports, together with the positions of any necessary guys, braces or anchors, and the lines within which clearing must be done. The location plan should carry this information as well as the names of the land owners, and blueprints from this serve the purpose admirably. It is well, however, to have the plan cut into sections showing but one owner on each. What the man being dealt with does not know about the conditions of location on his next door neighbors does him no harm, and often keeps him from trying his hand at a relocation, with consequent embarrassment to the buyer or the would-be locator or both.

MAPS ARE OF GREAT SERVICE IN SUPPLEMENTING PHRASEOLOGY

If the line has an adequate engineering organization it is well to have a series of such individual maps prepared, to be used first in buying the rights desired and then attached to the respective agreements or deeds, to show just what was secured.

As a rule the location is first secured through options, the owner agreeing, in consideration of a nominal but actual payment (usually one dollar) to convey the desired right at a stated price, on or before a given date, usually either thirty or sixty days later. This gives time in which to have the title searched, and while protecting the agreement to sell, leaves the company free to choose whether it will or will not purchase the rights. The option, if properly drawn and executed, is a contract, and the courts will compel fulfillment in case the owner tries to back out. Not infrequently when there is trouble in securing the right-of-way it is possible by a relocation to get the necessary new rights and start construction long before the old location could be cleared up by condemnation. For this reason it is well not to convert the options into easements or deeds until the line is all secured, unless the time limit expires before that happy result is obtained.

In the matter of the physical location the engineer should rule absolutely. In securing the title the lawyer should be followed, but it is highly important that lawyer and engineer should each have a reasonable knowledge of the field of the other. He should clearly understand that, on the one hand, what may seem an unimportant change in the location may place an operating or maintenance burden on the line for all time, while, on the other hand, carelessness as to form may so cloud the title or limit the rights as to require an entirely new adjustment, often through long and costly lawsuits. This is true particularly if, as is apt to be the case, the flaw is not discovered until the line has been built and put in operation. Moreover it is essential that the engineer know a contract when he sees it, for unless the various agreements be good contracts it may be entirely possible for the land owner to withdraw his consent.


10'4"
3'
3'
D.B.
11623
4 Pin Arm
3¼"X4¼"
Lee
12"
8"
2'8"
22"
30"
4'10"
½"X5½" Galv. Carriage Bolt with Washer
⅝" Galv. Bolts with 2-2¼"X2¼"X3/16" Galv. Washers
L,2"2"X3/16"
L,2"X2"X3/16"
21"
3'4"
2 Pin Arm
3¼"X4¼"
7'4"
⅝"X12" Galv. Mach. Bolt with Washer
6'
⅝" Galv. Bolt with 2-2¼"X2¼"X3/16" Galv. Washers
Proposed Future Installation
3'
⅜"X4" Galv. Carriage Bolt
18"X1¼"X¼" Galv. Strap Brace
2 Pin Telephone Arm
3¼"X4¼"
½"X4" Galv. Lag Screw
15"
3"

DETAIL OF POLE TOP

There are six things necessary to a proper contract, as follows:

1. There must be an offer, made in good faith, and an acceptance of that particular offer.

2. There must be a consideration, not necessarily large—quite commonly one dollar—but it must be of real value, and actually given.

3. In general, the agreement, or a reasonably definite memorandum of the agreement, must be in writing.

4. The parties must be legally capable of executing a contract; minors, drunken persons, persons of unsound mind or under conservators, corporations, married men under certain conditions, and married women under the common law are totally incapable or are restricted in their power of legally entering into a contract.

5. The agreement must be real; misrepresentation, fraud, duress, undue influence and certain legitimate mistakes permit one of the parties to avoid a contract.

6. The object of the agreement must not be forbidden by law or opposed to the policy of the law.

Of the six items, but three are likely to make trouble. Every now and then some buyer, finding he can get his option without the payment of any money, pats himself on the back, entirely losing sight of the fact that in consequence he has but a license which until the deeds pass may be revoked at any time. While nine times out of ten there would be no question, the tenth time some genius discovers the situation and makes trouble, which may be exceedingly serious. On some railroad work with which the writer was connected such a piece of economy on the part of an old right-of-way man cost his company between twenty and thirty thousand dollars for the right to have the foundation of a long retaining wall extend *six feet* on the property, but at a distance about fifteen feet below the surface. This was a right which took from the land owner nothing he would ever want, and which as a matter of fact he was willing to grant for a dollar. As there were about twenty owners the buyer saved temporarily twenty dollars.

A less inexcusable error is as to the capability of the party. The options are usually secured before a careful title search can be made, and the buyer has to rely on statements which may be intentionally false, or may be made in perfectly good faith. Minors ordinarily look their age, and the facts can be readily dug up to verify an assumption that a person is under age. The condition of a man sufficiently "soaked" to be considered legally a drunken person is obvious—quite so in these days—as are many of those of unsound mind. However, there are many who should be under conservators who appear rational, and whose neighbors hesitate to term other than perfectly competent, who are permitted to transact their own affairs until they deal with a corporation of reputed wealth. Then friends spring up, a conservator is appointed, rights granted are declared illegal, and their "value" goes skyward. And as this usually happens just in the thick of construction a settlement is generally the cheapest in the end.

SOME SAMPLES OF THE STUMBLING BLOCKS WHICH MAY BE ENCOUNTERED

Corporations usually have the right to execute contracts as to land, but it is highly important that any agreement be signed by the proper official and sealed with the corporate seal. The first requirement is also true of other organizations, including states and minor political bodies. The buyer is legally held responsible for finding who is the proper person, and if the signer has not the lawful authority the paper may be worthless.

The capability of married persons is affected in some states. In Connecticut, for example, a man married before 1877, whose wife is still living, cannot convey land properly except as his wife joins with him, even though the land stands on the records in his name only. Particularly in the smaller towns and the country the man of the house is accustomed to do most of the business, and while aware that a regular deed should have the signatures of both himself and wife, takes it for granted that his signature is sufficient for an option or even an easement. A famous Connecticut case, the New Milford Power Company against Russell, hinged on such a transaction.

Misunderstanding of the terms, failure to have what the lawyers call a "meeting of the minds" of the parties, is less likely to occur when a reasonably clear option form and map are used in buying. Under these circumstances it is usually possible to make a satisfactory defence to the claim. Real trouble arises where an over-enthusiastic buyer cuts loose and limits his promises only by the sky. But here again, if option and map are clear and the seller can read, the contract will usually stand. In such cases, however, if the claimant is apparently sincere in his belief, it is the wise policy to make some compromise rather than have a neighbor who is convinced, however incorrectly, that the company "did" him.

As to the details of the buying, that requires largely trading instinct if the seller will not sign at once. What the rights are fairly worth should be determined in advance, and as many as possible signed up below or at that figure. Just how to deal with the others is a problem in human nature. Some want a general discussion of world and local politics before they will talk on the real business in hand; some want direct and continuous argument till the matter is closed; some must be visited several times; some can only be secured through the help of a friend, while a few can only be made to grant the rights desired by court action. By getting the easy ones first, however, the "holders-out" can often be persuaded not to be stumbling blocks to the scheme when so many of their neighbors have agreed to it, and as the number to be settled with diminishes, the limit of payment can be raised, although any material increase is an injustice to those who settled reasonably and should be given only when actually necessary.

H. C. L. Increases 7 per Cent

THE average living cost in American communities increased 7 per cent between November, 1919, and March, 1920, according to a preliminary announcement made on May 3, 1920, by the National Industrial Conference Board. This makes a total increase of about 95 per cent since July, 1914, and an increase of 21 per cent within the last 12 months.

Increases in the cost of each of the five major items making up the family budget, based on reliable information from retail dealers in food and clothing and from brokers and others in close touch with the real estate situation, were as follows:

	Increase March, 1920, Over July, 1914, per Cent	Increase March, 1920, Over November, 1919, per Cent	Average Pre-War Apportionment of Total Expenses, per Cent
Food	100.0	4.2	43
Shelter	49.0	8.0	18
Clothing	177.0	17.9	13
Fuel, heat and light	49.0	0.7	15
Sundries	83.0	4.6	20
Average	94.8	6.9	100

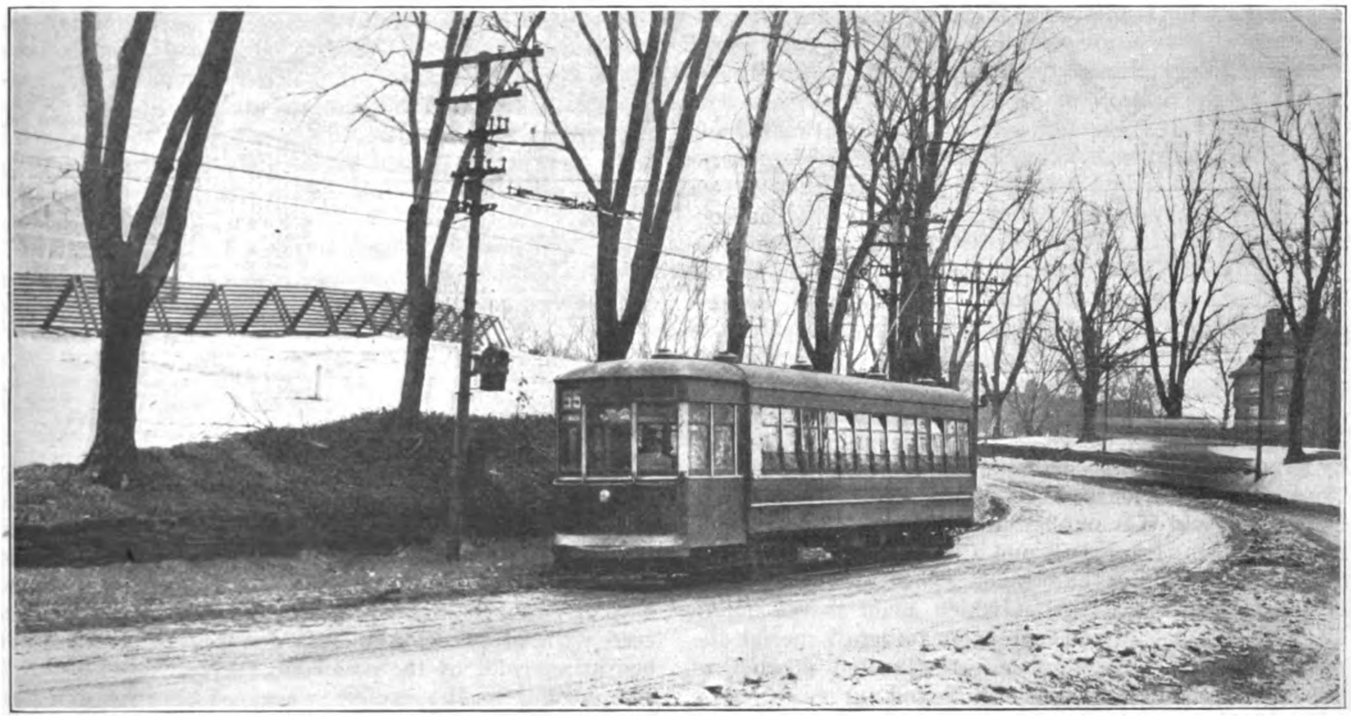
In estimating changes in the family budget the last column of the table shows pre-war expenditures based on a number of reliable investigations, including some of the United States Bureau of Labor Statistics.

Motor Vehicle versus Electric Car Transportation

IN AN address before the Optimists' Club of Los Angeles, on April 29, H. B. Titcomb, vice-president Pacific Electric Railway, discussed recent developments in motor transportation and compared the conditions under which motor vehicles and electric cars operate. The latter, he said, have to pay out annually about 30 per cent of their gross receipts for taxes, interest on the cost of their roadbed construction and maintenance for track and pavements, whereas the motor vehicles in California do not pay over 2 per cent of their receipts for these items, because the roads are maintained by the public. Mr. Titcomb then mentioned several improvements which the Pacific Electric Railway would make if it could prove that it was a profitable venture, but until competing means of transportation are taxed equally with the railways further electric railway development in Southern California seems doubtful.

Operating a 14-Mile Suburban Line on a Thirty-second Headway

Special Safety Record Has Been Established by the P. R. T. on a Line Whose Natural Characteristics Impose Several Service Operating Difficulties



AUTOMATIC SIGNAL PROTECTING GRADE AND CURVE, BRANCHTOWN HILL

THE lines of the Philadelphia Rapid Transit Company operating on Old York Road and serving Willow Grove Park carry on many days during the park season what is probably the largest volume of passenger traffic handled on any similar suburban line in the entire country. The route, from the center of Philadelphia to Willow Grove Park, is about 14 miles, and on heavy days cars are scheduled on thirty-second headway over the entire route, which means that with any lag in the line cars very frequently are running at two or three-second intervals.

York Road is double-tracked throughout, the tracks for most of the distance being on the side of the highway, but in some of the towns and at other locations the tracks cross to and are laid in the center.

In addition to the heavy street car traffic York Road is Philadelphia's principal vehicular outlet to the north, it being a direct continuation of Broad Street. The highway, therefore, carries an enormous automobile and truck traffic, adding greatly to the complications involved in operating the car lines with the tracks cutting in and out of the center of the highway.

Due to efficient operating methods and supervision the service has been operated for several seasons with a remarkable record for safety and regularity.

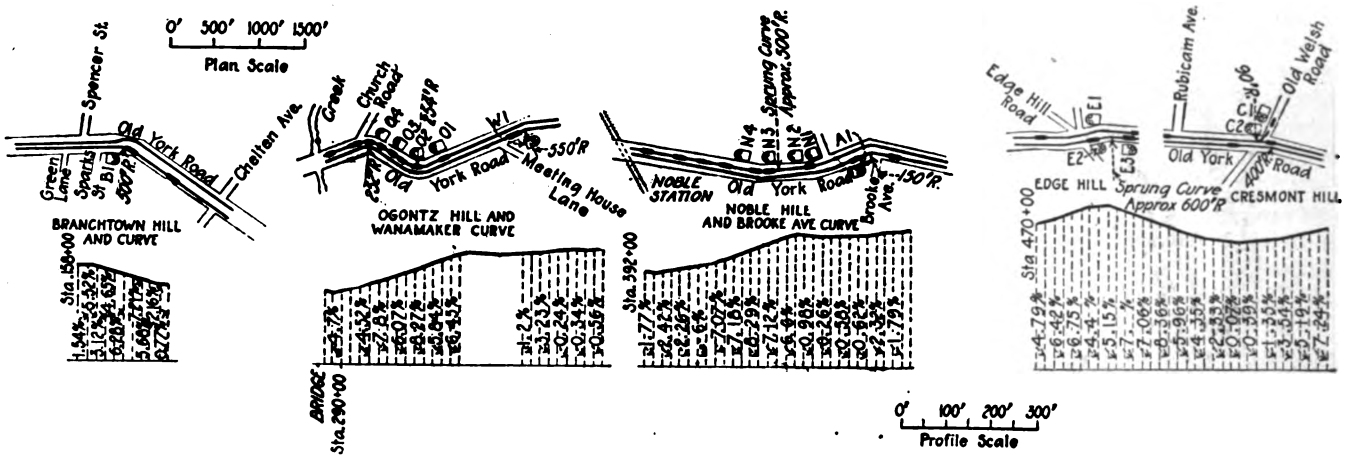
A most important factor in handling dense traffic under these conditions is rear-end protection. Recognizing this, the company's rules governing flagging were formulated with the utmost care and are rigidly enforced. Whenever circumstances require the stopping of a car for any cause in excess of the time of an ordinary service stop the rules require that first thought must instantly be given to flagging to the rear. This is made a cardinal principle for all crews.

In every such case the conductor is required to hasten at once to the rear of his car at least 200 ft. to flag his follower, who, in turn, is required to protect the rear of his car in like manner, each conductor promptly assuming the responsibility of rear-end protection immediately upon arrival at the scene of delay.

Wherever a grade is involved or the rail is known to be slippery, or where the view of approaching motormen is obstructed by curves, buildings, fences, trees, foliage, fog, snow or darkness, the flagging point is placed at such greater distance as in the judgment of the conductor will insure absolute protection against collision. Motormen are instructed that when vision ahead is obscured by fog, rain, sleet, snow, smoke or any other cause the car must be operated only at such speed as will permit them to stop within the limits of vision, and if the rail is slippery that fact must be taken into calculation and the motormen must govern themselves accordingly.

The rules provide that all passenger cars that are being transferred between depots or to terminals or moved to and from shops must be kept lighted during hours of fog and darkness, and under no circumstances are they to be operated by other than properly authorized motormen. A special set of rules is in force governing operation of utility equipment, such as freight, milk, ash, coal, cinder, sand, sprinkler, lamp, newspaper, test, storeroom, supply, emergency and line cars, as well as snowplows and sweepers, all of which are required to be supplied with two red lanterns and two red flags for special flagging.

There are five locations on the York Road route where the operating problem is somewhat complicated by grades in combination with curves. These five locations are known locally as Branchtown hill and curve, Ogontz hill and Wanamaker curve, Noble hill and Brook Avenue curve, Edge Hill and Crestmont hill. The accompanying profiles and plans show the grades and curves at these locations, at which, prior to the installation of signals, it was customary to detail special dispatchers, each patrolling a very limited stretch of track, to control traffic on the hills and curves.


0' 500' 1000' 1500'
Plan Scale
Spencer St.
Green Lane
Sparks St
B1
500'R
Old York Road
Chelten Ave.
BRANCHTOWN HILL AND CURVE
Sta. 158+00
Creek
Church Road
O4
O3
O2
O1
154'R
W1
550'R
Old York Road
Meeting House Lane
OGONTZ HILL AND WANAMAKER CURVE
BRIDGE
Sta. 290+00
Sta. 392+00
NOBLE STATION
N4
N3
N2
N1
Sprung Curve Approx. 500'R
A1
Old York Road
Brooke Ave.
150'R.
NOBLE HILL AND BROOKE AVE CURVE
Edge Hill Road
E1
E2
E3
Rubicam Ave.
Old Welsh Road
C1
C2
90'R
Old York Road
400'R
EDGE HILL
Sprung Curve Approx 600'R
CRESMONT HILL
Sta. 470+00
0' 100' 200' 300'
Profile Scale

SIGNAL LOCATIONS ON OLD YORK ROAD LINE, PHILADELPHIA RAPID TRANSIT COMPANY, SHOWING SIGNAL NUMBER SCHEME

In 1917 automatic signals, comprising sixteen separate blocks, ranging from 200 ft. to 1,500 ft. in length, grouped at the five locations referred to, were installed for the purpose of spacing cars as well as assuring extra protection on grades and curves.

For this purpose Nachod automatic signals of the HD type, with overhead trolley contactor, were selected. These are two-line wire signals for the protection of following movements on double track and for double-track curve and grade protection. They are what is known as two-position home signals normal clear and are installed with one block overlap.

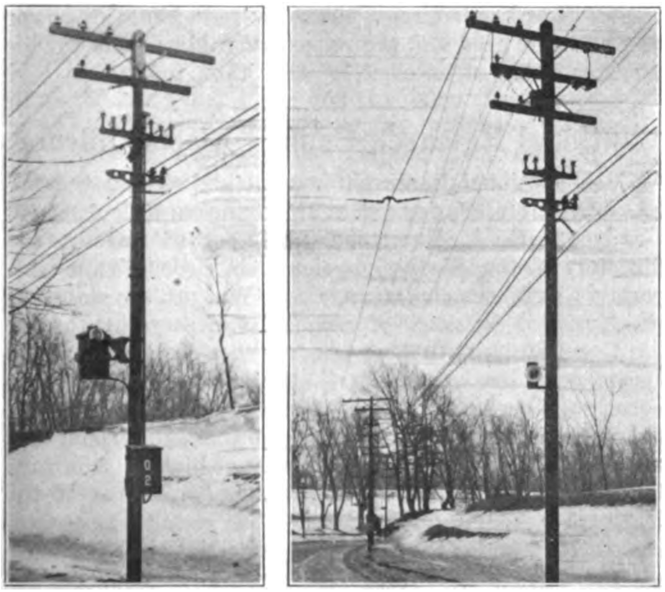
Upon approaching a signal showing a green light and a green disk the motorman is permitted to enter the block with the assurance that there is no car between him and the clearing contactor, which is at the second signal beyond. But since these signals are installed only at points of known hazard he is instructed to proceed with proper caution and due regard to all other operating rules of the company.

Immediately the trolley wheel passes through the contactor a red light and a red disk replace the green as an indication to the next following car that the block is occupied. The motorman thus entering the block must immediately satisfy himself that the signal has operated properly, which he does by closely observ-

SIGNAL AND DOUBLE CONTACTOR PROTECTING REAR END, OGONTZ HILL ing the white tell-tale light located in every case upon the first pole beyond the signal in a forward direction.

This white tell-tale or signal indicator operates simultaneously with the setting of the signal. If it lights up it is a positive indication that the signal has operated properly. If, however, it remains dark it must be regarded as a warning to the crew that the signal behind them may not have operated. In such a case the motorman is instructed not to stop his car or attempt to back up for the purpose of again passing beneath the contactor, but to continue through the block with proper caution and with the knowledge that the signal may be affording him protection from following movements. Should it become necessary to make a stop, however, other than an ordinary service stop, the duty immediately devolves upon the conductor to proceed a safe distance to the rear of his car in order that he may flag possible following cars, in accordance with the company's rules for flagging.

Upon approaching a signal displaying red and which does not clear within a reasonable time the instructions provide that the motorman will wait three minutes from the time of his arrival at the signal, when he will be permitted to enter the block, proceeding with the greatest caution and the knowledge that his track may be obstructed.



AT LEFT, AUTOMATIC SIGNAL, OGONTZ HILL. AT RIGHT, SIGNAL INDICATOR ON OGONTZ HILL

When thus operating against a red light the assumption must be that there is line trouble in the block, rather than that there is some mechanical defect in the signals, and if vision ahead is obscured by fog, rain, sleet, snow, smoke, foliage, curves or grades, or any unusual or dangerous condition, the conductor will precede his car on foot at such distance as will insure absolute safety of operation, the motorman meanwhile sounding his gong at frequent intervals.

If power is off the line the signals will show red. At such times cars must under no circumstances be permitted to drift under a contactor. With power on the line the signals will operate whether the controller is applied or not when passing through the contactor.

There are two lights behind each signal lens, though one of them burns normally. Should this fail, however, the reserve lamp is automatically cut into circuit. Should the lights fail to show, though the disk is observed to operate properly, car may enter the block provided the green disk appears in the normal way. At such times the motorman's instructions are to proceed with extreme caution.

Conciliation and Arbitration in New Zealand

CONCILIATION and arbitration practice in New Zealand is the subject of Research Report No. 23, recently issued by the National Industrial Conference Board, 15 Beacon Street, Boston, Mass. New Zealand was the first country to adopt definite legal measures with reference to conciliation and arbitration in disputes between labor unions and employers, it having introduced the system in 1894. Since that time there have been advances and changes, and a history of the developments in the legislation on this subject forms the principal body of this report.

The report points out that the conditions in New Zealand can hardly be likened to those in the United States, as New Zealand does not contain the large mining, metal and manufacturing industries so numerous in this country. The largest union is among transportation workers, while builders come next. The total number of union members has progressed from 45,614 in 1907 to 72,873 in 1915. The administration of difficulties with labor unions numbering no more than this in a population of approximately 1,000,000 cannot, of course, be compared with American conditions.

However, the analysis of the development of the situation in New Zealand is of interest as it shows the gradual progression toward an acceptance of a conciliation machinery, which must act before any arbitration is called for. In other words, certain officials have the power to create conciliation boards, consisting of representatives of labor and employers in the particular groups affected, whenever there is any labor difference. In case the conciliation board cannot agree upon a settlement, then appeal may be made to the general arbitration board of the country.

From 1894 to 1905 there were no strikes in New Zealand, while from 1906 to 1918 the greatest number per year was forty-six in 1914, while the average number has been thirteen in the period 1906 to 1918 inclusive. From 1910 to 1918 there was a total of 151 prosecutions for enforcements of awards and for strikes and lockouts.

Since the publication of this report one serious strike has occurred. An interesting fact, which may be merely a coincidence, but which may have a significance unappreciated in the United States is that this strike was a general strike on the railways and took place during the recent visit of the Prince of Wales, delaying his travel.

Calvin Tompkins, president the Material Handling Machinery Manufacturers' Association of New York, in a recent statement urged the more general use in freight handling of standardized unit containers. Such a container should be in the form of a demountable closed auto truck body, which can be readily transferred by cranes between railroad flat cars, auto chassis, warehouse floors and vessels. He suggests 5 tons as the size which would be most generally useful and refers to the use of such mountable bodies for railroad transport between terminals in Cincinnati as being satisfactory.

The New Water-Power Law

Permits Private Development of National Water Powers—Government Has Option of Renewal or Purchase at End of License Period

THE new water-power law, which was signed by President Wilson on June 11, at last makes possible private, state or municipal development of water resources on public lands and reservations. This law is one of the most important legislative acts passed by the last Congress, as it is expected to add at least 3,000,000 hp. to the national power supply and aid transportation by increasing the available power for electrification of railroads and railways and by adding several thousand miles to the mileage of navigable streams. It should also aid agricultural development by increasing the water-storage capacity for irrigation in arid regions.

The law creates a federal power commission to be composed of the Secretary of War, the Secretary of the Interior and the Secretary of Agriculture and gives the President the authority to name the chairman. This commission is authorized "to make investigations and to collect data concerning the utilization of the water resources of any region to be developed, the water-power industry and its relation to other industries and to interstate and foreign commerce, and concerning the location, capacity, development costs and relation to markets of power sites, etc.," on government lands and reservations. The duties of the commission not only deal directly with the development of the water power in any region but also with other features associated with the development of water resources, such as irrigation, navigation and the use of reservoirs for storage purposes and flood prevention.

The act permits the use of licenses in aiding such developments and its provisions are considered so reasonable and equitable that private capital is expected to be attracted. The commission is authorized to issue licenses to a private citizen or corporation or to any state or municipality for the purpose of constructing, maintaining and operating dams, reservoirs, water conduits, power houses and transmission lines necessary for the improvement of navigation, development and transmission of power or for utilizing the surplus water or water power from any government dam on any of the navigable rivers, public lands or reservations of the United States. The commission has jurisdiction over the licensee as to its accounting system, plans for development, construction features, etc., but the local or state regulating commission has jurisdiction as to rate and service regulations.

Preference is given a municipal or state applicant for a license and such an applicant pays no annual charge to the government, excepting in the case of a project on Indian lands, if the power developed is sold at no profit or used for municipal or state purposes. Licenses granted to individuals or corporations require them to pay the government an annual charge fixed by agreement. Such licenses cannot be transferred or sold excepting by permission of the commission.

The license fixes a time limit of two years, with one extension of not longer than two years, for beginning construction of the project, and also gives the licensee the right of eminent domain. Power contracts with consumers for a term of more than fifty years can only be made with the joint approval of the commission and the local or state regulatory commission. In an emergency, such as war, the government reserves the right to take over and operate any project provided the licensee is compensated.

The horsepower that will be developed cannot have a very appreciable effect immediately on the national power situation, as the present cost of development and construction and the location of the larger and more cheaply developed water-power projects on reservations or land in districts lacking both dense populations and industries seem to indicate that, with the exception of the Pacific slope, railroad electrification offers the only large application for the utilization of such power. The railroads in certain districts of the Rocky Mountains are given an opportunity to develop the adjacent water powers, and no doubt the incidental advantages through increased irrigable land will mean prosperity for arid sections.

In the East and in the South many small water powers will now be developed on both navigable and non-navigable streams, and every horsepower added to our power supply through the development of hitherto wasted water resources means a reduction in power cost and fuel used and the release of rolling stock for the transportation of necessities other than fuel.

National Research Council Elects Officers

THE National Research Council has elected the following officers for the year beginning July 1, 1920: Chairman, H. A. Bumstead, professor of physics and director of the Sloane physical laboratory, Yale University; first vice-chairman, C. D. Walcott, president of the National Academy of Sciences and secretary of the Smithsonian Institution; second vice-chairman, Gano Dunn, president of the J. G. White Engineering Corporation, New York; third vice-chairman, R. A. Millikan, professor of physics, University of Chicago; permanent secretary, Vernon Kellogg, professor of biology, Stanford University; treasurer, F. L. Ransome, treasurer of the National Academy of Sciences. The council was organized in 1916 under the auspices of the National Academy of Sciences to mobilize the scientific resources of America for work on war problems, and reorganized in 1918 by an executive order of the President on a permanent peace-time basis.

Super Power Study Progresses

BY HIS signature on the sundry civil appropriation bill, President Wilson has made available the $125,000 appropriation requested by the Department of the Interior to finance an investigation of and report on the super power scheme for the Northeastern Atlantic Seaboard region.* This means that an active study will be made and a report on the feasibility of the scheme, as well as suggested engineering methods of carrying it out, may be expected by July 1, 1921.

The work will be done under the supervision of the United States Geological Survey, George Otis Smith, director. An engineering commission will be created, of which W. S. Murray, the originator of the present plan, has already been appointed chairman and chief engineer. Mr. Murray has also been authorized to appoint the rest of his engineering commission, with encouragement to draw upon responsible engineers with field experience.

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*See ELECTRIC RAILWAY JOURNAL, Feb. 28, 1920, page 435.

Interesting Points in A. R. A. Reports

Committee Reports on Car Wheels, Car Construction and Standard Methods of Packing Journal Boxes Have Points of Interest to Electric Railways

AT THE convention of the American Railroad Association recently held at Atlantic City a number of points came up which are of interest to the electric railway engineer.

One of these is the report of the committee on standard method of packing journal boxes, an abstract of which was given in the ELECTRIC RAILWAY JOURNAL for June 19. This was recommended for submission to letter ballot for adoption as recommended practice.

RECOMMENDATIONS ON JOURNAL BOX PACKING

This provides for saturating the waste at 70 deg. F. for forty-eight hours and then draining. The packing is to consist of three main parts:

(a) Inner—A rope of packing to be twisted tightly and placed in back of box, this to be well up against the journal so as to lubricate the fillet and keep out the dust.

(b) Main—To be applied (preferably in one piece) between the inner piece and the journal collar.

(c) Outer—Third piece of firmly twisted packing to be applied in wedge-shaped fashion at the bottom of the box, resting firmly against the main packing.

Some little discussion developed at the meeting relative to the third or outer piece, some claiming that it was desirable because it kept dust away from the inner packing and helped keep the latter in place up against the journal. Others claimed that it was undesirable in that it is readily displaced by the rotation of the axle and became forced against the journal cover, allowing the waste to hang out of the mouth of the box, thus draining off the oil.

REPORT ON CAR CONSTRUCTION

The committee on car construction presented an elaborate report dealing with many phases of the subject, of which those most pertinent to the electric railway field are the following:

1. *Axle Capacities.*—Present axle capacities increase bysteps, which can be made more uniform by increasing the capacity of the axle with 5½ x 10 in. journals from 38,000 to 40,000 lb., the present dimensions being such that the allowable stresses will not be exceeded. It was suggested to add another axle with 6½ in. x 12 in. journals, capacity 60,000 lb., and bearing, wedge and box to suit.

2. *Calculation of strength of axle.*—The fundamental treatise on the M.C.B. standard method of calculating the stress in axles is given in the M.C.B. Proceedings for 1896, being one of the most notable contributions made by the association to the technical knowledge of the industry.

The committee this year has added some information in amplification of the original data as follows:

The committee on axles, in its splendid report of 1896, did not specifically cover the locus of the points of application of load for calculating the part of axle between wheel seats. In 1901 this was referred to in connection with a report on chemical composition of all steel car axles. It is desirable to put this question in such shape that uniformity in calculations be realized.

Frames above the journals of the same axle cannot spread more than 1 in., therefore the calculations for diameters of axle sections between wheel fits should be based on length between center of journals plus 1 in.

The following may be considered a continuation of the 1896 axle report, the only addition being the assumed distance between load application:

$$\left.\begin{array}{l} \text{Allowable stress} = \dfrac{22{,}000}{1.26} = 17{,}460\text{ lb.} \\ \text{Required diameter} = \sqrt[3]{\dfrac{M}{W} \times \dfrac{W}{S} \times \dfrac{32}{\pi}} \end{array}\right\} \text{As given in the 1896 Proceedings.}$$

Values for standard axles, based on distance between load applications of "L" (distance between centers of journals) plus 1 in.

Axle	Capacity Lb.	L + 1 in.	$\frac{M}{W}$	$\frac{W}{S} \times \frac{32}{\pi}$
A	15,000	76 in.	15.00414—.196X	8.751
B	22,000	76 in.	15.00414—.196X	12.835
C	31,000	77 in.	15.49821—.200X	18.085
D	40,000	78 in.	15.99228—.2035X	23.335
E	50,000	79 in.	16.48635—.2071X	29.170
F	60,000	80 in.	16.98042—.2106X	35.003

Value of ratio (R) of $\frac{M}{W}$ at edge of cylindrical center portion, at inside of collar and at wheel fit 24 in. from center and arm of force (X) on which these values are based.

	Near Center		Inside of Collar		At Wheel Fit	
Axle	X	R	X	R	X	R
A	36½ in.	7.85014	15¾ in.	11.91714	14 in.	12.23214
B	36½ in.	7.85014	15¾ in.	11.91714	14 in.	12.23214
C	37 in.	8.09821	16¼ in.	12.24821	14½ in.	12.59821
D	36 in.	8.66628	16¾ in.	12.58365	15 in.	12.93978
F	36½ in.	8.92720	19 in.	12.55145	15½ in.	13.27630
F	37 in.	9.02622	19½ in.	12.77112	16 in.	13.55682

Resultant theoretical diameters, based on above tables, and standard method of calculation.
(Y = distance from center of axle.)

	Near Center		Inside of Collar		At Wheel Fit	
Axle	Y	Diameter in.	Y	Diameter in.	Y	Diameter in.
A	1½ in.	4.096	22¼ in.	4.707	24 in.	4.748
B	1½ in.	4.650	22¼ in.	5.348	24 in.	5.395
C	1½ in.	5.271	22¼ in.	6.050	24 in.	6.108
D	3 in.	5.870	22¼ in.	6.647	24 in.	6.709
E	3 in.	6.386	20½ in.	7.154	24 in.	7.289
F	3 in.	6.811	20½ in.	7.646	24 in.	7.800

Brake Power and Brake Beams.—An important question in connection with car design is necessary brake power. The present standard is that the brake power shall be 60 per cent of the light weight of the car based on 50 lb. unit cylinder pressure. Cars in which the ratio of light weight to loaded weight is very low will then have a very low brake power when cars are fully loaded. Cars in which this ratio is high have a relatively high brake power when cars are fully loaded. It is, therefore, deemed advisable to make a change and to base the total brake power of the car on 40 per cent of the sum of the light weight plus ¼ of the maximum allowable load, and to base this on 50 lb. unit cylinder pressure. This will serve more nearly to equalize the brake power on freight cars with average loads. The possible maximum per cent of brake power for the lightest cars would be 75 per cent of the light weight of car, based on 50 lb. unit cylinder pressure. The formula for brake power will then be as follows:

$$0.40 \left\{ \frac{W - w}{4} + w \right\} = 0.1\,W + 0.3\,w.$$

but not more than 0.75w.
in which W = Loaded weight of car, maximum.
w = Empty weight of car,
W-w = Maximum allowable load.

As this is based on 50 lb. air pressure per square inch in the cylinder and the maximum unit pressure may be from 85 to 88 lb. the maximum brake pressure will be 1.75 (0.1W + 0.3w), which, divided by the number of brake beams, will be the required deflection load per beam.

The brake beam set load, which should be somewhat within the elastic limit of the beam, should be approximately 1¾ of this amount.

Recommendations.—(a) That the brake power on cars be as follows:

W = Loaded car weight, maximum,
w = Empty car weight,
N = Number of brake beams on the car.

Required brake power $= 0.1W + 0.3w$, which for cars having four and six wheel trucks will be:

	Brake Power	
Axle	Four-Wheel Trucks	Six-Wheel Trucks
C	13.200+.3w	19.800+.3w
D	16.900+.3w	25.350+.3w
E	21.000+.3w	31.500+.3w
F	25.000+.3w	37.500+.3w

(b) That the brake beam deflection load be

$$\frac{1.75}{N}(0.1W + 0.3w).$$

(c) That the brake beam set load be $\frac{3}{N}(0.1W + 0.3w)$.

NOTE.—If the above is adopted the 12,000-lb. beam will be required as follows:

Car Class	Car Weight
4 B	All cars,
4 C	Less than 50,000 lb.
4 D	Less than 40,000 lb.

The 15,000-lb. beam will be required as follows:

Car Class	Car Weight
4 C	50,000 lb. and over,
4 D	40,000 lb. to 60,000 lb.
4 E	Less than 45,000 lb.

(d) That the 6,500-lb. capacity beam be dropped from the standards and that the 12,000-lb. capacity beam be denominated as the No. 1 beam, and that the interchange rules should be amended to conform to the foregoing.

3. Slight changes are proposed in the dimensions of fillets of axles. These do not interfere with interchangeability.

4. Lugs for journal bearings have been increased slightly.

5. Quality of steel used in car construction.

The committee states that "the tendency to lower the requirements for elastic limit and elongation have endangered details which have been based on certain stresses; also the close adherence to requirements for ultimate strength and chemistry has caused rejection of material which was superior to material acceptable under the specifications."

Unit stresses commonly allowed for detail parts of cars made of steel, and which are subject to variable loads and occasional light shock, are 12,500 and 16,000 lb. per square inch. The minimum elastic limit should be double this amount, and the product of elastic limit and elongation should not be less than fifty times the allowable stress. As the test piece usually shows better physical properties than the casting or forging, the requirement for product of elastic limit and elongation should be increased by 50,000, making it fifty times the allowable stress plus 50,000. The reduction of area is considered secondary in importance. It should be seventy-five times the allowable stress. An addition of 50,000 for variation between test piece and the casting or forging may be made, but is considered unnecessary. The ultimate strength, content of carbon, manganese and silicon should be left optional, as the other requirements control these sufficiently and the restrictions used in specifications heretofore have caused rejection of good serviceable material.

The specifications should clearly circumscribe annealing and methods of making tests, the latter to insure uniformly comparative results from different laboratories.

The resulting specifications should be made optional for at least one year, to permit manufacturers to adjust themselves thereto.

Recommendation.—Provide specifications for all forged and cast steel used in car construction of two grades, based on fundamental requirements given below:

Grade of Steel	A	B
Minimum elastic limit (lbs.)	26,000	32,000
Product of elastic limit and elongation	700,000	850,000
Product of elastic limit and reduction of area	975,000	1,200,000

The ultimate strength, carbon, manganese and silicon shall be optional.

Sulphur shall not exceed .05 per cent.

Phosphorus shall not exceed .05 per cent.

The elastic limit shall be determined by extensometer.

The elongation shall be measured in a length of 2 in.

Grade "A" steel shall be annealed if the carbon content exceeds 0.30 per cent, or if the manganese content exceeds 0.75 per cent.

Grade "B" steel shall be annealed if the carbon content exceeds 0.22 per cent, or if the manganese exceeds 0.65 per cent.

Pieces of irregular section and of less carbon or manganese content where shrinkage or other internal strains may be suspected should also be annealed.

Unimportant details may be accepted on surface inspection only.

REPORT ON CAR WHEELS

The committee on car wheels has recommended increasing the weight of the present 625 and 725 lb. chilled iron wheels to 650 and 750 lb. respectively, and that instead of stenciling the wheels with the tape sizes on the wheel, as is the present practice, a permanent record of this information be provided as follows: Five small lugs $\frac{3}{8}$ in. in diameter by $\frac{3}{8}$ in. high to be cast on inner plate near hub. As each wheel is taped the necessary number of lugs to be broken or cut off, those remaining to indicate the tape size.

The contour of the standard rolled wheel is recommended to be changed back to that which was standard previous to 1912, inasmuch as the present standard, which is identical with the cast iron wheel, has been found impractical to roll.

The committee presented a recommended practice for mounting both cast iron and steel wheels as follows:

1. Standard table of mounting pressure:

MOUNTING PRESSURE IN TONS

Axle	Wheel Seat Diameter	Cast Iron Wheels		Steel Wheels	
		Minimum	Maximum	Minimum	Maximum
A	$5\frac{1}{4}$ in.	30	45	45	60
B	$5\frac{3}{4}$ in.	35	50	50	70
C	$6\frac{1}{2}$ in.	40	60	60	80
D	7 in.	45	65	65	85
E	$7\frac{3}{4}$ in.	50	70	70	95

2. Wheels having flanges worn so as to take limit gages for remounting cast-iron wheels shown on M. C. B. Sheet 16-A shall not be remounted.

3. The thickness of flanges of wheels fitted on the same axle should be equal and should never vary more than $\frac{1}{16}$ in.

4. In mounting of wheels, new or second hand, the standard wheel mounting and check gage should be used in the following manner:

After one wheel is pressed into position, place the stop "A" or "B" of the check gage against the inside of the flange of the wheel with the thinner flange with the corresponding tread stop "C" or "D" against the tread of the wheel. Press the other wheel on the axle until the opposite tread stop comes in contact with the tread of the corresponding gage point "E" or "F" in contact with the outside of the thicker flange.

5. The wheel seats on all axles must be turned to uniform diameter throughout the entire length of each wheel seat and must be smooth and free from ridges so as to provide even bearing for the wheel fit throughout. The mounting of wheels on axles having the wheel fit tapered is not permissible. The wheels must also have a straight bore with the exception of the chamfering for not more than $\frac{3}{8}$ in. at the back hub face which may be allowed to facilitate application to axles.

6. Wheels should be mounted centrally on the axle. All axles should be center punched and some form of gage be used to measure the location of the wheel from this center punch mark. The central mounting of wheels is necessary in order to secure proper running of the wheels and to prevent hot boxes.

7. Wheels should ordinarily be fitted to (word "used" eliminated) axles and not axles fitted to the wheels. It is usually unnecessary to turn the wheel seat of second-hand axles unless they are found a tapered fit.

8. In mounting either new or second-hand wheels care should be used to see that the wheels are of the same diameter. In the case of new wheels, the wheels should be taped in order to check the tape size marking, and in no case should wheels of different tape sizes be applied to the same axle.

9. The alignment of axle lathe, the trueness of the cen-

ters and the jaws on boring mills should be checked frequently in order to insure proper mounting of the wheels.

10. While the wheels are being bored the high spots on the flange should be marked, and in mating the high spots should be put opposite low spots on the mate wheels.

In the discussion of the report of the committee on car wheels it was interesting to note that one or two large roads are beginning to adopt two practices long familiar and in general use on electric railways, namely, grinding out flat spots on chilled wheels and further grinding new wheel pairs before placing them in service.

It was evident that these practices were not a matter of common knowledge among the mechanical men present, and it would indicate that some form of intercommunication between the American Railway Association and the American Electric Railway Association might be desirable.

Saving Transportation Costs

Mr. Fritch Tells Club Members About Monthly Data Sheets, Saving on Peak-Load Costs and Effect of Automobile Competition

TRANSPORTATION formed the subject of a paper by Howard F. Fritch, assistant general manager Eastern Massachusetts Street Railway, presented at the May meeting of the New England Street Railway Club in Boston on May 27. In addition Lieut.-Col. Leonard S. Horner of the United States Air Service discussed the development of commercial aircraft and William Arthur of New Haven, Conn., outlined the importance of coal conservation as affecting the industrial activities of the country.

The term "transportation," as defined by Mr. Fritch, means first and last the association of the revenue derived to the cost of service. The application of this theorem requires, first, the collection of data and its study, and, second, the establishment of traffic schedules through the agency of these data.

The collection of data and the keeping of accounts for any system should be carried out with a clear idea of the ultimate purpose in mind, *viz.*, to obtain information which can be assembled in a convenient way and can be interpreted easily and quickly. To be of greatest value such data should be compiled and submitted for study within the shortest time possible. Often data which have been collected at considerable expense and then worked up have been found useless in helping to solve the transportation problem, because conditions affecting service have changed during the interim. On the divisions of the Eastern Massachusetts Street Railway the plan now followed is to draw up monthly accounts, which are then closed at the end of each month. These accounts include traffic census reports, passenger accounts and general expenditures.

The graphical method of representation has been adopted and has been found to be convenient, as by this means load curves and running expenses show more clearly any deviation from normal or preceding returns. These graphical charts and accounts are presented to the division managers not later than the fifteenth of the following month, and after a thorough study such changes as are deemed necessary are acted upon at once. By this monthly account system inefficient service is most easily remedied.

Schedules are drafted after a careful study of the data has been made and should show the way for improved handling of the transportation for the district. Citing a concrete case, Mr. Fritch showed that in 1919 12 per cent was found to be the cost of extra expense outside of platform work. The tightening up of schedules, by eliminating layovers, together with the speeding up of runs, later resulted in decreasing this amount. In outlying districts, where the car interval is fifteen, twenty and thirty minutes, the introduction of the one-man car has proved to be advantageous, especially on short hauls.

ONE CAR-HOUR COSTS $3.40

Careful study of data taken for rush hours discloses conditions requiring special attention in order to promote efficiency at greatest economy in expense as the chances for loss in revenue during rush hours are very great. In 1915 the peak load during rush hours on one short line was found to be 85 per cent greater than normal. On this same line it is now 120 per cent greater. During the rush period on a short line to a shipyard twenty-six two-man cars are required during one hour in the morning and one hour at night in order to give service. As the cost of running a two-man car for one hour in 1915 was $2.20 (today it is about $3.40) it is evident that a schedule requiring the use of many extras is an expensive one to operate.

To eliminate this excessive cost of operation several schemes have been tried, none of which can be considered entirely satisfactory. The staggering of work hours has been proposed and tried out in one or two instances. This scheme met with strong opposition on the part of the labor class and had to be abandoned. Constant study of carefully collected data furnishes the only means by which a proper solution of such a problem can be reached.

Unprofitable lines and the question of their continuance must depend upon reliable data and careful examination of facts collected in the field. In the case of lines under public control the abandonment of service is ordered if after an exhaustive study it has been found that the revenue derived cannot cover the cost of service. The decisions of the Eastern Massachusetts Street Railway have been reached only after a careful study of the assembled data.

EFFECT OF AUTOMOBILE TRAFFIC

Any discussion of the problem of transportation on street railway lines at the present time must include a consideration of the effect of automobile traffic. Statistics for the year 1904, before the great use of motors, show for a division of the Eastern Massachusetts Street Railway, on a basis of 100 per cent for the months of January, February and March, that the increase of travel on street cars for the months of July, August and September reached to 200 per cent. For 1919, on the same basis, the summer travel reached only to 130 per cent, presenting a striking instance of the effect on street car traffic of the automobile. In this connection the jitney has played an important part. Though eliminated for the time being in many districts served by the street car lines, it should be borne in mind that the jitney must be considered as a serious potential competitor of the street railway.

Mr. Masuda, the newly appointed chief of the street car section of the Municipal Electrical Bureau of Tokyo, Japan, is having his hands full of labor problems. The men want improved working conditions, but so far the proceedings have consisted largely in exchange of words, and demonstrations by the men.

The Bus for Special Service Only

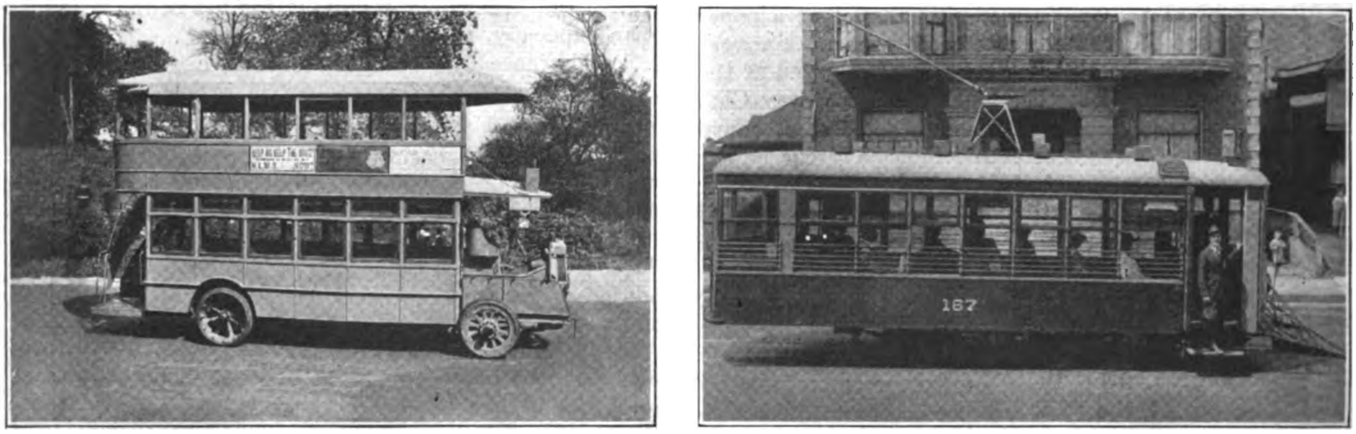
The Author Compares Bus and Safety-Car Operation from a Standpoint of Economics—Its Limitations and Inadequacies

By Karl A. Simmon
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Bus transportation has been attempted from time to time in a number of localities in the United States, but we find few well-organized operating companies of any size in existence.

In London, England, the real home of the bus, there are approximately 4,000 buses in operation. But for the war there would probably have been many more. It is reported that in London the bus companies are not receiving adequate compensation and that they cannot continue on the present revenue. In spite of this limitation, the bus has demonstrated that it is a means of transporting human beings and that even at a higher cost of fuel it has a certain field.

The more common form of London bus is a double decker, with little or no protection against the weather for passengers on the upper deck. It weighs about 7,840 lb. and seats thirty-two passengers, a weight of 250 lb. per seat. A new type of bus is said to be available which will seat forty-six passengers and weighs only 175 lb. per seat.



A DOUBLE-DECK BUS AND STANDARD SAFETY CAR REPRODUCED TO APPROXIMATELY SAME SCALE

The present London bus makes about 85 miles per day at a schedule speed of from 4 to 8 m.p.h. However, on the basis of an eighteen or nineteen-hour day the average distance covered is approximately 115 miles.

TABLE I—CHARACTERISTICS OF SEVERAL METHODS OF TRANSPORTATION

Mode of Transportation	Characteristics
Walking	Vehicle not employed; individual supplies necessary energy.
Roller chair	Vehicle employed; energy supplied by a human locomotive.
Skating and bicycle riding	Vehicle employed and the passenger transported supplies necessary energy.
Animal-drawn vehicle	Carriage employed, with animal as the locomotive or propelling power. The skid or drag logically comes under this classification.
Vehicle driven by stored energy	Under this classification might be considered the storage-battery car or a car driven by storage air.
Cable car	Vehicle employed; mechanical power supplied from a central generating station.
Self-propelled vehicle*	Includes such vehicles as steam-driven cars, using liquid or solid fuels, and combustion engines.
Electric propulsion*	Vehicle employed, and the equipment on the vehicle merely transforms electrical energy received from a rail or an overhead system into mechanical energy.

*Locomotives of respective types drawing passenger vehicles should be considered under these classifications.

TABLE II—WEIGHT EFFICIENCY OF VARIOUS METHODS OF TRANSPORTATION

Method	Approximate Weight of Vehicle in Pounds per Passenger
Walk	0
Skates	5
Bicycle	50
Combustion-engine skates	60
Two-passenger motor-cycle	135
Double-deck new type London bus	175
Present type London bus	250
Single-passenger motor-cycle	260
Cable car	325
Double-deck safety car	335
Ford car, or so-called "jitney"	340*
American double-deck bus	400
Double-deck low-floor car	410
Standard safety car (single deck)	430
Light-weight gasoline street car	500
Small storage battery car	550
Large city car	575
Modern passenger automobile	600
Small interurban car	650
High-speed interurban cars	1,300
Gasoline-electric interurban car	2,000
Pullman parlor car drawn by locomotive	3,000

*Driver counted as a passenger.

With fuel at 25 cents per gallon the average fuel cost per mile is 5 cents.

The standard safety car, which weighs approximately 15,000 lb., consumes about 1.1 kw.-hr. per car-mile for propulsion only. At 1½ cents per kilowatt-hour at the car the energy cost is 1.65 cents per car-mile.

At first glance it would appear that the cost of energy for propelling a vehicle by gasoline is approximately three times that of electric propulsion. However, if we look into the matter a little further we shall see that the ratio is higher than this. With the cost of bus fuel at 5 cents per mile and an average load of twelve passengers the cost of fuel for the bus ton-mile is 1.05 cents, whereas with the safety car the energy cost per car-ton-mile is but 0.198 cent. In other words, the true ratio of energy cost in the two cases is 5.3.

But even if the energy could be produced on the bus by the gasoline engine as cheaply as it is delivered in the form of electrical energy to the safety car, the cost of energy for the bus operation per ton-mile would still be much higher due to the higher road resistance.

The above statements are made not to convey the implication that there is no field for bus operation, but simply to show the inherent handicap involved when the internal combustion engine is employed for transportation, especially since the introduction of the safety car. Established electric transportation cannot, of course, show the same profit as that produced by the free-running, unregulated bus, where the latter is unfairly permitted to enjoy the "cream of the traffic" without any of the tax burdens, regulation of schedules, etc., which are imposed upon the railway. However, with regulation of operation and a partial highway tax buses have been operated successfully and provide transportation apparently satisfactory to the patrons. The indications are clear that buses will continue in favor regardless of their operating economy.

As an example of the last point, we may cite the Fifth Avenue bus line in New York City, which is patronized extensively, although the schedule is slower than that of the subway and the fare is much higher, but it is doubtful if bus transportation will meet the exacting requirements of the average American city as to speed, comfort and safety. During rush hours, even with all transportation systems in operation, accommodations are inadequate to transport all travelers in comfort. Under such conditions all will share the business. Again, in most large cities there are sightseers and others who enjoy riding in the open air. Further, bus routes which lie in thoroughfares not occupied by surface cars afford convenience to some people.

In view of the inherently higher energy cost, the necessity for well-paved streets, the greater congestion of streets that are already congested, the necessity for obtaining high-grade drivers, the short life of the buses and the continually increasing cost of fuel for internal combustion engines, even the most optimistic cannot hope to have the bus replace our urban or suburban surface railways or our subway and elevated railways.

In this connection the points which must be carefully analyzed by companies operating all-electric railway service are as follows: Density of traffic, location of existing transportation arteries, length of haul, class or classes of service rendered by other existing forms of transportation and value of bus transportation as a feeder to electric transportation. If the operation of self-propelled buses will produce a reasonable revenue on the investment, taking into account taxes, depreciation, obsolescence, operating expenses and indirect credit due to bus operation, then such a form of transportation should be operated by the railway as an adjunct to the traction lines.

In conclusion it will be interesting to note the characteristics of the several forms of transportation, a number of which are listed in Table I.

Table II contains a list of methods of transporting passengers, together with the weight of the vehicle per passenger transported. The latter figure is, of course, not a true measure of economy of operation, but it serves in a general way to show some of the advantages and disadvantages inherent in the several methods.

Electrification of Belgian National Railways

THE *Electrical Review*, London, reports that at a recent general meeting of a large Belgian manufacturing concern, the Ateliers de Constructions Electriques de Charleroi, the chairman stated that the company was perfectly equipped for eventually dealing with orders for plants for the electrification of the national railways, and in this connection the company has supplied first class plants to its subsidiary at Jeumont for the electric lines of the Midi Railway in France. However, the directors have estimated that the time is not opportune to think of general electrification of the Belgian railroad system due to reconstruction conditions. There are certain trunk lines which call for electrification, as, for instance, that between Brussels and Antwerp, which has been under discussion for twenty years.

Motor-Operated Graphic Instruments

IMPROVEMENTS have been made by the Westinghouse Electric & Manufacturing Company on its line of type M switchboard and portable graphic instruments. The principal change in these is in the pen-driving mechanism. Heretofore pens were driven by solenoids damped by dash pots, whereas they are now driven by a small motor actuated by contacts in the main circuit. Damping is accomplished by means of permanent magnets on an aluminum disk attached to the shaft of the pen-operating motor. Flexibility is increased and the mechanical balance of the motor operating element is easy to maintain. The external resistance is in a compact unit form, so that interconnections can be made to allow any instrument to operate on a control voltage of 110 volts, direct current, or 25 cycles or 60-cycles, alternating current. A 220-volt, 25-cycle or 60-cycle control resistor may be used. The weight of the instrument is considerably reduced as compared with that operated by solenoids.

MOTOR-OPERATED GRAPHIC INSTRUMENT

The case consists of a wooden frame with glass windows, so the entire mechanism can be seen without removing the case. The paper reroll is driven over an intermediate shaft in the clock, which in turn is driven directly from the motor. The rerolling operation takes place at each winding period and as a result the operation of the clock is not affected by the rerolling of the paper.

Trolley Contact Signal Operation

SINCE the publication of the article by Carl P. Nachod in the Jan. 3, 1920, issue of this paper, page 52, information has come to hand regarding the 1919 signal operating record of the road referred to. This article dealt with the rehabilitation and maintenance of an automatic block signal system on a Southern electric railway. This railway has eighteen blocks of trolley contact signals, or thirty-six signals in all, of one type.

Signal failures for 1919 averaged one per block in 42.7 days, due to all causes, but as only 43.5 per cent of those were due to the signals themselves failures from that cause would occur on an average of every ninety-eight days. The report from which this information is taken covers city operation under fairly heavy service, and the record is considered a good one for the method of operation employed and the type of employees available. Furthermore, the signals were not new, but were rebuilt by the railway company. Data of this kind are interesting for comparison with such records as are given on page 593 of the issue of this paper for March 20, 1920.

Letters to the Editors

Investigating Committees Should Utilize Electric Railway Libraries

BOSTON ELEVATED RAILWAY,
BOSTON, MASS., June 15, 1920.

To the Editors:

The article appearing in the May 29 issue of the ELECTRIC RAILWAY JOURNAL, page 1095, by H. B. Megargee, suggests an exceptional opportunity open for service by libraries of electric railway companies. If these companies would bring to the attention of the chambers of commerce in the various cities in the United States the mass of literature now in existence pertaining to the industry and encourage a serious study of transportation difficulties by the men appointed to the street railway committees before they make their reports a better understanding of the problems confronting railway executives would follow.

Until the list of electric railway transportation experts is scanned even an electric railway man hardly realizes that there are more than twenty-five individuals or firms specializing in this industry. The names of Col. B. J. Arnold, Col. Barclay Parsons, W. S. Twining, J. M. McElroy of England, J. E. Allison, F. B. Edwards, F. W. Doolittle, R. W. Harris, Prof. D. C. Jackson, Prof. A. S. Richey, John A. Beeler, Peter Witt and L. R. Nash come to mind, as well as such firms as Stone & Webster, Ford, Bacon & Davis, Jacobs & Davies and Sloan, Huddle, Feustel & Freeman, and there are many others in the field.

Do the chambers of commerce in most cities know that reports costing thousands of dollars have been made for Buffalo, Boston, Chicago, Cleveland, Cincinnati, Detroit, Fall River, Hartford, Kansas City, London, England; Los Angeles, Manchester, England; New Orleans, New York, Paris, Philadelphia, Pittsburg, Providence, Rochester, San Francisco, St. Louis, Springfield, Syracuse, Sydney, Australia; Toronto, Canada, and Washington, not to mention the articles that have appeared from time to time in the ELECTRIC RAILWAY JOURNAL, and that in these reports covering the investigations of the street railway systems are recommendations and suggestions applicable to any railway in the country?

These reports are not for sale over the counters of a book store and can only be had through the courtesy of the individual companies for which they were prepared. They cannot be found in public libraries, because the librarians have no knowledge of the existence of the reports and because they cannot be bought. Through co-operation of the firms and engineers mentioned, however, the libraries of the electric railway companies have these valuable reports and through their courtesy the libraries can produce literature upon schedules, service-at-cost plans, depreciation and valuation problems, corrugation, through-routing, subway-planning, appreciation of real estate, rush-hour problem, jitneys, types of cars, electrolysis, etc., from many points of view. No committee appointed by a governor, mayor or chamber of commerce need grope in the dark for matter pertaining to what apparently seems like a new problem, for the reports already in existence have analyzed the business of transportation so thoroughly that perusal of the reports would suggest a possible remedy.

During 1919 the cities of Denver, Kansas City and Boston had special committees appointed to investigate the street railway situation. The Kansas City committee consisted of 100 men, the Denver committee of fifty-six and the Boston committee of six, and the gentlemen composing these committees undoubtedly will advise that the reports in existence regarding the street railway systems in other cities were of great assistance to them in rendering intelligent reports on their own cities.

That the managers of many electric railway properties must have realized the assistance street railway literature would be in investigations by their own engineers, traffic managers and legislative committees is borne out by the establishing of libraries, for today libraries are maintained by the electric railway systems in Baltimore, Kansas City, Milwaukee, Boston, New Jersey, Eastern Massachusetts and Cincinnati, as well as by the companies mentioned by Mr. Megargee.

L. A. ARMISTEAD,
Librarian.

Reunion Meeting Proposed

PORTLAND, ME., June 21, 1920.

To the Editors:

As neither the American Electric Railway Association nor the Accountants' Association makes any attempt to keep in touch with the "has beens," I have turned to you to make a suggestion. Speaking for myself, and yet with the feeling that it applies to others as well, I miss the friendships of those who helped to start the Accountants' Association, twenty-three or twenty-four years ago. Many of us are not now in the public utility business, and as the appeal of friendship is as strong as ever, we have no means of indulging it except through the course of special events, and it is such a special event that I wish to suggest.

I presume the Accountants' Association will have an annual convention this fall, and I would like to suggest that at that time arrangements be made to hold a dinner composed of, first, those who attended the organization meeting in Cleveland; second, those who have served the association as president since that time, and, third, Henry H. Winsor of Chicago, first friend of the Accountants' Association, and Henry W. Blake.

I assume the association has the machinery that could put such a thought as this into motion, if any one else thinks well of it. WALTER B. BROCKWAY.

Census Accident Data Encouraging

A BULLETIN from the National Safety Council directs attention to a report of the United States Bureau of the Census comparing the casualties resulting from electric railway accidents during 1917, 1907 and 1902. While street car fatalities increased exactly 100 per cent between 1902 and 1907, the increase between 1907 and 1917 was only 8 per cent. Non-fatal injuries increased 150 per cent during the first period and 20 per cent during the longer period.

In 1907 one person was killed for every 3,086,319 passengers carried on street cars and in 1917 one for every 4,393,572. In other words, based on the number of passengers carried, the electric railway accident hazards decreased approximately 33 per cent.

The Safety Council attributes this striking reduction in hazards in the face of a heavy increase in population almost entirely to (1) the perfection of mechanical safety devices, (2) improved methods of operation and (3) the training both of the general public and of electric railway employees along safety lines.

Association News

American Executive Committee Meets

FIFTEEN members and guests attended a meeting of the American Association executive committee in New York City on June 23.

Secretary Burritt abstracted the minutes of the Jan. 7 meeting, held at Cleveland, which were approved, as were also the results of two letter ballots respectively approving the publication by the association of Harlow C. Clark's book on "Service-at-Cost Plans" and opposing the government coinage of a two-cent piece.

A resolution was then passed expressing appreciation of the action of the recently dissolved American Electric Railway Manufacturers' Association in turning over to the American Association the balance which remained in the treasury of the Manufacturers' Association. The amount, more than $700, is for the use of the Committee of One Hundred. Another resolution transferred the rights of the association in the book on "Cost of Urban Transportation Service" to the author, F. W. Doolittle, who wishes to revise it. Still another resolution covered the making of a contribution to the building fund of the United States Chamber of Commerce. After explanation of the nature and work of the National Industrial Conference Board by L. S. Storrs and of the American Engineering Standards Committee by E. R. Hill, it was decided to apply for membership in these organizations.

A resolution of congratulation to Lord Ashfield on his accession to the British peerage was ordered sent, this being the first meeting of the executive committee since word of that event had been received.

The convention program was then discussed, a tentative form being presented. After full discussion of possible transportation difficulties in the way of getting exhibits to Atlantic City, it was decided to have the exhibit feature as usual.

The subject of possible changes in the plan of publication of the association magazine, *Aera*, was discussed. A memorandum, prepared at the request of the executive committee, giving some suggestions from James H. McGraw as to ways in which the cost of publishing the magazine could be reduced, was read by Mr. Burritt. An extensive report of the *Aera* advisory committee was also read. This advocated, among other things, the enlargement of *Aera* to standard magazine size. The report was approved.

Mr. Burritt then read statements regarding the publicity activities of the association and of the rapidly expanding work of the bureau of information and service, indicating the increasing usefulness of the association to its members. Among miscellaneous business a number of new members were elected and a report of the secretary for the year to date was received. After the meeting the committee lunched together at the Hotel Manhattan.

In attendance at the meeting were these members: President John H. Pardee, New York City; S. B. Hare, Altoona, Pa.; W. H. Collins, Gloversville, N. Y.; W. I. Bartholomew, East Pittsburgh, Pa.; S. M. Curwen, Philadelphia, Pa.; C. L. Henry, Indianapolis, Ind.; L. S. Storrs, New Haven, Conn.; John J. Stanley, Cleveland, Ohio, and Secretary E. B. Burritt, New York City. Guests present included F. H. Gale, Schenectady, N. Y.; C. C. Peirce, Boston, Mass.; Martin Schreiber, Newark, N. J., and M. B. Lambert, East Pittsburgh, Pa.

Way Committee at Work

THE committee on way matters of the A.E.R.E.A. met at association headquarters in New York on June 14 and 15. The committee was unable to accomplish all of the work before it in two whole days, so it put in an evening session on each day, working until 11:30 on the evening of June 14. Those members in attendance were R. C. Cram, Brooklyn, chairman; W. F. Graves, vice-chairman, Montreal; E. M. T. Ryder, New York City; W. R. Dunham, Jr., New Haven, Conn.; H. Fort Flowers, New York City; H. A. Abell, Rochester; C. A. Alden, Steelton, Pa.; Victor Angerer, Easton, Pa., and E. B. Entwisle, Johnstown, Pa. Others in attendance were E. M. Haas, of the 1917 committee; G. C. Farkell, representing the A. S. T. M.; G. S. Vickery, Steelton, Pa., and J. C. Jameson, Springfield, Ohio.

The report of the subcommittee on curved heads for girder rails was presented, discussed and placed in form for presentation at Atlantic City. On subject No. 6, revision of standards and recommendations, G. C. Farkell gave the committee an interesting talk on the details of the proposed impression test for girder rails as proposed by the A. S. T. M. He exhibited specimens of rail sections upon which this test had been made and gave the committee considerable data relating to the comparisons of the impression with other tests, which indicate the tensile strength of the specimens. The discussion of this subject indicated that the committee is not ready to accept this test until further investigation can be made.

At the evening session on June 14 subject No. 3, progress on rail joints, came up for discussion, particularly in relation to the rapid use and development of the arc weld form of joint. Subject No. 1, complete standardization for track spirals, was also discussed at length. The form of the reports to be made at the Atlantic City convention was agreed upon.

On June 15 subject No. 4, revised specifications for plain bolted special trackwork, was considered in detail, and the specifications were revised as they will appear in the report of the committees. Subject No. 5, further investigation of wood block paving, was taken up on Tuesday and further consideration was given to the revision of the standards. Reports were presented on subjects 7a, 7b and 7c, covering data on safe limit of wear in rails and special trackwork. Subject No. 3, study of progress in rail joints, was considered further and a tentative report was read and subjected to criticism.

The complete report of the committee will be quite extensive, covering as it does many corrections and revisions in the Engineering Manual required by progress in the interim when little committee work could be done, due to war-time conditions.

The most important features of the report will be comprised in the recommendations on standard spirals, curved head rails and revision of designs for standard section 80, 90 and 100 lb. rails.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Wage Offer Rejected

Aurora Company Offered Average of Twenty-two per Cent Increase —Fare Advance Necessary

In a vote taken on June 21 the employees of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., decided, 573 to 12, to reject the wage increases offered by the company. The proffer of the company in general amounted to about 22 per cent. The men had demanded an increase of approximately 50 cents an hour, whereas the company's offer ran from 1 cent to 13 cents an hour. To make this concession, the company anticipated increases in revenue which it hoped to derive through increased business and through increases in rates on the Aurora and Elgin city lines, etc.

SOME DETAILS OF TRAINMEN'S SCHEDULES

Limitations of space prevent the presentation of the details of the entire wage schedule advanced by the company, but for trainmen on the city lines in Aurora and Elgin the new and proposed rates in cents per hour were:

	Present	Proposed
First year.............	40.2	52
Second year............	41.4	54
Third year.............	43.8	56

For the third-rail division the scales for trainmen were:

	Present	Proposed
First year.............	48	60
Second year............	51.6	64
Third year.............	52.2	67

Motormen and conductors on the Aurora-Elgin interurban were offered 60 cents as opposed to 48 cents and similar employees on the Yorkville interurban were offered 58 cents as opposed to 45.6 cents.

It is assumed that the rejection of the wage offer will be followed by further negotiations, although the company officials declare that they see no possible way of giving the men any further increase. Edwin C. Faber, general manager, said the company had done the best it could and was taking the chance that the Illinois Public Utilities Commission would authorize an increase in fare on the Aurora and Elgin city lines.

For the first four months of 1920, the gross operating revenue of the Aurora city lines was $108,596 and the gross operating expense, $114,537. For the corresponding period the gross operating revenue from operations on the lines within the city of Elgin amounted to $76,922 and the gross operating expense, $75,609. The taxes apportioned to this period of four months amounted to $741, leaving a net income of $572.

Joseph K. Choate, receiver, made the following statement:

> As a basis for determining the greatest increase that it would be possible for the receiver to offer, we have made a forecast as to earnings and expenses for the year June 1, 1920, to May 30, 1921, based upon present rates of fare, on average weather conditions, and on the same general industrial conditions prevailing as at the present time. To this forecast of earnings we have added the estimated additional revenue that may be produced through an increase in commutation rates on the Chicago division of approximately 2.5 per cent, by increasing the rates of fare on the city lines of Aurora and Elgin to 10 cents cash and three tickets for 25 cents; by increases in freight rates and the development of freight business; by increases in excursion rates; and by increases in rental of tracks and facilities to other companies.

Simultaneously with the announcement of its wage increase offer the company filed application with the Public Utilities Commission for the increases in the fare on the city lines in Aurora and Elgin, indicated above. The present rate of fare in these two cities is 8 cents cash, seven tickets for 50 cents, or fifteen tickets for $1. There is no opportunity to increase the straight passenger rate on the interurban line, since the present rates are equal to the maximum rates charged on the competing steam lines.

The freight rates are now practically equal to those charged by the steam line. By and large, the outlook as to the ability of the company to pay any higher wages than those offered is anything but bright.

Cities Confer on Wages and Fares

Representatives of the City Councils of Minneapolis and St. Paul, Minn., will confer over the situation presented by the proposal of the trainmen of the Twin City Rapid Transit Company to strike on July 1 unless their wages are advanced 20 cents an hour for eight hours and they receive double pay for overtime on Sundays and holidays.

Horace Lowry, president of the company, has notified the men that the company cannot meet this advance unless the operating companies are allowed a 7-cent fare in the two cities, now 5 cents, and that the men are asking too much.

Four ways are suggested by the city attorney for the Minneapolis Council to increase fares. In St. Paul the people have passed a measure by which the Council is authorized to advance fares under set conditions. These four ways are: By ordinance, by Council resolution, by a motion, and by adoption of a committee report.

W. O. Clure, general passenger agent, said June 18 at the meeting in St. Paul of the National Association of Comptrollers and Accounting Officers:

> If the public will accept municipal ownership as the solution the company will be elated.
>
> If we can get a fair price for the street railway system we will be glad to sell—to the city or anybody.

Quiet Campaign Expected

Not Much Enthusiasm Yet at Toledo Over Railway Grant—Mr. Doherty May Submit Measure

The campaign to be waged on behalf of the municipal ownership ordinances submitted by the Council of Toledo, Ohio, to the voters for a referendum on Aug. 10 will be a quiet one according to indications. At present it follows very closely the same path taken by the famous "ouster" ordinance last fall. The company has made no move to fight the ordinances with counter propaganda. Only one newspaper is supporting the ordinances. There is serious doubt that the ordinances will accomplish much if passed.

COMMISSION MEMBER STATES CASE

Chairman W. L. Milner, of the commission which spent six months in drafting a cost-of-service ordinance, finally rejected by Henry L. Doherty because of disagreement over the valuation of the railway property, said he believed the cost-of-service plan offered the city the best method of securing municipal ownership. He is quoted as follows:

> I believe we could have municipal ownership sooner by the cost-of-service method as planned in our ordinance than by the direct route now before the people.
>
> There will be such an endless mass of litigation, court fighting and tangles before we finally get municipal ownership of the railway that it would be quicker in the end to adopt some form of cost-of-service and municipal ownership combined.

This also appears to be the attitude of the railway company. There is little fear that the advocates of public ownership can select the paying lines of the present system and buy them through condemnation proceedings without such a claim for damages as to force the city to buy the entire system. The city attorneys have admitted that condemnation of portions of a railway system has very little if any precedence in any courts.

The outcome of the present municipal ordinances may be a warfare between city-owned buses and the railway. One of the ordinances provides money for acquiring a transportation system and the other for constructing one. Under the terms of the construction ordinance it may be possible to follow the plan of the municipal ownership commission and purchase about $2,000,000 worth of motor buses to be operated by the city.

COURT ACTION LIKELY TO FOLLOW

If these were portioned out on various new lines and put into operation as competitors of the present railway system, the Toledo Railways & Light

Company, now operating under the protection of the United States District Court, might bring the matter into court. The original plan was to have buses as an auxiliary system to the railway to provide for extensions of service and to fill in gaps where new rails were to be laid, under the comprehensive scheme outlined by the commissioners.

The details of the plan were left entirely to the Council. It was suggested that a commission of three men be appointed to reroute the present lines and plan for the necessary extensions. If voters do ratify the twin ordinances it is doubtful whether the buses could be secured and placed in operation before the next summer.

Mr. Doherty made some plans to submit a cost-of-service plan of his own to the voters. He has one modeled after the Cleveland plan with sufficient signers to place it before the people. However, the Milner ordinance had so many good points acceptable to the general public that undoubtedly any ordinance on the cost-of-service plan would be patterned closely after it.

The method by which the city is to gain ownership of the lines is rather unique with the Milner ordinance. Under the process which it provides the city would own about 20 per cent of the property at the end of seven years. At the expiration of the twenty-five-year grant the car receipts would have paid off all the preferred stock and bonds of the company, and the city would have all the common stock and entire ownership of the lines. If, after the grant had been in operation ten years, the city wanted to renew the original grant an amortization fund would be set up seeking the same end on a slower basis.

This is the plan which Mr. Milner said would work out for municipal ownership sooner than the present plan before the citizens of Toledo.

Pittsburgh Wage Agreement Signed

Charles A. Fagan, S. L. Tone and W. D. George, receivers of the Pittsburgh (Pa.) Railways, and the officers of the trainmen's union on June 16 signed a wage scale agreement for the year ending May 1, next. It was over a new wage scale that the receivers and the men indulged in a controversy that lasted three months and threatened to precipitate a strike.

Since the acceptance by the men of a rate of 70 cents an hour, conferences to settle the working conditions have been in progress. Those conferences are now about concluded. It was learned that the working conditions will not include an eight-hour day.

Formal announcement of the contemplated increase in the fare from 7½ to 8⅓ cents has been made by the receivers. The increase will become effective on July 14. It is expected that all the resulting increase in revenue will be absorbed by the increase in wages.

Canadian City Is Strike Ridden

Railway in London, Ont., Offers to Sell to City at Value Determined by Arbitration

Service was restored on the London (Ont.) Street Railway on June 16. This marked the end of the second strike within six weeks and the third within eleven months. Two years ago the company applied to the City Council for the right to increase fares over the scale set in 1895—seven unlimited and nine limited tickets for 25 cents. Last summer to end a strike the Council authorized six and eight tickets, but a court order quashed the ordinance and the company reverted to the old scale. Some months ago the Appellate Division of the Supreme Court of Ontario sustained the Council's right to amend the fares agreement, but the Aldermen of 1920 are unable to agree on any policy whether for purchase or higher fares. The company is willing to abandon its franchise, which has five years to run, and to sell out at a value determined by arbitration.

The employees had been working at a maximum wage of 44 cents. They demanded 65 cents and struck on May 1. On May 5 the Ontario Railway and Municipal Board took possession of the property at the request of the City Council and on May 6 restored service under a temporary arrangement with the men, who were guaranteed 44 cents an hour and whatever further amount remained from the proceeds of operation after fixed charges and other operating expenses had been met.

DEFICIT IN MAY $101

The remaining days of May produced an actual deficit of $101 on the 44-cent scale. Meanwhile the board engaged auditors to report on the financial condition of the company. The report submitted to the City Council showed that the old rate of fares will not produce sufficient revenue to pay any increase in wages, even if no provision is made for dividends or depreciation; that the entire amount of capital stock outstanding was paid for in cash or as stock dividends "properly declared out of earnings"; that the average dividends for the past twenty-five years have been 4.82 per cent per annum, of which 0.28 per cent was in stock; that since 1915 the whole amount of cash paid to the shareholders has been $17,180 on $637,480 of stock, and that no dividends were declared in 1918 or 1919; that in 1918 there was a deficit of $48,268 and that in 1919 there was a loss of $33,179.

The railway board acknowledges that it has no authority to change the fares or otherwise modify the agreement between the city of London and the company. This is taken as a precedent affecting the whole of Ontario. Neither is the board empowered to operate any property at a loss, as it has no funds with which to meet deficits. Consequently where there is no other recourse the board must abandon any property and leave a strike unsettled.

STRIKE RESUMED JUNE 7

The City Council on receipt of this report, which showed what scale of fares would be required for certain rates of wages, unanimously agreed with the men that the maximum pay should be 52 cents an hour, to be covered by fares of 5 cents cash with seven limited tickets for a quarter. While the legal draft of the agreement was in preparation political haggling developed over the question of a vote of the people, and when the Council reached its adjourned session to enact the by-law a majority switched to the side opposing higher fares. The men then resumed their strike on June 7, and until June 16 the city was served only by trucks and other motor cars operating as 10-cent jitneys.

FARE ELECTION PROPOSED

The City Council at three special meetings failed to agree on any policy and the strikers, who acknowledged their urgent need for work, appealed to the railway board to withdraw a sufficient number of cars from service and to effect other economies through which to pay 48 cents an hour to the men retained. One-way service is now being given on former two-direction belts and other drastic curtailments have been made. In the interests of employees reverted to the spare list the union has appealed to the Trades and Labor Council. That body has forwarded to the City Council a request that an immediate special election be held on a six and eight for 25 cents proposal, such rates to be continued in effect only while the Ontario Railway Board remains in charge of the property.

STRIKE ON SUBURBAN LINE

The collapse of the strike parallels the result of a walkout of all operating staff men on the London & Port Stanley Railway, a high-speed radial owned by the city of London, in May. The men had been paid 48 cents an hour. They demanded an advance of 25 cents an hour, and in some cases the adoption of the McAdoo steam road scale. They were offered 52 cents by the operating commission, but rejected that and agreed to a board of conciliation. The board confirmed the commission's offer and the strike was at once called. Alleged sabotage followed at once when operation was undertaken with other crews. The line was patrolled by special forces and within a week the railway removed its embargo on freight. The men, by secret ballot, voted to return to work and manned the trains for a public holiday the next morning. They accepted the commission's original offer, but since have been given certain additional amounts, freight crews receiving 54 cents, while passenger train operators continue at 52 cents.

Chicago Business Men Urge Support of Utilities

Civic Associations and Clubs Lead Way in Effort to Show Utility Commissioners What Thinking Public Wants

Business men of Chicago are urging fair play for the utilities. A conference of the presidents of the various business associations and clubs of Chicago recently drew up a statement addressed to the Illinois Public Utilities Commission to urge the commission to immediate action in relief of the public utilities in the many cases pending before it, and to give the commission definite evidence of the fact that the thinking public is ready to indorse the orders of the commission in its evident necessity to grant increases in rates. This statement, as drawn up in conference, was submitted by the presidents to the governing boards of their respective organizations for approval before forwarding to the commission.

AT the time of this writing the Chicago Association of Commerce, the Chicago Association of Credit Men, the Citizens' Association of Chicago, the Chicago Commercial Club, the Illinois Manufacturers' Association, the Traffic Club and the Union League Club had indorsed the statement and forwarded it to the commissioners. This presents to the commission the indorsement of organizations with a membership of more than 16,200 men. The statement follows:

STARVED UTILITIES A MENACE

There are now pending before the honorable body many applications by public utilities operating throughout the state for increases in rates and for other financial relief.

It is a matter of common knowledge and experience that the utilities operating in Illinois, and especially those in the city of Chicago, have been unable fully to meet the demands of the public for extensions and betterments to their properties and that, with few exceptions, the quality of the service rendered is unsatisfactory.

Our information is that conditions now obtaining will increasingly become worse unless immediate relief is afforded.

The financial status and need of the various utilities are well known to your honorable body, as well as the present state of the money market, which prevents even the stronger companies from obtaining additional capital in large amounts except at exceedingly high rates of interest. These conditions, as a matter of business judgment, will cause the utilities to make only the absolutely necessary extensions and leaves them totally unable to anticipate future needs.

This inability to comply with the demands for public service is not only a serious and continuing menace to the commercial development of Chicago but some of our citizens are in imminent danger of being deprived of necessary light and heat in their homes and transportation to and from their places of business or where they are employed.

Under the law the State Public Utilities Commission is vested with the general supervision of all our public utilities, including full responsibility for service, adjustment of rates and the finances of the operating companies.

We are well aware of the grave character of the questions with which the utilities commission has to deal and of the great injury not only to the private interests but to the public at large that may result from errors.

CASES MUST BE DECIDED SEPARATELY

The rates for service established by the commission must be reasonable both to the public and to the utilities, and a just and reasonable rate is necessarily a question of sound business judgment, rather than one of legal formula. The real test of the justice and reasonableness of any rate is that it should be as low as possible and yet sufficient to induce the investment of capital in the business. Such rate must often be tentative, since exact results cannot be foretold.

We realize full well that the case of every utility must rest upon its own facts.

We shall not enter into the realm of controversy as to the causes underlying the present condition of public utilities in Illinois, neither shall we offer any plan or plans for the solution of the many difficult problems continuously presented to this commission. We do, however, earnestly urge the necessity of immediate relief, for we confidently believe that unless prompt action is taken even the present unsatisfactory public service cannot be maintained.

We respectfully suggest that, in all cases where it is impossible for the commission to give the case presented such an exhaustive consideration as will enable the commission to determine and prescribe a permanent rate or plan respecting the utility under consideration, tentative orders be entered covering experimental or temporary periods until such time as the experience of the commission or further investigation and deliberation will enable your honorable body to do complete and full justice in the premises.

Detroit Calls for Bids

Asks Tenders for Material and Supplies for Twenty Miles of Municipal Railway Line

Municipal activities at Detroit, Mich., have been started on a large scale with the calling for bids on approximately 20 miles of railway track comprising some of the much needed east and west crosstown sections of the proposed $15,000,000 municipal electric railway system. The work for which bids are asked includes excavating, concrete foundation, ties, rails and all track equipment.

As a result of a conference between city officials and officials of the Detroit United Railway, a double-track will be built on Harper Avenue, the north track to be built by the company and the other by the city. By virtue of a grant from the township of Hamtramck before it became part of the city of Detroit, the Detroit United Railway maintains its right to a track on the north side of Harper Avenue. By authority of a resolution of the Common Council directing the company to move the single-track line to the center of the street and build a double-track, the right to build such double-track is claimed. Part of this line has been completed. It was the construction of the remaining section that was stopped by the direction of the Mayor.

In order to facilitate paving on Harper Avenue and to meet the views of the people of the locality the Detroit United Railway agreed to move the existing single-track lines between Van Dyke Avenue and Gratiot Avenue to the proper location for the north track of a double-track line.

With the city owning one track and the company the other, connecting up with the company's existing double-track, the question of operation will be left to the time when the city and the company are ready to operate.

The St. Jean line, the other line where the company's construction activities were stopped by the police and which forms a basis for a suit now in the United States District Court, will be completed by the city, the city taking over the work already done by the Detroit United Railway and paying for that work on a basis to be agreed upon later. It was arranged that the city be permitted to proceed with construction work at once, and that only a formal protest would be filed in the court by the Detroit United Railway in order to refrain from prejudicing the company's case now pending in the federal court.

The fact has been brought out that Michigan seems to have no legislation contemplating public ownership of such a utility as the city proposes to construct, and the Michigan Public Utilities Commission has asked the Attorney-General for an opinion regarding its powers relative to the project.

City May Finance Extensions in Milwaukee

According to reports in the Milwaukee papers there is a possibility that the city of Milwaukee may finance extensions to the lines of the Milwaukee Electric Railway & Light Company within the city limits.

A conference was held on June 17, 1920, at which there were present Mayor D. W. Hoan, John I. Beggs, president of the Milwaukee Electric Railway & Light Company; City Attorney Williams and representatives of the Public Land Commission and of the committee on the acquisition of public utilities. As a result of the conference the Mayor is reported to have announced that an understanding had been reached on the problems affecting the municipality and the company.

The suggestion was made at the conference that a plan be worked out by which, if the city proposes to purchase the railway lines at some future time, extensions needed at this time be financed by the city, the company to pay rental for the use of tracks thus built. This, it was claimed, would solve for the company the problem of financing such extensions and would provide gradually for city ownership.

It was also suggested that the city and the company co-operate with the public land commission on its zoning and arterial highway plans. It was pointed out that railways could be laid in the center of streets converted into boulevards. The laying of track through grassy plots in the center of wide highways would, it was thought, remove the interference of other traffic, speed up schedules, do away with the expense of paving and sprinkling the roadbed and make snow removal easier.

It is also reported that the interurban controversy referred to in the ELECTRIC RAILWAY JOURNAL of May 22, 1920, was discussed and hope expressed that it could be settled without causing an interruption of service.

Omaha Case Unsettled

Railway Commission Refuses to Go Into Ramifications on Cost of Living

The net result of the hearings during the week ended June 19 before the State Railway Commission, over a wage controversy between the Omaha & Council Bluffs Street Railway and its men, did not bring the disputants very far toward an agreement.

UNION WOULD WITHDRAW

After having filed an application before the commission, asking that body to assume jurisdiction, on the grounds that the men had voted to strike unless a demand for an increase of 13 cents an hour was granted, counsel for the union moved to dismiss the case when the commission declined to go into the ramifications of the high cost of living. Commissioner Browne said:

> It is generally accepted that a complainant has the right to dimiss his own case. In this instance the board undoubtedly has further powers to continue the inquiry if it should decide to go ahead. I have no information what the attitude of the men will be and of course cannot express myself on that matter.

Chairman Taylor, in announcing the commission's determination to continue the hearing, held that evidence already taken indicated the possibility of an interruption of service. He added that the commission further considers it a duty to proceed. John L. Webster, counsel for the company, said:

> I told the commission when it first took up the dispute that the union would only abide by its decisions if the decisions were favorable to the union, and the action today verifies my statement.

The company asserted its willingness to leave the matter to the discretion of the commission, but reserved the right to challenge its jurisdiction.

A. H. Bigelow, counsel for the union, stated that the scope of the hearing as now defined by the commission was such that he would be unwilling to have his clients bound by the result; that his cilents are unwilling to be bound legally or morally by the results of an inquiry which ignores living costs.

HEARING WILL CONTINUE

The commission announced that it will subpœna representatives of the company and the men, and will continue the hearings in the interests of public policy. Some of the facts presented by the company follow:

> Number of cars operated Jan. 1, 1919, 279; June 1, 1919, 291; June 1, 1920, 307, showing a continued increase of service.
>
> Trainmen employed Jan. 1, 1919, 785; Jan. 1, 1920, 837; June 1, 1920, 858.
>
> Week ending June 12, 1920, 59 applied for work as trainmen under present scale of wages.
>
> More than 500 trainmen—76 per cent of the total--have expressed opposition to a strike.
>
> During May, 1920, 652 trainmen worked twenty-five days or more, earning an average of $155.53 for the month, the highest individual wage for that month being $204.98.
>
> The company's deficit for period of nine months ending April 1, 1920, was $74,000, with nothing allowed for dividends on common stock.

Chairman Taylor of the commission, in his announcement that the cost of living should not enter the hearing, said:

> We arrived at the decision that regardless of our personal feelings, there should be some tribunal to pass on the question of a standard of wages. The commission is restricted only to the question of service. The cost of living is not directly related to service, therefore it does not come within the scope of the commission.

Wants to Retain Railway

Announcement of Abandonment by Waupaca Company Inspires Effort to Make Road Pay

For the purpose of ending a long struggle with a losing railway the Waupaca Electric Service & Railway Company, which operates 5 miles of electric railway in Waupaca, Wis., served notice on the Waupaca City Council, the town of Farmington and the Railroad Commission of Wisconsin that on May 10, 1920, it would surrender its indeterminate franchise and abandon operation of the railroad.

This action was brought about by the fact that for several years the passenger traffic on the line has been insufficient to produce earnings adequate to meet the ever-increasing operating expenses, and because the various local authorities showed no disposition to grant relief. A certain freight franchise has been under discussion for a number of years, but has always been opposed and blocked by the city authorities for no legitimate reason that the company has been able to ascertain.

In addition to this, a paving project came up in which the city fathers refused to release the company from the paving obligation which it declared its inability to pay. On the contrary, the city served notice on the company that a certain street would be paved and that the railway would have to assume its share of the cost of such paving.

The company objected on the ground that the earning capacity of the road did not permit of this and that it was an unjust, unreasonable and uncalled for charge against any railway. The city authorities refused to follow the example of numerous other municipalities throughout the country as well as four in Wisconsin which have already eliminated such paving charges.

After serving notice of suspension of operations on the railroad, the commission on its own motion promptly set a hearing at Waupaca for May 6. At this hearing it was quite clearly demonstrated that the citizens as well as the community at large did not want to see the railway abandoned. Many suggestions were offered as to how to sustain the road. The city agreed to leave that part of the street occupied by the railway unpaved and filled in with gravel; also to draw up a freight franchise which would be acceptable by the citizens as well as the railroad company. This freight franchise is still in process of framing. Operation of the property has continued thus far and if the road can be made a paying proposition through release from paving obligations and ability to earn more money by carrying freight it is probable the railway will not be abandoned.

Utility Plank Urged

Arguments in Favor of Utilities to Be Presented Before Democrats in San Francisco

In the belief that the continued efficient and uninterrupted operation of all utilities subject to public regulation is essential to the nation's welfare, representatives of the three public utilities—gas, electric lighting and electric railways—will make a determined effort before the platform committee at the San Francisco convention to have a plank included in the democratic platform declaring for preservation of these utilities.

A committee, headed by Judge George A. Cooke of Chicago, conferred with leaders of the Democratic party on this subject at Washington recently. Arrangements were made for them to receive a formal hearing before the resolutions committee at San Francisco tomorrow.

The contention is made that all public utilities are faced with a serious crisis arising from the shortage of essential materials and the great increase in the cost of labor and material, and that any interruption to the public service of these utilities or any impairment of their ability to attract new capital would result in a national calamity.

It is further argued that the principle should be recognized that labor and capital engaged in the service of the public should receive such fair and impartial treatment as will attract their continued flow into these highly important industries. Leading men in these industries declare that the question involved is no longer confined to local situations, but is of great national interest and demands prompt attention and consideration.

Judge George A. Cooke, of Cooke, Sullivan & Ricks, Chicago, will present the arguments in favor of this plank before the resolutions committee.

Wheeling Wages Adjusted

At a meeting of the officials of the Wheeling district traction companies and the executive board members of the unions recently the annual wage scale and agreement were signed, granting the 600 employees an increase of an average of nearly 20 per cent with several working concessions asked for by the men. Under the arrangement just consummated the men agree to accept an increase of approximately 20 per cent with the understanding that they are to receive an additional increase on Aug. 1, if the fare of the traction corporation is increased.

Offer Made to Sell to City

The Colorado Springs & Interurban Railway, Colorado Springs, Col., proposes to renew the offer made about two years ago to sell the entire system and plant to the city of Colorado Springs, and accept in payment city bonds bearing interest at 4 per cent.

Duluth Defeats Municipal Ownership

The residents of Duluth, Minn., on June 21 voted down the referendum ordinance giving the Duluth Street Railway the right to fix its fares at not more than 6 cents. The vote was taken at a special municipal election. The result was 6,916 for and 7,373 against. The ordinance proposing that the city acquire the Duluth Street Railway lines by purchase or condemnation was also defeated by more than two to one. The result in this case was 4,121 for and 9,272 against. Herbert Warren, general manager and vice-president of the railway, says that the company is now placed in a position where extensions to and improvement in service will be made impossible on some lines. He indicated that service may be curtailed. Duluth voters at the same election turned down all but one of six special issues submitted. The proposal to issue bonds for a public market was the only one which carried.

Praise for Mr. Mitten

Richard Spillane, editor of the business and financial section of the Philadelphia *Public Ledger*, has jumped to the defence of T. E. Mitten, president of the Philadelphia Rapid Transit Company, as the result of a full page advertisement in the New Orleans *States* of June 12 by the New Orleans Railway & Light Company. The ad quoted from the recent committee report in Philadelphia. Interspersed were comments. Of Mr. Mitten and his work, Mr. Spillane says:

> Everybody who knows anything about the P. R. T. appreciates the financial troubles Mr. Mitten has had to shoulder come from financial juggling that antedated his connection with the property and that financially and physically it was a wreck when he took control. That he was able to build it up to strength and efficiency on a 5-cent fare basis, waterlogged as it was and is with its "indulging securities," is remarkable—so remarkable as to have no parallel in present traction history.

Seattle Plans Rapid Transit for Business District

The city engineering department of Seattle, Wash., under City Engineer A. H. Dimock, has practically completed tentative plans for a subway and elevated trestle system of routing the cars of the Seattle Municipal Railway. Plans provide for the construction of two subways, and an elevated trestle in the downtown district, and reduction to a minimum, and possibly the entire elimination of the operation of surface cars in the business sections of Second and Third Avenues.

The plan also proposes operation of express trains from outlying points to the business district. Stations would be established in Ballard, the University section and other parts of the city. From each of these stations, express trains made up of cars assembled from various surface lines converging at the station would travel to and from the business district over the most direct route on special tracks and roadbed. In the congested district these trains would be operated through subways.

The plans have been turned over to Major Carl H. Reeves, Superintendent of Public Utilities, and D. W. Henderson, general superintendent of the Seattle Municipal Railway, who will study them from the point of street railway operation, and then submit their recommendations.

Montreal Preparing for Arbitration

J. A. Woodward, president of the Fifth Sunday Association, is the choice of the employees of the Montreal (Que.) Tramways as their member of the board of conciliation, which the men have asked the Minister of Labor to appoint to arbitrate with the tramways in the matter of demands for higher wages and other concessions.

The application for a board of conciliation under the Lemieux act comes from the men, following the refusal of the Tramways Commission, which is the authoritative body in effect on the other side, that the demands of the men for wages running up to 75 cents an hour could not be granted, and the refusal of the men to accept a counter proposition made by the commission. The men have not yet received a reply from the Minister of Labor as to their request for a board, but the Minister, following usual procedure, has asked the tramway for a statement of its side of the case, and when both cases are before the Minister the request will be decided.

The tramway has named H. V. Villeneuve as its arbitrator. Justice Archambault has been selected as chairman.

East St. Louis Wage Arbitration Begun

The trainmen of the East St. Louis and Belleville divisions of the East St. Louis & Suburban Railway, East St. Louis, Ill., have presented the following demands to the company for increase in wages and improvement of working conditions:

1. Eight-hour day.
2. Minimum wage of 87½ cents an hour.
3. Conductors to be allowed additional half hour to check up fares at the end of the day's run.
4. Extra men to be guaranteed a minimum wage of $125 per month in place of $80.

An arbitration committee has been selected by the employees and the management consisting of L. V. Walcott, former Assistant State's Attorney, chairman; David M. Walsh, representing the employees, and C. E. Smith, consulting engineer of St. Louis, Mo., representing the company.

The first meeting of the committee was held on June 3. Representatives of the union explained their demands. The basis of the proposed new wage scale as brought out in the testimony was a yearly budget worked up for a family of four. Using present prices for rent, food and clothing this was computed to be $3,000 a year, or $250 a month.

The railway was not ready to present its side of the case and the arbitration committee adjourned for ten days.

Dayton Employees on Strike

A strike of conductors and motormen on June 20 put all the electric railways in Dayton, Ohio, out of operation, with the exception of the Oakwood line which connects the southern part of the city with the central section of Daytonview. The roads affected are the People's Railway, the City Railway, the Dayton Street Railway and the Dayton, Springfield & Xenia.

The strike followed the failure of the employers and employees to agree upon a wage scale. The men had asked for an increase of 40 per cent in wages. On the other hand, the companies had requested the city to authorize a higher rate of fare in order that the wage increase might be covered. The city declined to accede to this request. It insisted that the companies settle with their men first.

An increase of 20 per cent had been offered the men, but this was rejected. The present rate of pay is 50 cents an hour. The men demanded 70 cents. The compromise offer of 60 cents was made by Valentine Winters, representing all the companies affected. He declared there can be no arbitration as the companies decline to operate the roads at a loss.

Employees of the Oakwood road are not organized.

Private Operation Suggested for Municipal Road

Tacoma's municipal electric railway is in dire straits. This has been suspected for some time, but it comes out now that the road showed a deficit of $84,603 for last year. As the road is only 8 miles long this is at the rate of about $10,000 a year per mile of line or about $7,000 a month if one prefers to look at the matter that way.

This situation with regard to the municipal railway has been a cause of deep concern to Jesse W. Silver, commissioner of finance. The road was rebuilt on credit and Mr. Silver has before him the disagreeable task of confronting the creditor with only an excuse to offer and no cash. The creditor is the Emergency Fleet Corporation. That body advanced $232,400 for double-tracking the line. It expected the return of this sum at the rate of $40,000 a year.

Mr. Silver has evolved the idea that the railway be leased to a private individual. Although the line as before mentioned is losing $84,603 a year the optimist who has offered to take over the road and manage it feels he can make it pay. He has confided to Mr. Silver that he can save $57,752 in one fell swoop by reducing the number of employees from seventy-four to thirty-nine. Owing to the civil service classifications, it is said that many employees on the railway are busy only at rush hours. The leasing arranging would be for four years, and the proposed operator stands ready to accept as his compensation a percentage of the profits over a fixed amount. Mr. Silver will recommend the plan to the Council.

News Notes

Wages and Fares Increased.—Employees of the Brantford (Ont.) Street Railway have been granted an increase in wages of 15 per cent. This means 46, 48 and 50 cents an hour for first, second and third year men, respectively. The municipal commission which conducts the road has also put a straight 5-cent fare into force in order to provide against a deficit through the wage increase.

Danbury Line Readjusts Wages.—The wages of the employees of the Danbury & Bethel Street Railway, Danbury, Conn., have been readjusted by agreement between J. Moss Ives, the receiver of the company, and the men. Trainmen will receive 55 cents an hour, with 65 cents to operators of one-man cars. During the probationary period of six months new men will receive 50 cents an hour, with 60 cents to the operators of one-man cars.

Cambridge Subway Funds to Be Used.—The Department of Public Utilities of the State of Massachusetts has been petitioned by representatives of the Boston Elevated Railway for authority to use the balance of $4,456,000 remaining from the purchase of the Cambridge Subway. It is planned to expend these funds in extending the elevated structure at Forest Hills, costing about $1,000,000; extend the yards and storage facilities at Everett, costing about $500,000; $1,500,000 for the payment of West End Railway bonds maturing Aug. 1, and the remainder to be used for the payment of short-term notes.

Wages in Butte Advanced.—Motormen and conductors employed by the Butte (Mont.) Electric Railway were granted an increase in wages on June 3 of approximately 8 cents an hour, or 75 cents a day. The new scale, which was fixed at a series of conferences, is 65 cents an hour for the first six months, 68 cents an hour for the second six months and 73 cents an hour thereafter. All motormen and conductors have been with the company for more than a year and therefore received 73 cents an hour instead of the original 65 cents. The union agreed to abolish a 15-cents-an-hour bonus for overtime. The contract runs to May 1, 1921.

Revision of Schedules Will Mean Fare Increase.—It is said that Street Railway Commissioner Fielder Sanders, of Cleveland, Ohio, has advised the special committee that granting the men's demands for straight runs will mean an increase of 3 cents in the rate of fare. He estimates that the force will have to be doubled to comply with such a request. His staff of engineers and accountants have in preparation a report which will be submitted to the committee, after which public hearings on schedule revision will be held. Officers of the company and representatives of the employees will be called to testify.

Mediation Over Wages in St. Louis.—The Public Service Commission of Missouri recently decided to assume jurisdiction of the controversy over wages between the receiver and the employees of the United Railways, St. Louis. The commissioners will sit as a board of mediation and arbitration at the City Hall, commencing June 24. Both the receiver and the officials of the union representing the employees have signed a stipulation to submit to the ultimate findings of the commissioners. The demands of the men for wages of from 75 to 85 cents an hour, with an actual eight-hour day, were rejected by Receiver Rolla Wells. The men are now receiving 50 to 60 cents an hour.

Industrial Commission Allows Wage Increase.—Motormen and conductors of the Colorado Springs & Cripple Creek District Railway, Colorado Springs, Col., were granted a part of their demands for increased wages in findings and awards returned recently by the State Industrial Commission. The men originally asked for an increase of 12 cents an hour. Following the filing of the petitions with the industrial commission the company granted an increase of 5 cents an hour to the motormen and conductors. Following this action the men altered their demands to read: Two-men cars, 52 cents, 55 cents, 57 cents; one-man cars, 55 cents, 58 cents, 60 cents. The industrial commission granted the following wage scale: Two-men cars, 48 cents for first three months, 51 cents following nine months, 53 cents after first year; one-man cars, 55 cents for first three months, 58 cents following nine months, 60 cents after first year.

Municipal Ownership as It Is.—The J. G. White Management Corporation, New York, N. Y., is sending to security holders in its properties a reprint published by the Illinois Committee on Public Utility Information of the speech delivered in March, 1920, by Ole Hanson, former Mayor of Seattle, on municipal ownership. It was under Mr. Hanson that the local railway lines in Seattle were taken over. When he became Mayor, Mr. Hanson believed that the only outcome of the agitation in relation to street railways and probably electric power was municipal ownership. He thinks differently now. He said in his speech: "If after a time it becomes impossible for a utility enterprise that has honestly and conscientiously expended the public's money in creating or developing or building a gas plant or an electric plant or a street car plant—if the time comes that they cannot operate, it is impossible for them to get by—there is only one way, we must raise the rate so that they get by, or we must refund to them the money they put in the enterprise."

Programs of Meetings

Central Electric Railway Accountants' Association

The Central Electric Railway Accountants' Association will hold its summer meeting at the Hotel Ottawa, Ottawa Beach, Mich., on July 10. The program will be announced later.

Central Electric Railway Association

The program has been announced for the annual meeting of the Central Electric Railway Association at Hotel Ottawa, Ottawa Beach, Mich., on July 8 and 9. The session on July 8 will open at 10 a.m. The session on July 9 will open at 9:30 a.m. It is suggested to the members living at a distance that the trip be made in special interurban cars.

The Terre Haute, Indianapolis & Eastern Traction Company has arranged to furnish a special car to be operated between Indianapolis, Ind., and Niles, Mich., and the Michigan Railway has arranged for a special car between Kalamazoo and Macatawa, Mich., on July 7. The trip between Niles and Kalamazoo, Mich., is made by steam railroad and transfer between stations must be made at those points. On the return trip the party will remain in Kalamazoo on the night of July 9, continuing the trip on the following morning.

At the morning session on July 8 the following paper will be presented:

"The Manufacture of Wrought Steel Wheels," by George Atwell Richardson, of the Midvale Steel & Ordnance Company. A complete description will be delivered of the manufacture of steel and steel products.

The session on the afternoon of July 8, which will convene at 2 p.m., will be an experience meeting contributed to and participated in by representatives of the member companies.

On the morning of July 9 the following papers will be presented:

"Interurban Electric Railways, Their Problems and the Solution Thereof," by Robert M. Feustel, president of the Indiana Service Corporation, Fort Wayne, Ind.

"City Electric Railways, Their Problems and the Solution Thereof," by A. C. Blinn, vice-president and general manager of the Northern Ohio Traction & Light Company, Akron, Ohio.

The presentation of these papers will be followed by a written discussion or a general oral discussion on either or both by members of the association.

Members are requested to reserve their rooms in advance of the meeting, and in reserving accommodations at the hotel at Ottawa they are urged to be sure to state that they are attending the meeting of the C. E. R. A. All requests for reservations should be addressed to Charles H. Seelbach, manager, Hotel Ottawa, Ottawa Beach, Mich.

Financial and Corporate

Stock Sold at Home

Wisconsin and Missouri Companies Find Buyers for Their Securities Among Their Customers

Public utilities in both Wisconsin and Missouri have been successfully conducting campaigns for the financing of extensions among their customers. In St. Louis, Union Electric Light & Power Company placed $1,000,000 of 7 per cent preferred stock on sale Nov. 18, 1919, price par, purchase limited (until some thirty days ago) to book customers of the company. When the issue was placed on sale, through advertisements in St. Louis papers and papers published in the territory outside of St. Louis served by the Union Electric, St. Louis brokers were advertising the company's earlier issues of 7 per cent preferred at 97 to 98.

COMPANY CREATES MARKET

In December the company advertised that it would offer any shareholder's stock for resale, at par, and without making any charge for the service. Since then brokers have been unable to get hold of any of these shares. Holders wishing to realize on them have brought or sent them to the company's securities department and within twenty-four to forty-eight hours have got cash for them at par. The company has resold, from Dec. 15 to May 31, 2,382 shares in this way for 185 holders. These shares have been bought by 558 new investors. Meanwhile, from Nov. 18 to May 31, the company sold $656,500 of its third million of 7 per cent preferred at par for cash and $60,100 at 102 on a ten-payment plan—a total of $716,600.

Through this campaign the company on May 31 had 3,683 preferred stock shareholders, most of them book customers of the electric service department. By protecting its shareholders through its securities department, the company has steadily maintained a par home market for its preferred stock. The total sales, including resales, from Nov. 18 to May 31 were $954,700 while the over-all cost of selling was said to be slightly over 5 per cent. This compares with a cost of 1.231 per cent over-all cost of selling the first $2,000,000 of Union Electric 7 per cent preferred in 1917 and 1918 and with 2.049 per cent. the quoted over-all cost of selling $3,600,000 of the Milwaukee Electric Railway & Light Company's five-year, 7 per cent bond-secured notes between Dec. 18, 1918, and Sept. 18, 1919.

The large volume of resales in St. Louis is attributable by observers to a speculative spirit visible there during the past winter.

Less than 1 per cent of the more than $5,000,000 of securities sold to home investors in Milwaukee during the past three and one-half years has been brought back for resale, in which the holder got dollar for dollar.

The experience in Wisconsin as regards sales compares very closely with that in St. Louis. One of the most recent cases is that of the Wisconsin Gas & Electric Company, which placed $500,000 of five-year 7 per cent notes and $500,000 of 7 per cent preferred stock on sale at par for cash on March 18, 1920. On June 2 more than $400,000 of the notes and more than $200,000 of the stock had been sold at an over-all cost of approximately 5½ per cent.

1,000 WISCONSIN BUYERS OF
Wisconsin Gas & Electric
"SAFE HOME SEVEN PER CENTS"

One thousand Wisconsin investors—more than 300 of them women—have bought Wisconsin Gas & Electric Company "Safe Home 7 Per Cents" in 70 business days. More than 600 of the 1,000 live in Milwaukee. **Milwaukee and its suburban cities now have over 4,500 investors in Wisconsin Gas & Electric Company and The Milwaukee Electric Railway & Light Company. The two companies have over 8,000 investors in Wisconsin—including several hundred of their 4,700 employees.**

While they last—and they are going out steadily—**you can buy Wisconsin Gas & Electric 5-year, 7 per cent Gold Notes in $50, $100, $500 and $1,000 sizes, and 7 per cent preferred stock in $100 shares,** at the Company's offices in Milwaukee, Racine, Kenosha, Watertown, Whitewater, Burlington, South Milwaukee and Cudahy. **The Notes come due and will be paid off in cash March 1, 1925.** Their interest is payable March 1 and September 1. Preferred stock dividends are payable April 15, July 15, October 15 and January 15. **This stock**—preferred both as to dividends and assets—**has first claim on the Company's dividend earnings up to 7 per cent each year, and shares equally with the common stock all dividends paid over 10 per cent in any year. Its safe 7 per cent income, with its chance to earn one or two per cent more in good years, make it an especially desirable permanent income investment.** Holders of the 5-year Notes can, if they wish, exchange them at par for shares of the participating preferred stock, on any interest date to September 1, 1924.

Wisconsin Gas & Electric Company and The Milwaukee Electric Railway & Light Company are closely associated, under common ownership and management. The region they serve, embracing the Milwaukee metropolitan district and eleven counties surrounding the Milwaukee district on the north, west and south, is the richest, most populous and fastest-growing portion of Wisconsin. They have been able to finance most of their growth during the past four years, running into millions of dollars, by selling their 7 per cent notes and preferred stocks to Wisconsin investors. **They have been given this magnificent home indorsement, during a period when other American utility companies found it difficult and often impossible to get new capital, because from their beginning—T. M. E. R. & L. Co. in 1896 and Wisconsin Gas & Electric in 1912—THESE COMPANIES HAVE KEPT FAITH WITH THEIR INVESTORS. Because they are legitimately capitalized and honestly managed, they have been able to meet every obligation on the due date, earn regular dividends and pay liberal wages under fair working conditions, while charging lower rates and fares than similar utilities in most other states.**

Mail orders for Wisconsin Gas & Electric Company notes and preferred stock should be addressed to, and remittances made payable to, **WISCONSIN GAS & ELECTRIC COMPANY, Securities Department, Public Service Building, Milwaukee, Wisconsin.** Bank draft, certified check, post-office or express money order should be sent with mail orders. Prompt delivery of notes or shares will be made by registered mail.

The Milwaukee office, Public Service Building, is open to 9 p. m. to accommodate those who cannot come during the day.

Wisconsin Gas & Electric Company

APPEAL TO WISCONSIN INVESTORS

These home financing advertising campaigns are utilized to make the public acquainted with the needs of the utilities as public servants and their rights as companies of private investors. They have undoubtedly increased the good will asset of the companies. They have, moreover, by "selling the company" to its home public, helped to increase the profitable sales of electrical and gas appliances, as well as the state-regulated sales of fans and electric service.

$22,500,000 Equipment Plan

One Hundred and Eighteen Electric Cars and Two Electric Locomotives Included in Proposed Financing

Approval of its $22,500,000 equipment program is asked by the Southern Pacific Company in an application filed with the California Railroad Commission on June 11. Of this great expenditure for the improvement of the equipment and service of the company only a portion is to be allocated to the use of the company's systems, both steam and electrical, in California. The company states that it will identify at the hearing just what equipment is to be used exclusively in California service.

EQUIPMENT TRUST PROPOSED

The application recites that the company has entered into an agreement with Harry E. Righter, Andrew S. Hannum and the Commercial Trust Company under which the company leases the equipment needed for its service for a consideration of $22,500,000, of which only $15,000,000 will be issued at this time, payable in annual installments of $1,250,000 each on June 1 of each year from 1924 to 1935 inclusive. The obligation carries with it the payment of dividends semi-annually June 1 and Dec. 1 of each year at 7 per cent, payable in New York without deductions for taxes other than federal income taxes.

DETAILS OF EQUIPMENT

The trust agreement shows that the equipment list includes seventy locomotives of different patterns, two electric locomotives, 2,000 box cars, 1,000 stock cars, 500 automobile cars, 1,000 flat cars, 250 ballast cars, sixty-five cabooses, twenty steel coaches and thirty steel baggage cars.

Electric equipment listed shows twelve motor cars for the Fresno Traction Company, fifteen for the Stockton Electric Railroad, twenty-two for the San Jose Railroad and sixty-nine for the Pacific Electric.

The California Commission is empowered to pass only on the financing of equipment for intrastate use.

Net Earnings of P. R. T. Decrease

The Philadelphia (Pa.) Rapid Transit Company reports earnings as follows:

May	1920	1919
Operating revenue...	$3,379,183	$3,084,982
Operation and taxes	2,406,209	1,982,980
Operating income..	972,974	1,102,001
Non-operating income	37,742	41,836
Gross income.....	1,010,716	1,143,838
Fixed charges......	817,455	807,489
Net income.......	$193,261	$336,348
Five Months Ended May 31	1920	1919
Operating revenue...	$15,475,744	$14,211,333
Operation and taxes	11,077,954	9,801,611
Operating income..	4,397,790	4,409,722
Non-operating income	198,310	230,522
Gross income.....	4,596,100	4,640,244
Fixed charges......	4,083,158	4,045,645
Net income.....	$512,942	$594,599

Reorganization Planned

Security Holders of Suburban Line at Toledo Apparently Prepare to Foreclose

Bankers and individual holders of the $300,000 of first mortgage 5 per cent gold bonds of the Toledo & Maumee Valley Railway, which matured on March 1, 1920, have started a movement to reorganize the company and take control from the Maumee Valley Railways & Light Company, a Doherty organization which has been operating the railway since 1913.

Frank R. Coates, president of the company, at the time the bonds became due, addressed a letter to all bondholders in which he offered to extend the time of the bonds one year on a 5½ per cent basis with option of a second year's extension, in order to allow the company to make up the deficit incurred in the last two years of operation. The bonds which were defaulted both as to principal and interest were issued under the terms of the original indenture made to the Metropolitan Trust Company, New York, trustee, Feb. 15, 1895.

Franchises expired in June and September, 1919, and since then fares and service have been readjusted to take care of decreasing income. From a net profit of $10,329 in 1915 to a deficit of $28,199 in 1919 is the record of the company under increased costs.

The motor trucks and automobiles have cut into the revenues of the company during the last few years. A belt line connecting Toledo with Maumee and Perrysburg, two up-river towns on opposite banks of the Maumee River, is operated by the railway.

Another factor in the decrease of earnings is the competition of the Toledo, Bowling Green & Southern line, which brings Toledo passengers from Maumee and those who walk across the river from Perrysburg at a rate of 7½ cents, while the Maumee Valley line is forced to charge them 15 cents for the same 10-mile trip. This cheap fare for a long ride is only half a cent more than a straight city fare.

Marion M. Miller is chairman of the bondholders' committee. He is president of the Home Savings Bank, Toledo. Other members of the committee are Frederick W. Stevens, Charles L. Reynolds, John D. Biggers and George B. Storer, all of Toledo.

Santa Barbara Road Ready to Quit

The finances of the Santa Barbara (Cal.) Suburban Railway are in a serious condition and the company may desire to give up its franchise unless some measures are adopted whereby at least operating expenses can be earned. These facts were developed at an informal conference which State Railroad Commissioner Martin held with the City Council and representatives of the railway.

R. Sasche, chief engineer of the Railroad Commission, presented a report of his investigations into the company's affairs. He said that the company was facing an annual deficit of $40,000. He declared that there was no prospect of increasing the business of the company in Santa Barbara; that for five years this business had remained stationary, while the expenses have been steadily increasing, and would largely increase during the next few years when the corporation would be called upon to make replacements.

Mr. Sasche suggested that the city take over the property of the company. He also suggested that by raising the fare to 6 cents the revenues could be increased by about $15,000 annually and referred to the possibility of installing one-man cars, but explained that to substitute the one-man car the company would be obliged to invest $50,000, which would tend further to increase the financial problems which it faces.

Stockholders of the company are also stockholders of the Southern California Edison Company, and they have made up the loss occasioned by the railway from the earnings of the Edison company because the power company stockholders had hoped the railway would eventually be placed on a paying basis.

Default in Interest Announced

Interest will be defaulted on July 1 on the 4-6 per cent bonds of the National Properties Company, Philadelphia, Pa., secured by deposit of certain stock upon which the dividend ordinarily payable on June 15 was passed. An announcement dated June 8 said:

> Owing to the fact that dividend upon the stock pledged to secure these bonds (4-6 per cent secured gold bonds of the National Properties Company) and which would have been payable in ordinary course upon the fifteenth day of June next, has been passed, the National Properties Company will be without funds to pay the interest due upon July 1st upon its 4-6 per cent secured bonds, and default in payment of interest will occur upon that day. It is necessary for the protection and assertion of the rights of the holders of these bonds and the conservation of the value of the security pledged that concert and unity of action should be obtained. The undersigned have consented to act as a committee for this purpose and for the protection of the interest of all of the holders of the said 4-6 per cent secured bonds who shall become parties to an agreement which has been prepared, dated June 8, 1920, an executed copy whereof is lodged with the depositary hereinafter named.
>
> Holders of said bonds are requested to deposit the same with the Pennsylvania Company for Insurances on Lives & Granting Annuities, at its office, 517 Chestnut Street, in the city of Philadelphia, the depositary named in the said agreement, not later than July 10, 1920, at three o'clock p.m., when the right so to do will cease. Said depositary will issue transferable certificates of deposit therefore. All registered bonds must be accompanied with proper transfers thereof.
>
> As soon as convenient the committee will prepare a plan and submit the same to the depositing bondholders, who will be afforded the opportunity of withdrawing their bonds from deposit in case of dissent from the plan. It is essential that speedy action be taken and the committee urges upon each bondholder the necessity for a prompt deposit of his bonds under the agreement.
>
> Copies of the deposit agreement may be obtained at the office of the Pennsylvania Company for Insurances on Lives & Granting Annuities.

This statement was signed by Evan Randolph as chairman of a protective committee of the bondholders.

Mr. Hedley Disarms Critics

Riding Habit in New York Increasing—Declaration of Dividends from Earnings Not Unfair to Car Rider

Frank Hedley, president of the Interborough Rapid Transit Company, New York, N. Y., has a short article in the *Magazine of Wall Street* for June 12, in which he discussed some of the points brought out at the investigation of the Board of Estimate. He also gives interesting facts about the operation of the lines. In regard to the investigation, he says:

> The proceeding was not one in which the companies could, of their own motive, put on witnesses, either to give direct testimony or testimony in rebuttal of that given by preceding witnesses. The Interborough could offer testimony only by courtesy of the board, not as a right.
>
> It is, therefore, not surprising that (especially in view of the public statements and announcement of final settlement by many of the members of the board before the proceedings had much more than begun) the published account of the testimony should have given the matter a sinister coloring.

Commenting on the declaration of dividends, particularly in 1917, 1918 and 1919, Mr. Hedley says:

> But whether the declaration of the dividends was wise or unwise this much should be said:
>
> (a) The dividends were declared from earnings, not from capital, hence were lawful in every respect.
>
> (b) No funds to the use of which the public had a right were used as dividends. If the company was unwise, it was at the expense of its security holders. To hold that the company should have used its money, earned from former years, to meet increased operating expenses due to the war is to hold that the car rider should not be expected to pay the added cost of his ride by an adequate fare, but that the added cost of his ride should be given to him out of the company's surplus at the expense of investors. There is no legal foundation for such a claim.
>
> It is true that a more conservative dividend policy—if its wisdom could have been as clear then as now—would have strengthened the company's present position, but it is not true the car rider would have had any fair claim upon the company's reserve resources in disregard of the rights of investors.
>
> Even had such dividends not been declared the problem of payment for the added cost of riding would still have arisen, a problem which can be solved equitably and right only when the car rider pays the proper cost of his ride.

Mr. Hedley also said that in 1872 the number of rides taken by every inhabitant of the city on an average was 147 a year. In 1910 it had increased to 221; in 1915 to 345; in 1919 to 370, and is now estimated to be about 380 a year.

New Interests in North American Company

Harrison Williams and associates have purchased a large block of stock of the North American Company owned by the Campbell estate and Festus J. Wade, St. Louis. At a directors' meeting, Festus J. Wade, A. B. Boardman, E. G. Burkham and Morton Jourdan, representing the Campbell estate and Wade holdings, resigned. The following directors were elected to fill the vacancies caused by the resignations and the existing vacancy: Harrison Williams, Clarence Dillon, George P. Miller, Edward H. Wells and Frank L. Dame. Mr. Dillon is connected with William A. Reed & Company, bankers, New York. Mr. Wells is with the Worthington Pump Works. Mr. Miller is a Milwaukee banker.

Six Dividend-Paying Roads in Massachusetts

Six electric railways in Massachusetts have paid dividends of at least 5 per cent for five successive years and have thereby made their bonds legal investments for savings banks.

The list includes the Boston & Revere Electric, East Middlesex, East Taunton, Fitchburg & Leominster, Union of New Bedford and West End of Boston. The only change from last year is the addition of the Fitchburg & Leominster Street Railway.

Of the companies named, only three are operating companies, the East Taunton, Fitchburg & Leominster, and Union. The remaining three are operated under lease by other companies.

Congress Failed to Act

Congress adjourned without enacting legislation changing the form of taxation for the local railways in the District of Columbia. This probably will result in the Washington Railway & Electric Company falling several hundred thousand dollars short of earning 6 per cent on its valuation this year. In raising the fare to four tickets for 30 cents, or 8 cents cash, the utilities commission stated that the balance of $300,000 which it was estimated would be needed to permit the company to earn 6 per cent on its fair value should be made up by an act of Congress changing the method of taxing the companies. The proposal which the commissioners made to Congress was to abolish the tax on gross revenues and tax only net revenue in excess of 6 per cent.

$401,017 in Taxes in Dispute

Suit has been brought by the city of Seattle, Wash., and the Puget Sound Traction, Light & Power Company, to enjoin King County from collecting $401,017 taxes assessed in 1919 on the municipal railway. The city and the company contend that the railway was public property at the time of assessment, and therefore not subject to taxation, while the county holds that at the time of assessment, March 15, 1919, the city had not taken title to the lines and that the assessment was valid.

At the time the city purchased the railway lines of the Puget Sound Traction, Light & Power Company, it was agreed that in event the taxation was found valid, each should pay a proportion of the tax based on the time the property was in its possession. This would mean that the company would pay one-fourth of the tax, and the city three-fourths.

Former State Tax Commissioner Jackson admitted, upon cross-examining by Attorney Howe for the Puget Sound Company, that no other street railway property in the State was assessed at the time, March 15, 1919, when he assessed the Seattle railway system. All other street railway properties, he admitted, were assessed after April 1. Attorneys for the company and the city contend that the ownership of the railway passed to the city before the date on which it legally could be assessed by the State Tax Commissioner.

Financial News Notes

$98,584 Profit in Boston in May.—The Boston (Mass.) Elevated Railway operated at a net profit of $98,584 in May. The net deficit to be overcome on May 31 was $412,492.

Trolley Lines Discontinued.—The Malden-Revere and Malden-Salem lines of the Eastern Massachusetts Street Railway, Boston, Mass., have been discontinued owing to the inability of maintaining them on a paying basis.

Order of Sale Entered.—Judge George E. Hinman in the Superior Court at Norwich, Conn., has issued an order allowing Robert W. Perkins, receiver of the Shore Line Electric Railway, to dispose of all of the property of the company at public or private sale for junk or as the road stands for future operation. The order is understood to apply only to that section of the property from Flanders Corners, East Lyme, to New Haven.

Preferred Dividend Deferred.—At the recent meeting of directors of Republic Railway & Light Company, New York, N. Y., no action was taken on the regular quarterly dividend of 1½ per cent on the preferred stock. Although the earnings of the company for the last quarter have shown substantial increases over the corresponding period of last year, the directors felt that in view of pending financing the cash resources of the company should be conserved and used for necessary construction.

Foreclosure Proceedings Begun.—Papers have been filed in the Queens County Clerk's Office in an action to foreclose a mortgage of $800,000 on the property of the New York & North Shore Traction Company, Roslyn, Long Island, N. Y. The company was compelled to suspend operations last February because the Board of Estimate of New York City refused to sanction an increase in fares. The plaintiffs in the action are the Citizens Savings & Trust Company and Edward V. Hale, Cleveland.

Large Bond Issue for Springfield Company.—Attorney B. W. Warren on behalf of the Springfield Street Railway has petitioned the Massachusetts Department of Public Utilities for authority to issue bonds for $3,045,000. The money derived from these bonds is to be used for the payment of loans covering additions to the property, amounting to $207,000; $232,700 for working capital, $75,000 for repayment of loan for the purchase of the Woronoco Street Railway, $300,000 for extensions to the property and $2,230,000 for the retirement of funded debt.

Plan for City to Share Deficits.—Mention has been made previously in the ELECTRIC RAILWAY JOURNAL of the poor financial showing of the Gloucester lines of the Eastern Massachusetts Street Railway, Boston. So critical did the situation become that the trustees of the company served notice of their intention to suspend operation of the lines on June 20. In consequence a mass meeting was held at Gloucester on June 5. At that time residents went on record informally as being opposed to rendering any financial assistance to the company. As the time drew near for shutting down the road another meeting was called. This time the company, of its own volition, suggested that for the future the deficits be shared 50-50 between the city and the company. The proposed plan will not be retroactive. It will apply to the ensuing year. Up to June 15 the latest proposal had not been passed upon.

Permission for Refunding Issue Sought.—Rolla Wells, receiver for the United Railways, St. Louis, Mo., in a hearing before Special Master Lamm requested permission to issue receiver's certificates to the amount of $4,000,000 to take up the bonds now due on the Broadway line and other securities maturing in the near future. Figures based on the expenditures of the United Railways up to June 16 and on the findings of the last fare order of the Missouri Public Service Commission, with an estimate of the expenditures for the remainder of the year, were submitted by the auditor for the receiver. The statement based on the Public Service Commission's order gives the gross estimate for the year at $19,965,999 in revenue, total expenses $16,311,522 and the balance $3,554,477. A later estimate by the auditor for the receiver gives the receipts for the year at $14,953,319, expenditures $15,946,662, leaving a deficit of $993,343.

Form of Detroit "Public Utility Bond."—According to a Detroiter who is well acquainted with the subject of stocks and bonds, the proposed "public utility" bonds of the city of Detroit, to be issued in connection with the construction of its proposed municipal railway system, are issued on the faith and credit of the city. While the municipal ownership provision of the charter states that the rate of fare must be such as to pay operating expenses, interest on the bonds and to retire the bonds themselves, the people cannot be forced to ride if the rate of fare necessary to do all this should be deemed excessive. Hence, if and when a deficit occurs, it must be met out of taxation. Another course would be to issue bonds against the property itself, but the issuance of such bonds is not possible except by approval of the people, to whom must be presented the terms of the franchise. Such a proceeding was not involved in the recent vote.

Traffic and Transportation

Ten Cents in Michigan

Wage Increase Predicated on Increased Fare—Maximum 62 Cents for City and 70 Cents for Interurban

It was noted in the issue of the ELECTRIC RAILWAY JOURNAL for May 29 that the trainmen of the Michigan Railway had demanded 75 cents and 80 cents an hour on city lines and 85 cents and 90 cents an hour on interurban lines, with double time for overtime work. As the company was unable to come to an agreement with the men, John F. Collins, vice-president and general manager, took the matter up with the Chambers of Commerce of the various cities and also the city authorities, advising them that it would mean bankruptcy for the railway to meet the demands of the men unless a substantial increase in rates were granted.

JACKSON MAYOR TAKES ACTION

The Mayor of Jackson called a meeting of the Mayors of Owosso, Kalamazoo, Battle Creek and Lansing, in which cities the company operates city lines. In consequence it was agreed that the wage question should be arbitrated and that the rate of fare should be referred to the Michigan Public Utilities Commission.

An arbitration agreement was drawn up whereby the company was to select one arbitrator, the employees another and the third was to be selected by the several Mayors. Justin Whiting, Edward Whittaker and Frank T. Bennett were the three arbitrators, respectively, so selected.

The Public Utilities Commission refused to set up a temporary rate for the various cities, but agreed to establish a permanent rate if the case were presented to it according to law by the railway and the officials of the various cities. As a result the company was compelled to take the matter of a temporary rate up with the individual cities.

CITY APPPEALS TO COMMISSION

Battle Creek refused to grant the increase in fare requested. The city insisted that the Public Utilities Commission set the rate. After further negotiations the commission finally did set a temporary rate, which the Battle Creek City Commission later put into effect. The rate which the company is now charging on this temporary basis in the five cities of Owosso, Lansing, Jackson, Battle Creek and Kalamazoo is a 10-cent cash fare, with four tokens for 30 cents and 5 cents for children between the age of five and twelve years. Kalamazoo offered the company a rate of three tokens for 25 cents, but owning to the fact that it was impossible to get this rate in the other cities the company voluntarily agreed to cut the rate to that mentioned above.

The board of arbitration met promptly. It decided that motormen and conductors on city lines should receive a wage for the first year of service of 60 cents an hour and 62 cents an hour thereafter. Interurban trainmen were awarded 65 cents an hour for the first six months of service and 70 cents an hour thereafter.

WAGES DEPENDENT ON FARES

One of the conditions of the arbitration agreement regarding wages was that the company would be unable to pay the rate of wages awarded to the trainmen in any city where it was not able to collect the 10-cent cash fare, with four tickets for 30 cents. The company also stipulated that should any of the cities rescind the ordinance with regard to the rate of fare, the wages of trainmen in that city would go back to the old rate, which was 40 cents an hour for the first year and 42 cents thereafter.

Suburban Line Charges Seven Cents in City

A 7-cent fare on the lines of the Seattle & Rainier Valley Railway inside the city limits of Seattle, Wash., became effective on June 12, by order of the State Public Service Commission. Fifteen ticket tokens are being sold for $1, according to a provision of the schedule, but these tokens do not carry transfer privileges.

The new schedule eliminates commutation tickets to Renton, which have been sold at the rate of two for 25 cents. The fare in either direction is now 15 cents. The present arrangement between the Rainier lines and the Seattle Municipal Railway regarding transfers will not be affected by the fare changes until the fare on the municipally owned lines is increased to 10 cents. It now costs a passenger who transfers from a city line to a Rainier Valley car an additional 3 cents when he presents his transfer on the Rainier car, and an additional cent when he obtains a transfer from a Rainier car to a city line. The new 7-cent fare is effective only within the city lines of Seattle.

The Rainier Valley lines are divided into three zones. The first zone terminates at the city limits at Amherst Street. It now costs 7 cents to ride to that point. Passengers who travel into the second zone, which terminates beyond the town of Bryn Mawr, continue to pay a 10-cent fare. Those who ride into the third, or Renton zone, pay the present 15-cent fare. Persons who ride between two points within either of the two outlying zones pay a 5-cent fare, as in the past.

Eight Cents in Portland

Oregon Commission Authorizes Increase After Failure of City to Extend Aid to Company

Fares in the city of Portland, Ore., were increased from 6 cents to 8 cents on June 15 by an order issued by the State Public Service Commission. The findings of the commission held that the new rate was necessary in order to increase the revenue of the Portland Railway, Light & Power Company to meet its expenses, since the voters of the city at the recent election failed to pass any of the measures planned to extend relief to the company.

Under the new rate tickets in books of fifty coupons are $3.65 a book, an increase of 90 cents over the old rate. Tickets in strips of six coupons sell for 45 cents. School children will continue to ride for a 4-cent cash fare, with a book of twenty-five tickets for $1.

VOTERS' ATTITUDE SCORED

The commission states that the failure of the citizens to adopt any of the suggestions put before them in the form of measures at the recent election is the indirect cause of the increase. Had the measures carried, the report states, the valuation of the railway system would have been lessened by several million dollars and reductions in operating expenses made possible which would have brought about a saving to car riders of several hundred thousand dollars.

The decision handed down by the commission followed nearly a year of consideration. The original application for an increase was filed by the company on Aug. 15, 1919. During the fall a vast amount of data was gathered and a thorough investigation of the company's receipts, expenditures and valuations made. As a result of these investigations the commission arrived at the conclusion that either greater revenue or less expense for the company must be provided, and chose the latter method as preferable if it could be brought about.

When the relief measures proposed by the commission and city officials were completely snowed under at the election on May 21 the company immediately pressed its claim for higher fares. These measures would have relieved the company of certain paving and franchise charges. Their defeat by the voters was decisive.

RAILWAY DIVISION ON OWN FEET

The suggestion that the profit which the company is declared to make from its electric light and power business be used to make up the deficit from the operation of the railway is not looked upon with favor by the commission in its report. On this point the commission said:

> The principle of permitting one branch of a utility's operation to support another and totally different service is wrong. Finally, the facts before us show conclusively and beyond question that the light and power division of the utility is not financially able to be of assistance to the railway.

Eight Cents on Chicago Surface Lines

Utilities Commission Heeds Companies' Plea for Immediate Relief Pending Fixing of Permanent Rate

An 8-cent fare, effective July 1, was allowed the Chicago (Ill.) Surface Lines by the Illinois Public Utilities Commission in an order dated June 19. The commission held that the 6-cent fare, which had been in force since last December, was no longer adequate to meet the situation and that an 8-cent fare must be allowed "even if we were to hold against the applicants upon every doubtful question in this case." The necessity of rehabilitating the system's credit, the increase of $6,000,000 in operating expenses incidental to the pay raise of 15 cents an hour to all trainmen on June 1 and the prevalent high prices for materials and supplies were given as reasons for allowing the increased rate.

THE commission held out one specific hope of fare reduction in the near future. It suggested that the city commute its share of the net receipts, which under the 1907 ordinances go into the city treasury, and that the companies be permitted to keep this sum, amounting to about $2,000,000 annually, in return for a reduction in fares. Representatives of the City Council have indicated that no such relief may be looked for.

Prompt Action Necessary

The latest order of the commission is another temporary arrangement. Final arguments in the valuation proceedings were presented on June 17, and as the record is quite voluminous the commissioners decided that relief should not be withheld while a study of the experts' figures was being made. Therefore, they said:

> In the light of the record now before us and in the view of present economic and financial conditions $10,500,000 is the lowest amount which can be said to represent a fair return upon the fair value of the property of the applicants used in the public service. This is a return of 7 per cent upon a valuation of $150,000,000, of 7½ per cent upon a valuation of about $140,000,000 and of 8 per cent upon a valuation of approximately $131,000,000. It is not necessary that a complete valuation of applicants' property should be made to determine that the applicants are entitled to put in force a rate of fare which will produce the smallest return to which it can be said, in any view of the evidence, they are reasonably entitled.

It was estimated that the requirements for operating expenses, including reserve for depreciation, for the year ending Jan. 31, 1921, would be about $42,600,000, and that under a 6-cent fare the gross earnings would be only $47,000,000. This would leave about $4,400,000 for return. Receipts for the same period under an 8-cent fare are estimated at $55,800,000. After deductions for operating expenses and the city's share, the amount left for the companies would be about $10,315,000.

Fears Service Breakdown

The commission stated that the inevitable result of the continuance of the 6-cent fare would be the appointment of receivers for the property, the disruption of unified service in Chicago and great injury not only to the companies but to the public also. "Obviously, this will not inure to the public welfare," the order stated. It was set forth that in granting this relief at this time the commissioners had in mind the restoration of the financial credit of the companies and that the applicants having been granted the full measure of relief sought by them would be expected and required to furnish to the people of Chicago adequate and efficient service. It was further stated that in determining the rate to be finally authorized in this proceeding consideration would be given to the steps taken by the companies to improve their service.

Discussing the rate of return, the commission said:

> It is not reasonably possible to place upon the property of the petitioners used and useful in the public service a lower valuation for rate-making purposes than the sum of $140,000,000, and 7½ per cent is as low a rate of return as should be allowed in this case under present economic and financial conditions.

A lengthy discussion was started by the suggestion of the commission that the city's share of the profits be commuted into a reduction of fares. Under the 1907 ordinance the city has collected in the past thirteen years about $25,000,000 from the surface companies. The city has the right under the ordinance to commute a sum not exceeding its share of the net receipts for the previous year into a reduction in fares.

Disagreement on Valuation

Various figures on valuation were presented. A. L. Drum estimated that the reproduction cost at prices of April 1, 1920, was $247,246,637, while the valuation averaged over a seven-year period was $176,588,415. The "going concern" value was placed at $33,236,187. The companies' experts would allow 17.93 per cent for depreciation, while the city's figure was 25.21 per cent. The companies also have in the renewal fund about $10,000,000. The Surface Lines, however, asked the commission to allow a value of $159,113,114, which is the amount of the capital account or purchase price brought up to date by the Board of Supervising Engineers. Witnesses for the city claimed that the value does not exceed $129,000,000, eliminating various items such as money invested in property discarded since 1907. There was a difference of $14,035,994 between the city and the company claims as to cost of reproduction.

At the close of the companies' case a memorial addressed to the commission was presented by the Chicago Association of Commerce and a number of other civic organizations asking that reasonable rates be established for all public service. This statement is represented in full elsewhere in this issue.

As soon as the decision of the commission was made known interest was revived in Mayor Thompson's plan for "people's ownership and operation" of the car lines. This plan has been under consideration by a special committee for several months in the hope that arrangements can be made for taking over the surface line in exchange for a new form of city security and giving service for a 5-cent fare. The city authorities have tried to block the companies several times in the courts, but all important rulings have sustained points decided by the commission. This has made the politicians turn to the 5-cent fare slogan in the hope that the Mayor's plan may be approved and that the State Legislature will be forced to pass enabling legislation.

Emergency Rise Sought

Pacific Electric Railway Applies for Increase on All Its Lines—Asks Seven Cents in Cities

Stating that its earnings for the year 1919 fell short by $2,600,000 of meeting operating expenses and fixed charges, the Pacific Electric Railway, Los Angeles, Cal., on June 11 formally applied to the State Railroad Commission for an increase in fares over its entire system. The company asked permission to charge emergency rates pending the fixing of permanent tariffs.

The commission was asked to institute a thorough investigation of the system's operations, service, rates and general affairs with a view to arriving at a just basis for the fixing of permanent rates. In its application the company placed a valuation of $75,000,000 on its property. It estimated that for the current year it would fail to meet operating expenses and fixed charges by more than $2,400,000. It pointed out further that it had never paid a dividend on its capital stock.

The company asked permission to charge the following emergency rates:

> Increase in all 5-cent fares in cities outside of Los Angeles, including Pasadena, Long Beach, Pomona, Riverside and San Bernardino, to 7 cents.
>
> Fares in Los Angeles City to be increased by creating two zones inside the present 5-cent fare limit, the inner zone to extend approximately 2½ miles from the center of the city and to have a 5-cent fare, the second zone to cover the remaining portion of the present 5-cent limit territory and to have a 7-cent fare.
>
> Fares between the center of the city and the outside zone, beyond the proposed 7-cent limit, to be 10 cents or five tickets for 40 cents, without restrictions as to use. School tickets in Los Angeles and other cities where local service is given by Pacific Electric lines to be increased from 2½ to 3½ cents a trip.
>
> One-way interurban fares to and from Los Angeles to be raised 5 cents each and round-trip interurban tickets to cost 10 cents more each, in connection with the increase of local fares in Los Angeles, upon which interurban fares are based.

The company also asks that the commission take cognizance of its application jointly with others for an increase of 23.91 per cent on its freight rates and asks that its freight rates be increased and adjusted to a parity of the freight rates on steam railroads competitive with its lines.

Relative to the company's application

H. B. Titcomb, vice-president of the Pacific Electric, said:

> With only 5 per cent more employees in 1919 than during 1916, the payroll increased, comparing the two years, $2,731,734, or more than 78 per cent. Recently an additional increase has been granted, so that during the next twelve months the payroll will show, on the basis of the same number of employees, an increase of 100 per cent, or $3,500,000 over the calendar year 1916.
>
> The Pacific Electric purchases all of its power from a power company, and the need of the latter for increased revenue has necessitated the Railroad Commission granting it an increase of its rates to its consumers, with the result that increased power cost to the Pacific Electric will be about 48 per cent, or in excess of $500,000 a year.
>
> In the company's application to the Railroad Commission is brought out the company's desire of getting its interurban trains off the street surfaces in the central section of Los Angeles. The company has stated its readiness to proceed with this work in large degree whenever permission is granted. In other words, notwithstanding the company's lack of earning power it is its belief that the situation justifies the extension of its elevated line from the rear of the Pacific Electric Terminal across the Los Angeles River.

Sliding Fare Plan Suggested

A new ordinance, providing for a sliding scale of fares, has been prepared for introduction in the City Council of Akron, Ohio, in which city the Northern Ohio Traction & Light Company operates. According to this ordinance all returns from fares will go into a general fund from which operating expenses, except maintenance, renewals and depreciation will be deducted.

If in any year there should be an excess of gross revenue over operating expenses, such excess each year up to 5 per cent of the capital value of the company is to be placed in a "maintenance and renewal" fund for the purpose of maintenance, renewals and replacements due to depreciation.

Any excess over the expense of operation and the amount applied to the maintenance and renewal fund is to be placed to the credit of an income fund, up to 7 per cent of the capital value, to provide an annual return on the capital investment. This is to be paid in semi-annual installments.

Revenue over and above the expense of operation and the amounts credited to the two funds named are to be placed in a reserve fund until it has reached the amount of $400,000. When this amount has been reached, it is to be distributed as follows: 20 per cent to the company, 20 per cent to the city, and 60 per cent to a fund for the reduction of fares.

If at any time this fund exceeds an amount equal to 1 per cent of the number of passengers carried the previous year, the cash fare will be reduced 1 cent and remain at that point for six months. In case the fund falls below $50,000 the rate will be increased 1 cent. The sliding scale will cover a range of fares from 3 to 10 cents. Other provisions of the plan follow:

> Company to keep the paving in repair.
>
> Council to route cars and fix schedules.
>
> Council may order line extensions.
>
> Council may designate the number of cars to be run.
>
> City to appoint a utilities commissioner, whose salary will be paid by the company.

All disputes between the city and the company will be subject to arbitration.

Ten Cents Cash in Seattle

Council Prepared to Go Even Farther with Fare Boost Than the Mayor

An ordinance passed by the City Council of Seattle, Wash., provides for a fare of 10 cents on the lines of the Seattle Municipal Railway, with metal fare tokens for sale at 6¼ cents each, or four for 25 cents; eight for 50 cents, or sixteen for $1. Mayor Hugh M. Caldwell has signed the measure, which will go into effect on July 19. It was at first believed that the Mayor would veto the bill; in that case it was planned by members of the City Council to pass the act as a thirty-day ordinance rather than an emergency measure, when it will require only six votes to make it a law, without the Mayor's approval. Besides a straight 10-cent fare, the ordinance provides for a 7½-cent cash fare for each of two persons riding together, free transfers with cash or token fares; 3-cent fares for school children, except that two may ride for a nickel; ten school tickets for 25 cents.

THE metal tokens, costing 6¼ cents, will be on sale on all cars in lots of four, eight and twelve, but not singly. It was on the point of where the tokens would be obtainable that the Council held up action, it being the general opinion that the tokens must be placed on sale on the cars. D. W. Henderson, superintendent of railways, states that he believes no undue delay will result from the sale aboard the cars, but if this develops arrangements will be made to sell the tokens at downtown stores. An order has been placed for 2,000,000 tokens.

STEADY RIDERS FAVORED

The ordinance which was finally adopted by the Council replaced the former ordinance of Councilman R. H. Thomson, calling for 7-cent fare, with fifteen tokens for $1. It was feared the 7-cent fare would unnecessarily delay traffic in the making of change. It is pointed out that the 10-cent fare, with sixteen tokens for $1 for the regular car rider, will place a greater burden of maintaining the lines on the irregular or occasional rider.

According to figures prepared by Mr. Henderson, the increased fare will result in additional annual revenue of $1,478,280, sufficient to operate the railway without loss and to pay the interest and meet the installments on the $15,000,000 of obligations which the city incurred in the purchase of the system.

BIG REVENUE GAIN EXPECTED

Mr. Henderson figures that a loss of approximately 10,000 passengers a month will result from the increase in fares. He estimates 8,480,000 passengers will ride on the city cars a month on the 6¼-cent token. This would bring in a monthly revenue of $530,000. It is estimated that the number of persons expected to take advantage of the two-for-15-cent fare will provide revenue of $5,000 per month.

The receipts from 10-cent fare passengers are expected to total $30,000 a month. The total estimated monthly revenue under the proposed plan would be $533,375, an increase of $123,190 over the present monthly revenue of $410,185. The additional revenue will represent a gain of 30 per cent.

The question of higher fares has been under consideration by the municipal authorities for several months. Mayor Caldwell was at first opposed to any advance in the rate. He later advocated a fare of 6 or 7 cents as the most equitable means of providing relief to the city lines.

Three-Cent Transfers Soon on P. R. T.

Although no official announcement has been given out by the Philadelphia (Pa.) Rapid Transit Company, on the subject of increased fares, reports in the Philadelphia newspapers indicate that the proposed 3-cent charge for exchange tickets will go into effect on July 1. It had previously been stated that opposition of certain of the company's directors to the Mitten plan of a universal transfer charge would result in the P. R. T. asking for a flat increase in fare.

Opposition to a fare increase or to an extension of the transfer charge was voiced in a report submitted to the City Council on June 22 by Col. Sheldon Potter and William Hancock, city members of the company's board of directors. The report contended that it would be better for the company to go into bankruptcy than for the city to come to its rescue to preserve the present financial structure of the system.

It also protested against the form of the proposed fare increase, alleging that the term "5-cent fare" employed by Mr. Mitten means in reality "a fare of 5 cents for each zone traversed, and that is quite a new meaning, and one which would not surprise traction managers if they understood what Mr. Mitten was talking about." It was contended in the report that the 3-cent charge for "exchanges" would net the company an increase of $3,000,000 a year, while the company needs $5,000,000 merely to maintain the present standard of service.

Announcement was made on June 23 that the State Public Service Commission would immediately order the company to make a number of changes in car routing to relieve congestion in the business district. In addition, sweeping changes in automobile parking regulations will be made shortly. The changes in routing are the result of a comprehensive study by the commission of local traffic conditions.

Traffic May Be Speeded Up

Plan Successful in Detroit in Facilitating Handling of Railway Traffic May Be Tried in Milwaukee

The committee on acquisition of public utilities of Milwaukee, a public body consisting of representatives of the City Council and of others, has recently received the report of a special committee sent to investigate traffic conditions in Detroit. As a result of this report the Milwaukee police department will be asked to co-operate in expediting the movement of electric railway cars in the congested districts.

Industrial plants will be asked to co-operate with the Milwaukee Electric Railway & Light Company, by notifying the company of changes in working hours and in every other possible way. Attempts may later be made to arrange working hours in the various industrial establishments in the city so that the workmen can be handled either before or after the rush hours for office and business establishments. In other words, an attempt may be made to introduce the "staggered" hour system.

MAY TRY QUEUE LOADING

As a result of the study of Detroit methods, experiments may also be conducted at certain Milwaukee industrial plants with the "queue" plan of car loading, employees being asked to line up in boarding cars. If this is found to expedite traffic it will be tried out in the down town district during rush hours, as is done in Detroit.

The investigating committee found that for several years the downtown railway traffic in Detroit had been given preference over traffic arising from industrial plants. This policy made it necessary for industrial concerns in Detroit to place their hours of opening and closing at such times of the day that the Detroit United could furnish them the service which they desired, or else the industry had to take its chance with the regular service. This practice of separating the industrial peak from the downtown and office peak enables the Detroit United to obtain double use of practically all of its equipment during both the morning and evening rush hours.

The investigating committee points out, however, that the general working conditions in Detroit at the present time, namely, eight-hour shifts with twenty-four hour operation, are favorable for the staggering of working hours. The committee also points out that faster and more uniform loading of cars with less inconvenience and discomfort to passengers is made possible by the Detroit method of loading.

Six-Cent Fare Retained

After a period of uncertainty the British Columbia Electric Railway, Vancouver, B. C., has received permission to continue charging a 6-cent fare on its lines in Vancouver, New Westminster and North Vancouver. The company was granted a 6-cent fare in July, 1918, under an agreement with the various Councils in the districts in which it operates, but this permission was granted only until a Public Utilities Commission to be formed in the Province of British Columbia could adjudicate upon the matter.

The commission last year started its hearings, but, owing to a political controversy, the commission was dissolved. In the meantime the railway lines of the company had been taken from the jurisdiction of the province and placed under the Dominion Railway Commission by an act of the Dominoin Government.

Since the discontinuance of this act efforts have been made to have the company brought back under provincial jurisdiction, but since the commission was dissolved this would have the effect of throwing the company back on the terms of the original franchises, which provide for a 5-cent fare. The company opposed such a measure, and while the Dominion Government has removed the system from its jurisdiction, it has continued the 6-cent fare for another year by which time the provincial legislature may have appointed another commission to hear the matter.

Transportation News Notes

Eight Cents in Butte.—The Butte (Mont.) Electric Railway has been authorized by the State Public Service Commission to charge a straight 8-cent fare on its lines. The new rate went into effect on June 10.

Eight-Cent Fare Asked.—The Fairmount Park Transit Company, Philadelphia, Pa., has applied to the Fairmount Park Commission for permission to raise its fare from 5 cents to 8 cents. The company's line is 8 miles in length.

Wants More on Georgia Road.—Application has been made to the Georgia Railroad Commission by the Fairburn & Atlanta Railway & Electric Company, Fairburn, for an increase in fare from 6 cents to 7 cents in each zone. There are four zones on the company's line.

Higher Ticket Rate Authorized.—Ticket rates were raised on the lines of the Massachusetts Northeastern Street Railway, Haverhill, Mass., on June 16, under authority of an order issued by the State Department of Public Utilities. Under the new schedule six tickets are sold for 50 cents instead of five for 30 cents. Cash fares remain at 10 cents.

Trolley Freight to Be Discontinued.—The Eastern Massachusetts Street Railway, Boston, Mass., has announced the discontinuance of its trolley freight business. The reason given by the company for this move is that this department is unprofitable. The freight cars will be transformed into snow-fighting equipment.

Publicity for European Food Drafts.—The Interborough Rapid Transit Company, New York, prints in its June *Bulletin* a notice from the American Relief Administration explaining how food drafts, payable in Warsaw, Hamburg, Vienna, Prague and Budapest, can be bought and how much food will be furnished for $10.

Labor Shortage Forces Shutdown.—The scarcity of labor in Jackson, Tenn., resulted in a suspension of service on the lines of the Jackson Railway & Light Company on June 14. The company was unable to obtain sufficient colored help to operate the boilers in power plants. During the past year it has been unable to obtain steady colored labor, although greatly increased wages are being offered.

Seven Cents on Jersey Line.—The Five Mile Beach Electric Railway, Wildwood, N. J., has been granted permission by the Wildwood City Commission to increase its fare from 6 cents to 7 cents. The company announced that it would have to suspend operations unless the increase was granted. Other towns along the line have given permission for an increase in rates and the matter is now pending before the State Board of Public Utility Commissioners.

Halts Long Island Increase.—Deputy Public Service Commissioner Alfred E. Barrett, of the First District, has issued an order suspending a proposed increase in fares which the Long Island Railroad, New York, N. Y. planned to put in effect on July 1. A thorough investigation of the proposed rate increase will be made by Commissioner Barrett. While the Long Island Railroad has the charter right to make a charge of 3 cents a mile, it must submit any rate increase to the commission.

Refuses London Increase.—By a vote of six to three the City Council of London, Ont., recently rejected a proposed bylaw to permit the London Street Railway to raise its fares to 5 cents and to sell seven tickets for 25 cents. On the proposed ordinance was to be based an agreement with the company, the increased revenue to go toward higher wages for the men and any surplus to be placed to the credit of the city as a special fund.

Higher Fare in Evansville.—The Public Service Commission of Indiana has authorized the Evansville Street Railway to charge a 6-cent fare with twenty tickets for $1 for a period of sixty days. The new fare rate went into effect on June 1. At the end of the sixty-day period, the company's financial condition will be investigated by the commission, and it is expected that a permanent financial basis will be worked out at that time.

Orders Higher Power Rate.—Finding that the rate of 1½ cents a kw.-hr. for power furnished by the Monmouth

Lighting Company to the Jersey Central Traction Company, Keyport, N. J., is unduly low, the State Board of Public Utility Commissioners has ordered that the rate be increased to 2 cents. The board stated that it should not be construed that it obligated itself thereby to authorize an increase in fare which has been requested by the Jersey Central Traction Company to absorb the increased cost of operation resulting from the higher power charge.

Ten-Cent Fare in Danbury.—Ten-cent fares are now being charged on all the lines of the Danbury & Bethel Street Railway, Danbury, Conn. The increase in fare was made necessary by the wage increase recently granted to the employees. The company is selling twenty-five tickets for $2. These tickets are good for all rides within the city limits up to 6.30 p.m. except on holidays and Sundays. J. M. Ives, receiver of the company, has announced that service throughout the system will be immediately improved.

Ten Cents in Santa Cruz.—By an order of the California Railroad Commission issued on June 9 the Union Traction Company, Santa Cruz, was authorized to increase its fare from 6 cents to 10 cents. The company was also authorized to sell books of tickets containing eight coupons for 50 cents. The company has been loosing money, the loss in 1919 being $6,074. The company is required to set aside in monthly installments $15,000 a year to provide for depreciation and it is also required to submit a new scheme of accounting for approval by the commission.

Seven Cents in Springfield.—Fares on the lines of the Springfield (Mo.) Traction Company were raised from 5 cents to 7 cents on June 20 by order of the State Public Service Commission. Four tickets are sold for 25 cents, while the rate for children is placed at 3 cents. The new fares will remain in effect for seven months unless the commission later extends the time. The company must, at the end of six months from June 20, submit statements showing earnings and expenditures for each month in that period, including reserve set aside and net earnings available for interest charges, dividends and surplus.

Six Cents on Dallas Lines.—The City Commission of Dallas, Texas, on June 24 unanimously passed an ordinance granting the Dallas Railway a 6-cent fare. The measure carried an emergency clause and went into effect at midnight on June 25. It grants a straight 6-cent fare with universal transfer privilege as under the old franchise. Tickets outstanding are to be accepted as fares and new tickets are to be sold in convenient numbers at 6 cents each. The company obligates itself to buy fifty new double-truck cars within ten days to be put into immediate service.

Wants Curb on Buses.—The Worcester (Mass.) Consolidated Street Railway has forwarded to the State Department of Public Utilities a petition asking that the department restrain jitney buses from interfering with its cars at white posts and from "stealing" passengers. The petition further asks the department to require jitney owners to file a $1,000 bond for each passenger a jitney will hold. Under the new law that went into effect May 1, if any street railway objects to jitney regulations of any town or city it may apply to the public utilities commission, within thirty days of the passage of the law, for intervention against the practices of the competitors against whom the railway complains.

Will Ask Louisville Rise.—Recommendations that the Louisville (Ky.) Railway be allowed to increase its fare will shortly be submitted to Mayor Smith by the committee which has had the company's affairs in charge since the resignation of Thomas J. Minary, as president, several months ago. The committee is preparing its report prior to turning over the management of the company to James P. Barnes, recently elected president. Mr. Barnes is expected to arrive in Louisville about July 1. Last year the company applied to the City Council for an increase in fare from 5 cents to 7 cents. The application was denied, but the company was given to understand that if at the end of four months the system was still in need of additional revenue, the city authorities would entertain a second application for relief.

Must Continue Freight Service.—A petition of the Birmingham Railway, Light & Power Company, Birmingham, Ala., to discontinue its freight service between Birmingham and Bessemer and between Birmingham and Ensley on all shipments of less than carload lots, has been denied by the Alabama Public Service Commission. The company was granted an increase in its freight rates of 25 per cent. At a hearing before the commission J. S. Pevear, general manager of the company, testified that the road was losing approximately $3,000 a month on its freight service to Bessemer and Ensley. He maintained that the loss was due to the heavy inroads of truck traffic on the company's freight business and stated that even an increase in rates would not put the freight service on a paying basis.

Wants 10 Cents in Portland.—Stating that the increase in wages recently awarded its employees by a board of arbitration makes necessary an immediate increase in revenue, the Cumberland County Power & Light Company, Portland, Me., has renewed its petition to the State Public Utilities Commission for authority to charge a 10-cent cash fare. At present a five-ride ticket costs 35 cents and the cash fare is 9 cents. On March 31 a petition was filed by the company asking that the fares be increased to 8 cents by ticket and 10 cents cash and a hearing was ordered by the utilities board. Counsel for the company later requested a postponement, in view of the fact that the employees were about to make a demand for more wages. The deficit for the first five months of this year is $147,694 and that for the last three years and five months amounts to nearly $370,000.

Tickets Will Cost More.—Ticket fares on the lines of the Pittsburgh (Pa.) Railways will advance from 7½ cents to 8⅓ cents on July 15. The cash fare will remain 10 cents. Announcement of the increase follows the recent agreement, wherein the receivers of the company are to pay the trainmen a maximum hourly wage of 70 cents. The 70-cent rate just agreed upon, with the adjustments which will follow in the wages of other employees, will cause a wage increase of about $1,700,000. It is expected that all the resulting increase in revenue will be absorbed by the increase in wages. The receivers state that they are not willing to adopt the policy of attempting to operate on an inadequate fare, for this would endanger the continuance of car service, necessitate the discontinuance of needed work on tracks and the abandonment of the idea of acquiring additional cars and carhouse facilities.

Seven Cents Not Enough.—H. M. Atkinson, chairman of the board of directors of the Georgia Railway & Power Company, Atlanta, Ga., declared at a recent hearing before the State Railroad Commission that a 7-cent fare would prove insufficient to meet the company's needs. The company has applied for an increase in fare from 6 cents to 8 cents. Mr. Atkinson gave a detailed account of the system's condition, declaring that it was unable to borrow money and that a crisis threatened in its affairs. He said that the company was unable to make any improvements and that the service would break down unless the increases were granted. The company has been compelled to countermand orders for material and machinery for improvement work amounting to $1,732,040 because its income was insufficient to stand this expenditure. Preston S. Arkwright, president of the company, told the commission that the company faced a deficit this year of more than $1,000,000 on the commission's valuation of its physical assets.

Approves Philadelphia Buses.—An ordinance to permit the operation of motorbuses by the Philadelphia Transportation Company has been passed by the City Council of Philadelphia, Pa. P. M. Raymond, representing the company, said there would be between twenty and thirty buses ready for operation at least by Sept. 1. They may be ready by Aug. 15. The ordinance fixes 5 cents as the maximum fare to be charged in each zone. It limits the franchise granted the company to fifteen years, but with the provision that after the expiration of five years the Council may terminate the franchise by giving the company two years' notice of that action; fixes a bond of $50,000 to be furnished the city by the company, and requires the company to pay the city 5 per cent of its gross receipts of fares annually, the minimum sum to be paid each year being $7,500. Before commencing operation the company must secure the approval of the State Public Service Commission. The commission recently refused the application of a bus company for permission to operate lines which would compete with those of the Scranton Railway.

City Buses Lose Again.—The Appellate Division of the State Supreme Court on June 19 affirmed an order of Justice Lydon granting an application of Job E. Hedges as receiver of the New York (N. Y.) Railways for an injunction restraining Mayor Hylan, the Department of Plant and Structures and others from continuing to operate bus lines which parallel lines of the New York Railways. The lines affected by the decision were the Fourteenth Street Line, the Seventh Avenue-Delancey Street Line and the Eighth Street Line, which operates from the west side of Manhattan over the Williamsburg Bridge to the Plaza on the Brooklyn side. The court in its decision held "that the city, which accepted franchise money from two different lines of the New York Railways, had no legal right to enter into competition with those lines, running omnibuses in opposition." This is the second case in which the city's bus project has been held illegal. The Court of Appeals recently sustained the action of the lower courts in enjoining the operation of municipal bus lines in competition with the lines of the Brooklyn City Railroad. Arrangements have been made by the Brooklyn City Railroad to place additional cars in service on the lines formerly paralleled by the buses.

Wants Joint Freight Rates Abandoned.—The Buffalo & Lake Erie Traction Company, Buffalo, N. Y.; the Chautauqua Traction Company, and the Jamestown, Westfield & Northern Railroad, Jamestown, N. Y., have petitioned the Public Service Commission for the Second District for permission to discontinue joint freight rates between these three interurban electric lines operating between Buffalo and Jamestown and intermediate points. At a hearing before Chairman Charles B. Hill of the commission in Buffalo, recently scores of merchants and manufacturers appeared in opposition to the proposed tariff change. They contended that it would mean an increase of from 75 to 160 per cent in through rates between Buffalo and Jamestown and intermediate points. Under the proposed tariffs of the three companies the rate to various points would be a combination of local rates. Counsel for the traction companies contended that unless the through joint rates were canceled the companies would be forced to stop package freight and express business because of the low carrying charges now in force. The three lines make a specialty of carrying freight and express shipments from Buffalo to points in the southwestern part of the State.

Personal Mention

A. W. Hemphill in New Firm

Albert W. Hemphill has become associated with Gardner F. Wells as a member of the firm of Hemphill & Wells, with offices in New York City. Mr. Hemphill is well known to the electric railway industry through his work as a public utility engineer and his former connection with the properties of Stone & Webster. With Mr. Wells he will continue the practice of engineering, which he has hitherto conducted independently.

Mr. Hemphill was educated at the Massachusetts Institute of Technology and Haverford College. After graduating he was employed on steam railroad construction work for about three years. He went with Stone & Webster in 1909 and remained with that firm for about six years. While with that organization he was employed in the reorganization of the Metropolitan Street Railway, New York, N. Y., for three years and for the remainder of the time was with the securities department. He left Stone & Webster to go with J. G. White & Company, Inc., and remained with that firm for about a year and a half in an official capacity. He then went into business for himself as a consulting engineer.

A. W. HEMPHILL

Mr. Hemphill is the son of Alexander J. Hemphill, chairman of the board of directors of the Guaranty Trust Company, New York, and is a brother of Clifford Hemphill of Hemphill, Noyes & Company, investment bankers.

Mr. Wells served during the war as manager of the division of transportation of the United States Housing Corporation, resigning early in 1919 to enter the consulting engineering field. For fifteen years Mr. Wells was connected with the Stone & Webster organization. During the greater part of the period he served as an appraisal expert, making office and field examinations and preparing reports and appraisals of public utilities. A biography of Mr. Wells was published in the issue of Feb. 8, 1919.

Prof. Morrow Joins Staff

L. W. W. Morrow, assistant professor of electrical engineering at the Sheffield Scientific School, Yale University, has been appointed a special editorial representative on the staff of the ELECTRIC RAILWAY JOURNAL for the summer months.

Professor Morrow is a graduate of Cornell University. After teaching at that institution for two years he went to the University of Oklahoma, where he became director of the School of Electrical Engineering at the end of five years. While a resident in Oklahoma, Professor Morrow was secretary of the Oklahoma Gas, Electric & Street Railway Association and was also associated with various Oklahoma utilities in a consulting capacity. He joined the teaching staff at Yale two years ago.

Henry L. Doherty, president of the Cities Service Company, was honored by the employees of the Toledo Railways & Light Company and its other Toledo subsidiaries on the occasion of his fiftieth birthday anniversary on May 15. Employees under the leadership of F. J. Derge, assistant general manager of the Toledo Railways & Light Company, and E. R. Kelsey, advertising manager, gathered at each of the five principal power stations in Toledo and planted a Cornish elm. Each tree will be surrounded by an iron fence and bear a bronze tablet telling of the occasion.

J. S. Badger has tendered his resignation as resident engineer and general manager of the Brisbane Electric Tramways Investment Company, Ltd., Brisbane, Australia, on account of failing health. Mr. Badger is an American by birth. He was connected with the original Sprague Electric Railway & Motor Company, and later with the Edison General Electric Company, and served as construction engineer with a number of the early electric railway lines in the United States. About twenty-five years ago he accepted the position of general manager of the Brisbane tramway system, which under his supervision has been developed into one of the most important electric railways in Australia. Since taking up this work at Brisbane he has revisited this country from time to time. Mr. Badger recently returned to the United States and is now making his home in Monrovia, Cal.

A. L. P. Smith, purchasing agent of the Savannah (Ga.) Electric Company, has resigned.

H. S. Swan, treasurer of the Alabama Power Company, Anniston, Ala., has resigned.

Samuel A. Miller of Philadelphia, Pa., has been appointed assistant superintendent of the New Jersey & Pennsylvania Traction Company, Trenton, N. J.

R. A. Mitchell has been made treasurer of the Alabama Power Company, Anniston, Ala., succeeding H. S. Swan, resigned. Mr. Mitchell is also vice-president of the company.

W. P. McArdle has been appointed assistant auditor for the receivers of the Pittsburgh (Pa.) Railways. Mr. McArdle was formerly chief clerk in the accounting department.

Hugh F. O'Reilly, general foreman of the Broadway division of the New York (N. Y.) Railways, has been promoted to the position of acting assistant superintendent of transportation.

Howard V. Lee has been appointed general attorney for the Louisville (Ky.) Railway. Mr. Lee succeeds Frank T. Straul, who has been granted an indefinite leave of absence.

John M. Mellor, general manager of the Hartford & Springfield Street Railway, Warehouse Point, Conn., has resigned. Mr. Mellor has accepted a position as the New England representative of the Ohio Brass Company.

J. L. Beals of Pittsburgh, Pa., has been appointed superintendent of the Clarksburg division of the Monongahela Valley Traction Company, Fairmont, W. Va., succeeding C. H. Hardesty, who has been appointed general traffic agent of the company.

R. M. McCletchie has been elected comptroller of the Alabama Power Company, Anniston, Ala. Mr. McCletchie will have supervision of all accounting and finances of the company. The office of comptroller is a newly created one.

A. E. Dedrick has been appointed assistant to the comptroller of the Philadelphia Company, Pittsburgh, Pa., which owns the Pittsburgh Railways, the Duquesne Light Company, the Equitable Gas Company and other public utilities in and around Pittsburgh.

J. C. Davidson, formerly with Gibbs & Hill of New York, N. Y., has been appointed engineer of electrical traction of the Norfolk & Western Railway, with offices in Bluefield, W. Va. The electrification work of the Norfolk & Western was done by Gibbs & Hill, and Mr. Davidson while in the employ of that concern spent considerable time in Bluefield.

William J. Boucher has been appointed assistant supervisor of way and structures of the Eighth Avenue Railroad and the Ninth Avenue Railroad, New York, N. Y. Mr. Boucher was formerly connected with the Rapid Transit Subway Construction Company, New York, and more recently with the Philadelphia Subway Construction Company.

Charles E. O'Donnell has been appointed superintendent of the Southbridge division of the Worcester (Mass.) Consolidated Street Railway to succeed William W. Walker, resigned. Mr. O'Donnell was formerly a car starter with the Southbridge division. Before joining the Worcester Consolidated Street Railway several years ago he was in the employ of the Connecticut Company.

Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, is the subject of an article by William S. Dutton in the June issue of *System*. In the article, which is illustrated with a portrait of Mr. Mitten and with other photographs, the author describes the building up of the Philadelphia Rapid Transit System under Mr. Mitten's direction. Mr. Dutton sums up Mr. Mitten's success in the phase that "nothing is too trivial for him to give attention to, just as nothing is too big for him to tackle."

Edward J. Cheney, chief of the division of light and power of the Public Service Commission for the Second District, has resigned to take up consulting engineering practice in New York City. Mr. Cheney will give attention to public utility problems, including rates, appraisals, public relations, design, construction, operation and management. While with the commission he was in charge of all general and technical questions concerning gas, electric and steam utilities and the service rendered by them. He is a graduate of the University of Minnesota.

William W. Walker, who for the past eight years has been superintendent of the Southbridge division of the Worcester (Mass.) Consolidated Street Railway, has been appointed superintendent of the Hartford & Springfield Street Railway with headquarters at Warehouse Point, Conn. Mr. Walker entered railway work in 1894 as a conductor with the Schenectady (N. Y.) Railway. He served with the company later as an inspector and continued in its employ for about ten years. He next was appointed a train dispatcher with the Berkshire Street Railway and a year later was transferred by that company to Westfield as an inspector of construction on the Western Massachusetts Street Railway. When the Western Massachusetts Street Railway was placed in operation Mr. Walker was appointed inspector of transportation. He was next transferred from Westfield to Springfield in the same capacity and was later appointed superintendent of the Blackstone Valley division of the Worcester Consolidated Street Railway. He was made superintendent of the company's Southbridge division in 1912.

Lesley C. Paul, who has been connected with the McGraw-Hill Company, Inc., and its predecessor, the McGraw Publishing Company, Inc., for the last five years, has resigned from the editorial staff of the ELECTRIC RAILWAY JOURNAL to assume the position of technical editor in charge of railway publicity in the publicity department of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Mr. Paul was graduated from the Engineering School of the University of Colorado in 1915, and accepted a position in the field service department of the McGraw Publishing Company, Inc., publishers of the ELECTRIC RAILWAY JOURNAL, immediately following his graduation. He remained in the field service department until October, 1916, during which time he traveled over a large part of the United States in the interests of the company. He then accepted the position of assistant circulation manager of the company in charge of ELECTRIC RAILWAY JOURNAL circulation. He continued in that capacity until November, 1917, when he was appointed to the editorial staff of the paper in New York. In March, 1918, Mr. Paul was appointed editorial representative of the paper in Chicago, where he performed the duties of Western editor until January of the current year, when he returned to the New York office to assume the duties of civil engineering editor in charge of way and structures.

Obituary

George C. Wallace, a former official of the Paducah Traction & Light Company, Paducah, Ky., died at his home in Lexington, Ky., on June 7. Mr. Wallace had been ill for several weeks.

Charles Blizard, third vice-president of the Electric Storage Battery Company, Philadelphia, Pa., died on June 12. Mr. Blizard was born in Wisconsin fifty-six years ago. He became connected with the Electric Storage Battery Company in 1893.

Carl P. Berger, president of the Irvington Varnish & Insulator Company, died on June 15. Mr. Berger was one of the pioneers in the manufacture of insulation. He invented special machinery for varnishing cambric, silks and paper in continuous rolls, greatly reducing cost of manufacture and at the same time perfecting the product.

Whitfield P. Pressinger, vice-president of the Chicago Pneumatic Tool Company, Chicago, Ill., died on June 10 as a result of complications following an operation. Mr. Pressinger was actively engaged in the pneumatic tool and allied machinery industry for many years. He was general manager of the Clayton Air Compressor Company for seven years and became widely known through numerous activities in the American Society of Mechanical Engineers and the Compressed Air Society. He was born in New York City in 1871.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Railway Motor Market Shows Improvement

Shortage of Gears Handicaps Shipments, but Manufacturing Facilities Are Expanding with Demand

From last year's "low point" in the curve of railway motor sales this year's market to date shows a gratifying improvement. The rapid gain in popularity of the safety car affords the manufacturer of motors and control equipment the best present outlet for his products, the ratio being about three to one as compared with two-man car equipment. The number of motors bought during the past two years has not kept pace with the needs of growing populations and manufacturers are laying their plans for new shop facilities which will go a long way toward meeting the expected business of the coming year. The longer purchases are postponed the larger must be the concentration of orders when the equipment becomes imperatively needed, and next winter's orders are being counted upon to exceed those of the winter just passed.

LITTLE DELAY IN MOTOR SHIPMENTS

Deliveries of motors for car service are now on an excellent basis, the only handicap of serious import being the acute shortage of gears. Quotations of from forty-five to sixty days are common, and shipments of motors have been made in even shorter time under pressing circumstances. The factories are suffering from a scarcity of insulating material, and of linen in particular. Textile strikes and railroad workers' strikes have cut into reserve stocks of raw materials, but in comparison with many other electrical products deliveries are better in railway motors than is usually the case with other material.

In some instances where it has been impossible to obtain gears shipments have been held up three or four months. Labor troubles in the Naugatuck Valley are contributing their quota to the general disquiet as regards raw material supply, but the indications are that these will yield to exhaustion before many weeks. In fact, some of the mills in the lower part of the valley recently won a complete victory over the strikers, and this has led to some improvement in shipments. Deliveries of motors for safety car service have been maintained on a better basis than for other types of cars for the reason that one gear ratio is widely used in this class of service, permitting the accumulation of larger stocks of gears than where divers sizes are required.

Factory stocks of motors are not large but the practice of maintaining, as one representative producer does, a stock of about fifty motors constantly at each of the works of the car builders proves very advantageous. This means that in a pinch a fair number of motors can be obtained for emergency service. No trouble is experienced in keeping deliveries of car control equipment well within the motor delivery dates. Motor prices are steady at present. These have advanced about 50 per cent during the past four years, or from $1,200 to $1,800 in a typical case covering two motors for safety car service. Inquiries are coming in well and the outlook for the fall business is promising.

Trolley Wire Ordering About Up to Normal

Mills Can Ship in Good Time, but Demand for Bare Is Turning Some Mill Capacity from Trolley

Manufacturers of trolley wire in general report that railways are not buying heavily at present, but as this is the slack season for orders such a condition is regarded as normal and a stronger wave of buying is looked for soon. Most of the demands on trolley wire are for replacement work, especially in the East. Western railways are in somewhat better financial shape and are able to undertake more new construction work because they have been more favored on rate increases.

Production in this line is about normal, with manufacturers able to fill orders subject to railroad delivery. One company, however, reported it was accepting virtually no new orders because the mills were drawing out trolley wire to small sizes of bare wire and insulating it in order to catch up on the tremendous backflow of orders for insulated wire. This company was therefore rather tardy on shipments of trolley wire, but deliveries generally are quoted fairly regular, at from three to eight weeks.

Raw material shipments are coming through in good shape, with high prices prevailing. The market on trolley wire has been holding steady. Rumors of possible price reductions are current, but manufacturers discount these reports and consider further cuts unlikely, with base copper now at a comparatively low figure, and high prices for labor and raw material the rule.

No cancellations have been noted. Railways are on the whole meeting their bills within the thirty-day limit, although this may be due in part to manufacturers exercising careful supervision of orders.

Production of Malleables Improving

Supply of Molders Is Still Short and Prices Are Tending to Mount Higher

Improvement is reported in the malleable castings field. Present production has been estimated at between 60 and 80 per cent of capacity, where only a few weeks ago reports placed it at around 50 per cent. The chief factor in keeping it down is the labor shortage, particularly in the molding department. Here there are not enough molders to keep the other departments going to capacity.

Turnover in labor is high, and because of that and the independence of the worker, rejections of materials and defective work have been vital factors in the cost of malleable castings. Overhead costs on mill equipment have continued regardless of the capacity under operation. Prices on the finished goods have been tending higher all spring and summer, although malleable pig-iron quotations are the same today as they were the first of March. At the same time the demand is increasing.

A coal shortage is looming up now to put a more unsatisfactory aspect on the situation, while fresh walkouts in certain railroad yards in the East contribute still further to the chances of poorer shipments of malleables. Customers are driven to use such substitutes as steel, forgings, brass and bronze for the malleables, and at present there is little difference in price, with the main item of labor overshadowing the base metal prices.

Sales of Electric Tools on the Increase

Some Factories Below Capacity, but Stocks Can Supply Reasonable Orders for Smaller Sizes

Healthy increases in the volume of sales of electric hand tools are reported from manufacturers of these specialties throughout the country. Railway car builders during the war placed heavy orders for this class of tool, and, because of long shipments and the general let-down in railway equipment building after the armistice, they were well supplied for the work in hand. It is expected, however, that recent plans for renewed activity in the railway field will result in further demands for electric tools. At the same time, this demand probably will be less than might at first be contemplated from reports in circulation concerning the large amount of rolling stock to be purchased.

Sales this year have been heavy, but manufacturers have been able to keep fair stocks at their distributers' warehouses. It is still possible to make up shipments on ¼-in., ⅜-in. and ½-in. sizes from district stocks, but large orders, and orders for other sizes, are requiring three to four weeks to fill. Tool factories are not producing up to full capacity in all cases, one at least being on a 75 per cent capacity and one on zero because of strike conditions at the mill. Raw material and labor shortages are responsible for under-production, it is reported. Motors have been very difficult to obtain in some cases, but with the use of motor trucks a sufficient quantity have been picked up to keep up to production schedule day by day.

Orders Drawn to End Eastern Coal Shortage

Interstate Commerce Commission Gives Preference to Open-Top Cars and Assures New York of Assistance

Within the past few days the coal supply question has loomed up in increasing seriousness, especially in the East. The situation has been considered as of so much importance that public officials and representatives of power and traction companies in New England and New York have gone to Washington to take the matter up directly with the Interstate Commerce Commission.

As a result, the Interstate Commerce Commission has ordered that, effective June 24, coal for New England shall have priority in transportation. This was issued on June 19, and with that order came one providing for the preferential use of open-top cars for coal loading, effective June 21, and to remain in force for thirty consecutive days. In addition a virtual embargo for a time has been placed on foreign exports of coal, so some relief in the domestic market may be looked for in this direction.

The situation in New York City is very acute, but assurance has just been given by the Interstate Commerce Commission that no public utility in that city would have to shut down for lack of coal. Public service corporations, it is stated, have coal enough to run them through the present week as a minimum, while certain of them can go for a week or ten days. Enough coal is expected by the end of the week to relieve the situation. Traction companies have been curtailing their coal consumption to the last pound and have been enabled to survive in that way.

In another week the probability is that sufficient coal will be given the right of way to care for the immediate needs of the Eastern States, and in due course those needs of the other states which may be acute will also be satisfied. Sufficient coal is at the mines, according to reports, but the car equipment is not able to handle it except with preferentials and embargoes.

Electric Sheet Supply Below Demands

Wage Controversy Likely to Affect Adversely Output of Sheets for Third Quarter

Electric sheet mills are following different paths in regard to receipt of orders for shipment beyond June 30. Certain allocations of output for the third quarter have recently been made, but it has been estimated that the quantity available will meet only about half the requirements of the trade. Where the remainder will come from is still to be seen, but it is hardly expected that production will be any better in the next three months than in the past three. At present a new freight tie-up threatens to make matters still worse. There has been some revision of prices, averaging around 15 per cent upward.

The wage agreement for sheet and tin-plate workers expires on June 30. From the deadlock which resulted from the meeting at Atlantic City last week of union sheet and tin mill owners and the Amalgamated Association, it appears that the operatives want no further conferences until the first week in September. Of course the owners may undertake to operate as non-union concerns or to take the other course and close down.

A 20 per cent advance in base rates of scale and a six-hour day have been demanded. If a walkout is declared on July 1, shipments of sheets will be further delayed than they are now. An estimate gives the Amalgamated control of about 40 per cent of the sheet and tin-plate mills, and in this number is a certain capacity in electric sheets. What the mills will do which have not already accepted allotments of their next quarter or half year capacity remains to be seen when there are further results from the agitation of the wage question.

Promotions in Westinghouse Railway Department

In a recent arrangement of the personnel of the railway department of the Westinghouse Electric & Manufacturing Company at East Pittsburgh five promotions have been made, as follows: W. R. Stinemetz is manager of the heavy traction section, with Franklin W. Carter in charge of both foreign and domestic negotiations; E. D. Lynch is manager of the light traction equipment section, with George Skipton in charge of negotiations; J. L. Crouse is manager of the new railway apparatus and supply section, and K. A. Simmon is manager of the safety car and foreign railway equipment section.

W. R. Stinemetz was graduated from Lehigh University in 1893 as electrical engineer. In 1897 he became associated with the Westinghouse company in the engineering school, leaving in 1899 to become electrical assistant to the chief engineer of the Third Avenue Railroad, New York. A few years later he returned to the Westinghouse company, and, in 1905, was sent to Atlanta, Ga., to superintend the installation of one of the early single-phase roads. The next year he studied single-phase railway installations in Italy and France, and in 1912 became associated with the railway sales department.

Franklin W. Carter is a graduate of the Virginia Military Institute and after completing the Westinghouse engineering course he joined the railway sales department. During the war he served as lieutenant in the Rainbow Division abroad.

E. D. Lynch has just completed his tenth year with the Westinghouse company. He was first employed in the service department in Chicago, following his graduation from the Baltimore Polytechnic Institute in 1910. In 1911 he enrolled in the two-year graduate students' course and became a member of the railway and lighting department upon completing it.

George Skipton began his electric railway career in 1906, with the Indianapolis & Cincinnati Traction Company, which was the first single-phase interurban road. After graduating from Purdue University in 1913, he joined the graduate students' course of the Westinghouse company. Upon completing the course he was sent to the Niles Car Company and later to the Salt Lake & Utah Railway, where he had charge of the shops and the maintenance work. Mr. Skipton returned to the Westinghouse company in 1915, first with the railway and lighting department and later in charge of all equipment installation and trouble adjustments of the railway equipment section.

J. L. Crouse became associated with the Westinghouse company in 1893, leaving his position as superintendent of the Wilkinsburg Division of the Duquesne Traction Company. He was first placed in the inspection department and later in the construction department, where he had charge of the electrification of the Brooklyn elevated roads. Later he had charge of field development on single-phase railway developments. In 1913 Mr. Crouse was made superintendent of electric shops, and four years later took up work in the executive department at East Pittsburgh.

K. A. Simmon entered the employ of the Westinghouse company in 1905 after graduating from the University of Minnesota. Railway control has been his special work for many years and he was head of the railway control section. Before his latest promotion Mr. Simmon was in charge of light traction engineering.

Rolling Stock

The City Council of Toronto, Ont., Canada, has authorized R. C. Harris, general manager of the Toronto Civic Railway, to purchase new steel street cars to the extent of $200,000.

Beloit Traction Company, Beloit, Wis., has purchased four of the "200" type single-truck street cars from the Rockford (Ill.) City Traction Company. These will be rebuilt and used as trailers on the Beloit lines. One interurban car has been overhauled and put in service as an extra between Beloit and Waverley Beach.

The United Railways of St. Louis, Mo., has let contract to the St. Louis Car Company to furnish 50 steel trailer cars for street car service. Seating capacity is sixty-four persons and the cars are 45 ft. long. No motors are to be provided. Entrance will be at center of car and on one side only. The amount of the bid was $420,600.

Recent Incorporations

Houston, Bay Shore & Texas City Traction Company, Houston, Tex.—The Houston, Bay Shore & Texas City Traction Company has been incorporated with a capital stock of $300,000. The incorporators are: E. Kennedy, Houston; A. B. Phillips, Texas City; S. D. Simpson, C. E. Truelove, J. B. Koster and W. D. Thornton.

Franchises

Tidewater Southern Railway, Stockton, Cal.—The Tidewater Southern Railway has received a new franchise to change its tracks from Virginia Avenue and W Street to a line along the irrigation lateral to Nellie Street, and thence to Ninth Street to connect with its tracks again.

Los Angeles (Cal.) Railway. — The Los Angeles Railway has secured from the Los Angeles City Council a franchise for the extension of its Western Avenue line from Melrose Avenue to Santa Monica Boulevard. The company was recently given a franchise for the extension of its Temple Street line from Spring to Hoover Street.

Philadelphia (Pa.) Rapid Transit Company.—An ordinance granting the Philadelphia Rapid Transit Company a franchise to build and operate an electric railway extension in Roosevelt Boulevard to the new Sears-Roebuck plant was passed by the City Council on June 22. The company has also received from the Council a franchise to build and operate a line in Erie and Hunting Park Avenues to connect with the Boulevard line.

Track and Roadway

Tri-City Railway of Illinois, Rock Island, Ill.—The Tri-City Railway of Illinois has been ordered by the Moline City Council to begin immediately the construction of a line in Twenty-seventh Street, Moline, from Fifteenth Avenue to Twenty-third Avenue.

Public Service Railway, Newark, N. J.—The State Board of Public Utility Commissioners has authorized the Public Service Railway to remove its tracks from Park Avenue, East Rutherford, between Paterson Avenue and the tracks of the Erie Railroad.

Hamilton (Ont.) Street Railway.—The Hamilton Street Railway plans to construct an extension to its line.

Hydro-Electric Power Commission of Ontario, Ottawa, Ont.—The Hydro-Electric Power Commission of Ontario, which recently took over the lines of the Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., has made arrangements to double-track the line in London Street, Windsor.

Indiana Service Corporation, Fort Wayne, Ind.—The Indiana Service Corporation, successor to the Fort Wayne & Northern Indiana Traction Company, plans to rebuild the tracks on Wells Street, Fort Wayne, and to lay double tracks on this street, on Clinton Street and on West Creighton Avenue.

Detroit (Mich.) United Railway.—The Detroit United Railway has received permission to lay a single-track line in Harper Avenue, Detroit.

Waterloo-Wellington Railway, Waterloo, Ont. — The Waterloo-Wellington Railway has been refused permission to extend its line from Bridgeport to Guelph. The Ontario Legislature has also denied the company the right to issue $40,000 debentures for every mile of single track to be built.

Utah Light & Traction Company, Salt Lake City, Utah.—The Utah Light & Traction Company has petitioned the City Commission for a franchise to lay a track on South Eighth Street parallel to its track on Indiana Avenue. It plans to remove the track from the latter thoroughfare.

Professional Notes

A. J. Bibighaus, consulting engineer, has opened an office at 530 Hamilton Street, Allentown, Pa. He has been connected with several large corporations as an electrical and mechanical engineer, including Thomas A. Edison, Inc., Ingersoll-Rand Company, Phillipsburg, N. J., and the electrical department of the Bethlehem Steel Company.

The California Engineering Company has opened offices at 131 Leidesdorff Street, San Francisco, Cal., for investigating and reporting on problems in civil, electrical, mechanical, hydraulic and marine engineering fields; also the organization, development and management of engineering projects. Paul B. McKee is president of the company and Paul R. Parker is vice-president and chief engineer.

Midstates Engineering Company, Chicago, Ill., has recently incorporated as consultants, specializing in industrial, power and plant engineering. The equipment and commercial division activities will be directed by J. H. Milliken, while the engineering work will be executed by R. J. Gaudy, president, known through his activities with the Sessions Engineering Company.

Trade Notes

The Economy Fuse & Manufacturing Company, Chicago, announces the appointment of F. L. Easton as district sales manager of its Denver (Col.) office, 205 Commonwealth Building, succeeding R. M. Olsen, who resigned recently.

The St. Louis Malleable Casting Company, St. Louis, Mo., is making improvements at a cost in excess of $500,000 which, when completed, will increase its capacity 100 per cent. These are expected to be completed during the summer.

B. G. Prytz has resigned as president of the SKF industries, Inc., New York City. He has been elected managing director of the parent company, with headquarters at Gothenburg, Sweden. F. B. Kirkbride, vice-president since the organization of the company, has been appointed president to succeed Mr. Prytz.

The Hays School of Combustion, 1412-14 South Michigan Avenue, Chicago, has published a book entitled "Opportunities for the Combustion Expert," in which it gives consideration to the subject of preventable waste of fuel and the installation of mechanical apparatus to check the amount of fuel used.

The Service Casting Company has recently been organized at Blanchester, Ohio, and will specialize in making small gray-iron castings for the trade. The foundry has been in operation since Feb. 1, 1920, doing contract work. The personnel consists of R. H. Huyett and Charles N. Secrist, both of wide experience in foundry and machine practice.

Cleveland Twist Drill Company, Cleveland, made some remarkable records in drilling cast iron and steel at the recent Atlantic City convention of the American Railroad Association, mechanical section. The following was done with cast iron: Style of drill, milled high speed; size of drill, 1¼ in.; peripheral speed in feet per minute, up to 235; feed per revolution, 0.100; speed of drilling, 72 in. a minute.

New Advertising Literature

Grates.—George S. Herrick, Syracuse, N. Y., has issued a thirty-two-page booklet on Herrick shaking grates.

Hydraulic Turbines.—The Wellman-Seaver-Morgan Company, Cleveland, Ohio, describes and illustrates some of its hydraulic turbines in bulletin No. 43.

Insulating Materials.—Miniature Catalog 5-A-1, on "Insulating Materials and Supplies," is being distributed by the Westinghouse Electric & Manufacturing Company.

Expansion Joints—The Griscom-Russell Company, 90 West Street, New York City, is circulating bulletin No. 1010, describing its G-R expansion joint for use on low-pressure steam lines.

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